Handbook of Research on

Smart Management for Digital Transformation

Belem Barbosa, Sandra Sarabando Filipe,
and Claudia Amaral Santos

IGI Global
PUBLISHER of TIMELY KNOWLEDGE

Handbook of Research on Smart Management for Digital Transformation

Belem Barbosa
University of Porto, Portugal

Sandra Filipe
University of Aveiro, Portugal

Claudia Amaral Santos
University of Aveiro, Portugal

A volume in the Advances in E-Business Research (AEBR) Book Series

Published in the United States of America by
IGI Global
Business Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Library of Congress Cataloging-in-Publication Data

Names: Barbosa, Belem, 1971- editor. | Filipe, Sandra, 1973- editor. | Santos, Claudia Amaral, 1968- editor.
Title: Handbook of Research on smart management for digital transformation / Belem Barbosa, Sandra Filipe, and Claudia Amaral Santos, editors.
Description: Hershey, PA : Business Science Reference, [2022] | Includes bibliographical references and index. | Summary: “This book analyzes the drivers of digital transformation of businesses by assessing digital transformation success factors in the short, medium and long run, using case studies of digital adoption by companies in different business sectors”-- Provided by publisher.
Identifiers: LCCN 2021044527 (print) | LCCN 2021044528 (ebook) | ISBN 9781799890089 (hardcover) | ISBN 9781799890102 (ebook)
Subjects: LCSH: Information technology--Management. | Organizational change.
Classification: LCC HD30.2 .S6236 2022 (print) | LCC HD30.2 (ebook) | DDC 658.4/038--dc23
LC record available at https://lccn.loc.gov/2021044527
LC ebook record available at https://lccn.loc.gov/2021044528

This book is published in the IGI Global book series Advances in E-Business Research (AEBR) (ISSN: 1935-2700; eISSN: 1935-2719)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Advances in E-Business Research (AEBR) Book Series

In Lee
Western Illinois University, USA

ISSN:1935-2700
EISSN:1935-2719

Mission

Technology has played a vital role in the emergence of e-business and its applications incorporate strategies. These processes have aided in the use of electronic transactions via telecommunications networks for collaborating with business partners, buying and selling of goods and services, and customer service. Research in this field continues to develop into a wide range of topics, including marketing, psychology, information systems, accounting, economics, and computer science.

The **Advances in E-Business Research (AEBR) Book Series** provides multidisciplinary references for researchers and practitioners in this area. Instructors, researchers, and professionals interested in the most up-to-date research on the concepts, issues, applications, and trends in the e-business field will find this collection, or individual books, extremely useful. This collection contains the highest quality academic books that advance understanding of e-business and addresses the challenges faced by researchers and practitioners.

Coverage

- Valuing e-business assets
- E-business strategies
- Interorganizational information systems
- Social Network
- E-Marketing
- Mobile Business Models
- E-procurement methods
- E-Business Management
- Trust, Security, and Privacy
- Electronic Communications

IGI Global is currently accepting manuscripts for publication within this series. To submit a proposal for a volume in this series, please contact our Acquisition Editors at Acquisitions@igi-global.com or visit: http://www.igi-global.com/publish/.

The Advances in E-Business Research (AEBR) Book Series (ISSN 1935-2700) is published by IGI Global, 701 E. Chocolate Avenue, Hershey, PA 17033-1240, USA, www.igi-global.com. This series is composed of titles available for purchase individually; each title is edited to be contextually exclusive from any other title within the series. For pricing and ordering information please visit http://www.igi-global.com/book-series/advances-business-research/37144. Postmaster: Send all address changes to above address.

Titles in this Series

For a list of additional titles in this series, please visit: www.igi-global.com/book-series

Handbook of Research on Digital Transformation, Industry Use Cases, and the Impact of Disruptive Technologies
Martin George Wynn (University of Gloucestersire, UK)
Business Science Reference • © 2022 • 487pp • H/C (ISBN: 9781799877127) • US $325.00

Handbook of Research on Pathways and Opportunities Into the Business of Esports
Sharon Andrews (University of Houston-Clear Lake, USA) and Caroline M. Crawford (University of Houston-Clear Lake, USA)
Business Science Reference • © 2021 • 473pp • H/C (ISBN: 9781799873006) • US $345.00

Complex Systems and Sustainability in the Global Auditing, Consulting, and Credit Rating Agency Industries
Michael I. C. Nwogugu (Independent Researcher, Nigeria)
Business Science Reference • © 2021 • 320pp • H/C (ISBN: 9781799874188) • US $195.00

Handbook of Research on Management and Strategies for Digital Enterprise Transformation
Kamaljeet Sandhu (University of New England, Australia)
Business Science Reference • © 2021 • 443pp • H/C (ISBN: 9781799850151) • US $275.00

Multidisciplinary Approaches to Crowdfunding Platforms
Carla Sofia Vicente Negrão (University of Coimbra, Portugal) and João António Furtado Brito (University of Cape Verde, Cape Verde)
Business Science Reference • © 2021 • 303pp • H/C (ISBN: 9781799832263) • US $205.00

Impact of Globalization and Advanced Technologies on Online Business Models
Ree C. Ho (Taylor's University, Malaysia) Alex Hou Hong Ng (INTI International University, Malaysia) and Mustafa Nourallah (Mid Sweden University, Sweden)
Business Science Reference • © 2021 • 399pp • H/C (ISBN: 9781799876038) • US $225.00

Rural Entrepreneurship and Innovation in the Digital Era
Sachithra Lokuge (RMIT University, Australia) and Darshana Sedera (Southern Cross University, Australia)
Business Science Reference • © 2021 • 337pp • H/C (ISBN: 9781799849421) • US $195.00

Advanced Digital Architectures for Model-Driven Adaptive Enterprises
Vinay Kulkarni (TCS Research, Tata Consultancy Services, India) Sreedhar Reddy (TCS Research, Tata Consultancy Services, India) Tony Clark (Aston University, Birmingham, UK) and Balbir S. Barn (Middlesex University, London, UK)
Business Science Reference • © 2020 • 364pp • H/C (ISBN: 9781799801085) • US $205.00

701 East Chocolate Avenue, Hershey, PA 17033, USA
Tel: 717-533-8845 x100 • Fax: 717-533-8661
E-Mail: cust@igi-global.com • www.igi-global.com

Amo: volo ut sis.
The quintessential definition of love by Saint Augustine.
We dedicate this book to our children Inês, Alice, Gabriel, and André, whom we love, unconditionally.

Editorial Advisory Board

List of Reviewers

List of Contributors

An, Jiyoon / *Broadwell College of Business and Economics, Fayetteville State University, USA* ... 275
Añaña, Edar S. / *Universidade Federal de Pelotas, Brazil* ... 292
Barbosa, Belem / *University of Porto, Portugal* ... 332
Borges da Costa, Sunamita Iris Rodrigues / *Universidade Federal de Pernambuco, Brazil* ... 480
Carneiro, Marta Isabel Coutinho / *University of Porto, Portugal* ... 462
Castillo-Clavero, Ana M. / *University of Malaga, Spain* ... 1
Chawla, Raghu Nandan / *Birla Institute of Technology and Science, Pilani, India* ... 165
Demel, Jaroslav / *Technical University of Liberec, Czech Republic* ... 139
Fan, Mingyue / *School of Management, Jiangsu University, China* ... 308
Federici, Daniela / *University of Cassino and Southern Lazio, Italy* ... 94
Filipe, Sandra / *University of Aveiro, Portugal* ... 332
Gomes, Cristina Maria Norte / *University of Porto, Portugal* ... 462
Goyal, Praveen / *Birla Institute of Technology and Science, Pilani, India* ... 165
Harmawan, Wisnu Agus / *Universitas Sumatera Utara, Indonesia* ... 233
Holienka, Marian / *Faculty of Management, Comenius University in Bratislava, Slovakia* ... 357
Katti, Chaitra / *Sikkim Manipal University, India* ... 332
Lodders, Johannes Willem Eduard / *Hans Lodders Management BV, The Netherlands* ... 480
Marques, Laura Andrade / *University of Porto, Portugal* ... 462
Maršíková, Kateřina / *Technical University of Liberec, Czech Republic* ... 113, 139
Martínez-Leiva, Andrés / *University of Malaga, Spain* ... 1
Matos, Manuel Victor Martins de / *Federal University of Rio de Janeiro, Brazil* ... 439
Mazurchenko, Anastasiia / *Technical University of Liberec, Czech Republic* ... 113
Memis Kocaman, Emel / *Tokat Gaziosmanpasa University, Turkey* ... 256
Mikuš, Juraj / *Faculty of Management, Comenius University in Bratislava, Slovakia* ... 357
Ostic, Dragana / *School of Finance and Economics, Jiangsu University, China* ... 308
Özkent, Yasemin / *Selcuk University, Turkey* ... 77
Parisi, Valentino / *University of Cassino and Southern Lazio, Italy* ... 94
Pilková, Anna / *Faculty of Management, Comenius University in Bratislava, Slovakia* ... 357
Pinheiro, Margarida M. / *University of Aveiro, Portugal* ... 504
Qalati, Sikandar Ali / *School of Finance and Economics, Jiangsu University, China* ... 308
Ribeiro, Hugo / *Aveiro University, Portugal* ... 191
Rosário, Albérico Travassos / *GOVCOPP, IADE, Universidade Europeia, Portugal* ... 27
Rosenbaum, Gitte / *University of Southern Denmark, Denmark* ... 462
Ruco, Alexandre Crespo / *ISCAC, Portugal* ... 53
Rydvalová, Petra / *Technical University of Liberec, Czech Republic* ... 139

Sampat, Michael / *Independent Researcher, Canada* 411
Sánchez-Teba, Eva M. / *University of Malaga, Spain* 1
Santos, Claudia Amaral / *University of Aveiro, Portugal* 332, 504
Saxena, Deepak / *Birla Institute of Technology and Science, Pilani, India* 165
Shabani shojaei, Alireza / *University of Kerala, India* 210
Simmonds, Hamish / *Deloitte, Australia & Research School of Management, Australian National University, Australia* 382
Situmorang, Syafrizal Helmi / *Universitas Sumatera Utara, Indonesia* 233
Türkmen, Büşra Meltem / *Istanbul Medipol University, Turkey* 256
Yu, Muchen / *Independent Researcher, China* 411
Yu, Poshan / *Soochow University, China & Krirk University, Thailand* 411

Table of Contents

Foreword xxii

Preface xxiv

Acknowledgement xxviii

Section 1
Digital Transformation Approaches

Chapter 1
Big Data and Artificial Intelligence in the Touristic Sector: Bibliometrics and Applications 1
Ana M. Castillo-Clavero, University of Malaga, Spain
Eva M. Sánchez-Teba, University of Malaga, Spain
Andrés Martínez-Leiva, University of Malaga, Spain

Chapter 2
The Organizational Impact of Digital Adoption: A Literature Review 27
Albérico Travassos Rosário, GOVCOPP, IADE, Universidade Europeia, Portugal

Chapter 3
Disrupt!Canvas: A Framework for Strategic Platform Business Model Analysis 53
Alexandre Crespo Ruco, ISCAC, Portugal

Chapter 4
Big Data in Digital Media Platforms 77
Yasemin Özkent, Selcuk University, Turkey

Chapter 5
Digital Technologies in Italian Cultural Institutions 94
Daniela Federici, University of Cassino and Southern Lazio, Italy
Valentino Parisi, University of Cassino and Southern Lazio, Italy

Chapter 6
Digital Transformation and Skill Acquisition: Enablers and Barriers for Today's Workforce 113
Kateřina Maršíková, Technical University of Liberec, Czech Republic
Anastasiia Mazurchenko, Technical University of Liberec, Czech Republic

Chapter 7
Human Resources in the Digital Era: Hybrid Work Environment as a "New Normal" 139
Petra Rydvalová, Technical University of Liberec, Czech Republic
Kateřina Maršíková, Technical University of Liberec, Czech Republic
Jaroslav Demel, Technical University of Liberec, Czech Republic

Chapter 8
The Critical Role of the Chief Information Officer in Smart Management of Digital Transformation 165
Raghu Nandan Chawla, Birla Institute of Technology and Science, Pilani, India
Deepak Saxena, Birla Institute of Technology and Science, Pilani, India
Praveen Goyal, Birla Institute of Technology and Science, Pilani, India

Section 2
Digital Transformation Outcomes

Chapter 9
The Impact of Digital Transformation on Business Strategy: A Closer Look on Success Determinants 191
Hugo Ribeiro, Aveiro University, Portugal

Chapter 10
Does Digital Transformation Impact Customer Experience? 210
Alireza Shabani shojaei, University of Kerala, India

Chapter 11
Customer Value, Brand Experience, and User Experience on Customer Satisfaction and Loyalty in Digital Streaming Services 233
Syafrizal Helmi Situmorang, Universitas Sumatera Utara, Indonesia
Wisnu Agus Harmawan, Universitas Sumatera Utara, Indonesia

Chapter 12
The Effects of Use of Restaurant Management Systems Perceived by the Personnel According to Their Demographic Characteristics 256
Emel Memis Kocaman, Tokat Gaziosmanpasa University, Turkey
Büşra Meltem Türkmen, Istanbul Medipol University, Turkey

Chapter 13
Digital Transformation and Reimagined Brand Messages for Travelers in the Pandemic: Empirical Investigation on Twitter Data From Cruise Brands 275
Jiyoon An, Broadwell College of Business and Economics, Fayetteville State University, USA

Chapter 14
The Causes and Their Influencers in the Age of Digital Business: The Instagrammers' Influence in Shaping the Attitudes for and Against the Animal Products 292
Edar S. Añaña, Universidade Federal de Pelotas, Brazil

Chapter 15
Social Media Usage in Small and Medium-Sized Enterprises (SMEs) in Developing Countries..... 308
Sikandar Ali Qalati, School of Finance and Economics, Jiangsu University, China
Dragana Ostic, School of Finance and Economics, Jiangsu University, China
Mingyue Fan, School of Management, Jiangsu University, China

Chapter 16
The Role of Websites in Business Internationalization: A Closer Look at Objectives and Strategies 332
Belem Barbosa, University of Porto, Portugal
Claudia Amaral Santos, University of Aveiro, Portugal
Chaitra Katti, Sikkim Manipal University, India
Sandra Filipe, University of Aveiro, Portugal

Section 3
Digital Transformation Success Strategies: Selected Case Studies

Chapter 17
Drivers of SME Digital Transformation in the Context of Intergenerational Cooperation in Slovakia..... 357
Anna Pilková, Faculty of Management, Comenius University in Bratislava, Slovakia
Marian Holienka, Faculty of Management, Comenius University in Bratislava, Slovakia
Juraj Mikuš, Faculty of Management, Comenius University in Bratislava, Slovakia

Chapter 18
An Ecosystem Governance Lens for Public Sector Digital Transformation: A New Zealand Case Study 382
Hamish Simmonds, Deloitte, Australia & Research School of Management, Australian National University, Australia

Chapter 19
Smart Management for Digital Transformation in China 411
Poshan Yu, Soochow University, China & Krirk University, Thailand
Muchen Yu, Independent Researcher, China
Michael Sampat, Independent Researcher, Canada

Chapter 20
The Role of Digital Transformation in the Oil Industry: The Case of Brazilian Subsea Production Systems 439
Manuel Victor Martins de Matos, Federal University of Rio de Janeiro, Brazil

Chapter 21
Designing a Digital Marketing Strategy for Start-Up Luxury Brands: The Case of Vidda Royalle... 462
Gitte Rosenbaum, University of Southern Denmark, Denmark
Marta Isabel Coutinho Carneiro, University of Porto, Portugal
Cristina Maria Norte Gomes, University of Porto, Portugal
Laura Andrade Marques, University of Porto, Portugal

Chapter 22
Digital Transformation in the Feed Industry Business: The Development of the GMP+ International Academy for Knowledge Exchange on Feed Safety 480
Sunamita Iris Rodrigues Borges da Costa, Universidade Federal de Pernambuco, Brazil
Johannes Willem Eduard Lodders, Hans Lodders Management BV, The Netherlands

Chapter 23
The Future Is Now: Coping With the Digital Paradigm in Higher Education 504
Claudia Amaral Santos, University of Aveiro, Portugal
Margarida M. Pinheiro, University of Aveiro, Portugal

Compilation of References 527

About the Contributors 602

Index 610

Detailed Table of Contents

Foreword xxii

Preface xxiv

Acknowledgement xxviii

Section 1
Digital Transformation Approaches

Chapter 1
Big Data and Artificial Intelligence in the Touristic Sector: Bibliometrics and Applications 1
Ana M. Castillo-Clavero, University of Malaga, Spain
Eva M. Sánchez-Teba, University of Malaga, Spain
Andrés Martínez-Leiva, University of Malaga, Spain

Tourism is a vital sector in the economy of many countries. It is important to bear in mind that this activity is highly oriented towards consumer satisfaction and is also subject to a high degree of uncertainty. This means that there is a great need for information and business intelligence in order to produce long-lasting, sustainable competitive advantages, which can be achieved with smart business management in which big data and artificial intelligence play a key role. In this bibliometric study on the use of these technologies in the tourism industry, the authors analyze the evolution of these concepts within the sector. By analyzing the literature, we can follow the transformation of tourism management, study how these technologies have become progressively more defined and consolidated, and lastly, provide guidelines for future lines of research on this subject.

Chapter 2
The Organizational Impact of Digital Adoption: A Literature Review 27
Albérico Travassos Rosário, GOVCOPP, IADE, Universidade Europeia, Portugal

Diverse forms of digital innovations are at the forefront of transforming organizations, based on new digital technologies. Extant research has examined distinct themes such as gender equality in accessing digital technology, new methods on arts, health and education flexibility, just to mention a few. Nevertheless, existing research has not shown in full all the research streams, how they interplay with each other, and the potential knowledge development. Thus, a literature review on digital adoption on organizations in this post-COVID world is opportune. This chapter aims at identifying research trends in the field through a systematic bibliometric literature review (LRSB) of research on digital adoption. The review involves 55 documents indexed in the Scopus database. It follows that digital adoption results from the organizational ability to adopt and use appropriate technologies based on their business processes and needs.

Chapter 3
Disrupt!Canvas: A Framework for Strategic Platform Business Model Analysis 53
Alexandre Crespo Ruco, ISCAC, Portugal

To analyze a startup or an existing business under the light of this strategy can be useful to produce insights on how these connections can be created between producers and consumers and how a company could develop some of the elements or characteristics of a platform business. Strategic management templates like business model canvas are focused on the business models in a generic way. This chapter proposes a specific approach, an analysis of the business model, oriented by the most successful and impactful business strategy of the digital age, the platform strategy.

Chapter 4
Big Data in Digital Media Platforms 77
Yasemin Özkent, Selcuk University, Turkey

Located in the center of contemporary information and technology society, big data causes evolutionary transformations in many areas. A potential competitive advantage is provided through big data analytics to revolutionize social, cultural, political, and economic relations. Just like other industries, television has also been affected by this digital transformation. The integration of television into technology can be observed in areas such as content production and distribution occurring through big data processing in digital media platforms. The digital transformation process in television was covered through the usage areas of big data in digital platforms and within the scope of current applications in this study. The importance of big data for media industry, which is closely related to technology, was presented through the innovations it provided to the new broadcasting ecosystem. With its theoretical approach, the study is aiming to examine the conceptualization of big data and the improvement and use of big data in digital media platforms.

Chapter 5
Digital Technologies in Italian Cultural Institutions..... 94
Daniela Federici, University of Cassino and Southern Lazio, Italy
Valentino Parisi, University of Cassino and Southern Lazio, Italy

The application of digital technologies plays a crucial role in offering solutions to enhance the economic potential of the cultural sector, through new modalities for distribution and reception of cultural experiences. The question of whether and how ICT adds value to collections, museums, and cultural sites and promotes access and communication with users/visitors is an open one. This chapter aims to provide empirical evidence on the effects of technological innovations in the economic performance of cultural institutions. To this end, the authors use data of Italy's statistical office covering the universe of Italian cultural organizations in the year 2018. The findings suggest that new digital technologies play a role in enhancing the value and relevance of cultural heritage and its influences over the socio-economic context.

Chapter 6
Digital Transformation and Skill Acquisition: Enablers and Barriers for Today's Workforce..... 113
Kateřina Maršíková, Technical University of Liberec, Czech Republic
Anastasiia Mazurchenko, Technical University of Liberec, Czech Republic

The chapter brings a review of literature on primary and secondary data analysing the aspect of digital transformation from the point of view of human resources (HR). It describes the perspective of employees and their digital skills acquisition, as well as the perspective of employers and their readiness for digital

transformation. It also introduces barriers to digital skills acquisition. The primary data used in this chapter is presented on a sample of Czech companies and employees in order to illustrate the current situation in this field. The authors concentrate on answers to the following research questions: What digital competencies were identified as those mainly needed for current employees and how they acquire them? What are the main barriers to closing digital skills gaps at work? How has the Covid-19 pandemic changed the requirements for employees' digital skills? The literature review results are supported by global secondary data analysis on demand for skills at the workplace in European countries.

Chapter 7
Human Resources in the Digital Era: Hybrid Work Environment as a "New Normal" 139
Petra Rydvalová, Technical University of Liberec, Czech Republic
Kateřina Maršíková, Technical University of Liberec, Czech Republic
Jaroslav Demel, Technical University of Liberec, Czech Republic

The chapter focuses on aspects of digital transformation connected with managing human resources (HR). It aims to present trends brought to the working environment using technologies and tools to manage people and their knowledge. Firstly, the authors aim to specify selected areas of HR management influenced by the development of information technologies based on the literature review and a professional opinion. Four areas were selected: a hybrid world of work, robotic/intelligent process automation (RPA/IPA), talents, and knowledge management in the digital era. The research statements were prepared for the round table discussion with experts and a survey using the CAWI method. Practitioners' opinion was compared with theoretical findings and statements. Despite the research limitations, the results bring topical information and complement the professionals' views. Overall, respondents agree that discussed trends in HR bring new opportunities, freedom, and flexibility, but also some challenges. RPA/IPA solutions free people from routine work and give space for creativity.

Chapter 8
The Critical Role of the Chief Information Officer in Smart Management of Digital Transformation 165
Raghu Nandan Chawla, Birla Institute of Technology and Science, Pilani, India
Deepak Saxena, Birla Institute of Technology and Science, Pilani, India
Praveen Goyal, Birla Institute of Technology and Science, Pilani, India

Organisations are increasingly attempting to digitally transform their business models. Effective management of these new-age business models requires specific skills. In this regard, among all the C-suite leaders, the role of the Chief Information Officer (CIO) is the most impacted. The role itself is getting transformed from traditional infrastructure and application management to becoming a strategic business partner. As a result, expectations from the CIOs have increased manifold though many organisations remain dissatisfied with the delivery of digital transformation. Thus, specific to CIO role perspective, both in practice and literature, there exists a gap between what is expected versus what is delivered. To address this gap, through this study in context of digital transformation (DT), the authors deliberate on how the role of the CIO is transforming, outlining novel responsibilities and vital leadership skills that will be perquisite to contribute effectively for the future CIO position.

Section 2
Digital Transformation Outcomes

Chapter 9
The Impact of Digital Transformation on Business Strategy: A Closer Look on Success Determinants 191
Hugo Ribeiro, Aveiro University, Portugal

The purpose of this document is to systematically review and summarize the literature that studies the impact of digital transformation on companies' business strategies, centered on the key capabilities for a successful digital strategy, as well as on the determinants of success. The systematic review of literature was based on a sample of 39 articles extracted from the Web of Science. The results indicate that leadership, innovation, and organizational structure are the key skills most referenced in the literature for the implementation of a digital business strategy. The trans-functional role of IT, as well as the strategic posture of the company, were also identified as determinants of success. This study provides us with a comprehensive analysis of the success factors of digitalization in companies and helps to identify potential research opportunities. The chapter ends with a research agenda for future studies.

Chapter 10
Does Digital Transformation Impact Customer Experience? 210
Alireza Shabani shojaei, University of Kerala, India

Nowadays, customers are expected to digitize their operations, and they start their journey anywhere, anytime, and from any device; they use multiple communication channels to interact with a business. Providing superior customer experience is considered a consumer-based strategy for attracting and retaining customers, and the customer experience plays a crucial role in digital transformation. To move the field forward, the purpose of this chapter is to review the literature on customer experience and develop a set of fundamental premises that identify the linkage between digital transformation and customer experience. The findings of this study provide guidelines for further research and make contributions towards new knowledge of how firms and brands can provide effective customer experiences.

Chapter 11
Customer Value, Brand Experience, and User Experience on Customer Satisfaction and Loyalty in Digital Streaming Services 233
Syafrizal Helmi Situmorang, Universitas Sumatera Utara, Indonesia
Wisnu Agus Harmawan, Universitas Sumatera Utara, Indonesia

The COVID-19 pandemic has limited people's access and mobility, forcing consumers to prefer home video streaming services over going to the cinema. This condition causes a decline in the performance of the cinema film industry but brings blessings to the digital streaming service industry. The growth of the streaming business jumped sharply, and as a result, the competition became increasingly fierce. This chapter analyzes the effect of brand experience, customer value, and user experience on customer satisfaction and loyalty in the millennial generation. Data analysis used Smart PLS-SEM to test the direct, indirect, and total effect of the relationship between variables. The findings of this study indicate that although satisfied with customer service, they are still not loyal. This is due to the ease with which customers switch services, cheap services, and the desire to seek new experiences from the content provided by streaming services.

Chapter 12
The Effects of Use of Restaurant Management Systems Perceived by the Personnel According to Their Demographic Characteristics 256
Emel Memis Kocaman, Tokat Gaziosmanpasa University, Turkey
Büşra Meltem Türkmen, Istanbul Medipol University, Turkey

Restaurant management systems (RMSs) developed to increase business efficiency and service quality in operation and management processes in restaurants were discussed in this study. This research reveals the current impact of RMSs in restaurants processes from the perspectives of staff working in restaurants. The purpose of this study was to assess the restaurant staff's perspective on restaurant management systems (RMS) based on their demographic characteristics. Research data were collected by conducting face-to-face and online surveys to a total of 385 staff working in restaurants in different cities of Turkey. ANOVA test and independent-sample t-test were used in the analysis of research data. A significant difference was found between the education level of the restaurant staff and the components of operation management, sales increase, and production/service standard of the RMSs perspective scale ($p<0.05$). Sector employees with higher general education and/or vocational training have a more positive view of RMSs' contributions to the business.

Chapter 13
Digital Transformation and Reimagined Brand Messages for Travelers in the Pandemic: Empirical Investigation on Twitter Data From Cruise Brands 275
Jiyoon An, Broadwell College of Business and Economics, Fayetteville State University, USA

In the pre-pandemic era, price competition dominates digital brand messages in the tourism industry for "call to action"; however, in the pandemic era, the focus of digital brand messages is to provide aspiration for potential travelers. For example, the cruise industry used to focus on providing information on deals in the communication, but today it appears to maintain attention, interest, and desire for cruise which has not been continued due to pandemic. In the pre-pandemic era, loyalty can be measured by action-level purchase data, but today it can be measured by attitudinal data including reactions to the social media messages. This chapter used text mining methods to examine how various brands adopts different messages strategies with various sentiments and topics. These empirical findings will provide theoretical and managerial implications for digital communication strategies for more reactions and digital brand management for greater loyalty.

Chapter 14
The Causes and Their Influencers in the Age of Digital Business: The Instagrammers' Influence in Shaping the Attitudes for and Against the Animal Products 292
Edar S. Añaña, Universidade Federal de Pelotas, Brazil

This study evaluates the effect of Instrammers' recommendations pro and against the consumption of animal foods, on the attitude towards the animals' welfare, in light of respondents' involvement with the so-called healthy eating. The research uses a sample of 144 respondents, whose data were analyzed by structural equation modeling performed with the Smart-PLS-2.0. The sample was collected through online questionnaires, containing videos of four different influencers in favor and against the consumption of animal foods, to which the respondents were randomly assigned to. The result pointed out that influencer credibility, in this case, is best organized as a second-order construct, which in addition to the three factors suggested by Ohanian also incorporates the influencer's interactivity with the consumer.

The result confirmed that both the involvement with the healthy eating cause, and the Instagrammers' credibility contribute directly or indirectly to the quality of information posted and to the attitude towards animal welfare.

Chapter 15
Social Media Usage in Small and Medium-Sized Enterprises (SMEs) in Developing Countries..... 308
Sikandar Ali Qalati, School of Finance and Economics, Jiangsu University, China
Dragana Ostic, School of Finance and Economics, Jiangsu University, China
Mingyue Fan, School of Management, Jiangsu University, China

Small and medium-sized enterprises (SMEs) can use social media (SM) for communicating information with stakeholders with minimal cost. The ability to access and share information influences the SMEs' performance, but there is little scholarship on the association between the adoptions and usage of SM from a SMEs perspective. In this context, the present chapter discusses the concept, definition, and importance of SM use in SMEs operating in developing countries. In addition, this chapter also insights into the benefits, characteristics, and challenges of SM use in the SME context. Furthermore, this chapter aims to identify the technological, organizational, environmental, and personal factors influencing social media use and its impact on SMEs. This chapter also offers theoretical and practical implications and insights for future scholars.

Chapter 16
The Role of Websites in Business Internationalization: A Closer Look at Objectives and Strategies..... 332
Belem Barbosa, University of Porto, Portugal
Claudia Amaral Santos, University of Aveiro, Portugal
Chaitra Katti, Sikkim Manipal University, India
Sandra Filipe, University of Aveiro, Portugal

This chapter aims to contribute to a better understanding of the role of websites in business internationalization by exploring how website overall objectives and their coherence with website strategies support website internationalization effectiveness. It provides empirical evidence on the experiences of Portuguese companies shared by 20 managers of large companies and SMEs of various activity sectors. Results show the importance of a clear website strategy (e.g., clear objectives and coherent tactics) for an effective role in internationalization. Findings also confirm that, while many managers are skeptic about the effectiveness of websites as an internationalization touchpoint, namely due to sector characteristics (e.g., type of customers, type of products/services), the website is perceived as an essential tool for reaching, attracting, and involving international customers, supporting other communication instruments such as participating in international fairs and sales force.

Section 3
Digital Transformation Success Strategies: Selected Case Studies

Chapter 17
Drivers of SME Digital Transformation in the Context of Intergenerational Cooperation in Slovakia 357
Anna Pilková, Faculty of Management, Comenius University in Bratislava, Slovakia
Marian Holienka, Faculty of Management, Comenius University in Bratislava, Slovakia
Juraj Mikuš, Faculty of Management, Comenius University in Bratislava, Slovakia

Digital transformation is one of the key recent trends in business organizations, entire business sectors, and whole economies, and it reflects the recent economic, social, and technological challenges across societies. One of such challenges is the intergenerational context of (not-only) business enterprises that has become apparently relevant in recent years. In the following chapter, the authors offer a blended perspective on these two phenomena, with a purpose to examine the lived experiences of small business owner-managers from various generational groups with an aim to identify the key drivers, and experiences with digital transformation in Slovakia with the emphasis on the intergenerational cooperation. This chapter starts with introducing the context of the subject under investigation and explaining its background. Then, the empirical research undertaken by the authors is explained, its results are presented and discussed, and conclusions are offered.

Chapter 18
An Ecosystem Governance Lens for Public Sector Digital Transformation: A New Zealand Case Study 382
Hamish Simmonds, Deloitte, Australia & Research School of Management, Australian National University, Australia

The world's public sectors continue to introduce and struggle with digital transformation programs, responding to new demands and requirements to provide and interact with stakeholders. Far from merely digitizing services for efficiency, these changes respond to the sociotechnical reconfiguration of interdependent technology, people, relationships, culture, and organizational structures. This chapter presents a case study of digital transformation in the New Zealand public sector, examining the role of governance mechanisms in enabling this complex sociotechnical reconfiguration. The chapter draws from the increasingly prevalent lens of ecosystems in the strategy, information technology, and marketing literature to frame and investigate ecosystem governance mechanisms as central to the process of digital transformation.

Chapter 19
Smart Management for Digital Transformation in China 411
Poshan Yu, Soochow University, China & Krirk University, Thailand
Muchen Yu, Independent Researcher, China
Michael Sampat, Independent Researcher, Canada

Under the situation of an epidemic, the new industry based on digital technology and the rise of new platforms has injected new vitality into many economic subjects and enterprises, also bringing a series of new challenges such as digital asset security, digital financial risk, and platform monopoly. China is no exception. As one of the world's major economic entities, China has begun to emphasize the

importance of digital economy for real economy or enterprise transformation; through government support and related policies, enterprises' own transformation planning has brought new opportunities for digital economic development. This chapter will focus on China's digital transformation of intelligence. Through data integration and data collection, the author conducts academic research on the characteristics of transformation, policy regulation, case studies, and existing shortcomings and challenges of smart management in China's digital transformation.

Chapter 20
The Role of Digital Transformation in the Oil Industry: The Case of Brazilian Subsea Production Systems 439
Manuel Victor Martins de Matos, Federal University of Rio de Janeiro, Brazil

The Brazilian oil industry is facing a period of significant techno-economic challenges to meet the increase in reserves and production in ultra-deep waters. The subsea production system is an essential technological frontier to ensure the technical and economic viability of oil fields. Thus, the use of digital technologies fits in with these goals and already shows promising results, which stimulate companies in the development of digitalization. For this, the main aim of this chapter is to investigate the role of digital transformation to the subsea productive system of the Brazilian oil industry. By using the analytical and theoretical framework of innovation system, the author explores the relevance, capacity, and strategy developed for the use of digital transformation into subsea production system activities. It was possible to identify the critical features of techno-economic development and conclude that despite the existing capacity, coordination, interactions, and funding are issues to be promoted and improved.

Chapter 21
Designing a Digital Marketing Strategy for Start-Up Luxury Brands: The Case of Vidda Royalle... 462
Gitte Rosenbaum, University of Southern Denmark, Denmark
Marta Isabel Coutinho Carneiro, University of Porto, Portugal
Cristina Maria Norte Gomes, University of Porto, Portugal
Laura Andrade Marques, University of Porto, Portugal

This study investigates how a luxury start-up can use a digitalization strategy to overcome the liabilities of smallness and newness and compete with well-established incumbents. Given that many luxury firms have been relatively slow in adopting digital technologies out of brand-dilution concerns, start-ups can compete if they can successfully manage the "internet dilemma" of marketing high-value brands online, and especially if these competences can be leveraged across geographical markets. This study examines the case of Vidda Royalle, a Portuguese luxury start-up already operating in international markets. Based on case data, the authors find that Vidda Royalle´s digital strategy is based on the brand´s ability to leverage its unique collaboration with renowned artists in the production of its luxury bedlinen. The study presents a series of strategic recommendations based on the RACE framework (reach, act, convert, engage) for further enriching the online customer journey, and enhancing its competitive advantage.

Chapter 22
Digital Transformation in the Feed Industry Business: The Development of the GMP+ International Academy for Knowledge Exchange on Feed Safety 480
Sunamita Iris Rodrigues Borges da Costa, Universidade Federal de Pernambuco, Brazil
Johannes Willem Eduard Lodders, Hans Lodders Management BV, The Netherlands

Access to valuable knowledge about feed safety is crucial for the globalized animal feed business, which is linked to food production and, therefore, human health. However, due to differences between regions and actors in the production chain, the demand for knowledge varies strongly. Digital transformation helps to spread knowledge and to make it accessible throughout the globe, but there are some other conditions to make access to knowledge successful. The case of the development of the worldwide GMP+ Academy on feed safety shows that besides the application of digital tools and channels, a relevant but not competitive subject is essential, as well as the leading role and position of the organization that created the academy. Last but not least, successful knowledge sharing depends on collaboration and a clear value proposition for all stakeholders.

Chapter 23
The Future Is Now: Coping With the Digital Paradigm in Higher Education 504
Claudia Amaral Santos, University of Aveiro, Portugal
Margarida M. Pinheiro, University of Aveiro, Portugal

Digital transformation in higher education (HE) institutions is a process that has been gradually implemented by decision-makers and educators for more than a decade, witnessing an exponential growth over the last two years. The University of Aveiro (UA), in Portugal, has been putting considerable effort in preparing staff, faculty, and students for this disruptive approach to education. This case study aims to share UA's experience in areas related to digital transformation at pedagogical, technical, managerial, and societal levels by providing data on digital capabilities, technological support, and institutional strategies. The research also intends to present findings on the balance between HEI-envisioned digital learning environments and their operationalization. The adoption of a qualitative approach through interviews to seven top decision-makers will provide relevant insights regarding UA's digital transformation model, namely by sharing the perceptions HE representatives have of higher education's future in an ever-growing digital scenario.

Compilation of References 527

About the Contributors 602

Index 610

Foreword

In recent years, technological development has driven the adoption of new technologies by companies. In this changing paradigm where the Internet has become the fundamental axis for innovation and evolution towards a connected digital ecosystem, companies have to face the novel challenge of managing digital transformation successfully. However, despite the wide spread of digitization in the last decade, companies encounter many challenges in terms of its correct and successful management. All relevant trends in this area are covered in this edited volume. For example, the recent evolution and use of some kinds of artificial intelligence (AI) and similar technologies are becoming an added value for companies to obtain competitive advantages. Digitization towards data-centric strategies and the extensive use of tools that work with AI are one of the great technological investments of recent times.

Further, as concerns the management of such challenges, company executives and managers should be able to adopt new work methodologies related to digitization and become fully aware of the risks and user privacy concerns that adoption of digitization can entail. Indeed, there are many important trends and challenges linked to the management of digital transformation in the present-day connected era.

To address these issues, this book provides a valuable overview of the current landscape where companies are facing a new paradigm in which, as a result of the multitude of digital platforms and tools, large databases are collected and analyzed. These extensive datasets about consumers allow companies to better predict demand for products and services and gain competitive advantage. Undoubtedly, the companies that adopt new tools for massive data management strategies can help other companies to make better decisions related to digital transformation processes.

The management of the digital transformation should not exclusively focus on organization, structure, and processes—rather, it should also carefully consider the adoption of new technologies that allow companies to better manage their processes. Managers should also apply innovation and new methodologies that promote flexible strategies. Future challenges linked to the management of digital transformation require appropriate adoption of new technologies, as well as effective prediction of customer behavior and automated processes. Digital transformation and its management should boost the adoption of new technologies that respect users' and customers' privacy, as well as promote innovation as a major driver of business success.

Foreword

Jose Ramon Saura
Rey Juan Carlos University, Spain

Jose Ramon Saura *is Tenured Professor of Digital Marketing in the Business Economics Department at Rey Juan Carlos University, Madrid (Spain). Previously, he held positions and made consultancy at a number of other companies including Google, L'Oréal, Deloitte, Telefónica, or MRM//McCann, among others. He earned an international Ph.D. in Digital Marketing at the Rey Juan Carlos University, while researching at London South Bank University (LSBU) and Harvard University (RCC at Harvard). His research has focused on the theoretical and practical insights of various aspects of User-Generated Data and Content (UGD - UGC), with a specific focus around three major research approaches applied to business and marketing: data mining, knowledge discovery, and information sciences. His research has appeared in leading international business, marketing, and information sciences journals such as: Journal of Innovation and Knowledge, International Journal of Information Management, Technological Forecasting and Social Change, Journal of Business Research, Industrial Marketing Management or Technovation, among others.*

Preface

In a global and digital society, businesses are constantly being challenged by innovative and disruptive management strategies. The dramatic changes that took place in all quadrants of the world during COVID-19 pandemic confirmed that companies need to constantly update their resources and anticipate trends. The new normal demands dedicated approaches to the markets, where technology and the digital channels have been gaining importance. Clearly, success will depend on the swift adaptation to change and to leading-edge practices that ultimately require digital transformation.

Overall, companies are using digital channels to achieve a diversified set of business objectives. Indeed, digitalization offers endless innovation scenarios that companies take advantage of, some with resistance, others leveraged by gains in profitability and market share. Generally, digital media provide significant strategic opportunities, namely to foster business growth. Although opportunities and challenges posed by digital channels are clear, a comprehensive understanding of the determinants for success of digital transformation is essential to guide practitioners, scholars, and students.

Accordingly, the title of this book is self-explanatory: digital transformation needs smart management to succeed. To be smart requires not only to be good at learning, but also to show good judgment. And transformation indicates that something changes completely, usually in a good way. With these two positive concepts in mind, the editors of this publication invited scholars and practitioners to share their views on the new challenging business environments that pervade all sectors of activity, and the solutions to address these challenges, from private to public spheres.

Results could not have been more rewarding. An outstanding number of proposals from various continents was received, providing a clear indication on the appropriate timing to discuss such an important topic, even more so in a world hit by an unexpected health crisis that caused an unimaginable impact in our lives.

There is, in fact, an urgency to manage businesses smartly. There is, no doubt, an urgency in incorporating digital technologies wisely in the economy. These profound changes confirmed that companies and institutions have to update resources and to anticipate trends. What drives companies to adhere to digital environments? Are the approaches adequate? What is missing to keep the pace with these incredible technological possibilities? Are managers ready to face such disruptive challenges? Does their workforce have the necessary skills to progress in a digital scenario? What motivates leaders to embrace the modern digital requirements of running a business? Who are the new mentors? Can generations exchange practices and adapt to present-day ways of communication? How can whole sectors of industry survive to rapid changes? What is the role of social media in these exceptional times? What measures are brands implementing to attract and retain customers? Are governments prepared to meet citizens' digital expectations? What strategies are countries applying to avoid losing digital momentum? These are some of the interrogations addressed by the chapters of this book.

When foundational questions like these arise, change is definitely on the way. Digitalization offers countless innovation windows and strategic opportunities for companies to reinvent and reposition themselves in the market. With a thorough and dedicated analysis of what drives and motivates customers, managers and decision-makers will be in a better position to respond to both internal and external demands.

This book intends to offer academics, business students, researchers, communication and marketing agencies, digital strategists, entrepreneurs, practitioners, and institutional stakeholders, valuable contributions on distinct sectors where digital technologies have changed and will continue to change the business landscape. By addressing topics such as digital concept models, institutional approaches to technology, brand messaging, digital media platforms, human resources skills, or higher education goals for a digital future, this publication can be a critical resource to all interested in applying digital advancements in a smart way.

The book was divided into three main sections in an attempt to mirror the major areas of research on the topic and thus provide valuable insights to readers.

The first section, dedicated to facilitators and barriers to digital transformation, offers eight chapters that capture not only the impact of adopting digital technologies in organizations, the importance of mastering digital resources such as artificial intelligence and big data, and the need to upskill collaborators, but also render perceptions on how relevant sectors react to digital demands. The initial chapter, "Big Data and Artificial Intelligence in the Touristic Sector: Bibliometrics and Applications," shares a conceptual analysis on the evolution of smart technologies in the touristic field, emphasizing that innovative and digital management approaches are pivotal to the success of this industry. The second chapter, entitled "The Organizational Impact of Digital Adoption: A Literature Review," provides a judicious overview on how digital technologies will sustain the transformation of organizations in a post-Covid era. The next contribution, "Disrupt!Canvas: A framework for Strategic Platform Business Model Analysis," proposes an in-depth scanning of a business model fully immersed in a digital environment, emphasizing that strategic and smart management relies on tools that can anticipate market trends. The chapter that follows, "Big Data in Digital Media Platforms," augments the lens and delves into the role of big data analytics and how it has revolutionized the way we interact with each other at several levels—socially, culturally, politically and economically—by exploring how the media industry is adapting to this new digital mindset. The way smart technologies foster the economic potential of the cultural sector is discussed in "Digital Technologies in Italian Cultural Institutions," the fifth chapter of the book, with the authors calling attention to the importance of adapting new digital approaches to cultural experiences and the effects that have been observed in the economic performance of cultural institutions. Covid's impact on the acquisition of skills in a digital world appears in the background of the following chapter, "Digital Transformation and Skill Acquisition: Enablers and Barriers for Today's Workforce," where the authors elaborate on employees' and employers' perceptions on the digital skills gap, a major aspect in today's business world. The topic is further explored in the next chapter, "Human Resources in the Digital Era: Hybrid Work Environment as a 'New Normal'," with an in-depth look into how human resources' routines and tasks are affected by digital technologies and perceived by those involved in the process. The first section ends with an interesting perspective on the transformation that is taking place inside the office. In the chapter "The Critical Role of the Chief Information Officer in Smart Management of Digital Transformation," the authors call attention to new skills and responsibilities generated by digital environments and the adaptation to new-age business models.

The following section, devoted to digital transformation outcomes, presents a second collection of eight chapters with concrete examples of determinants that support a successful implementation of a digital strategy. Chapter 9 of this book, "The Impact of Digital Transformation on Business Strategy: A Closer Look on Success Determinants," shares a literature review on what determines companies to prevail on the road to digitalization. And since companies exist to offer meaningful value propositions, the chapter that follows, "Does Digital Transformation Impact Customer Experience?" accompanies readers in the journey of modern-day customers by identifying fundamental premises that connect experiences to digital tools. The topic and its impact in the millennial generation is explored in the next chapter, "Customer Value, Brand Experience, and User Experience on Customers Satisfaction and Loyalty in Digital Stream Service," with a concrete example taken from the cinema film industry and how it struggles with disruptive competition. Chapter 12 contributes with a second example on how digital tools affect work routines and what variables are most prominent in the adoption of technology by staff. "The Effects of Use of Restaurant Management System Perceived by the Personnel According to their Demographic Characteristics" is thus a focused perspective on a sector that impacts economies all over the world. The following chapter adds relevant insights on the outcomes of digital transformation, in this case in the cruise industry, with an analysis of how brand messages are conveyed. By comparing pre-pandemic and pandemic times, "Digital Transformation and Reimagined Brand Messages for Travelers in Pandemic: Empirical Investigation on Twitter Data from Cruise Brands," shares information on loyalty and attitude parameters in a digital communication environment. Exploratory studies on the relevance of social media continue with the chapter "Influence in Shaping Attitudes for and Against Animal Products in the Age of Digital Business," where the authors evaluate the effect of Instagrammers' recommendations and credibility, with effects on the quality of information and attitudes of followers, a topic that will certainly continue to interest researchers in the near future. The authors of the next contribution discuss the concept, definition, importance, and impact of social media in Small and Medium Enterprises with the chapter "Social Media Usage in Small and Medium-Sized Enterprises (SMEs) in Developing Countries." The relevance of this topic is undeniable. SMEs constitute the backbone that sustain economies, and their adjustment to digital business strategies is crucial, namely the way communication is established with the audience. The last chapter of this section is therefore devoted to a particularly important aspect of this global digital transformation, complementing the macro-observation of Chapter 13. "The Role of Websites in Business Internationalization: A Closer Look on Objectives and Strategies" builds on empirical evidence to share data on the relevance and value of websites to SMEs' positioning in the market, concluding that a digital divide is yet to be overcome.

Lastly, the third section of the book contains contributions from several continents and is dedicated to case-studies on digital transformation and on how managers, companies and institutions embraced the challenge of running businesses smartly. The first chapter, entitled "Drivers of SMEs Digital Transformation in the Context of Intergenerational Cooperation in Slovakia," offers an engaging perspective on the challenges of digital transformation in an intergenerational context by identifying key drivers and experiences in this so important cooperation. The next contribution comes from a very distant geographical location with the chapter "An Ecosystem Governance Lens for Public Sector Digital Transformation: A New Zealand Case Study," with considerations on how the public sector managed to set the pace with digital transformation programs, together with new demands and requirements from stakeholders. Moving to a new continent now, the book continues with interesting perspectives on China and its strategies to implement a digital revolution. "Smart Management for Digital Transformation in China" shows how COVID-19 epidemics impacted society, bringing a series of new challenges and injecting vitality into

many sectors. Brazil represents the next continent in this section. "The Role of Digital Transformation in Oil Industry: The Case of Brazilian Subsea Production System" contributes with insights on how technologies respond to specific demands of the oil industry by exploring the use of digital possibilities and their outcomes. Moving now to Europe, the twenty-first chapter of the book concentrates on how luxury brands' digital positioning influences the company's success. "Designing a Digital Marketing Strategy for Start-Up Luxury Brands: The Case of Vidda Royalle" exemplifies how a luxury start-up can use a digitalization strategy to overcome international markets' barriers, contributing with valuable recommendations to the digital journey of customers. The authors of the next chapter, "Digital Transformation in the Feed Industry Business: The Development of the GMP+ International Academy for Knowledge Exchange on Feed Safety" explores the outcomes of digital transformation in the animal feed business, calling attention to the specificities of each market and how business strategies should accommodate the adoption and the implementation of digital tools to succeed. And, finally, since the three editors of this book are also academics and researchers, and therefore particularly sensitive to the enormous efforts higher education institutions are undertaking in this digital era, the last chapter, entitled "The Future Is Now: Coping With the Digital Paradigm in Higher Education," shares the perceptions of decision-makers in a Portuguese university on the digital transformation that is taking place at various levels—pedagogical, technical, managerial and societal—and reflects on present and future expectations of educational models underpinned by an ubiquitous digital presence.

The editors believe that proper guidance is key to absorb novelty without losing ground. This same premise was clear in all proposals submitted to the call of this publication, an enthusiastic and genuine will to support industry and institutions alike in a digital adventure. Our deepest appreciation to everyone involved in the publication of this book.

Acknowledgement

Creation happens whenever imagination happens. This book is the result of a wholehearted collaboration of three colleagues who believe that observing the same object from different angles is the only path to interpret it. The priceless contribution of all the authors who shared their distinct views on the topic of this book, the effort of all the reviewers, also co-creators with their insightful and constructive comments, and the attentive support of the publishing team, constituted an invaluable pillar to the successful completion of this publication.

Section 1

Digital Transformation Approaches

Chapter 1
Big Data and Artificial Intelligence in the Touristic Sector:
Bibliometrics and Applications

Ana M. Castillo-Clavero
https://orcid.org/0000-0002-7451-8668
University of Malaga, Spain

Eva M. Sánchez-Teba
University of Malaga, Spain

Andrés Martínez-Leiva
University of Malaga, Spain

ABSTRACT

Tourism is a vital sector in the economy of many countries. It is important to bear in mind that this activity is highly oriented towards consumer satisfaction and is also subject to a high degree of uncertainty. This means that there is a great need for information and business intelligence in order to produce long-lasting, sustainable competitive advantages, which can be achieved with smart business management in which big data and artificial intelligence play a key role. In this bibliometric study on the use of these technologies in the tourism industry, the authors analyze the evolution of these concepts within the sector. By analyzing the literature, we can follow the transformation of tourism management, study how these technologies have become progressively more defined and consolidated, and lastly, provide guidelines for future lines of research on this subject.

DOI: 10.4018/978-1-7998-9008-9.ch001

INTRODUCTION

It is common knowledge that uncertainty is an element that all of the economic agents in our society and our markets have in common across all sectors. For this reason, any technology, method or innovation that economic agents can find and use to reduce this uncertainty is highly appreciated.

Information and data, and the intelligence that is extracted from them, have become enormously valuable in the present day. Several years ago, they might not have been significantly valuable due to the small amount of data and information available to companies, or because the use of the technology that was available at that time did not yield conclusions that could lead to decision-making and firm and secure actions, as is the case today.

Big Data technology "allows its users to use and process massive amounts of data obtained from the macro-environment of the different agents to facilitate decision-making and process automation" (Gartner, 2021, p. 1).

Process automation has made Artificial Intelligence (referred to here as AI) possible. AI consists of "the ability of machines to use algorithms, learn from data, and use what they learn in decision-making, just as a human would" (Rouhiainen, 2018, pp. 3-4).

Since tourism is a sector that is highly oriented towards consumer satisfaction, in addition to presenting a high level of uncertainty, there is a great need for information and business intelligence to create competitive advantages that Big Data can satisfy, and we believe that the study of its applications in the tourism sector is well-merited.

This study is organized according to the following sections:

1. Background. Literature review. This section presents an analysis of the contents of the publications we are working with, extracting key information from those best suited to our research.
2. Main focus of the chapter. Materials and bibliometric methods. We analyze the materials and methods used in our bibliometric study in order to better interpret the obtained results. Bibliometric results. We present and interpret the numerical-graphical results on the subject of our study generated by the software and associated tools.
3. Solutions and recommendations. Discussion and conclusions. We cover the most relevant aspects of the results from the previous sections and how the use of Big Data and AI affect economic agents in the tourism sector.

BACKGROUND

Before carrying out the bibliometric analysis of the articles and publications retrieved from the Web of Science database, it is helpful to extract their literary content in order to provide the necessary context for understanding the results.

BIG DATA AND AI IN THE TOURISM SECTOR

The traditional tourism sector can be understood as a sector in which users had a limited range of action and planning. In other words, the sources of information and tools that consumers consulted were based

on the concept of "word-of-mouth," as users consulted acquaintances, brochures and printed journals or went directly to travel agencies, airports and other transportation stations to plan their tourism experiences (Colladon et al., 2019).

This resulted in processes that today would be considered ineffectual and inefficient and that did not allow economic agents such as companies to obtain such vast quantities of data as they currently handle, resulting in tourism offerings that were quite standardized and provided much less added value to users than what we enjoy today (Vecchio et al., 2018).

However, it is true that there are no publications that cover traditional tourism in the period that was studied, since, as mentioned above, the use of information technologies, not to mention the use of Big Data and AI, was very limited for two main reasons: the scarcity of data and technological limitations.

Based on our research, it was specifically starting in 2010 that public institutions in the tourism sector of some Chinese cities began to use disruptive technologies such as Cloud Computing, IoT, mobile internet connectivity, even going so far as to use AI and virtual reality, which were all interdependent to ensure the development and construction of a smart tourism industry (Shao & Zhang, 2012).

With the goal of offering greater value to consumers, the solution that was starting to take shape was the creation of a less standardized tourism offering, or in other words, satisfying the demand for tourism experiences based on the specific and individual needs of each user (Vecchio et al., 2018).

From 2014 onwards, we began to find real applications of technologies such as the aforementioned "Cloud Computing" together with Big Data. Cloud Computing is defined by Furht & Escalante (2010 pp. 3-4), as "a new trend in computing in which a wide variety of resources can be offered through different internet-based services." The proposed formula therefore consisted of creating a centralized platform that could collect sufficient data on the users that formed the demand to create an ideal context to satisfactorily respond to the individual needs of consumers by offering more services that were less standardized (Feng et al., 2014).

The big question that arose at the time was how to collect the necessary information from consumers, taking into account, for obvious reasons, that each destination has different attractions and, consequently, different consumption patterns.

One of the keys to collecting this information is the concept defined by the authors as User-Generated Content.

This term basically refers to reviews and opinions that users share on the internet, on social media and specialized blogs, about tourist destinations and the general experience of their stays there. This content unquestionably held great value for the cities, regions and economic agents in question. The information stored on the internet could help them determine their weaknesses, strengths and possible future opportunities while considering a key element, which had been relatively unexplored up to that point: getting to know their own consumers (Bowen, 2017).

Big Data and AI therefore began to answer the aforementioned question, enabling economic agents from that point on to collect massive amounts of data to feed their systems, giving rise to smarter tourism and cities, i.e. Smart Cities and Smart Tourist Destinations, in addition to Business Intelligence (Marine-Roig & Clave, 2015).

This trend was continuously applied in terms of new uses and expanding new sources of information. By 2016, obtaining data on consumer preferences and needs through networks and blogs specializing in tourism and its destinations proved to be insufficient.

Not only could economic agents obtain information about the users after they consumed the tourism products; they could also gather information on all the potential consumers who searched for those products even before consuming them, using what is known as Electronic Tracking (Albusaidi et al., 2016).

Electronic Tracking is simply the trail that users and consumers leave on the internet in the form of information and data. The data is subsequently processed and used with Big Data and AI technologies by economic agents, such as companies.

Not surprisingly, most tourism companies offer limited products for specific periods of time. In other words, hotels, airlines and monuments have limited space offerings due to their specific characteristics, whether in terms of rooms, seats or capacity limitations.

For this reason, economic agents and companies have a great need for information to diminish uncertainty with knowledge in order to make predictions and facilitate more secure and efficient decision-making that maximizes both business profits and social benefits (Bustamante et al., 2020).

This could be made possible by using said knowledge to appropriately promote various destinations, designing marketing strategies much more adapted to the majority of their potential consumers' needs. This improved understanding of users could in turn make it easier to implement much more personalized and transparent offers, contributing increased added value (Del Vecchio et al., 2018).

An additional added value that can also be beneficial to consumers is the improvement of the customer service experience and the resolution of issues, given the nature of the tourism sector, which is highly related to consumers' total satisfaction with customer service when consuming tourism experiences (Buhalis & Leung, 2018)

To maximize this value while companies and other economic agents improve their operational efficiency, we would like to discuss another trend fed by AI: chatbots or self-programmed chats.

These contain a wealth of information relating to questions or doubts that consumers may have and can usually be found on the digital portals of transportation companies, hotels and even museums and monuments, which substantially improves both sides of the sector, consumers and companies or institutions (Pillai & Sivathanu, 2020).

It is also important to remember that the digital revolution the sector has experienced has completely overtaken the very common instruments that consumers used at their destinations. One clear example of the application of AI to an element that could now be considered "rudimentary" is the use of traditional physical maps, which has been turned into a much more advanced concept that provides greater value to users.

These applications consist of AI and Augmented Reality technologies that guide visitors in destinations they are logically unfamiliar with, calculating the fastest and most efficient routes not only on foot, but also interconnected with public transportation options at the destination (Ma et al., 2018).

Innovation in mobility is closely linked to tourism and has facilitated and improved the experience of many users, not only for tourists and visitors, but also the inhabitants of cities (Bauder, 2020).

However, the reverse is not true, and not all aspects of the digital revolution in the tourism sector have had a positive impact on destinations and their inhabitants. This is due to the fact that the easy, instantaneous availability of information on the internet and our mobile devices creates seasonal trends that can lead to mass tourism. This mass tourism is being studied in many popular destinations such as Venice, Barcelona, Paris, and Rome, where it has a negative impact on the inhabitants, historical centers and emblematic sites.

A new application of Big Data and AI solves this problem by providing metrics, monitoring and predicting of the number of visitors expected at a particular destination in order to facilitate decision-making by public institutions and avoid mass tourism (Zubiaga et al., 2019).

As a result, Tourism 4.0 began to take shape in 2019, with sustainability as one of the most important terms and the axis of this transformation. After analyzing multiple tools and systems that maximize profits of economic agents such as companies, it is therefore helpful to analyze mass tourism as an external reality that has a social cost for the population, creating the need for instruments to prevent or reduce this harm, which, according to del Vecchio et al., 2021, may be based on solutions such as the circular economy or services such as the Ecobnb platform, a search engine for sustainable accommodations.

In other words, the steps to create a smart tourism industry must go hand in hand with the creation of smart cities that first benefit residents in order to generate enough attraction, in addition to the attraction that already exists due the simple fact that they are tourist regions, to convince travelers to visit them, thereby producing benefits and the maximum level of socio-economic development (Mo & Ren, 2021).

MAIN FOCUS OF THE CHAPTER

Applied Materials and Methods

First, and by way of context for this bibliometric analysis, bibliometric science was first defined in 1969 as "the application of statistical and mathematical methods aimed at defining the processes of written communication and the nature and development of scientific disciplines using techniques to tally and analyze that communication" (Pritchard, 1969, pp. 348-349).

Sources and Resources

The following materials and instruments were used:

1. Databases and bibliographic sources. These consist of websites that store a large quantity of literature on a wide variety of subjects. The following will be used:
    a. Web of Science (Core Collection). This is a collection of databases that include bibliographic references, publications and citations since the beginning of the 20th century (Spanish Foundation for Science and Technology, 2021).
2. In our case, and given the nature of this study, which analyzes the use of Big Data and AI, the time span of the search did not need to be limited since the relevant publications began in 2012.
3. We studied a total of 161 publications, discarding 9 articles that were found to be duplicates when combining the three searches for the terms Big Data, AI and Tourism.
4. SciMAT: This software is used to process the data exported directly from the aforementioned databases. Thanks to this software and the Andalusian Interuniversity Institute in Data Science and Computational Intelligence, we were able to carry out a science mapping analysis under a longitudinal framework. In other words, we were able to perform and obtain a large number of metrics that allowed us to analyze the scientific references and citations that relate the tourism sector with the use and application of Big Data and AI technologies.

To do this, we used the software functions to define distinct independent periods in the software, from the start of the publications to the present.

Extraction of References

The following steps were carried out to perform the bibliometric analysis of references and scientific publications that relate the terms Big Data and Artificial Intelligence with the tourism sector:

1. We searched the Web of Science (WOS) database, selecting the WOS Core Collection, which returned multiple results for the combination Tourism and/or Smart Tourism and the terms Big Data and Artificial Intelligence. In our case, the 161 results we studied were the product of the following searches, all of which were run on June 2, 2021:
    a. Smart Tourism as the main theme, together with Big Data in all fields (title, theme, organizations etc.). This yielded a total of 76 results. The query used in this search was TI= ("Smart Tourism" and "Big Data").
    b. Smart Tourism as the main theme, together with Artificial Intelligence in all fields. This generated 24 results. The search query used in this case was TI= ("Smart Tourism" and "Artificial Intelligence").
    c. Tourism as the main theme, together with Big Data and Artificial Intelligence in all fields. This returned 70 results. In this final case, the search query was TI= ("Tourism" And "Big Data" and "Artificial Intelligence").
2. After obtaining the results from the three aforementioned searches, we exported from WOS in .txt format to be able to process the results and eliminate duplicates of authors, words, citations or references due to differences in format or the use of the same words in singular and plural.

SCIMAT BIBLIOMETRIC SOFTWARE AND ITS TOOLS

In order to obtain better results from the analyses explained below, we needed to relate similar keywords to form concept groups. In other words, in our case, Big Data and Big Data Analytics or Intelligent Tourism and Smart Tourism would form two groups of words instead of being four independent keywords, since each pair leads to the same concept. After completely processing our database, we obtained the necessary input or raw material to proceed with our analysis.

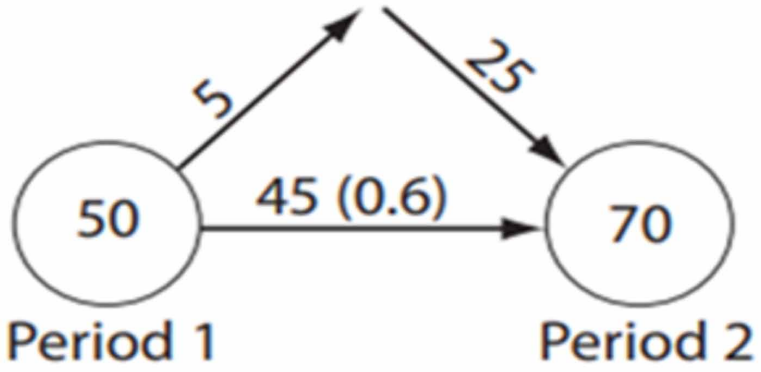
One of the most useful tools that allows the study of the use of keywords across the defined periods is the overlapping map. Figure 1 shows a map with three circles, representing each of the previously defined periods following a logical temporal order.

Their main purpose is to show the evolution of the use of keywords in each of the defined periods; that is, how many keywords are used in each period and where they come from, either from previous periods or new usage. It also shows how many keywords were discarded at each stage and therefore not later used.

Next to the circles, we can make a distinction between horizontal and diagonal arrows. Their different meanings are:

1. Upward: These indicate the number of keywords used in the circle or period from which the arrow starts that are not used in subsequent circles or periods.
2. Downward: In contrast to the upward arrows, these arrows show the number of completely new keywords used in the period or circle at which the arrow is pointing and which therefore were not used in previous periods.
3. Horizontal: This last type of arrow indicates the number of keywords used in previous periods and that are used again in subsequent periods.

Figure 1. Overlapping map of keywords
Source: (Cobo Martín, 2011)



The second instrument for identifying the most common and important themes for the defined periods was longitudinal mapping by theme. Figure 2 shows an example of a longitudinal map. As shown in the figure, we obtained multiple interrelated circles, showing the themes covered the most in each period and how they are related to the themes in later stages. Each period is represented in sequence by a column of circles.

Strategic maps were another of the most useful tools for identifying keywords and themes. These are figures obtained from the analysis with SciMAT with an area divided into four quadrants, as shown in Figure 3.

Each quadrant has a different meaning for the total of the most popular or common themes found among the articles we worked with, but we must first define the concepts of centrality and density that delimit each sub-area.

Density in strategic diagrams is defined as the level of development of a particular theme in the set of publications, or in other words, the level to which this theme has been developed scientifically in a given area of study. The higher the density, the greater the scientific development. Centrality, on the other hand, refers to the importance of the theme within the scientific area, so the greater the centrality, the more significant the themes (Alvarez-Marin et al., 2017).

Figure 2. Example of longitudinal mapping by period
Source: (Cobo et al., 2012)

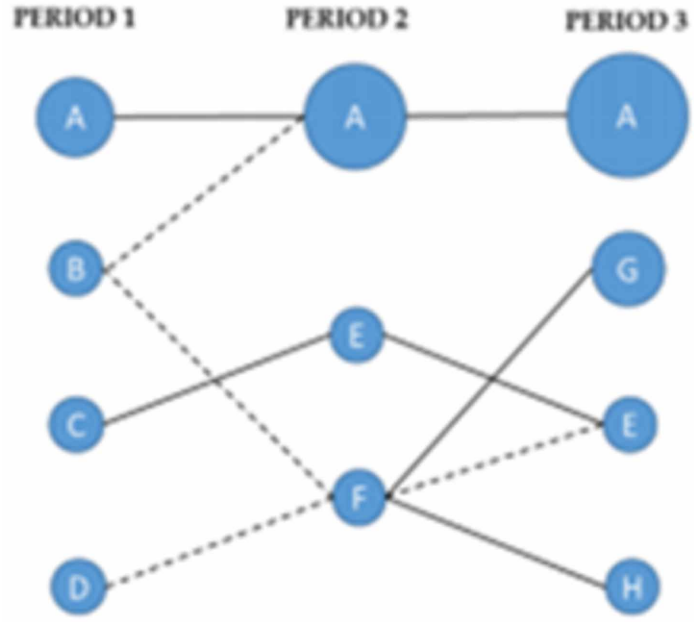


Figure 3. Strategic diagram by quadrants
Source: (Cobo Martín, 2011)
The final tool used was thematic networks. These were used after analyzing the strategic diagram for each period to identify the key themes for each period.

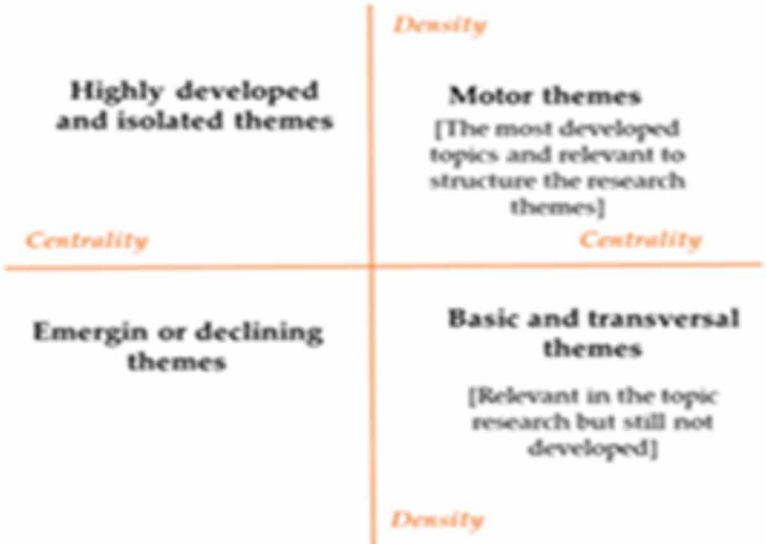


Figure 3 shows the different quadrants based on higher levels of density or centrality. Quadrant one contains the key themes, which are the themes that are of the greatest interest and that can provide the most information because they are very well developed and highly relevant to our area of study, which is to say that they have high levels of density and centrality.

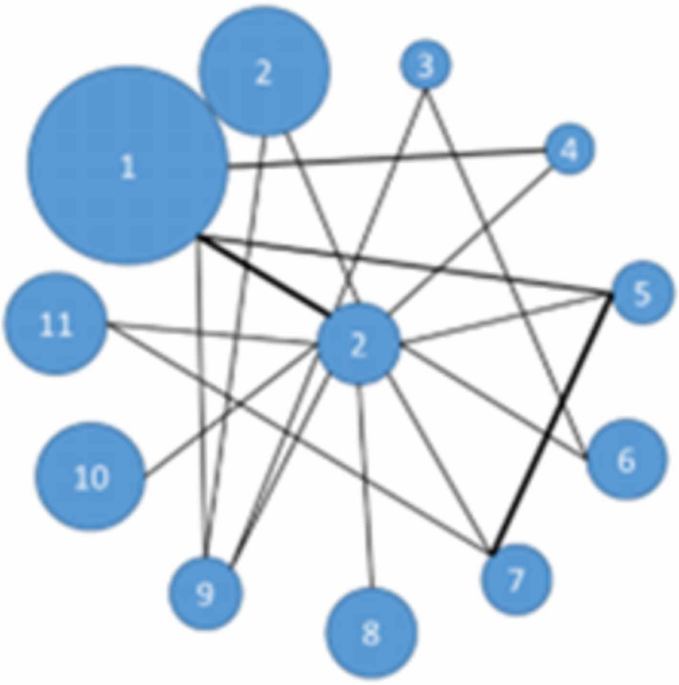
This would be followed by quadrant two, where the peripheral themes are located. These are themes that are very well developed but that do not contribute much value to the scientific area, which means that they are far from our theme of interest and have high density, but low centrality.

Quadrant three indicates emerging or declining themes, so called because they have low levels of centrality and density, which means that they are not yet well developed and do not contribute significantly to the themes being studied.

Lastly, quadrant four contains basic and transversal themes, with low density and therefore minimal development, but that are nevertheless important for the area of study due to their high levels of centrality.

These thematic networks show us what other areas are related for each key theme of each period, represented in Figure 4 by the central circle. This makes this tool very useful for understanding the temporal evolution and the thematic relationships of each area and to observe how they change.

Figure 4. Example of a thematic network
Source: (Cobo et al., 2012)



BIBLIOMETRIC RESULTS

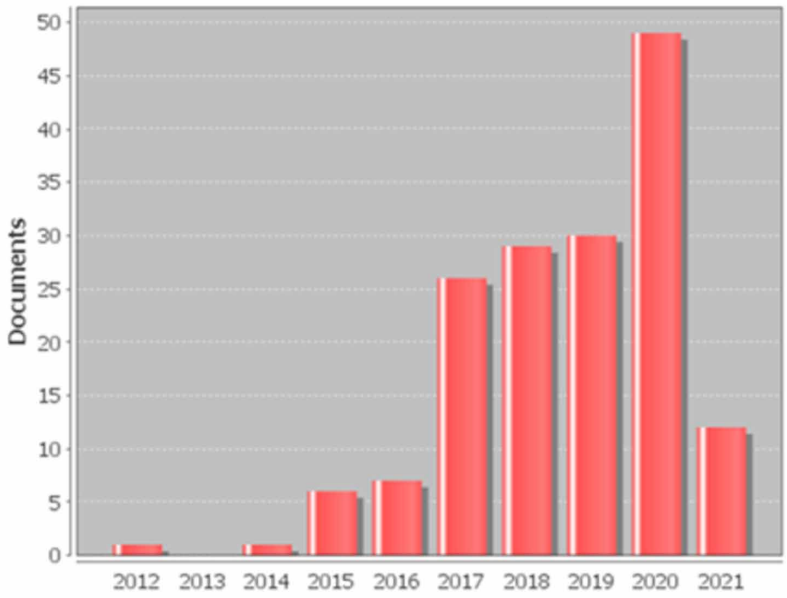
Temporal Analysis of Available Publications

To begin with the analyses, it is helpful to analyze the distribution of the documents retrieved from WOS based on the years when they were published.

Between 2012 and 2017, we retrieved 41 publications, approximately 26% of the total, for a time span of 5 years. However, the number of publications and articles on the theme being studied increased in the later periods. From 2018 to 2019, we retrieved 59 articles, or 36%, and from 2020 to the present, 61 publications, or 38%. In other words, 74% of the total publications were produced from 2018 to the present.

Figure 5 was generated by the software to show the number of publications per year from 2012 to the present. As shown in the figure, few articles were published from 2012 to 2016. The greatest growth was mainly from 2017 onwards, with 2020 as the benchmark year in terms of the number of publications.

Figure 5. Number of documents by year of publication
Source: (Data extracted from SciMAT software)



Analysis of Publications by Authors and Journals

Continuing with the bibliometric analysis of the articles extracted from Web of Science on tourism, Big Data and AI, it is helpful to analyze the origins of the publications. To do this, based on the data generated by SciMAT from a total of 420 authors, Figure 4.2 shows the authors that are the most active in publishing articles.

One of the most published and cited authors is Pasquale Del Vecchio, whose work is of great use to us. He has been publishing since 2017, providing us with literature that spans the theme's evolution over time, and his work is specifically focused on Big Data as the engine that drives the smart tourism sector (Del Vecchio et al., 2019).

In addition to Pasquale Del Vecchio, another very prominent author, especially in terms of the total number of citations, is Zheng Xian, whose publications from 2015 to the present deal with the direct relationship of Big Data and the smart, internet-connected tourism sector (Xian & Fesenmaier, 2016).

Table 1 below shows the most prolific authors based on the number of publications. It also indicates when they started publishing and the date of their latest research, as well as the number of times they have been cited in other papers.

Table 1. Ranking of authors by number of publications and citations, three or more publications

Author	Nº Publications	Year of publication (first and last)	Cited by
Del Vecchio, Pasquale	4	(2017-2019)	102
Zhang, Kun	4	(2019-2020)	33
Wei, Wei	4	(2020)	18
Kim, Kun	3	(2017)	37
Park, Oun-Joung	3	(2017)	37
Yun, Haejung	3	(2017)	37
Yun, Seunghyun	3	(2017)	37
Passiante, Giuseppina	3	(2017-2020)	21
Chen, Junxin	3	(2020)	6
Gajdosik, Tomas	3	(2019)	6
Wang, Wei	3	(2020)	6
Zhao, Lan	3	(2018)	6
Xiang, Zheng	3	(2015-2020)	428

Source: (Data SciMAT Bibliometric Software)

The table above illustrates an interesting point, which is that the most active authors of all the publications collected from the WOS database are mainly concentrated in the later periods we considered, from 2019 to the present.

There is a close relationship between the content authors and the journals that publish them. Table 2 shows that the sources are Big Data and AI-related international conferences and trade fairs, such as: the International Conference on Information Technology and Quantitative Management (ITQM) and the International Conference on Cloud Computing and Big Data Analytics (ISAI). These conferences are very relevant to our study since they are related to the development of Smart Tourism Areas, which are similar to the well-known Smart Tourism Destinations (Lin & Wei, 2020).

Furthermore, some authors use Cloud Computing and Big Data to study how to analyze and predict the number of tourists that would arrive at destinations using Google Trends technology (Feng et al., 2019).

In the field of smart tourism, there are journals and publishers that specialize in research on innovation in the tourism sector. One example is the International Journal of Contemporary Hospitality Management, which includes publications such as the adoption of AI-enriched chat and conversation systems for tourism agent and hoteliers' digital portals (Pillai & Sivathanu, 2020).

In more general terms, the Journal of Hospitality and Tourism Technology includes very comprehensive articles on the Fourth Industrial Revolution in the tourism sector, i.e. Tourism 4.0, (Osei et al., 2020) or literature reviews of the use of AI and Big Data in tourism (Samara et al., 2020).

Table 2. Number of publications per journal

JOURNAL	Nº OF PublicaTIONS	FIRST- LAST PubliCATION
Journal Of Destination Marketing Management	5	(2015-2020)
Sustainability	5	(2017-2020)
ITQM 2017	5	(2017)
International Journal of Contemporary Hospitality Management	4	(2017-2020)
Tourism Management	4	(2019-2021)
ITQM 2019	4	(2019)
Information Processing Management	3	(2018-2020)
Ieee Bigdataservice 2018	3	(2018)
Electronic Markets	3	(2015-2018)
Tourism Review	3	(2019-2020)
ISAI 2020	2	(2020)
Journal Of Hospitality and Tourism Technology	2	(2020)
Applied Sciences-Basel	2	(2018-2020)
Investigaciones Regionales-Journal of Regional Research	2	(2018)
Isprs International Journal of Geo-Information	2	(2017-2020)
Asia Pacific Journal of Tourism Research	2	(2020)
Worldwide Hospitality and Tourism Themes	2	(2017-2018)

Source: Data SciMAT Bibliometric Software. Analysis of journals. Prepared in-house

In regard to the early publication years, several of the most active journals or conferences on the theme in question began to be published starting in the first defined period, including: Electronic Markets journal, which published articles suggesting the implementation of AI-enriched robotics in the European hospitality industry (Blöcher & Alt, 2020).

Another is the Journal of Destination Marketing Management, which has content that explains how a system for identifying images in photographs could be developed online using AI, thereby promoting Geo-Tagged Marketing that could be used in social networks such as Facebook or Instagram (Wang et al., 2020).

Analysis of Key Words and Themes

Overlapping Map. Evolution of Keywords by Periods

After completing the analysis of the temporal distribution of the articles we worked with, we focused on analyzing the keywords used by the authors of these publications, as well as the keywords suggested by the WOS database for each reference.

We used SciMAT for our initial approach to the author's keywords and the database for the previously defined periods, as shown in Figure 6 in the keyword overlapping map.

Figure 6. Temporal overlapping map of keywords
Source: (Bibliometric Software SciMAT)

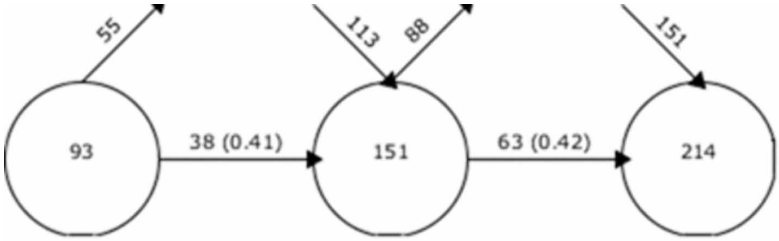


Figure 6 shows that, based on the number of publications previously obtained, we found 93 keywords in use during the 2012-2017 period. Compared to later periods, this once again indicates the growth of our theme starting in the second period.

An analysis of the second period from 2018-2019 shows that the number of keywords used increased by 58.

The horizontal and vertical arrows indicate that more than half of the keywords used in the first period disappeared, with only 38 of them remaining in the second period.

This indicates that 75% of the total number of keywords used in our references from 2018-2019 are completely new terms.

Finally, in the third period defined by the last circle, there is another increase in the number of keywords with a total of 38 new terms, which is a much smaller increase than from the first period to the second.

The keyword density rate for the previous period is around 42%, which once again indicates high keyword turnover. This shows the significant disappearance of keywords from the previous circle and the significant appearance of new terms in the latter circle – in this case the third and final circle.

Longitudinal Map Evolution of Themes by Period

After completing the overlap analysis, it is useful to further explore the most frequently mentioned themes in each of the defined periods.

To do so, we used a longitudinal co-occurrence map, which is represented graphically with a simple circle algorithm. The result is Figure 7, which shows the evolution of themes over time (i.e. how Big Data and AI technologies are related within the scope of the tourism industry, in this case).

Each period is represented by a column of circles. As indicated in Figure 7, the first column represents the 2012-2017 period, the second period is for 2018-2019 and the third and final circle, from 2020 to the present.

The first column shows that most of the articles deal with destination management, internet and Big Data. Although these three themes are expanded in later periods, the relationship between the tourism sector and disruptive technologies was evident from the beginning of the very first period.

As previously mentioned, the number of themes is much greater in the second period, which shows the relationship with a greater number of publications. During this period, we started to see city-related themes, as well as Destination Management, Search, Web Services, and Digital Transformation.

When we analyze the relationships between the first and second periods, we find connections such as that of Big Data and Digital Transformation or Destination Management, indicating an innovative trend in destination management. There is also a relationship with Web Services, which provide Big Data with part of its data as we previously saw in its definition.

The last column shows how terms such as Smart Tourism and AI are beginning to emerge and are related to Destination Management, which is a theme of interest in the first and second periods and which could also be related to the Fourth Industrial Revolution.

We also observe connections between Web Services and Cities, the themes from the second period, and Consumer Behavior and AI, which once again leads us to the idea of building a smarter tourism sector.

In general, we can see some connections indicated by dotted lines, which means that the connected clusters indirectly share some keywords, while clusters connected by solid lines share some keywords directly.

Unlike the dotted lines, the connections indicated by thicker lines show much more stable relationships, such as the connection between the terms Destination Management in the first and second period and Artificial Intelligence in the third period.

The connection between the terms Big Data, Digital Transformation and Performance is also very stable between the first, second and third periods, respectively.

Strategic Diagrams and Thematic Networks by Periods

Next, we analyzed the strategic diagrams for the defined periods, identifying each of the key themes in each diagram and then analyzing their thematic networks to determine the other related fields of knowledge. We used the total number of citations for these key themes as an indicator, so the larger the circle, the more citations for the term in question.

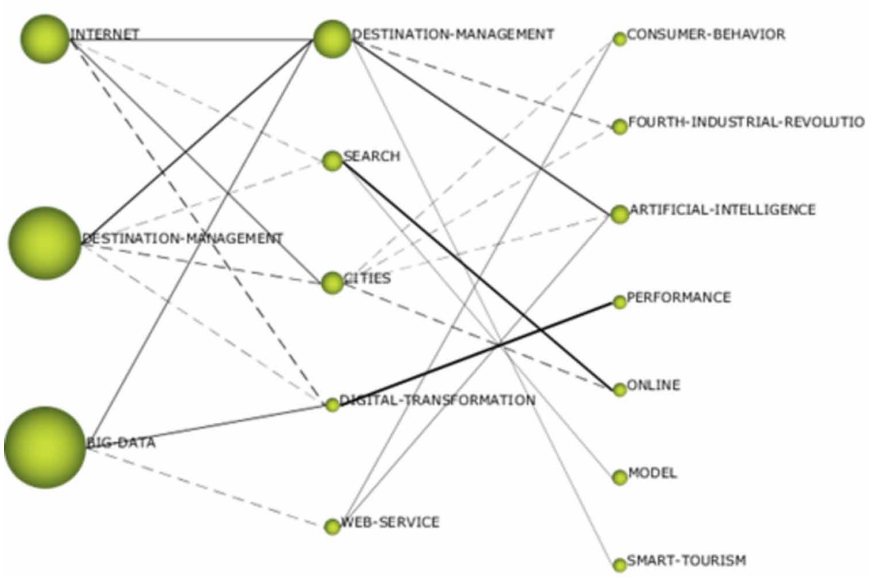
Figure 8. shows that the key themes identified for the 2012-2017 period dealt with cities, foundations and, to a lesser degree, technology, with high levels of centrality and density.

If we look at quadrant two, we see that Text Analytics, Word Segmentation and AI were very well-developed themes but that they did not add much value to the knowledge of the field in question for that period and are therefore considered to be peripheral themes.

Quadrant three contains terms such as Online, which at that time had a low level of development and knowledge value for our subject and was considered to be an emerging theme.

However, in the fourth and final quadrant, we find basic themes such as Tourism, Technology and Challenges, areas of knowledge that are not very well-developed, but that have a high value.

Figure 7. Map of temporal evolution of keywords
Source: (Bibliometric Software SciMAT)



After establishing the key themes, we analyzed their thematic networks. Figure 9 shows how the term Cities is closely related to the concepts of Smart Cities, Internet, Destination Management, Information, and Business Analytics.

In Figure 10, the thematic area Foundations is related to the terms Knowledge, User-Generated Content, Quality, Industry, and Value Creation.

This shows us that the key theme areas, despite their initial focus on cities and establishing foundations, include the presence of Big Data-related technologies to create more value and information.

Figure 10 shows that Foundations can be placed in a context where the aim is to create bases or precepts on which to build or develop a better tourism sector. Thanks to its thematic network, we can see the concepts and terms on which future innovations in the sector will be based.

After completing the analysis of the first period, we studied the second period from 2018 to 2019.

We began by identifying the key themes using the strategic diagram for the corresponding period, as shown in Figure 11.

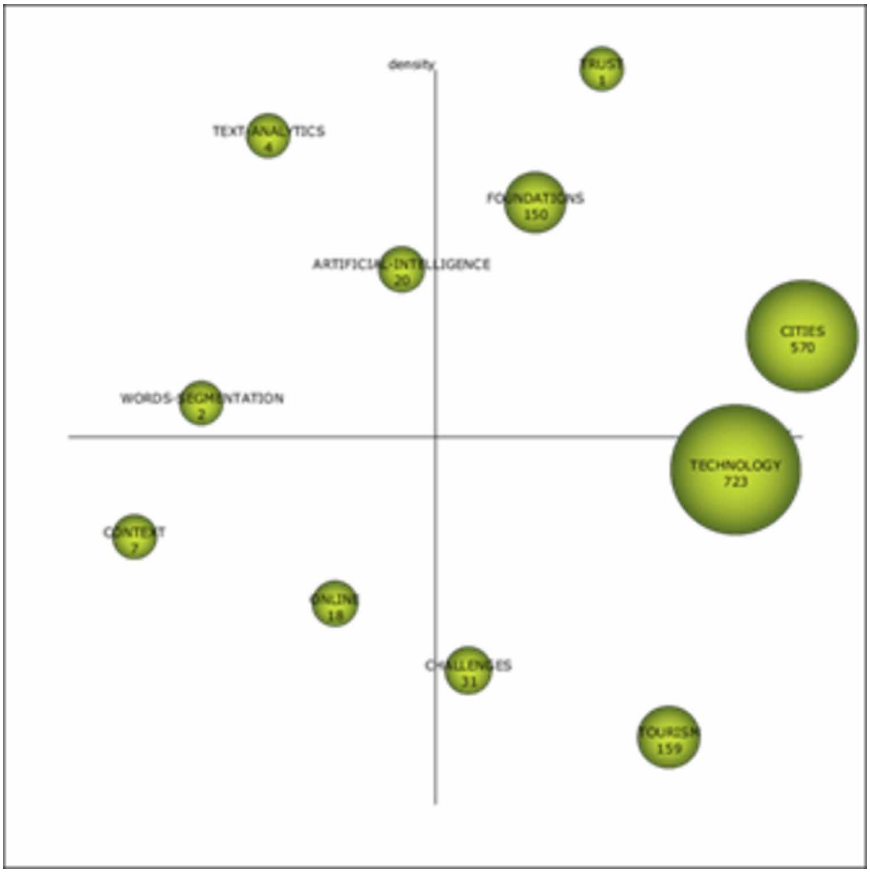
According to the diagram, the main key themes are Destination Management and SEARCH, that is online searches, which we can see in their respective thematic networks.

Quadrant one contains Destination Management, which is a predominant key theme based to the number of times it is cited as well as its high levels of density and centrality, which prove that it is a very well-developed theme that contributes a great deal of knowledge to this field.

In regard to the second key theme, Search, although it is in the first quadrant, its levels of centrality and density are not as high as compared to the first key theme.

Nevertheless, we analyzed its thematic network in order to further study the relationships this term can provide us in regard to tourism and the use of new technologies.

Figure 8. Strategy map for the 2012-2017 period
Source: (Bibliometric Software SciMAT)



As we can see in the second quadrant, the term Web Services plays a peripheral role in the themes in the publications due to its high density and low centrality.

In quadrant three, Digital Transformation is an emerging theme due to its low level of development and value in our thematic area.

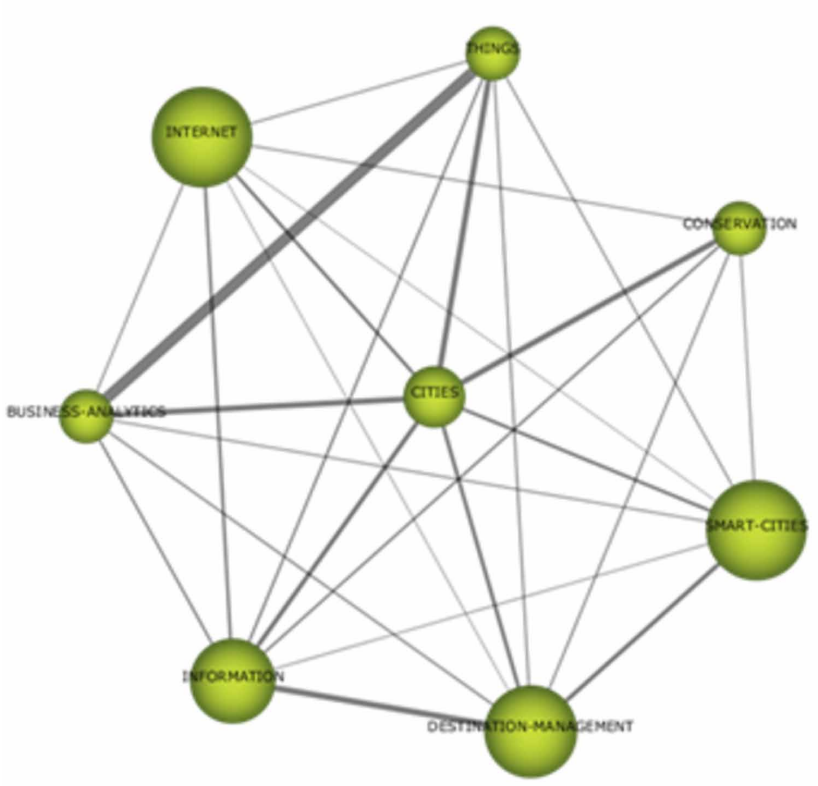
Finally, quadrant four contains the term Cities, which was a key theme in the previous period. In this quadrant, it is only a basic theme that is not very well-developed, although it provides high-value knowledge.

Figure 12 shows the first of the thematic networks for the key theme Destination Management with multiple connections, including some very common and prominent connections such as Tourism, Smart Tourism and Big Data.

Other notable thematic relationships include those with Information, Business Analytics, Internet, and Technology, which are all directly related to the most important themes mentioned above: Smart Tourism and Big Data.

For the second key theme, Figure 13 shows the existing relations for the thematic area searches, and in addition to these connections, the context in which the term has been used.

Figure 9. Thematic network for the term CITIES. 2012-2017 period.
Source: (Bibliometric Software SciMAT)



As we can see in the figure, it is connected to another very important theme: User-Generated Content, which is the material that people create online through blogs, publications on social media or reviews of their experiences.

The theme Search Engine is also connected with International Tourism, Interactivity, Semantic Analysis, and Models, terms that are likewise connected to User-Generated Content and Online area.

We then analyzed the final period, which spans from 2020 to the present. Figure 14 shows the strategic diagram of the most frequently cited themes divided by the respective quadrants of the diagram.

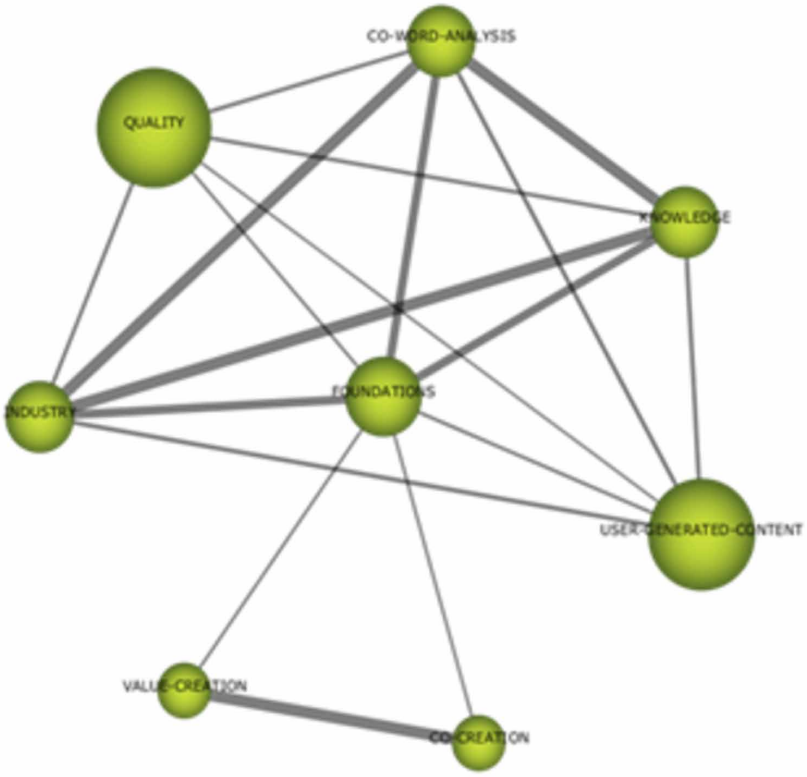
The key knowledge areas in this case include Artificial Intelligence and the study of Consumer Behavior.

Artificial Intelligence has high levels of centrality and density, which, together with the large number of citations, makes it the main key theme and a highly developed theme that provides a significant amount of valuable knowledge.

Although the second key theme in this period, Consumer Behavior, does not have a large number of citations, it does present good levels of density and centrality, which is why we chose to include it in our analysis of the thematic networks for this period.

Quadrant two contains Performance and Fourth Industrial Revolution as peripheral themes that are well developed but that do not contribute much knowledge to this field at the present time.

Figure 10. Thematic network of the term foundations. 2012-2017 period.
Source: (Bibliometric Software SciMAT)



Emerging or declining themes include the term Online, which was previously identified in the thematic networks for earlier periods, but in this case is an underdeveloped area that does not provide knowledge of great value.

Quadrant four contains terms that appeared earlier as basic terms, including Model and Smart Tourism, which were both in the thematic networks for the previous period. In this case, these themes contribute a great deal of value to the main themes, but they are still underdeveloped.

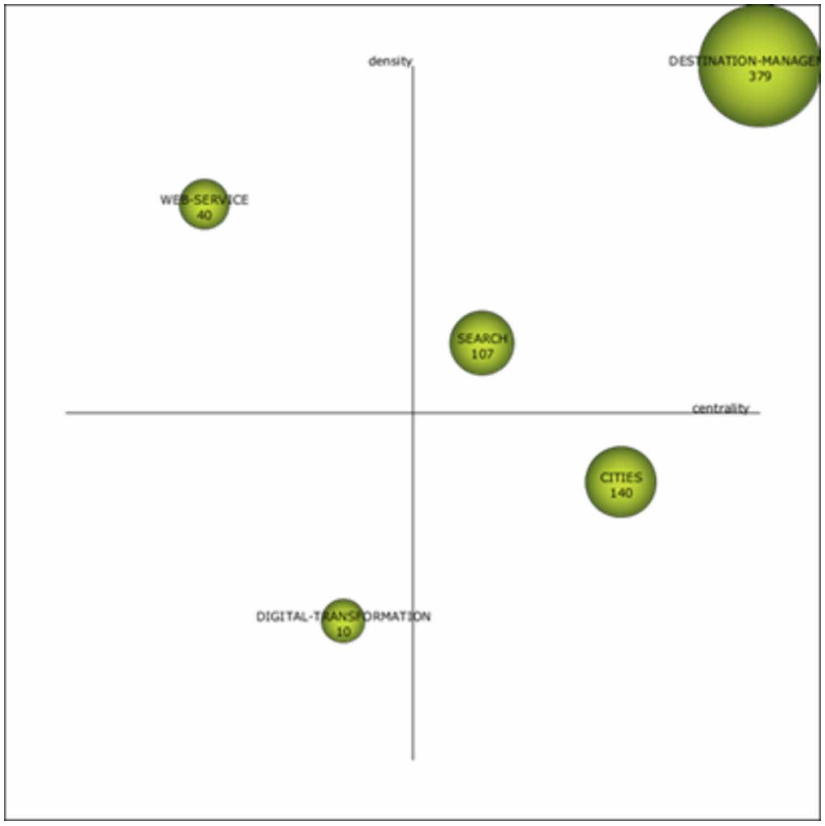
After determining the key themes of the last period, we analyzed their thematic networks in search of connections with these terms.

Figure 15 shows the thematic network of the key theme Consumer Behavior. This is directly connected to terms such as Web Services, which has a thicker line, indicating a very strong relationship, even though it was a peripheral theme in the previous period.

It also has connections with Foundations, or the establishment bases – a key theme in the first period – and with Marketing and Daily Tourist Flows.

An analysis of Figure 16 shows the thematic network for our main key theme, indicating very strong relationships between AI and Big Data, Tourism, Destination Management, and even Smart Cities, for example.

Figure 11. Strategic diagram. 2018-2019 period.
Source: (Bibliometric Software SciMAT)



The importance of these terms in the final period should be noted as they are terms that we were able to identify and position in the thematic network for one of the key themes from the first period: Cities. We currently see these concepts linked to another idea of city – the concept of Smart Cities.

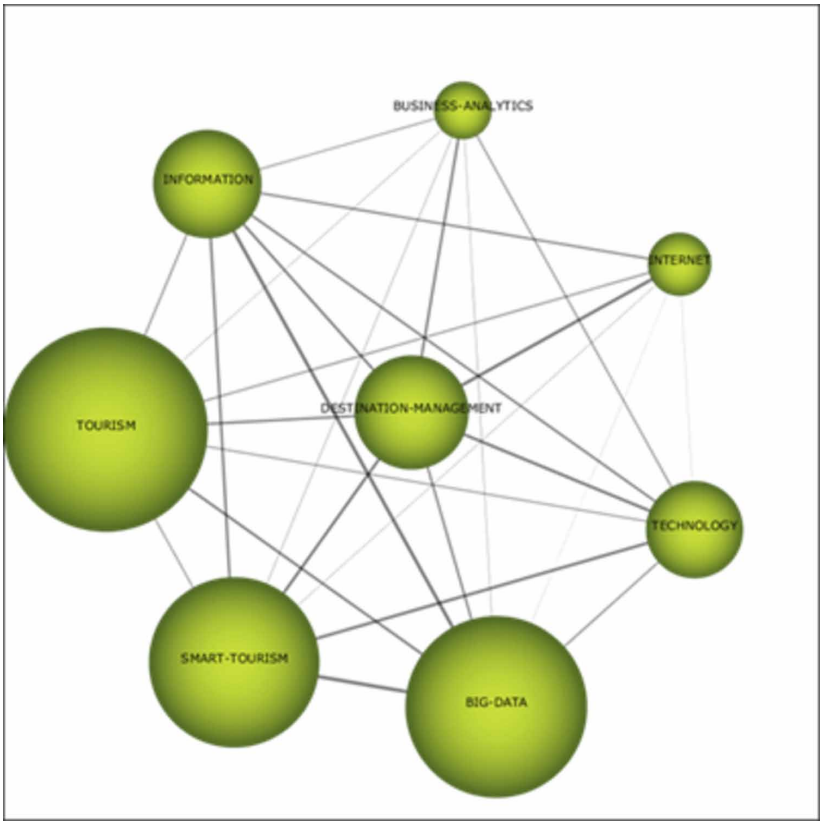
Finally, it important to consider not only the size of the circles but also the thickness of the lines connecting them, which indicates strong existing relationships, such as between the terms Tourism and Big Data or Co-Creation and Visual Content.

SOLUTIONS AND RECOMMENDATIONS

After completing the bibliometric analysis and the resulting literature review, we were able to confirm that there are uses, applications and technologies underlying the relationship between smart tourism, Big Data and AI that have advanced the tourism sector. We also confirmed the temporal evolution of the relationship under study.

In the first period, the tourism sector was not very digitally advanced. The economic agents involved in tourism were still using physical or analog methods to develop and promote their products, which may seem inefficient compared with the endless possibilities available to us today.

Figure 12. Thematic network of the term DESTINATION MANAGEMENT. 2018-2019 period.
Source: (Bibliometric Software SciMAT)



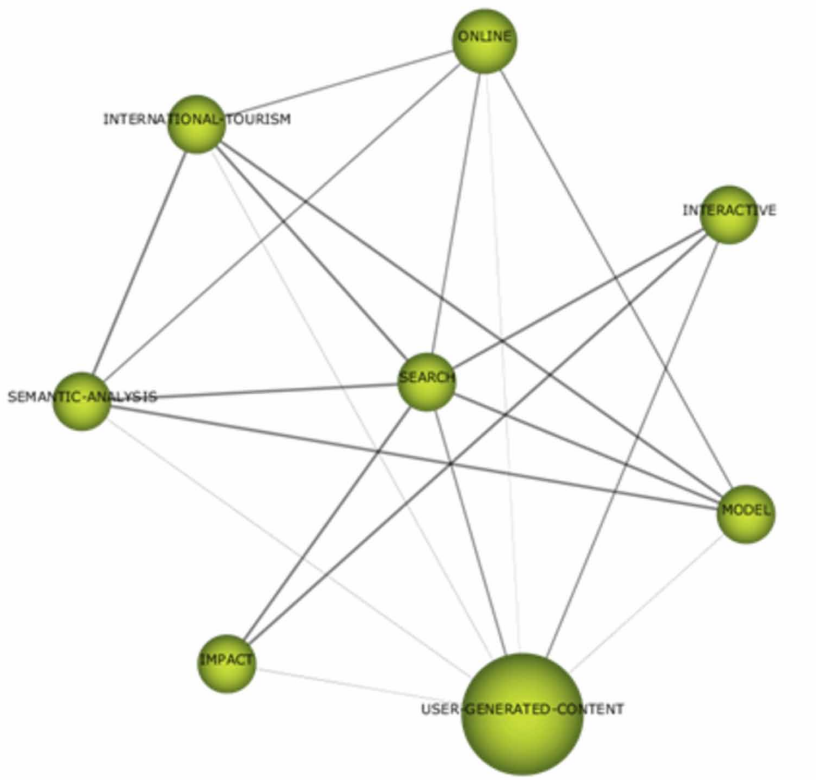
A clear indication of the temporal evolution of this theme can be seen by analyzing the temporal overlap, which shows that a large number of terms were discarded from one period to the next and many previously unused terms were used for the first time in later periods. This indicates changes in trends or uses and applications from one period to another.

In the first period, we found that themes focused mainly on the study of cities and the establishment of foundations which, through their thematic networks, were related to knowledge, smart cities and user-generated content and business analytics. We understand this to mean the establishment of a series of bases or principles for initiating the digital transformation of the industry.

We believe that economic agents have always had a need for information, not only to meet the needs of smart cities, but also to help companies to better understand their customers and make better predictions based on the intelligence obtained with this information, thereby reducing the uncertainty associated with any economic sector.

Although disruptive technologies such as Cloud Computing have started being used in the industry in some regions of the world, the volume of data required to implement more advanced technologies such as Big Data and AI have not made this possible. Nevertheless, in the strategy diagrams, we could see that technology developed until it was able to collect a larger volume of data on users. This also occurred thanks to the increase in individuals' interactions on websites, blogs and social media, which generated massive amounts of data that enriched the systems and models built by Big Data.

Figure 13. Thematic network term SEARCH. 2018-2019 period.
Source: (Bibliometric Software SciMAT)



It therefore seems logical to see how authors began to use terms such as user-generated content, which refers to internet user activity on the internet.

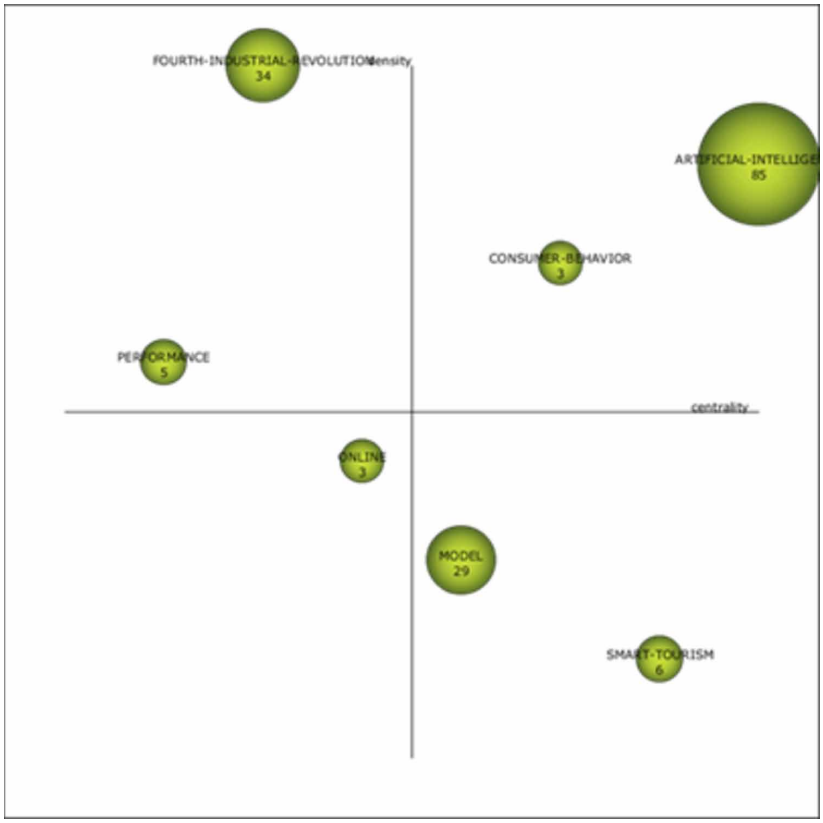
As observed in the second period, thanks to advances in Big Data and AI technology, among others, the information needs of economic agents were much greater and the existing content of already consumed experiences was insufficient, requiring sources to be extended to include the digital footprint users leave behind from their searches – the motor term of our second period.

Searches play a very important role in the use of Big Data since, as shown by the thematic network, they are directly related to user-generated content. The connection takes place through the digital tracks left behind by users' searches – this forms part of user-generated content and would therefore be valuable information for economic agents, helping them predict trends and consumers' behavior before they consume.

The aforementioned economic agents, which have been the subject of studies, are either publicly (institutions, councils, ministries...) or privately (tourism companies) responsible for destination management, another key theme from the second period. As demonstrated by the thematic network, the existing relationships showed that destination management is closely connected to tourism and smart cities.

We also observed how destination management is related to smart cities' requirements in regard to innovative tourism sectors, Big Data, technology, internet, information, and business analytics. We also saw how digital transformation was an emerging theme in the strategic diagram.

Figure 14. Strategic diagram 2020-2021
Source: (Bibliometric Software SciMAT)



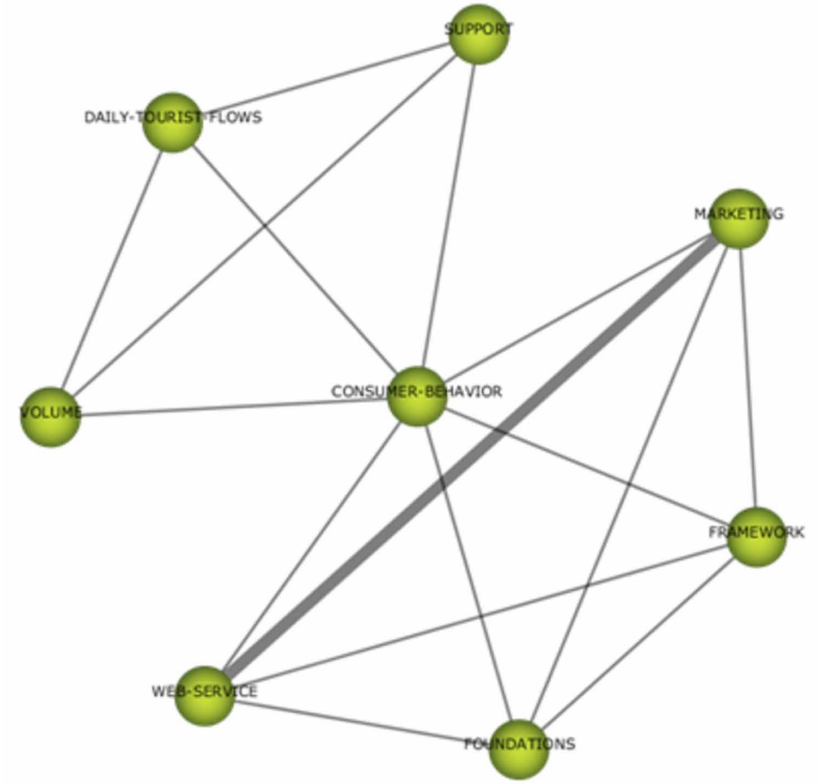
FUTURE RESEARCH DIRECTIONS

In regard to sustainability, one potential line of future research could be the study of how the public sector has been able to promote smarter and more attractive tourism based on the Smart Cities concept, maximizing liveability, sustainability and the economic benefits of tourism.

A common link between Smart Cities and Smart Tourism is smart mobility, which we understand not only as searching for and using new, cleaner energy sources, but also expanding the range of transportation opportunities for tourists and inhabitants alike. This is applied by creating new transportation lines or connections by identifying new consumption needs or patterns.

Finally, we are starting to see AI being used in the tourism sector – evidence we already saw in the temporal map of the three periods using the term "destination management," as well as in the strategic diagram of the third period. Its thematic network showed that it was not only connected to destination management and the Big Data on which it feeds, it was also related to visual content and cellular networks. Many of its applications involve improving the consumer experience, whether by means of chat assistants on websites or starting to use robotics in customer service, and one of its primary and perhaps most developed applications is its implementation in interactive technologies such as Google Maps and other similar technologies.

Figure 15. Thematic network term consumer behavior. 2020-2021 period.
Source: (Bibliometric Software SciMAT)



AI in tourism is another line of research that may yield greater results in the future since, as we have seen, although it is a rather recent concept, it is clearly developing at a swift rate within the tourism sector.

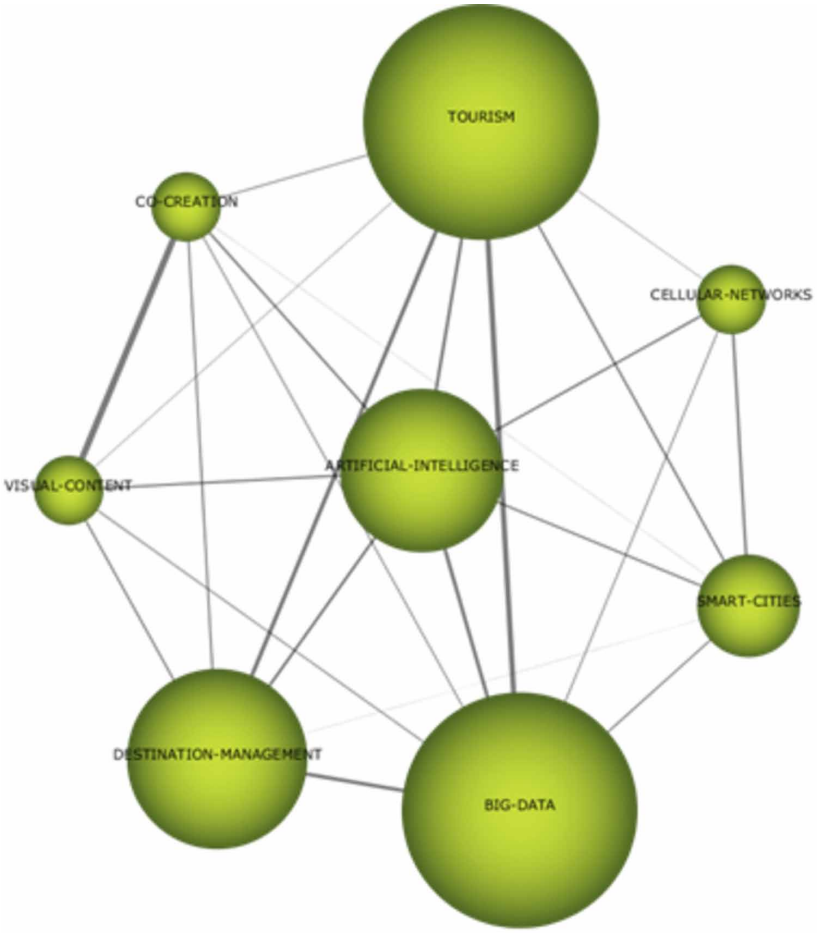
CONCLUSION

Digitalization has undoubtedly enabled economic agents to gain a better understanding of their users and provide them with more personalized offerings and greater added value. Furthermore, thanks to increasing amounts of data, it is now possible to make increasingly accurate predictions and to build business intelligence through data analytics.

It is important to note that these tools can also be used to understand tourists' behavior and ensure the sustainability of the industry. Consumer behavior was one of the key themes observed in the final period that was studied, along with AI. Their respective thematic networks show how they were related to the daily volume and flow of tourists, destination management, Big Data and Smart Cities.

This indicates that not only is there a goal of maximizing profits, there's also a desire to develop an industry that can use data to build smart systems to ensure sustainability through effective destination management.

Figure 16. Thematic network term ARTIFICIAL INTELLIGENCE. 2020-2021 period
Source: (Bibliometric Software SciMAT)



REFERENCES

Albusaidi, H., Udupi, P., & Dattana, V. (2016). Integrated Data Analytic Tourism Dashboard (IDATD). In *5th International Conference on Reliability, Infocom Technologies and Optimization* (pp. 497-500) IEEE.

Alvarez-Marin, A., Castillo-Vergara, M., & Geldes-González, C. (2017). Bibliometric Analysis of Augmented Reality and its Relationship with Business Administration. *Información Tecnológica*, *28*(4), 57–66. doi:10.4067/S0718-07642017000400008

Bauder, M. (2020). Mobility 4.0 in tourism - developments, effects and challenges from a destination perspective. *Zeitschrift für Tourismuswissenschaft*, *12*(1), 38–56. doi:10.1515/tw-2020-0012

Blöcher, K., & Alt, R. (2020). AI and robotics in the European restaurant sector: Assessing potentials for process innovation in a high-contact service industry. *Electronic Markets*, *31*(3), 529–551. doi:10.100712525-020-00443-2

Bowen, J., & Whalen, E. (2017). Trends that are changing travel and tourism. *Worldwide Hospitality and Tourism Themes*, *9*(6), 592–602. doi:10.1108/WHATT-09-2017-0045

Buhalis, D., & Leung, R. (2018). Smart hospitality—Interconnectivity and interoperability towards an ecosystem. *International Journal of Hospitality Management*, *71*, 41–50. doi:10.1016/j.ijhm.2017.11.011

Bustamante, A., Sebastia, L., & Onaindia, E. (2020). BITOUR: A Business Intelligence Platform for Tourism Analysis. *ISPRS International Journal of Geo-Information*, *9*(11), 671. doi:10.3390/ijgi9110671

Cobo, M., Lopez-Herrera, A., Herrera-Viedma, E., & Herrera, F. (2012). SciMAT: A new science mapping analysis software tool. *Journal of the American Society for Information Science and Technology*, *63*(8), 1609–1630. doi:10.1002/asi.22688

Cobo Martín, M. J. (2011). *SciMAT: herramienta software para el análisis de la evolución del conocimiento científico. Propuesta de una metodología de evaluación*. Universidad de Granada.

Colladon, A. F., Guardabascio, B., & Innarella, R. (2019). Using social network and semantic analysis to analyze online travel forums and forecast tourism demand. *Decision Support Systems*, *123*, 113075. doi:10.1016/j.dss.2019.113075

Del Vecchio, P., Ardito, L., Cerchione, R., & Raguseo, E. (2019). Big data in smart tourism: Challenges, issues and opportunities. *Current Issues in Tourism*, *22*(15), 1805–1809. doi:10.1080/13683500.2019.1612860

Del Vecchio, P., Malandugno, C., Passiante, G., & Sakka, G. (2021). Circular economy business model for smart tourism: The case of Ecobnb. *EuroMed Journal of Business*.

Del Vecchio, P., Mele, G., Ndou, V., & Secundo, G. (2018). Creating value from Social Big Data: Implications for Smart Tourism Destinations. *Information Processing & Management*, *54*(5), 847–860. doi:10.1016/j.ipm.2017.10.006

Feng, W., Duan, Y., Huang, M., Dong, L., Zhou, X., & Hu, T. (2014). A research on smart tourism service mechanism based on context awareness. *Applied Mechanics and Materials*, *519*, 752–758. doi:10.4028/www.scientific.net/AMM.519-520.752

Feng, Y., Li, G., Sun, X., & Li, J. (2019). Forecasting the number of inbound tourists with Google Trends. *Procedia Computer Science*, *162*, 628–633. doi:10.1016/j.procs.2019.12.032

Furht, B., & Escalante, A. (2010). *Handbook of Cloud Computing*. Springer. doi:10.1007/978-1-4419-6524-0

Gartner. (2021). *Information Technology Glossary, Big Data*. https://www.gartner.com/en/information-technology/glossary/big-data

Lin, Q., & Wei, W. (2020). Design and Research of Intelligent All-area-advancing Tourism Cloud Platform in the Era of Big Data. *Journal of Physics*, *1575*(1), 12145.

Ma, X., Sun, J., Zhang, G., Ma, M., & Gong, J. (2018). Enhanced Expression and Interaction of Paper Tourism Maps Based on Augmented Reality for Emergency Response. *Proceedings of The 2018 2nd International Conference On Big Data And Internet of Things*, 105-109. 10.1145/3289430.3289442

Marine-Roig, E., & Clave, S. A. (2015). Tourism analytics with massive user-generated content: A case study of Barcelona. *Journal of Destination Marketing & Management*, *4*(3), 162–172. doi:10.1016/j.jdmm.2015.06.004

Mo, J., & Ren, F. (2021). Analysis on the Countermeasures of Optimizing Urban Tourism Public Service System under the Background of Smart City. *Complexity*, *2021*, 1–13. doi:10.1155/2021/6642404

Osei, B. A., Ragavan, N. A., & Mensah, H. K. (2020). Prospects of the fourth industrial revolution for the hospitality industry: A literature review. *Journal of Hospitality and Tourism Technology*, *11*(3), 479–494. doi:10.1108/JHTT-08-2019-0107

Pillai, R., & Sivathanu, B. (2020). Adoption of AI-based chatbots for hospitality and tourism. *International Journal of Contemporary Hospitality Management*, *32*(10), 3199–3226. doi:10.1108/IJCHM-04-2020-0259

Pritchard, A. (1969). Statiscal bibliography or Bibliometrics. *The Journal of Documentation*, *25*(4), 348–349.

Rouhiainen, L. (2018). *Inteligencia Artificial*. Alienta Editorial.

Samara, D., Magnisalis, I., & Peristeras, V. (2020). Artificial intelligence and big data in tourism: A systematic literature review. *Journal of Hospitality and Tourism Technology*, *11*(2), 343–367. doi:10.1108/JHTT-12-2018-0118

Shao, L., & Zhang, Y. (2012). Study on the Key Technology and Application of Smart Tourist Public Service System. *Proceedings Of The 8th Euro-Asia Conference on Environment and Csr: Tourism, Mice, Hospitality Management And Education Session*, 8-15.

Spanish Foundation for Science and Technology. (2021). *Bases De Datos Web Of Science*. https://www.recursoscientificos.fecyt.es/licencias/productos-contratados/wos

Wang, R., Luo, J., & Huang, S. (2020). Developing an artificial intelligence framework for online destination image photos identification. *Journal of Destination Marketing & Management*, *18*, 100512. doi:10.1016/j.jdmm.2020.100512

Xian, Z., & Fesenmaier, D. R. (2016). Big Data Analytics, Tourism Design and Smart Tourism. *Analytics in Smart Tourism Design*, 299-307.

Zubiaga, M., Izkara, J. L., Gandini, A., Alonso, I., & Saralegui, U. (2019). Towards Smarter Management of Overtourism in Historic Centres Through Visitor-Flow Monitoring. *Sustainability*, *11*(24), 7254. doi:10.3390u11247254

Chapter 2
The Organizational Impact of Digital Adoption: A Literature Review

Albérico Travassos Rosário
https://orcid.org/0000-0003-4793-4110
GOVCOPP, IADE, Universidade Europeia, Portugal

ABSTRACT

Diverse forms of digital innovations are at the forefront of transforming organizations, based on new digital technologies. Extant research has examined distinct themes such as gender equality in accessing digital technology, new methods on arts, health and education flexibility, just to mention a few. Nevertheless, existing research has not shown in full all the research streams, how they interplay with each other, and the potential knowledge development. Thus, a literature review on digital adoption on organizations in this post-COVID world is opportune. This chapter aims at identifying research trends in the field through a systematic bibliometric literature review (LRSB) of research on digital adoption. The review involves 55 documents indexed in the Scopus database. It follows that digital adoption results from the organizational ability to adopt and use appropriate technologies based on their business processes and needs.

INTRODUCTION

Competitive pressures in the local and international markets have led to digitizing processes to increase efficiency, quality, performance, and productivity. Lee et al. (2020) define digitalization as adopting and using digital technologies by an organization. Pagani and Pardo (2017) explain that the availability of digital technologies has created access to a wide range of digital systems that determine network interactions with actors such as suppliers and customers. It can be explained that a single author cannot provide an end-to-end solution with adequate partnership management capabilities (Pagani & Pardo, 2017). Therefore, organizational digital adoption strategies aim to improve business relationships by

DOI: 10.4018/978-1-7998-9008-9.ch002

digitizing the supply and demand chains. The improved business relationships influence value co-creation efforts and processes, leading to digital transformations and organizational competitiveness in the modern digital economy.

The impacts of digital adoption range from enhanced connectivity increased access to global markets, equalization, and financial inclusion. Lee et al. (2020) categorize the effects of digital adoption in three dimensions; activity-links-centered digitalization that involves optimizing existing activities, resource-ties-centered digitalization to enable inputs for new activities, and actor-bonds-centered digitalization to establish and maintain networks between multiple stakeholders. The variations in technology adoptions and implications in each organization can be interpreted through the technology acceptance model (TAM) which proposes that individuals and firms adopt digital technology based on the perceived ease of use and usefulness (Kwabena et al., 2021). Identifying the key drivers of digital adoption highlights the intentions to use and the desired and acquired implications. Although current research highlights various themes and trends resulting from increased digital adoption, there is a lack of comprehensive research that interprets the impacts from a broader viewpoint. This research aims to fill this research gap by synthesizing academic research on technology adoption to indicate the interconnection between the implications for knowledge development. Thus, this study aims to understand the organizational impact of digital adoption.

METHODOLOGICAL APPROACH

A Systematic Bibliometric Literature Review (LRSB) was conducted to identify appropriate sources providing information on digital adoption and its impacts on organizations. Literature reviews play a critical role in knowledge development by facilitating information gathering and evaluating existing literature. They allow contextualization of a topic or research problem based on the existing evidence (Rosário, 2021, Raimundo & Rosário, 2021, Rosário et al., 2021, Rosário & Cruz, 2019).

Similarly, bibliometric methods investigate an emerging research field since complete maps of information structure in specified literature streams (Rialti et al., 2019). LRSB adopts a scientific, replicable, and transparent research process that minimizes bias during evidence selection by offering a comprehensive audit trail of methods, judgments, and conclusions throughout the literature search (Linnenluecke et al., 2020). Given the increasing number of published scholarly articles on digital technologies, it has become gradually more difficult for professionals to track new developments due to time requirements and vast amounts of information.

Therefore, this LRSB aims to provide synthesized information from multiple academic sources to provide essential knowledge on digital adoption and its associated trends and implications. The findings can be used for decision-making in businesses and knowledge development in scholarly research and teachings (Table 1).

This study used the SCOPUS indexing database of scientific articles, as we consider it the most important with peer-review in the academic environment.

However, we consider that one of the main limitations of the study is that it is limited to the SCOPUS database only, excluding other databases of academic indicia. However, SCOPUS is the leading index of peer-reviewed academic documents, with nearly 19,500 titles from more than 5,000 international publishers, including coverage of 16,500 journals.

Table 1. Process of systematic literature review

Fase	Step	Description
Exploration	Step 1	definition of the research question
	Step 2	location of studies
	Step 3	selection and evaluation of studies
Interpretation	Step 5	analysis and synthesis
Communication	Step 6	presentation of results

The bibliographic search includes peer-reviewed scientific articles published until June 2021. The keywords for the initial search were 'digital technologies' and 'digitalization' and identified 87 potential sources. Only titles and abstracts were selected for relevance. However, limiting the search to business articles and using the exact keyword 'digital adoption' reduced the number of sources to 55, which were synthesized in this research.

Content and theme analysis techniques were used to identify, analyze and report the various studies as proposed by Rosário (2021), Raimundo & Rosário (2021), Rosário et al. (2021), Rosário & Cruz (2019) (Table 2).

Table 2. Articles search and screening process

Phase	Screening	Publications
Literature Search	keyword: digitization, digital technologies	87
Abstract Screening	keyword: digitization, digital technologies	66
Full-text screening	keyword: digitization, digital technologies, digital adoption Subject area Business, Management and Accounting June 2021	55
Final Selection		

Source: own elaboration

The 55 scientific articles were analyzed in a narrative way to deepen the content and possible derivation of common themes that respond directly to the research question of the article (Rosário, 2021, Raimundo & Rosário, 2021, Rosário et al., 2021, Rosário & Cruz, 2019). 55 documents were selected, 34 are articles; 9 documents in conference paper; 6 under conference review; 3 book chapter; 2 reviews; and lastly, 1 note.

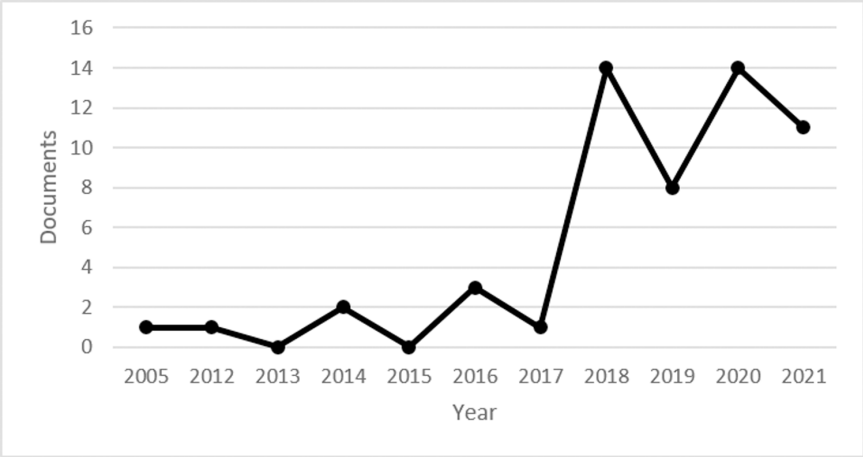
PUBLICATION DISTRIBUTION

The study looked at peer-reviewed studies up to June 2021. The year 2018 and 2020 were the ones with the highest number of peer-reviewed publications on the subject, reaching 14 each.

Figure 1 summarizes the peer-reviewed literature published to June 2021.

The Annals of the Annual Offshore Technology Conference with 7 documents should be highlighted, the remaining publications only had 1 document.

Figure 1. Documents by year
Source: own elaboration



From 2017 onwards, interest in the topic is evident.

In Table 3 we analyze he Scimago Journal & Country Rank (SJR), the best quartile and the H index by publication. Journal Of Development Economics is the most quoted publication with 5,590 (SJR), Q1 and H index 142.

There are a total of 21 journals in Q1, 10 journals in Q2, 6 journals in Q3 and finally 3 journals in Q4. Journals from best quartile Q1 represent 41% of the 51 journals titles; best quartile Q2 represents 20%, best quartile Q3 represents 12%, and best Q4 represents 6% each of the titles of 51 journals.

Finally, 11 of the publications representing 22%, the data are not available

As evident from Table 3, the significant majority of articles of the organizational impact of digital adoption rank on the Q1 best quartile index.

The thematic areas covered by the 55 documents were: Social Sciences (20); Computer Science (15); Engineering (14); Business, Management and Accounting (11); Economics, Econometrics and Finance (8); Energy (8); Arts and Humanities (5); Medicine (5); Environmental Science (2); Mathematics (2); and with 1 (Biochemistry, Genetics and Molecular Biology; Chemical Engineering; Decision Sciences; Earth and Planetary Sciences; Materials Science; Nursing; Physics and Astronomy).

The most quoted article was "Future-proofing pathology: The case for clinical adoption of digital pathology" from Williams et al. (2017) with 44 quotes published in the Journal of Clinical Pathology 1.100 (SJR), the best quartile (Q1) and with H index (127). The published article focuses on the study clarifies the "strategic context of digital pathology adoption, defines the different use cases a healthcare provider may wish to consider as part of a digital adoption and summarises existing reasons for digital adoption and its potential benefits".

In Figure 2 we can analyze the evolution of citations of articles published between ≤2010 and 2021. The number of quotes shows a positive net growth with an R2 of 2,99% for the period ≤2010-2021, with 2020 reaching 176 citations.

The h-index was used to verify the productivity and impact of the published document, based on the largest number of documents included that had at least the same number of citations. Of the documents considered for the h-index, 8 have been cited at least 8 times.

Table 3. Scimago journal & country rank impact factor

Title	SJR	Best Quartile	H index
Journal Of Development Economics	3,590	Q1	142
Proceedings Of The IEEE	2,380	Q1	287
European Economic Review	1,910	Q1	128
International Studies Quarterly	1,900	Q1	100
Party Politics	1,900	Q1	73
Journal Of Innovation And Knowledge	1,720	Q1	20
Journal Of Rural Studies	1,500	Q1	104
Canadian Journal Of Cardiology	1,400	Q1	90
Educational Technology Research And Development	1,350	Q1	90
International Marketing Review	1,200	Q1	89
Journal Of Public Policy And Marketing	1,160	Q1	74
Convergence	1,160	Q1	39
Journal Of Clinical Pathology	1,100	Q1	127
Telecommunications Policy	0,840	Q1	69
Journal Of Applied Gerontology	0,860	Q1	50
Internet Policy Review	0,800	Q1	12
IEEE Transactions On Engineering Management	0,700	Q1	92
Jahrbucher Fur Nationalokonomie Und Statistik	0,690	Q1	21
Economic Analysis And Policy	0,630	Q1	29
Journal Of Economic Studies	0,560	Q1	43
Cultural Studies Critical Methodologies	0,510	Q1	33
Journal Of Consumer Marketing	0,650	Q2	98
Journal Of Interactive Media In Education	0,570	Q2	6
Anatolia	0,450	Q2	29
Economics	0,370	Q2	17
Voluntary Sector Review	0,370	Q2	8
Asia Pacific Journal Of Business Administration	0,330	Q2	17
Applied Sciences Switzerland	0,290	Q2	18
Library Philosophy And Practice	0,230	Q2	20
Universal Access In The Information Society	0,490	Q2	42
Voluntary Sector Review	0,370	Q2	8
Journal Of Creative Communications	0,270	Q3	11
Lecture Notes In Computer Science Including Subseries	0,250	Q3	400
Academy Of Strategic Management Journal	0,240	Q3	17
Quality Access To Success	0,210	Q3	21
Icic Express Letters	0,190	Q3	20
Arab Media And Society	0,120	Q3	2

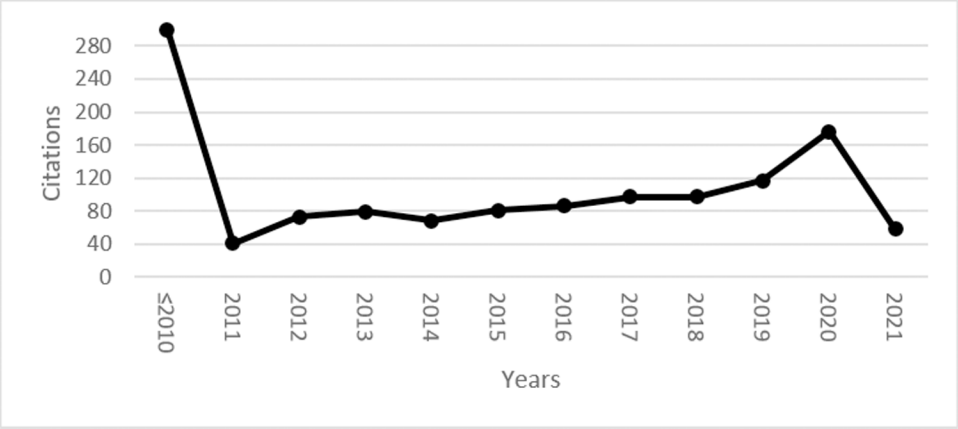
continues on following page

Table 3. Continued

Title	SJR	Best Quartile	H index
Communications In Computer And Information Science	0,160	Q4	51
Onkologe	0,140	Q4	14
Annals Of The Romanian Society For Cell Biology	0,100	Q4	7
Procedia Computer Science	0,330	-*	76
Proceedings Of The Annual Offshore Technology Conference	0,220	-*	33
Proceedings 2020 IEEE International Conference On Engineering Technology And Innovation ICE Itmc 2020	0,220	-*	8
International Journal Of Advanced Science And Technology	-*	-*	15
Progress In International Business Research	-*	-*	9
Csedu 2018 Proceedings Of The 10th International Conference On Computer Supported Education	-*	-*	-*
Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	-*	-*	-*
Proceedings Of The 30th International Bcs Human Computer Interaction Conference Hci 2016	-*	-*	-*
Proceedings Of The 32nd International Business Information Management Association Conference Ibima 2018 Vision 2020 Sustainable Economic Development And Application Of Innovation Management From Regional Expansion To Global Growth	-*	-*	-*
Routledge Handbook Of Museums Media And Communication	-*	-*	-*
Springerbriefs In Open And Distance Education	-*	-*	-*

Note: *data not available.
Source: own elaboration

Figure 2. Evolution of citations between ≤2010 and 2021
Source: own elaboration



Citations of all scientific articles from the period ≤2010 to 2021, with a total of 189 citations, from 55 publications 29 not cited. Document self-citation during the period ≤2010 to 2021, 31 documents were self-cited 28 times, the article Digital Pathology: Border with Intensive Use of Data in Medical Images by Pan et al. (2012) published in Proceedings of the IEEE has been cited 7 times.

A bibliographical analysis was used to study and identify the main indicators of evolution and its scientific dynamics from the key words used in the LRSB (Figure 3).

The bibliometric results were analyzed using the scientific software VOSviewe, which aims to identify the main research keywords "digitization", "digital technologies", "digital adoption". The research was based on articles studied on the organizational impact of digital adoption.

The keywords used can be analyzed in Figure 4, making it possible to highlight the network of keywords that appear together / linked in each document, allowing to know the themes investigated by the studies and to identify trends for future research. In Figure 5, a profusion of co-citation with a unit of analysis of the cited references is presented.

Figure 3. Network of all keywords

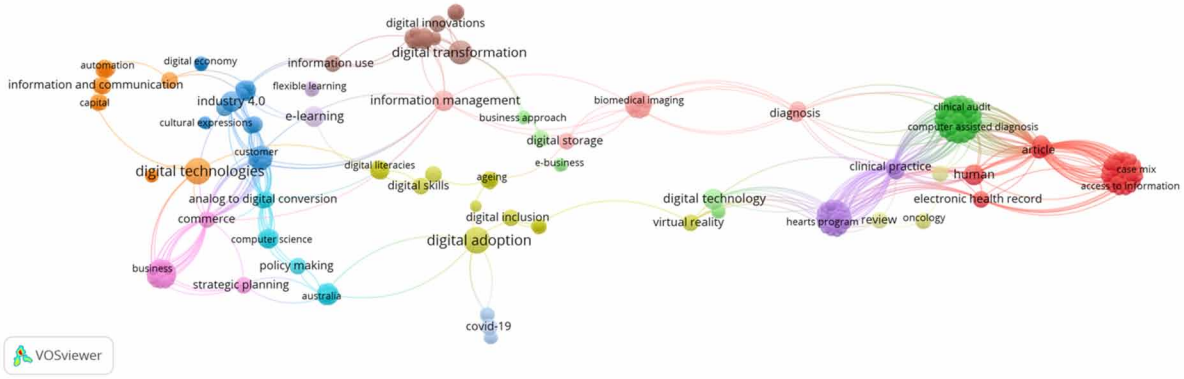


Figure 4. Network of linked keywords

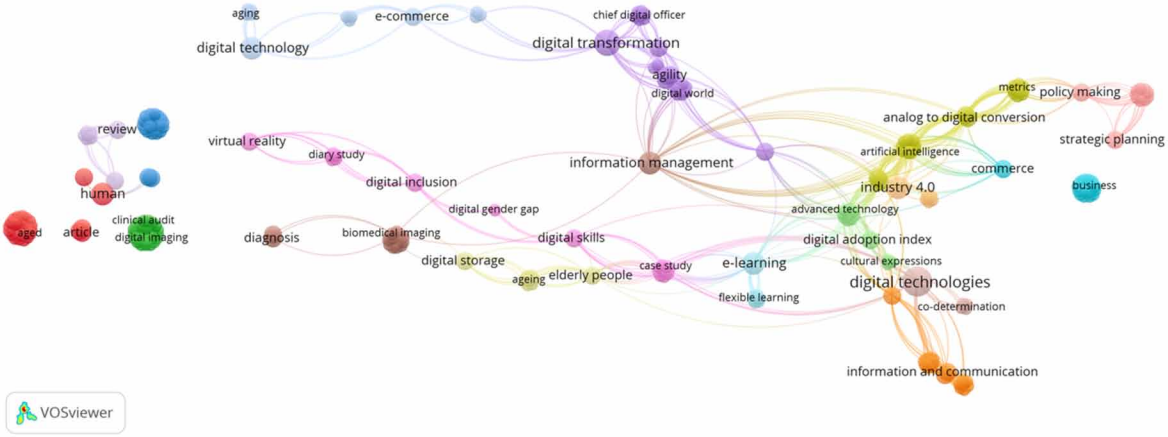
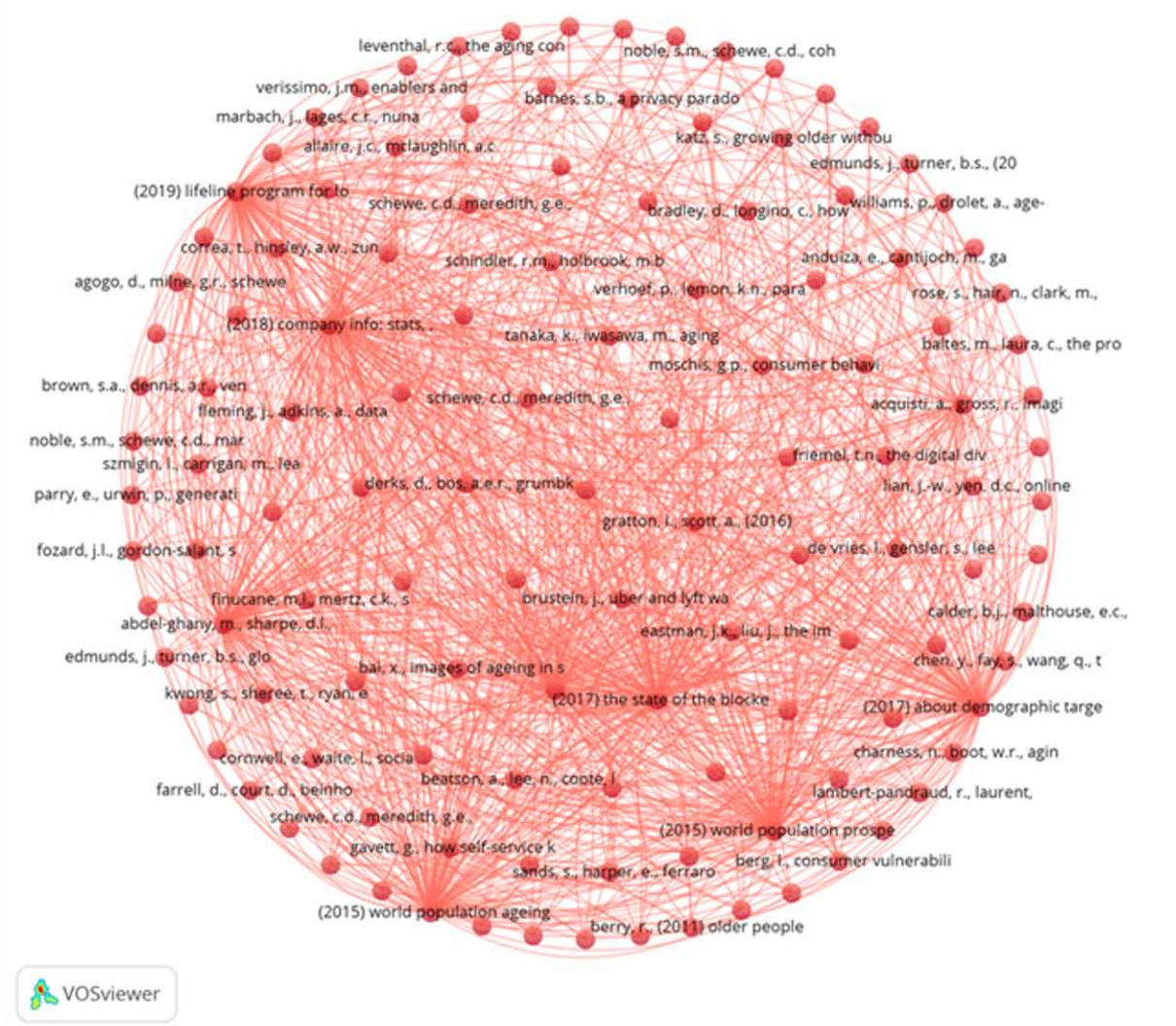


Figure 5. Network of co-citation



THEORETICAL PERSPECTIVES

Digitalization has created a global digital economy, where goods and services production and trade depend on internet-based digital technologies. The rapid technological growth and globalization have created a complex digital economy that requires firms to leverage technologies to create new value for customers, employees, and investors. Bolwijn et al. (2018) indicate that three-quarters of people in developing and emerging economies use the internet while two-thirds shop online. In addition, 50% of the population in developing countries and more than 25% of the African population use the internet. These increasing numbers of online interactions and transactions have facilitated the emergence and growth of a global digital economy, where firms target local and international markets. Unlike traditional commerce, digitization has shifted value creation to a network perspective instead of a value chain perspective. Dommett (2020) explains that it has also enhanced consumer engagement apart from

promoting IT-enabled business processes and services. In the digital economy, customers contribute to value creation and innovation through user-generated content. The complexity of the digital economy requires firms to create and maintain value networks and viable alliances to manufacture and deliver quality products or services).

Digital Adoption, Transformation, and Economy

Digital adoptions refer to an individual or firm's capability to use new technologies and successfully engage in digital processes for particular purposes. It increases people's knowledge of digital resources' potential, embraces and adopts them to achieve specific goals, and leverages innovation and process optimization technologies. Finkelstein Shapiro and Mandelman (2021) explain that digital adoption leads to higher automation, labor market structure changes, and employee outcomes. Digital technologies provide companies access to streamlined procedures and services that minimize barriers to entry by facilitating global market access. In addition, leveraging ICT can increase corporate profits due to increased efficiency and networks (Gupta et al., 2021). However, research shows an existing knowledge gap on the actual implications of digital adoption on employment. For instance, Finkelstein and Mandelman (2021) indicate that automation lowers job creation since companies tend to replace salaried jobs with capital, such as labor-saving innovations. However, the scholars also note that employees who lose their jobs to digital adoption tend to resort to self-employment as a coping alternative. Therefore, while digital adoption may cause a higher unemployment rate, it also leads to new firm creation (Skare & Riberio Soriano, 2021). Nonetheless, the economic theory proposes that indirect impacts of digital technologies, such as new investments, new machines, reduced wages, and lower prices, counterbalance technological unemployment (Matuzeviciute et al., 2017). Besides, the long-term adoption of computerized processes encourages employees to undertake computer-related training that makes them desirable for current jobs. Thus, digital adoption prompts workers to search for alternative coping mechanisms to offset the potential job loss problem despite the unemployment threat.

The growing digital adoption has created the need for digital business strategies, leading to digital transformation. Durão et al. (2019) define digital transformation as transformation caused by transformational information technologies and causes changes in organizational capacity, operational routines, and business procedures. The concept is also used to refer to innovative efforts implemented to impact multiple business and societal aspects, including customer experience, business models, and operational frameworks (Stolbov & Shchepeleva, 2020). Digital technologies are introducing changes that are transforming society in general by influencing multiple dimensions, such as e-commerce, online learning, healthcare, public administration, transport and logistics, and smart cities. For example, Holup et al. (2014) indicate that the healthcare sector has adopted electronic health records (EHR) that enhances health care safety and quality, eliminates inefficiencies, improves patient engagement, and minimizes costs. The transformation is facilitated by multiple digital technologies, such as social media, big data, the internet of things (IoT), cloud computing, artificial intelligence (AI), and augmented reality (AR), among others. These developments have increased competition in local and international markets, requiring firms to revolutionize their processes and systems to maintain relevance (Turlacu et al., 2018). Thus, while digital transformation increases positive outcomes such as higher consumer engagement and business processes efficiencies, organizations face the challenge of matching their adopted technologies to the worldwide digital changes.

The digital transformations influence production, delivery, and investment patterns creating a digital economy. Since most global businesses utilize digital technologies, the digital economy growth rate is seven times higher than the rest of the economy (Kokkinakos et al., 2016). The digital economy comprises multiple elements, including an online marketplace, digital infrastructure, computer-based skills and capabilities, and digital culture and mentality. According to Bolwijn et al. (2018), the internet has become a growth engine for multinational enterprises (MNEs) and has enabled them to increase their annual operating revenues by approximately 10%. The key drivers for this growth and expansion are technology adoption and an organizational culture aligned towards innovation and investment (Dziekan & Proctor, 2018). Digital computing technologies are the basis for the digital economy and have increasingly enabled conducting businesses over the internet and using digitalized processes for product development and manufacturing. Therefore, most successful companies in the current economies utilize various digital elements such as e-commerce, internet platforms, digital content, IT, and digital solutions (Nicoletti et al., 2020). These aspects enable firms to operate and invest in local and international markets, expand market reach, and increase revenues. Dommett (2020) indicates that companies can implement interactive connections and engagement with digital tools that facilitate two-way communication. In this context, firms can engage global consumers in brand-related discussions and communications to create information resources that inform innovation decisions and strategies. Therefore, business processes are consumer-centered in the digital economy and depend on reciprocal connections between firms and target consumers.

Hence, the concepts of digital adoption, digital transformation, and the digital economy are interconnected and associated with the rapid growth and embracing of digital technologies. With modern digitization and automation technologies, consumers, employees, suppliers, logistics, and management can communicate and cooperate effectively (Genz et al., 2019). This increased connectivity among crucial market players improves the working environment and conditions, leading to higher performance and productivity. For instance, automation reduces employees' physical strain by handling repetitive and physically demanding activities. In addition, data analytical tools empower firms to recognize threats before they occur and implement real-time solutions, creating safer working environments (Dziekan & Proctor, 2018). Although digital innovations are dominant in the enterprise sector, the public sector has also undergone digital transformation. Kokkinakos et al. (2016) identify government as the carrier of strategic development and establish legal frameworks that support and regulate technological trends. The authors conducted research that included data from five countries, Japan, UK, Spain, Russia, and Germany. They found that in three out of the five countries, digital technology diffusion was higher in the government sector than in the business sector. A country's ICT infrastructure influences digitization initiatives, explaining tech companies' dominance in developed countries compared to third-world countries. Thus, although the nature of technologies adopted in private and public sectors may differ due to variations in services and functionalities, both fields are actively involved in digital transformations and adoption.

Digital tools, such as the internet and social media, have become fundamental elements of people's daily lives. Although social media platforms are primarily adopted for social connections, they have become critical information sources that enable users to know about local and international occurrences. Firms leverage these technologies to build long-lasting relationships with target markets for marketing and commercialization purposes (Negrea et al., 2019). Information influx resulting from modern technologies has created a highly informed public that pays close attention to organizational business practices (Kokkinakos et al., 2016). Frequent engagement with consumers and timely response to their feedback creates

a sense of connection necessary in building trust and influencing their perception and attitudes towards a company and its offerings. Therefore, digital adoption and transformation are essential in improving organizational agility in the contemporary digital economy to ensure that the implemented processes, knowledge, and communication technologies match the turbulent changes experienced in society.

Key Drivers of Digital Adoption

Although inventors aim for a high diffusion rate of the innovations created, acceptance varies among individual firms and consumers. Fast adopters are driven by the desire to increase profits and market share, while slow adopters are skeptical and resistant to innovations (Lee et al., 2021). The latter often choose to wait until the products are mature and lower prices due to the reduced product life cycle. Jahanmir and Cavadas (2018) indicate that late adopters of new technologies, products, or services make up to half of the potential adopters, with 16% being laggards and 34% late majority. These statistics show that while half of the potential adopters embrace innovations to increase competitiveness and gain new unique experiences, others resist and take time before purchasing and integrating them into their social and business systems. However, given the increasing dominance of digital technologies in modern business environments, firms must acquire and develop innovative products with a high adoption rate (Al-Mulali et al., 2020). Therefore, understanding the factors influencing digital adoption is critical. Some key drivers of digital adoption discussed in this section include attitude towards the innovations, negative word of mouth, brand image, and digital competency and innovativeness.

Attitude Toward Innovations

Consumers' assessment of a technology's desirability influences their attitude and can predict the probability of adoption. In addition, their attitude towards technologies affects the evaluation and differentiation of reasons for and against specific innovations. Jahanmir and Cavadas (2018) explain that adopters consider factors such as brand and price to determine value and quality before making purchasing decisions. Al-Mulali et al. (2020) further clarify that consumers use ICT tools to access quality information on payment strategies and other users' experiences before making decisions. Therefore, innovation adopters base their adoption judgments on available information and perceptions on the quality of the products and services offered (Mariscal et al., 2019). In addition, an organization's digital adoption can depend on managers' and employees' attitudes towards innovation and creativity (Holup et al., 2014). Innovation adoption results in multiple organizational changes that directly influence employees' functioning and operations. The complexity of innovations can cause resistance among the management and employees. For instance, Matuzeviciute et al. (2017) indicate that technology adoption replaces human labor with equipment and machines that increase productivity and efficiency. Technological unemployment causes negative attitudes among workers who fear that embracing new technologies will render them jobless. However, the success of the innovations once integrated into an organization's systems and processes depends on workers' willingness and capacity to optimize them to enhance productivity and efficiency (Paulikas, 2018). Therefore, firms need to provide informational resources that focus on improving consumers' attitudes towards innovations and innovative products and services and employees' perceptions of the technologies' desirability.

Negative Word-of-Mouth on Technologies

Digital adoption depends on information transfer and acceptance among the target audience. The process of acceptance requires a solid social relationship to build a platform where the part aware of the innovation freely shares information with the unaware party (ies) to encourage adoption. As a result, Jahanmir and Cavadas (2018) explain that diffusion of innovation is a social phenomenon involving interpersonal communication. Therefore, adopters are influential players in digital adoption since they are the opinion leaders in their respective communities. People are likely to adopt a technology following recommendations and reviews from influential individuals than marketing professionals (McMahon, 2020). Word of mouth (WOM) enables these opinion leaders to share comments and opinions on service and product quality, performance, and trustworthiness.

However, negative WOM can threaten a brand's reputation and sales revenues. The opinion leaders share their dissatisfaction and complaints with their peers to discourage them from purchasing products and services offered. Given the increased adoption of social networking sites, such as Facebook and Twitter, the impact of negative WOM has significantly increased (Walker et al., 2021). Apart from affecting target consumers' attitudes and purchasing intentions, it can also lead to dilution of the brand, value erosion, and stock volatility (Balaji et al., 2016). In addition, negative e-WOM can lead to a public relations crisis if a post is rapidly shared online, subjecting the firm to criticism and exploiting negative publicity by competitors. Therefore, negative WOM both offline and online can lead to slow digital adoption or complete resistance towards the technologies due to bad reputation and negative attitudes.

Global Brand Image

Digital adoption is interconnected with globalization since technologies aim to link local and global cultures to influence consumer behaviors. Jahanmir and Cavadas (2018, p.340) define a brand as "a name, term, sign, symbol or design, or combination of them" to identify and differentiate goods and services from their alternatives. Adoption behaviors require consumers to understand additional value or benefits from adopting a particular technology compared to its competing alternative. Therefore, promoting innovations need firms to adopt and implement appropriate global marketing strategies that enhance the brand image in worldwide markets (Wang, 2020). With the rise of social media use, a misconduct or PR crisis in a particular country can cause global reputation damage as online communities share negative feedback and experiences.

Similarly, a distinctive brand image can stimulate a company's competitiveness by presenting unique characteristics that create distinct feelings among target consumers. The brand images can lead to positive emotions, perceptions, and attitudes towards an organization's innovations, leading to a higher adoption rate (Widjaja, 2021). In addition, companies are more likely to purchase and integrate innovative products, such as programs and systems from reputable tech companies. A positive brand image creates psychological and emotional connections that enable consumers to maintain loyalty, provided that the brand's product functionality meets consumers' needs and demands (Walker et al., 2021). Therefore, the branding information should include functional and non-functional features and images to influence consumers' purchasing intentions and build relationships based on mutual trust and understanding.

Digital Competency and Innovativeness

Digital competence refers to the stakeholder's capability to embrace new technologies. The unified theory of acceptance and use of technology (UTAUT) indicates that technology acceptance is based on multiple dimensions; facilitating conditions, behavioral intention, performance expectancy, usage behavior, social influence, and effort expectancy (Alam et al., 2018). Effort expectancy involves the ease of using digital technologies, while performance expectancy refers to the adopter's belief in the technology's capability to improve their job performance. These aspects predict technology acceptance since they determine they influence an individual's willingness to purchase and use specific technologies. For example, consumers are only likely to buy an innovation if they believe that it is easy to use and provides additional benefits that improve their performance. These dimensions influence satisfaction and trust, encouraging adoption.

Additionally, consumer innovativeness influences individual preferences for specific brands. Jahanmir and Cavadas (2018) define it as consumers' tendency to purchase or adopt innovations. Consumers with an innovative attitude are likely to adopt new technologies faster than those without the attitude. Alam et al. (2018) recommend using social cognitive theory to understand consumer knowledge and propensity to adopt new technologies. The model identifies cognition, environment, and behaviors as the primary determinant of knowledge acquisition that influences innovativeness (Saeed, 2019). In addition, the adoption of technologies in B2B commerce can be understood from Technology–Organization–Environment (TOE) framework. TOE identifies various internal and external factors that influence organizational adoption of technologies, such as technology readiness, financial resources, company size, regulations, competition, and the global market share. Different industries require companies to adopt varying technologies depending on the business processes and strategies (Litto, 2018). The adopted technologies set limits on the scope and pace of technological changes throughout the adoption process. Therefore, digital adoption among individual consumers and companies depends on their innovative cultures and the capabilities to use the targeted innovations.

Digital Adoption in Media Broadcasting

The broadcasting industry is one of the fields significantly affected by digital adoption and transformation. The digitization of content and the establishment of multiple connection methods has led to digital convergence, allowing consumers to view multimedia content from various devices (Khahro et al., 2021). These digital developments have turned TV platform innovation into a competitive and highly advanced business. For instance, Chou (2014) reports that video services are the leading sector in the global entertainment and media industries, accounting for 14% of the market value and generating revenues worth US$229.45 billion. Digital technologies have led to stiff competition as TV platform operators compete for this market to provide target audiences with numerous video services. The internet protocol television (IPTV) is a significant development illustrating the importance of digital adoption in the broadcasting industry. Unlike traditional cable, terrestrial, and satellite broadcasting, IPTV enables television content transmission through Internet Protocol networks (Iosifidis, 2005). IPTV broadcast technology allows internet access, computer data exchange, and other services such as VoIP since it uses converged IP networks. With the development of cross-platform broadcasting due to WEB and mobile apps innovations, IPTV has become an attractive digital solution to modern video service consumers. Therefore, alongside other developments such as digital pay-TV services, digital adoption has become

a fundamental method of increasing competitiveness and maintaining large viewership in the media and entertainment industry.

Additionally, digital adoption led to the introduction of digital broadcasting. It caused television 'switchover', which Iosifidis (2005, p.58) defines as the "progressive migration of households, from analog-only reception to digital reception." Technological advancement led to the termination of analog broadcasting, requiring consumers to adopt appropriate technologies capable of receiving digital signals. Most consumers purchased digital devices due to the fear of the inability to continue watching television (Kossowski et al., 2020). This notion aligns with Henderson's (2019) argument that digital technologies required people to explore emerging systems and integrate them into their daily routines. In the self-reflect, the author highlights their resistance to technologies despite knowledge of diffusion theory. However, conditions such as being away from family and academic purposes prompt Henderson (2019) to embrace the once-detested technology and adapt to the digital world. Similarly, analogue television owners had to shift to digital devices to adapt to the digital broadcasting policies and requirements for receiving digital signals. These arguments indicate the power of digital adoption as an element of a progressive society. Iosifidis (2005) highlights multiple benefits of digitizing broadcast media, including increased choice and quality for audiences, reduced transaction costs, higher efficiency in spectrum use, and more interaction applications due to improved data transmission capability.

The digital technologies offer additional benefits, such as high definition and sound quality and more channels that grant viewers alternative access to quality entertainment and information sources (Chou, 2014). In addition, the audiences have more control over the content they watch and find appealing, thus prompting producers and media investors to pay attention to viewer needs and standards. Therefore, the media industry has shifted towards the value co-creation strategy, which has become a fundamental business component in internet-based environments.

Media digitization has created a shift from print to electronic media, allowing audiences access to timely, global, and cheaper information. Digital media is an innovative technology that produces fast and inexpensive sources of information for international audiences (Krishen et al., 2016). Unlike in traditional print media, where the printed materials were only accessible to audiences in a specific location, online news sources have access to worldwide audiences interested in the published article or topic. According to Gopeh and Umoh (2020), the electronic media growth rate in 2018 was 15.9% compared to 2.8% for print media. In this digital era, most people prefer electronic information sources due to ease of access, affordability, convenience, and availability of electronic devices, e.g., smartphones, laptops, and tablets (Hall et al., 2020). Given the increased young populations, the print media has been under pressure to innovate and integrate technologies that recognize changes in consumption and the industry. Although Gopeh and Umoh (2020) attempt to prove that most people still prefer print media over electronic media due to convenience and connections, they also recommend using promotional strategies such as blogs and online brochures, which are internet-based. This argument indicates the survival of print media depends on the publishers' capability to integrate innovative technology-based strategies into their production and delivery techniques. Internet growth makes library services and other informational resources more available and accessible to a broader audience than traditional print media (Singh et al., 2020). Given the variations in consumer attitudes and digital and print media perceptions, companies should innovatively optimize both techniques to accommodate audience needs and expectations.

Digital Adoption in Healthcare Organizations

Digital innovations have become fundamental elements in healthcare used to revolutionize medicine practice by improving operational efficiency based on the health care standards. Despite the increased clinical research and rigorous evidence, care delivery has been experiencing challenges in providing effective and timely solutions to rapidly changing medical issues. As a result, Padwal and Wood (2021) recommend using technological solutions to enhance treatment, awareness, and control. The authors define digital health as "the use of information technology or electronic communication tools, services, and processes to deliver health care services or facilitate better health" (p.711). Various technologies can be integrated during diagnostic and treatment procedures to improve health outcomes and efficiency. Internet of Things (IoT) and artificial intelligence (AI) provide smart devices that gather and analyze data to promote decision-making and stimulate innovative behaviors (Mansour, 2021). Although healthcare is primarily analog, these innovations are increasingly adopted to enhance service delivery and health outcomes (Kirrmann et al., 2018). Digital adoption increases data and knowledge flow speed, enabling professionals to adopt and implement timely and practical solutions to various patient problems. Consequently, the innovations make health care more accessible and personalized.

Electronic health records (EHR) is a powerful technology used to improve health care delivery, quality, and efficiency through electronic collection and storage of health information. EHR improves communication across various departments in the healthcare system and medical decision-making due to enhanced informational resources. Adopting EHR systems can lead to efficient health care services, reduced clinician workload, and minimal medical errors due to automation of activities (Kirrmann et al., 2018). For instance, digital registries and protocolized care enable recording individual and population-based BP measurements that can be leveraged to develop and implement appropriate therapeutic approaches based on individual or group-specific needs and health conditions (Padwal & Wood, 2021). In addition, given the increased demand for evidence-based practice, EHR systems facilitate the extraction of large data sets stored during medical treatments and diagnostic investigations. The data can be used for research, clinical audits, and administrative reporting. EHR facilitates coordinated care since the data is frequently updated, complete, and accessible to patients and other healthcare professionals and enables accurate diagnosis, reliable prescribing, and convenient care to reduce medical errors.

Digital technologies are further used in healthcare education and research. Williams et al. (2017) explain that the increasing workload related to volume and data complexity has significantly increased healthcare providers' interest in the digital adoption of technologies. For instance, digital pathology has become prevalent in diagnostic laboratories due to its capability to improve the safety, quality, and efficiency of services. These laboratories use innovations such as a 'virtual microscope' to navigate a whole slide image (WSI) during research and education and pathology practice (Cooper et al., 2012). Mansour (2021) further notes the significance of digital adoption for research purposes by highlighting the implications of COVID-19 on global health systems and the need for faster and practical solutions. The spread of COVID-19 globally required healthcare providers and researchers to ensure safety and effective responses to guarantee the restoration of global health outcomes. However, the lack of adequate data and vaccines undermined the healthcare system's capability to handle the overwhelming cases, causing deaths and deteriorated health conditions among affected populations. Nonetheless, the digital innovations facilitated information and skills flow worldwide that supported mass testing and production of vaccines that currently enable control and manage the health crisis. Education and research are fundamental in responding to problems and depend on information flow and the availability of neces-

sary skills. Thus, technology adoption is critical for the efficiency and stability of healthcare systems and processes.

Additionally, digital adoption empowers other stakeholders and provides resources needed to deliver additional support during a health crisis. For instance, civil society organizations (CSOs) and other organizations work with communities and individuals to offer innovative solutions and strategies for crisis management. Following COVID-19 government-initiated response approaches such as lockdowns, CSOs used digital technologies to mobilize resources and people and participate in advocacy (Nampoothiri & Artuso, 2021). In addition, various actors embraced social media as communication tools to create awareness and share critical information. The digital environments enable people and activists to engage in health discussions regardless of regional differences. Hall et al. (2020) indicate that one significant benefit of digital technologies in advocacy is to change the power structures by empowering individuals and groups to challenge the status quo. For instance, social media enables people to share opinions and facts about oppressive domestic and international policies that affect healthcare systems. People are more aware of various health conditions and their right to access quality and safe health care, enabling them to hold leaders and key healthcare players accountable.

Digital Adoption in Education

Digitalization has influenced education by reshaping the primary learning processes of content, delivery, and recognition. Content refers to the support and guidance offered to learners, including subject knowledge. Delivery involves the process and technique used to impart knowledge and the timing, pace, and place characteristics. Recognition involves formal methods such as evaluations that facilitate the recognition of academic achievements (Pereira et al., 2020). Since the younger school-going populations are familiar and exposed to digital technologies, institutions have adopted these innovations to serve them better and reach out to new student populations (Orr et al., 2019). However, some innovations, such as interactive games, are practical learning resources for the elderly. Oppl and Stary (2020) explain that older adults are unfamiliar with digital technologies and struggle to keep pace with these advancements. Game-playing provides supportive learning materials that help keep them active and healthy. Leveraging networked and information technologies facilitate more responsive and flexible learning structures and processes to enable knowledge and skills acquisition.

Electronic learning (e-learning) is a significant development of digital adoption in education. Also referred to as digital learning, e-learning enables educators to use technology-mediated methods to tutor, assess, and instruct, thus supporting student learning (Litto, 2018). It allows education institutions to distribute knowledge to a large student population through distance learning (Zhang & Bao, 2010). It leads to multiple benefits, including open access to quality resources, individualized learning processes, updated e-learning materials, and additional support through embedded links (Gogus, 2021). In addition, the technologies provide innovative adaptive learning programs established to match the needs of each learner, thus, enhancing personalized experiences ("Digitalism, capitalism, and contemporary…," 2020). During this learning process, the students and educators use technologies to access and share learning materials and any queries. In addition, digital learning integrates computer-based learning systems that store user–system interaction logs by using computerized methods of identifying patterns in gathering education data (Svobodová et al., 2020). The technologies further facilitate further learning by opening up new opportunities based on the data collected and recommending informational resources based on

the learner's clicks. Therefore, with e-learning, students can access educational resources regardless of distance, reduce education costs, and increase efficiency and learning outcomes.

Barriers to Digital Adoptions and Opportunities for Future Research

Embracing technologies subjects firms and consumers to multiple issues that lead to slow digital adoption. The primary barrier to adoption is cybersecurity, which threatens organizational, and consumer information safety and privacy. Although information sharing has become fundamental in the current business environment, most companies protect their secretive operational information to maintain uniqueness and safeguard themselves from unfair competition. However, malicious cyber-attacks facilitated by emerging technologies and increased tech skills among global populations continue to discourage digital adoption. For instance, Bailie and Chinn (2018) indicate that the vulnerability and high value of operational data in the oil and gas industry cause slow digital adoption in the sector. The authors further report that two-thirds of oil and gas executives participating in a 2017 survey identified cyberattacks as a significant problem, noting that they had experienced at least one cybersecurity comprise within the last year. These attacks in the digital environment can cause adverse impacts on safety and critical operations. The fear of an attack and uncertainties discourage some companies from adopting modern innovations such as cloud computing and storage. Despite the increased research on cybersecurity and its implications on organizations, inadequate information on protection strategies is implemented. Therefore, further research on this topic can provide information that can successfully increase the digital adoption rate by delivering solutions to a significant safety and security concern.

The generational gap among the workforce creates skills and knowledge problem that undermines the integration of digital technologies in some firms. For instance, while the older personnel possess operational knowledge on main organizational domains, the younger generation has advanced analytics knowledge (Bailie & Chinn, 2018). Blaynee et al. (2016) identify this condition as the digital divide, where the older generation lacks basic digital skills compared to the younger people. Digital adoption requires a new skill set and knowledge regarding new technologies and efficient ways of optimizing their features (Litto, 2018). Each generation experiences varying life experiences that influence their expectations, aspirations, and characteristics, leading to inter-generational employee tension and conflicts. For instance, baby boomers are more dedicated and self-motivated while generation X is more laid back and materialistic (Nunan & Di Domenico, 2019). Although the latter work smart due to their tech-savvy characteristics and attitudes towards work-life balance, they are often considered 'lazy' and 'inadequate' compared to the baby boomers who expect promotions based on their seniority and loyalty (Angeline, 2011). Some older generations are slow to accept and adjust to new technologies, while others, such as gen X and Y, are faster due to their growing experiences with technologies (Blažič et al., 2018). However, identifying and realizing the full potential of digital solutions requires intergenerational input, where the older workers provide knowledge and skills accumulated throughout the years of experience. In comparison, the younger workers offer solutions based on current trends and skills. While individual employees should understand these differences and develop appropriate attitudes and respect, organizations need to implement appropriate organizational cultures that encourage collaboration. Therefore, more research on intergeneration differences and potential solutions can promote digital adoption, especially among multigenerational workforces.

SOLUTIONS AND RECOMMENDATIONS

Digital adoption is a process that many organizations are or will go through, adapting to a new economic reality. This phenomenon is changing the way companies do business, making them more effective and efficient, i.e., better performing business. These business changes cause changes in business processes at the level of operations, customer experience and business model.

Thus, the importance of digital adoption will generate changes in the company's: in production; marketing and sales; and lastly, in human resources. In production it causes the automation of processes impacting the way they produce and deliver products. In marketing and Sales, allows you to understand the behavior of the consumer and improve their experience in order to retain them. In finance and accounting promotes bureaucratization, such as digital signature, blockchain is one of the great benefits in digital adoption. In human resources, digital adoption can be used to recruit new talent, allowing the selection of suitable candidates and the development of training plans and digital environments.

In this sense, it is recommended that companies take 5 steps in their adoption:

1. digital adoption without major business changes;
2. formalization of digital adoption as part of the business;
3. as part of the strategy;
4. construction of a converged infrastructure;
5. innovation in adoption driven by digital adoption.

Finally, we can argue that organizations and businesses during this digital adoption process face 4 major challenges: the first challenge, identification of the most relevant digital adoptions, the second cost identification, the third, development of training programmers and, finally, the development of culture of innovation.

FUTURE RESEARCH DIRECTIONS

In future studies, we propose to explore the transmission between globalization and the adoption of business digital technology. It will be necessary to identify how globalization can reduce digital technological barriers and how companies can take advantage to gain a competitive advantage. Investigations are needed to identify the implications of how that adoption can affect employment, as automation can reduce psychological and physical pressure of employees. Conduct further studies comparing the government sector and the private sector, between developed countries and third world countries. Investigate the role of public-private partnerships in promoting the adoption of digital technology through institutional construction and infrastructure development. Understand the participation of women and young people in digital technology adoption initiatives. Analyze the impact of negative WOM on the digital environment, analyze the pressure on consumers in digital adoption, analyze the co-creation of value as a strategy in digital adoption.

Finally, further research into cybersecurity that may provide an increase in the rate of digital adoption.

CONCLUSION

Rapid technological advancements have led to the digitization of business processes and systems through digital technology adoption. By digitizing supply and demand systems, organizations create network relationships that facilitate appropriate partnerships and collaborations in value creation. Digital adoption results from the organizational capability to adopt and use appropriate technologies based on its business processes and needs. Leveraging technologies requires organizations and their employees to embrace and adopt necessary innovations to achieve specified goals. Consequently, the adoption leads to digital transformation where the organizations experience changes in operational routines, capacities, and business processes. Digitalization has created a digital economy where companies operate in an online environment to enable value co-creation among customers, employees, and investors. However, digital adoption is dependent on various driving factors that range from the attitude towards the technologies, negative word of mouth, brand image, and digital competency and innovativeness. Success optimization of digital technologies requires an innovative culture that influences positive attitudes, improves brand reputation, and increases digital skills and awareness.

Some sectors affected by digital adoption include broadcast media, healthcare, and education. Digital technologies have prompted switching from analog television to digital television that involves multiple video service programs such as pay-TV and on-demand programs. In healthcare, various innovations, such as electronic health records (EHR), facilitate the gathering and analysis of health data for informed judgment and decision-making. Evidence-based and patient-centered practice depends on the availability and accessibility of informational resources. Similarly, the education system has adopted innovations to create innovative and flexible learning processes such as e-learning that grants learners access to considerable informational resources. Although these technologies are more prevalent among younger generations, innovations such as interactive games have been adopted to encourage elderly participation in digital activities. These trends show that digital adoption has been integrated into various organizational practices to increase efficiency, engagement, productivity, and performance.

In summary, digital transformation is a process in which organizations make use of technologies in order to improve their effectiveness and efficiency, ultimately, organizational performance. This digital transformation and its adoption have had a profound impact on organizations as it is a structural change, with technology playing a preponderant role, being evident the need to implement behavior change programs. We can conclude, that digital adoption must permeate the entire organizational culture, making it evident that digital adoption is an organizational challenge.

Finally, organizational impact on digital adoption in organizations beyond the challenge requires new skills and knowledge about new technologies, only then organizations could create a value proposition and acquire a competitive advantage.

ACKNOWLEDGMENT

I would like to express gratitude to the Editor and the Arbitrators. They offered extremely valuable suggestions or improvements. The author was supported by the GOVCOPP Research Center at the University of Aveiro and by the European University.

REFERENCES

Al-Mulali, U., Solarin, S. A., Andargol, A. E., & Gholipour, H. F. (2020). *Digital adoption and its impact on tourism arrivals and receipts*. Anatolia. doi:10.1080/13032917.2020.1856692

Alam, K., Erdiaw-Kwasie, M. O., Shahiduzzaman, M., & Ryan, B. (2018). Assessing regional digital competence: Digital futures and strategic planning implications. *Journal of Rural Studies*, *60*, 60–69. doi:10.1016/j.jrurstud.2018.02.009

Angeline, T. (2011). Managing generational diversity at the workplace: Expectations and perceptions of different generations of employees. *African Journal of Business Management*, *5*(2), 249–255.

Bailie, B., & Chinn, M. (2018). Effectively harnessing data to navigate the new normal: Overcoming the barriers of digital adoption. *Proceedings of the Annual Offshore Technology Conference*, *1*, 12-21. 10.4043/28699-MS

Balaji, M. S., Khong, K. W., & Chong, A. Y. L. (2016). Determinants of negative word-of-mouth communication using social networking sites. *Information & Management*, *53*(4), 528–540. doi:10.1016/j.im.2015.12.002

Blaynee, J., Kreps, D. D., Kutar, D. M., & Griffiths, D. M. (2016). Collaborative HCI and UX: Longitudinal diary studies as a means of uncovering barriers to digital adoption. *Proceedings of the 30th International BCS Human-Computer Interaction Conference, HCI 2016.* 10.14236/ewic/HCI2016.72

Blažič, B. J., Cigoj, P., & Blažič, A. J. (2018). Learning digital skills for elderly people by using touch screen technology and learning games: A case study. *CSEDU 2018 - Proceedings of the 10th International Conference on Computer Supported Education, 2*, 222-229. 10.5220/0006682002220229

Bolwijn, R., Casella, B., & Zhan, J. (2018). International Production and the digital economy. In *International business in the information and digital age*. Emerald Publishing Limited. doi:10.1108/S1745-886220180000013003

Chou, Y. (2014). The stalemate of cable digital switchover: A study of competition effects and deregulation. *Telecommunications Policy*, *38*(4), 393–405. doi:10.1016/j.telpol.2014.01.001

Cooper, L. A. D., Carter, A. B., Farris, A. B., Wang, F., Kong, J., Gutman, D. A., Widener, P., Pan, T. C., Cholleti, S. R., Sharma, A., Kurc, T. M., Brat, D. J., & Saltz, J. H. (2012). Digital pathology: Data-intensive frontier in medical imaging. *Proceedings of the IEEE*, *100*(4), 991–1003. doi:10.1109/JPROC.2011.2182074 PMID:25328166

Digitalism, capitalism, and contemporary transformations in academic work: An evaluative study of risks and opportunities. (2020). *Arab Media and Society*, (29), 1–31.

Dommett, K. (2020). Roadblocks to interactive digital adoption? Elite perspectives of party practices in the United Kingdom. *Party Politics*, *26*(2), 165–175. doi:10.1177/1354068818761196

Durão, N., Ferreira, M. J., Pereira, C. S., & Moreira, F. (2019). Current and future state of Portuguese organizations towards digital transformation. Paper presented at the *Procedia*. *Computer Science*, *164*, 25–32. doi:10.1016/j.procs.2019.12.150

Dziekan, V., & Proctor, N. (2018). From elsewhere to everywhere: Evolving the distributed museum into the pervasive museum. The Routledge handbook of museums, media, and communication, 177-192. doi:10.4324/9781315560168-15

Finkelstein Shapiro, A., & Mandelman, F. S. (2021). Digital adoption, automation, and labor markets in developing countries. *Journal of Development Economics*, *151*, 102656. Advance online publication. doi:10.1016/j.jdeveco.2021.102656

Genz, S., Bellmann, L., & Matthes, B. (2019). Do German works councils counter or foster the implementation of digital technologies? First evidence from the IAB-establishment panel. *Jahrbucher fur Nationalokonomie und Statistik*, *239*(3), 523–564. doi:10.1515/jbnst-2017-0160

Gogus, A. (2021). Shifting to digital: Adoption and diffusion. *Educational Technology Research and Development*, *69*(1), 11–16. doi:10.100711423-020-09862-6

Gopeh, I. O., & Umoh, M. S. (2020). +Users' perception of print media retention in a digital era. *Library Philosophy and Practice*, *2020*, 1–19.

Gupta, R., Mejia, C., Gianchandani, Y. B., & Kajikawa, Y. (2021). Ambidextrous firm strategy insights from internet of things linked interfirm deals. *IEEE Transactions on Engineering Management*, 1–16. Advance online publication. doi:10.1109/TEM.2020.3041250

Hall, N., Schmitz, H. P., & Michael Dedmon, J. (2020). Transnational advocacy and NGOs in the digital era: New forms of networked power theory note. *International Studies Quarterly*, *64*(1), 159–167. doi:10.1093/isqqz052

Henderson, A. (2019). Logging on laggardly. A critical (self) reflection. *Cultural Studies, Critical Methodologies*, *19*(1), 27–35. doi:10.1177/1532708617746422

Holup, A. A., Dobbs, D., Temple, A., & Hyer, K. (2014). Going digital: Adoption of electronic health records in assisted living facilities. *Journal of Applied Gerontology*, *33*(4), 494–504. doi:10.1177/0733464812454009 PMID:24781968

Iosifidis, P. (2005). Digital switchover and the role of the new BBC services in digital television take-up. *Convergence*, *11*(3), 57–74. doi:10.1177/135485650501100305

Jahanmir, S. F., & Cavadas, J. (2018). Factors affecting late adoption of digital innovations. *Journal of Business Research*, *88*, 337–343. doi:10.1016/j.jbusres.2018.01.058

Khahro, S. H., Hassan, S., Zainun, N. Y. B., & Javed, Y. (2021). Digital transformation and E-commerce in the construction industry: A prospective assessment. *Academy of Strategic Management Journal*, *20*(1), 1–8.

Kirrmann, S., Fahrner, H., Bach, T., Hall, M., Gläß, S., Schmucker, M., Gkika, E., Gainey, M., Baltas, D., & Heinemann, F. (2018). Digital radiation oncology [Digitale Radioonkologie]. *Der Onkologe*, *24*(5), 390–399. doi:10.100700761-018-0340-0

Kokkinakos, P., Markaki, O., Koussouris, S., & Psarras, J. (2016). Digital Transformation: Is Public Sector Following the Enterprise 2.0 Paradigm? In A. Chugunov, R. Bolgov, Y. Kabanov, G. Kampis, & M. Wimmer (Eds.), *Digital Transformation and Global Society. DTGS 2016. Communications in Computer and Information Science, 674*. Springer. doi:10.1007/978-3-319-49700-6_11

Kossowski, J., Heumuller, E., & Richter, S. (2020). Digital fitness - goal for the chief digital officer. *Proceedings - 2020 IEEE International Conference on Engineering, Technology and Innovation, ICE/ITMC 2020.* 10.1109/ICE/ITMC49519.2020.9198464

Krishen, A. S., Kachen, S., Kraussman, M., & Haniff, Z. (2016). Do consumers dig it all? The interplay of digital and print formats in media. *Journal of Consumer Marketing*, *33*(7), 489–497. doi:10.1108/JCM-01-2015-1287

Kwabena, G. Y., Mei, Q., Ghumro, T. H., Li, W., & Erusalkina, D. (2021). Effects of a Technological-Organizational-Environmental Factor on the Adoption of the Mobile Payment System. *The Journal of Asian Finance, Economics, and Business*, *8*(2), 329–338.

Lee, Y. Y., Falahat, M., & Sia, B. K. (2020). Drivers of digital adoption: A multiple case analysis among low and high-tech industries in Malaysia. *Asia-Pacific Journal of Business Administration*, *13*(1), 80–97. doi:10.1108/APJBA-05-2019-0093

Lee, Y. Y., Falahat, M., & Sia, B. K. (2021). Drivers of digital adoption: A multiple case analysis among low and high-tech industries in Malaysia. *Asia-Pacific Journal of Business Administration*, *13*(1), 80–97. doi:10.1108/APJBA-05-2019-0093

Linnenluecke, M. K., Marrone, M., & Singh, A. K. (2020). Conducting systematic literature reviews and bibliometric analyses. *Australian Journal of Management*, *45*(2), 175–194. doi:10.1177/0312896219877678

Litto, F. (2018). Brazil. *Adnan Qayyum Olaf Zawacki-Richter Editors*, *25*, 29–43. doi:10.1007/978-981-13-0298-5_4

Mansour, H. (2021). How successful countries are in promoting digital transactions during COVID-19. *Journal of Economic Studies (Glasgow, Scotland)*. Advance online publication. doi:10.1108/JES-10-2020-0489

Mariscal, J., Mayne, G., Aneja, U., & Sorgner, A. (2019). Bridging the gender digital gap. *Economics*, *13*(1), 20190009. Advance online publication. doi:10.5018/economics-ejournal.ja.2019-9

Matuzeviciute, K., Butkus, M., & Karaliute, A. (2017). Do technological innovations affect unemployment? Some empirical evidence from European countries. *Economies*, *5*(4), 48. doi:10.3390/economies5040048

McMahon, R. (2020). Co-developing digital inclusion policy and programming with indigenous partners: Interventions from Canada. *Internet Policy Review*, *9*(2), 1–26. doi:10.14763/2020.2.1478

Nampoothiri, N. J., & Artuso, F. (2021). Civil society's response to coronavirus disease 2019: Patterns from two hundred case studies of the emergent agency. *Journal of Creative Communications*, *16*(2), 203–212. Advance online publication. doi:10.1177/09732586211015057

Negrea, A., Ciobanu, G., Dobrea, C., & Burcea, S. (2019). Priority aspects in the evolution of the digital economy for building new development policies. *Quality - Access to Success*, *20*(S2), 416–421.

Nicoletti, G., von Rueden, C., & Andrews, D. (2020). Digital technology diffusion: A matter of capabilities, incentives, or both? *European Economic Review*, *128*, 103513. Advance online publication. doi:10.1016/j.euroecorev.2020.103513

Nunan, D., & Di Domenico, M. (2019). Older consumers, digital marketing, and public policy: A review and research agenda. *Journal of Public Policy & Marketing*, *38*(4), 469–483. doi:10.1177/0743915619858939

Oppl, S., & Stary, C. (2020). Game-playing as an effective learning resource for elderly people: Encouraging experiential adoption of touchscreen technologies. *Universal Access in the Information Society*, *19*(2), 295–310. doi:10.100710209-018-0638

Orr, D., Weller, M., & Farrow, R. (2019). How is digitalization affecting the flexibility and openness of higher education provision? Results of a global survey using a new conceptual model. *Journal of Interactive Media in Education, 2019*(1). doi:10.5334/jime.523

Padwal, R., & Wood, P. W. (2021). Digital health approaches for the assessment and optimization of hypertension care provision. *The Canadian Journal of Cardiology*, *37*(5), 711–721. doi:10.1016/j.cjca.2020.12.009 PMID:33340672

Pagani, M., & Pardo, C. (2017). The impact of digital technology on relationships in a business network. *Industrial Marketing Management*, *67*, 185–192. doi:10.1016/j.indmarman.2017.08.009

Paulikas, J. (2018). The factors determining employees' positive attitude to innovations: a case of Klaipėda public transport companies. *Organizacijų vadyba: sisteminiai tyrimai*, (79), 85-102.

Pereira, C. S., Durão, N., Fonseca, D., Ferreira, M. J., & Moreira, F. (2020). An educational approach for present and future of digital transformation in Portuguese organizations. *Applied Sciences (Switzerland)*, *10*(3), 757. Advance online publication. doi:10.3390/app10030757

Raimundo, R., & Rosário, A. (2021). Blockchain system in the Higher Education, European Journal of Investigation in Health, *Psychology and Education*, *11*(1), 276-293. doi:10.3390/ejihpe1101002

Rialti, R., Marzi, G., Ciappei, C., & Busso, D. (2019). Big data and dynamic capabilities: A bibliometric analysis and systematic literature review. *Management Decision*, *57*(8), 2052–2068. doi:10.1108/MD-07-2018-0821

Rosário, A. (2021). Research-Based Guidelines for Marketing Information Systems. *International Journal of Business Strategy and Automation*, *2*(1), 1–16. doi:10.4018/IJBSA.20210101.oa1

Rosário, A., & Cruz, R. (2019). Determinants of Innovation in Digital Marketing, Innovation Policy and Trends in the Digital Age. *Journal of Reviews on Global Economics*, *8*, 1722–1731. doi:10.6000/1929-7092.2019.08.154

Rosário, A., Fernandes, F., Raimundo, R., & Cruz, R. (2021). Determinants of Nascent Entrepreneurship Development. In A. Carrizo Moreira & J. G. Dantas (Eds.), *Handbook of Research on Nascent Entrepreneurship and Creating New Ventures* (pp. 172–193). IGI Global. doi:10.4018/978-1-7998-4826-4.ch008

Saeed, S. (2019). Digital business adoption and customer segmentation: An exploratory study of the expatriate community in Saudi Arabia. *ICIC Express Letters*, *13*(2), 133–139. doi:10.24507/icicel.13.02.133

Singh, A., Gupta, R., & Kumar, A. (2020). A strategic focus on adoption of mobile taxi application-a move towards digital India. *International Journal of Advanced Science and Technology, 29*(5), 352-364.

Skare, M., & Riberio Soriano, D. (2021). How globalization is changing digital technology adoption: An international perspective. *Journal of Innovation and Knowledge.* doi:10.1016/j.jik.2021.04.001

Stolbov, M., & Shchepeleva, M. (2020). What predicts the legal status of cryptocurrencies? *Economic Analysis and Policy*, *67*, 273–291. doi:10.1016/j.eap.2020.07.011

Svobodová, L., Hedvicakova, M., & Kuznetsova, A. (2020). *Education needs in the context of migration and industry 4.0 in selected EU countries.* doi:10.1007/978-3-030-38778-5_12

Turlacu, L., Chivu, R., Stoica, I., Orzan, G., & Herrezeel, T. (2018). Digital (R) evolution: From 2.0 to 4.0. Perspective and challenges for the Romanian market. *Proceedings of the 32nd International Business Information Management Association Conference, IBIMA 2018 - Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth*, 6684-6693.

Walker, T., Esmene, S., Colebrooke, L., Leyshon, C., & Leyshon, M. (2021). Digital possibilities and social mission in the voluntary sector: The case of a community transport organization in the UK. *Voluntary Sector Review*, *11*(1), 59–77. doi:10.1332/204080520X15787076882640

Wang, F. (2020). Digital marketing capabilities in international firms: A relational perspective. *International Marketing Review*, *37*(3), 559–577. doi:10.1108/IMR-04-2018-0128

Widjaja, G. (2021). Understanding the trend of digitization of tax services in Indonesia: Review of publication systematic. *Annals of the Romanian Society for Cell Biology*, *25*(4), 3004–3012.

Williams, B. J., Bottoms, D., & Treanor, D. (2017). Future-proofing pathology: The case for clinical adoption of digital pathology. *Journal of Clinical Pathology*, *70*(12), 1010–1018. doi:10.1136/jclinpath-2017-204644 PMID:28780514

Zhang, N., & Bao, H. (2010, January). Research on e-learning with digital technology in distance education. In *2010 International Conference on e-Education, e-Business, e-Management and e-Learning* (pp. 299-302). IEEE. 10.1109/IC4E.2010.126

ADDITIONAL READING

Alhubaishy, A., & Aljuhani, A. (2021). The challenges of instructors' and students' attitudes in digital transformation: A case study of saudi universities. *Education and Information Technologies*, *26*(4), 4647–4662. doi:10.100710639-021-10491-6 PMID:33746557

Cabello, P., Claro, M., Rojas, R., & Trucco, D. (2021). Children's and adolescents' digital access in chile: The role of digital access modalities in digital uses and skills. *Journal of Children and Media*, *15*(2), 183–201. doi:10.1080/17482798.2020.1744176

Clemens, T., & Viechtbauer-Gruber, M. (2020). Impact of digitalization on the way of working and skills development in hydrocarbon production forecasting and project decision analysis. *SPE Reservoir Evaluation & Engineering*, *23*(4), 1358–1372. doi:10.2118/200540-PA

Guenther, J., Smede, B., & Young, M. (2020). Digital inclusion in central australia: What is it and what makes it different? *Rural Society*, *29*(3), 154–170. doi:10.1080/10371656.2020.1819524

Hai, T. N., Van, Q. N., & Tuyet, M. N. T. (2021). Digital transformation: Opportunities and challenges for leaders in the emerging countries in response to covid-19 pandemic. *Emerging Science Journal*, *5*(Special Issue), 21–36. doi:10.28991/esj-2021-SPER-03

Hrustek, L., Tomicic Furjan, M., & Pihir, I. (2019). Influence of digital transformation drivers on business model creation. *2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics, MIPRO 2019 - Proceedings,* 1304-1308. 10.23919/MIPRO.2019.8756666

Jones, M. D., Hutcheson, S., & Camba, J. D. (2021). Past, present, and future barriers to digital transformation in manufacturing: A review. *Journal of Manufacturing Systems*, *60*, 936–948. doi:10.1016/j.jmsy.2021.03.006

Lammers, T., Tomidei, L., & Trianni, A. (2019). Towards a novel framework of barriers and drivers for digital transformation in industrial supply chains. *PICMET 2019 - Portland International Conference on Management of Engineering and Technology: Technology Management in the World of Intelligent Systems, Proceedings,* 10.23919/PICMET.2019.8893875

Osmundsen, K. S. (2020). Competences for digital transformation: Insights from the norwegian energy sector. *Proceedings of the Annual Hawaii International Conference on System Sciences, 2020-January* 4326-4335 10.24251/HICSS.2020.529

Raimo, N., Turi, I. D., Rubino, M., & Vitolla, F. (2021). *Which italian SMEs fall in love with digitalisation? an exploration into the determinants*. Meditari Accountancy Research. doi:10.1108/MEDAR-02-2021-1210

KEY TERMS AND DEFINITIONS

Artificial Intelligence (AI): Ability of a software system or a computerized robot to perform tasks commonly associated with intelligent beings.

Civil Society Organizations (CSOs): Group of people that operates in the community in a way that is distinct from both government and business (civil society; non-governmental; organization; and social movement organization).

Electronic Health Records (EHR): Electronic version of a patient's medical history, which is maintained by the provider over time, and may include key clinical data, demographics, progress notes, problems, medications, vital signs, medical history, immunizations, laboratory data, and miscellaneous reports.

Generation (Gen Y): Also called millennial generation, internet generation, born between 1980 and 1996.

Generation (Gen Z): Individuals born between the mid-1960s and the early 1980s, years following the post-war baby boom (1946-1964).

Internet of Things (IoT): It refers to the digital interconnection of everyday objects with the internet, connection of objects to large databases and networks to the network of networks.

Technology Acceptance Model (TAM): Model to understand the causal relationship between external variables of user acceptance and the actual use of the information system, seeks to understand the behavior of users through knowledge of the utility and perceived ease of use.

Whole Slide Image (WSI): Refers to the generation of digital images in video format to produce digital content.

Chapter 3
Disrupt!Canvas: A Framework for Strategic Platform Business Model Analysis

Alexandre Crespo Ruco
https://orcid.org/0000-0002-8863-6606
ISCAC, Portugal

ABSTRACT

To analyze a startup or an existing business under the light of this strategy can be useful to produce insights on how these connections can be created between producers and consumers and how a company could develop some of the elements or characteristics of a platform business. Strategic management templates like business model canvas are focused on the business models in a generic way. This chapter proposes a specific approach, an analysis of the business model, oriented by the most successful and impactful business strategy of the digital age, the platform strategy.

INTRODUCTION

The Platform Strategy has a central role in the Digital Revolution, and it is at the core of the most disruptive business models in the 21st century. Well-succeed startups like Uber, Airbnb, Facebook, Alibaba, and Farfetch are just some of the use cases of that strategy and were chosen as illustrative examples for the application of the method proposed in this article.

DISRUPT!CANVAS is a strategic management template created to support the sketch of business ideas and assessment of early-stage startups, based on the criteria of a business propensity to promote the disruption of markets. This chapter aims to propose a combination of the concepts present in the template and the fundaments of the Platform Business Strategy, resulting in an enhanced version of DISRUPT!CANVAS, with increased disruptive potentials.

This chapter is organized as follows: it starts with a literature review on Market Disruption, Digital Disruption, Platform Business Models, and Business Modeling Templates and the gaps this chapter is aimed to fill. Then, the building blocks of Disrupt!Canvas are detailed, with a short review and update

DOI: 10.4018/978-1-7998-9008-9.ch003

of the main concepts each block is based on. Examples from big and famous companies, and unicorns are used as illustrations of how the analysis of this business using the canvas could look like. The chapter ends with a discussion of some controversies, recommendations for the application of the template, directions for future research, and a conclusion.

BACKGROUND

Christensen (1997) proposes that the disruption of markets typically forms a double curve in the form of an S, which describes the gains of performance of innovation, after an early stage characterized by a level of efficiency even lower than the former version of a solution.

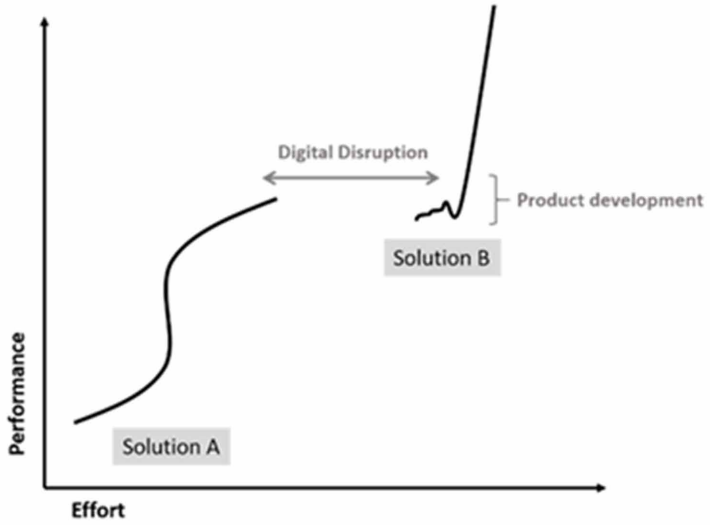
With shorter product development cycles, thanks to the adoption of the agile methodologies and the increasing importance of time to market due to the digitalization (Hofmann, 2020), a curve used to illustrate the disruption in the digital era could have a different shape, representing brief iterations, several versions and a very short period of lack of efficiency, to rapidly achieve high levels of performance (Fig.1).

This kind of turbulence in markets, characterized by the erosion of its boundaries, called Digital Disruption, a process of creative destruction that transform industries by changing the previous boundaries and approaches (Karimi & Walter, 2015) for value networks, value creation, and value capture, the primary components of a business model (Koen et al., 2011).

In this disruption process, there is a strategy that plays a central role: the Platform Strategy.

Research from MIT (Cusumano et al., 2020) shows that in 2017, 60% to 70% of the unicorns - start-ups valued at US$1 Billion or more - as so as the top-ranked companies by market capitalization, that represented in 2020 more than US$6.3 trillion in market value, were platform businesses.

Figure 1. Digital disruption curve
Source: The Author.



The main difference of Platform Business when compared with Product Business is the presence of the network effects, a phenomenon that occurs when the benefit an agent get from an action changes as a consequence of a variation in the number of agents doing the same action (Liebowitz & Margolis, 1994).

Platform Business Models exist basically in two types: innovation platforms, on its top, are created innovation by third parties, like IBM Watson, Facebook for Developers, GitHub, and Sony PlayStation; and transaction platforms, that serves as intermediaries for direct exchange or transactions – eBay, Ali Baba, Google Play, TripAdvisor. There are also hybrid platforms like Apple, Facebook and Amazon, that intermediate transactions and host innovations as well (Cusumano et al., 2020).

A startup or existing company that aims to develop a platform business model has two main strategic options: 1) coring: connects users and providers that no platforms have connected before, by solving a core technical problem like Google in internet research and 2) tipping: creates market momentum to win the platform war; an example of this approach is the operating system Linux, that took advantage of its better user experience to grow in the servers market, characterized by advanced users (Gawer & Cusumano, 2007).

In the last decade, the design and documentation of business models have been performed in iterative ways, mostly thanks to the advance of agile frameworks like Lean Startup (Ries, 2011) and the Business Model Canvas (BMC), a strategy's blueprint composed of nine building blocks that represent the way a firm intends to make money (Osterwalder et al., 2010).

BMC is a simple, quick, and clear tool, that enables creative and collaborative work; on the other hand, core elements for any business model, even more for platform-based one, are not considered: trends, final users, and competitors (Becker & Bröcker, 2021). That is the gap this chapter aims to fill, by proposing a framework to facilitate the composition and analysis of Business Models, with a special emphasis on the essential elements of successful platform businesses.

A FRAMEWORK FOR DISRUPTIVE BUSINESSES IDEATION

Created by a group headed by this author, the Disrupt!Canvas (Ruco, 2021/2021) is a strategic management template idealized with a very specific aim – to help students to compose business ideas that could serve as subjects for their Master's Thesis. Some changes (commits) on the original template were necessary to adapt the tool for this extended application, giving the origin of a "fork", a deeply new version of the tool.

The Disrupt!Canvas is composed of nine building blocks, listed in the first column of Table 1; the second column summarizes the changes in the blocks promoted as result of this research; the third column brings some comments on the changes applied.

In this section, the blocks of the enhanced version will be described and illustrated with examples of big companies and startups that are on the list of unicorns (Anand Sanwal, 2020).

Building Block 1: Problem Statement

The way a problem is addressed can be quite transformed by new technologies and business models, so it is very important to keep the focus on the problem itself before the analysis of competition. Understanding the human needs related to a problem is the first stage of the Design Thinking process (Foster, 2021), the method that aims to propose better or alternative solutions.

Table 1. Original and changed building blocks of Disrupt!Canvas

Original building block	Changes on the block	Comments
Problem Vision	Changed to "Problem Statement"	Just changed the nomenclature, the essence is the same.
Competitors	Changed to "Existing intermediaries"	A new platform business does not compete with an existing solution, but with the existing intermediaries.
Unrenewable Resources	Underexplored resources	The essence of a platform business is leveraging resources present outside the organization. Although renewable or not, there are resources that can be underexplored.
Excluding Market	Underserved niches	Just changed the nomenclature, the essence is the same.
Stable cash flow	Block suppressed	A platform business is monetized by capturing portions of the value created by the connections and interactions between users and producers. The revenue model of existing top-down businesses is not relevant for the new version of the Dirupt!Canvas.
Entry Barriers	Barriers to Entry	Just changed the nomenclature, the essence is the same .
Tech and data-based features	Faster and Broader Connections	A platform business doesn't offer features to compete in the market, but connects users and producers in faster and broader ways.
Benefits for the planet and people	Efficiency gains	The benefits for the planet and people are very important, but through the platform perspective, the innovation goes beyond, promoting gains of efficiency, by leveraging resources from the outside of the organization.
Sustainable revenues	Sustainable value model	The aim of a platform business is to create and capture value, instead of offering products or services to generate revenues.
Expanded Market	Kept as it is	As so as a disruptive business model has the potential to expand a market by creating demand-side scale, a Platform Business promotes expansions by bringing new users and providers to the market.
Disruptive solution	Block suppressed	The aim of the new business doesn't need to be described in the template, once is going to be implicit in the other blocks.

Collibra is a Data Intelligence company based in Brussels. This unicorn, evaluated in US$2.36 bi, offers an environment that connects people of different roles in an organization, to promote the production of creative solutions and data-driven decisions in a collaborative way. The Problem Statement for Collibra could be described as "Manage Data in a Trustful, Consistent Way", and the solution the company offer is a platform that uses templates based on APIs (Application Program Interface), certified drivers, and applications developed by its partners to integrate a network of databases, algorithms, and third-party platforms.

Table 2. A possible answer for this building block, using as an example a European Unicorn Source: Adapted from (Collibra, n.d.).

Company	Headquarter location	Aim of the platform	Problem statement
Collibra	Brussels	Data integration	Manage data in a trustful, consistent way

Building Block 2: Existing intermediaries

This replaces the original block "Competitors". A new platform business does not compete with an existing solution, but with the existing intermediaries. Not every intermediary is a platform. Even when the strategic option of the platform is "coring" – when there is no existing platform (Gawer & Cusumano, 2008) there are connection between providers consumers and, in some cases, other intermediaries.

Uber and Airbnb, for example, don't compete directly with taxi drivers or hotels - their innovative business models were used to substitute Radio Taxi Services and Travel Agencies as intermediaries between passengers and cabs; guests, and hosts, using technology to turn these connections into broader and faster ones.

These platforms also provide some additional services, such as standards, governance, and curation, allowing users to choose and trust their providers. These additional services were typically provided not for intermediates, but third parties like city councils, hotel chains, and the AAA (the independent organization responsible for the "stars"). The additional services can be considered a way to promote network effects, helping to solve what is known as "the chicken or the egg problem" (Caillaud & Jullien, 2001). How to attract guests and passengers if there are not many hosts and cabs, and vice-versa?

Bitpanda is a fintech that sells cryptocurrency directly to users, for earning a fee over market prices (Ofir Beigel, n.d.), achieving a non-crypto native public – 87% of the universe of crypto investors (Binance Research, 2021). Applications can be developed on top of Bitpanda's algorithm, through an API, an SDK (Software Development Kit), and a Project Repository.

Table 3. Illustration of the concept using as an example a unicorn

Company	Headquarter	Aim of the platform	Existing Intermediaries
Bitpanda	Vienna	Allows information services, app developers, and content producers to transact crypto assets.	Cryptocurrency exchanges

Source: Adapted from (Bitpanda, n.d.)

Building Block 3: Underexplored Resources

The essence of a platform business is leveraging resources present outside the organization. Although renewable or not, there are resources that can be underexplored. Thanks to the curation and standardization, and the broader and faster connections allowed by digital platforms, resources can be used in more efficient ways.

Before Airbnb, thousands of households had empty beds that only were not offered for rent because they were out of travel agencies' radar; thousands of cars with no license to work as taxis were inside of garages because there was no efficient way for passengers to choose a trustful cab.

Before the advance of media platforms like Instagram, Spotify, and YouTube, an amateur or event aspirant of a professional photographer, a garage band, or a specialist in a subject like, for example, car fixing, would probably never have space on traditional media to share their creativity and proficiency with a public that, despite the low volume compared to soccer and telenovelas, actually exists. The phenomenon is known as "The Long Tail" (Anderson, 2004).

Klarna is a marketplace and a fintech that offers friendly and featured payment and checkout services that can be accessed through an API. The high fees and bureaucracy of Credit Card brands are used to keep small retailers out of the online business game, and these resources, low in individual volume but enormous in their total amount, are explored in a much more efficient way.

Table 4. Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Underexplored Resources
Klarna	Stockholm	Allows developers to offer a friendly and featured payment method in his or her systems, online stores, and apps.	Retailers there were out of credit card service's target market.

Building Block 4: Underserved Niches

Determined by economies of technological and transactional costs or for imperfections on markets, like lack of information (Perry, 1989), the Vertical Integration grants the supply of critical resources and discourages new entrants by keeping the entry costs high. On the other hand, this strategy can bring a lack of flexibility, by promoting a commitment to a particular technology or way of operating (Robert D. Buzzell, 1983).

Once Digital Disruption makes the foundation of vertical integration, by making information more accessible, the transactions cheaper, or the technology obsolete, in some cases all of three options, the entry barriers tend to crumble, and for existing vertical integrated players, to survive in the market can become harder.

Under the control of major media companies, the industry of music was restricted to members of an exclusive club, selected by executives with the power to decide what people would listen to or not. Producing and recording music, manufacturing and distribution of discs, promoting the artists, all this ecosystem were owned by the same groups. In 2020, Spotify has paid US$5bi in royalties for 1.2 million artists with over 1,000 listeners on the platform (Carman, 2021).

Odoo is a startup based in Louvain-la-Neuve, Belgium, that is evaluated at US$2.3 billion. Tech giants focused on the B2B Market, such as IBM, Microsoft, and Sales Forced used to control all stages of production, from development to sales. With a strong cash flow obtained from these enterprise customers, these firms still concentrated on their core skills – office packs, HR management tools, Customer Relationship Management databases, and more. Odoo has invaded this citadel, with a product that not only combines but integrates all this data and can be extended by adding novel apps developed on the top of its platform.

Table 5. Illustration of the concept using as an example a unicorn Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Underserved Niches
Odoo	Louvain-la-Neuve	Offer an all-in-one solution for business management, through dozens of owned and thousands of compatible third-party apps.	Each sector of business is dominated by super-specialized software (SalesForce, Office, SAP).

Building Block 5: Barriers to Entry

Basic question: What are the obstacles that prevent new competitors to enter the market?

The entrance of competitors in a market becomes harder, for example, when established firms have advantages in the acquisition of inputs or enjoy preferred access to production techniques.

Understanding the existing barriers is very important for the identification of entry opportunities (Bain, 1956), due to changes in techniques and scale economies brought by digital transformation: access to knowledge, digital distribution channels, cheaper software and hardware structure, and abundant venture capital (Sean Middleton, 2015) are among the factors for this new scenario.

It was very hard, almost impossible, to start a new television company in the 1990s. How could regular companies build studios, hire artists, engineers, executives, put satellites in space from one day to another? How could they obtain a channel controlled by the government under no transparent rules? In 2020, 2 billion YouTube users spent 18 minutes per day watching 37 million different channels. The highest-paid content producer earned US$29.5 million in 2020 (Omnicore Agency, 2021). The growing adoption of platforms concentrates the market power in one or a few competitors (Rietveld & Schilling, 2021), rising new entry barriers, based on the control of computational structure that connects users and producers in a value network.

Table 6. Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Entry Barriers
GoStudent	Vienna	Connecting tutors and students for online learning.	Providing one-to-one lessons was historically a local business. This geographic barrier has been broken by the explosion of online learning (on the demand's side) and remote worker (on the side of the offer), in 2020.

Source: Adapted from GoStudent (n.d.).

Building Block 6: Faster and Broader Connections

This block substitutes the original one "Tech and data-based features", once a platform business doesn't offer features to compete in the market but connects users and producers in faster and broader ways. These knots of a universal network are going to create a new global digital culture that will boost human prosperity to never imagined levels (Canton, 2016). The control over the computational architecture of the platform is the source of power, in contrast with traditional companies, which power is based on the control of production factors (Kretschmer et al., 2020).

Philatelist stamp dealers are connecting buyers to sellers and capturing part of the value of these transactions in a new way. Most of the exchanged stamps are the same, but now these connections have one more intermediary: ebay.com. Catalogues and price lists formerly sent by mail with registered members were substituted by a platform that connects buyers and sellers with dealers and frequently buyers directly to sellers, in the process called disintermediation (Gawer, 2020).

Table 7. Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Faster and Broader Connections
Infobip	Vodnjan	Connect companies and users with omnichannel and third-party developed tools.	The connections between companies and users, performed by a contact center, are quite limited, making the service expensive for medium-small companies. Additionally, automation generates data that can drive optimization and decision-making.

Source: Adapted from (infobip, n.d.)

Building Block 7: Sustainable Value Model

Replaces the original "Sustainable revenues": the aim of a platform business is creating and capturing value, instead of offering products or services to generate revenues. A firm's growth and productivity have more positive impacts on a startup's profit than smart money injections IPO-driven boosted profit margins (Kang, 2020). The "best" money comes from clients, not from investors. To capture part of the value created, and use this this value to boost the creation of network effects, by subsidizing one or more sides of the network (Cusumano et al., 2020), a revenue model must be carefully chosen.

The value created by a platform enables the network effects, that can be even more important than the value capture. With few or none physical assets, platform organizations have in the network effects its entry barriers (Menz et al., 2021). The most common platforms' revenue models its characteristics are listed on Table 8.

Table 8. The most common platforms' revenue models

Revenue model	Main Advantage	Minimum Network Size	Value Added	Minimum maturity level
Subscriptions	Regular income	Large	High	Established
Listing fees	Volume	Large	Low	Growing
Commissions	High-ticket	Small	High	Startup
Interaction fees	Flexibility	Small	Low	Startup

Source: Adapted from Lazzaro (2021).

Building Block 8: Efficiency Gains

Replaces the original block "Benefits for the planet and people": the aim of a platform business is creating and capturing value, instead of offer products or services to generate revenues. Gain Efficiency in the Digital Age means building, operate and growing a digital business. It requires an exponential mindset that enables a company to compose and follow a business roadmap (for a non-born digital business, a digitalization roadmap), prioritizing the allocation and the acquisition of digital talent, infrastructure, and money to the digital strategy, and to the creation of digital assets and activities, using design thinking methods to design not only products but also processes, to build the future of the firm (Libert & Beck, 2017).

The gains of efficiency can be produced by combinations of complementary assets that enhance innovation capabilities, and even new innovative products and services (Coleman & Taylor, 2016).

The giant furniture retailer IKEA launched an app that allows customers to scan and pay for items using their mobile phones, skipping the checkout lines. With this new approach, the design of a store to seems more like a big house than like a supermarket, organized in rows. The data generated in each shop is used to drive decisions and produce valuable insight for the whole value chain (Stackpole, 2021).

Table 9. Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Sustainable revenues
Rohlik	Prague	Connect local grocery producers with consumers.	Rohlik earns a fee from local businesses to expand their markets, instead of trying to put them out of business.

Source: Adapted from (Rohlik, n.d.)

Building Block 9: Expanded Market

As so as a disruptive business model has the potential to expand a market by creating demand-side scale, a Platform Business promotes expansions by bringing new users and providers to the market.

When a market lead firm focuses its long-term decisions on the current necessities of its customer base, a risk is being assumed: a new product or service architecture, totally unknown by current users, can be under development or test, or even being launched (with less efficiency during the initial stages, as shown in fig1) and, in some cases, being underestimated as a potential competitor. It is called supply-side disruption.

When a company focuses on competitors' offers and ignores new entrants, which can be growing in the shadow, innovating in underserved segments, starting a demand-side disruption (Gans, 2016). These new entrants have the potential to disrupt entire markets, boosted by technology, venture capital, and successful platform strategies.

Disruptions can not only change markets by redistributing market shares, but also expanding those markets, particularly disruptions on the demand side. Despite its share representing less than 5% of the short rental market, the peer-to-peer virtual trust between guests and hosts has created a new circular-economy culture: not only hotels can be hosts, but anyone with a bed (and in some cases, also a breakfast).

Table 10. Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Efficiency gains
Lunar	Aarhus	Connect financial services and other providers with customers via an app.	Relationship with customers and investors were some of the higher costs of financial services providers. Lunar intends to be a "second bank", working as a bridge between clients and services, including the "primary" bank. Time, money, and talent are fully dedicated to the mobile app.

Source: Adapted from Lunar (n.d.)

Pleo is a fintech that grows in the shadow of the credit card companies market, focusing on a specific, underserved, and profitable niche: corporate cards. Expensive, bureaucratic, and exclusive, the classic corporate cards used to represent a fraction of credit card companies' revenues, that come mostly from retail. Pleo offers an easy-to-manage payment service, with user-friendly reports that allow companies of all sizes to have control of their expenses with lower administrative costs.

Table 11. Illustration of the concept using as an example a unicorn

Company	Headquarter location	Aim of the platform	Expanded Market
Pleo	Copenhagen	Connect financial service providers and companies to offer affordable, user-friendly corporate cards and management tools like business intelligence reports.	Small local fintechs can work as payment service providers; small companies and startups can have access to these services.

Source: Adapted from Pleo (n.d.).

Controversies

Even if it's possible to predict a disruption, it's certainly very hard, once uncountable businesses around the world are testing new products and services architectures or trying to give different offers to underserved niches. New use cases of emergent tech are being tested, some of them potentially disruptive. Which of these service architectures, business models, and tech use cases is going to disrupt a market?

If it's unfeasible to predict a disruption, what to say about planning one?

SOLUTIONS AND RECOMMENDATIONS

By using Disrupt!Canvas to analyze or ideate a business, a company, or startup, will be performing an analysis of possibilities, and the product of this analysis is going to be a hypothesis. Having clear expectations is very important: a hypothesis is only the first stage.

To produce a strong business hypothesis with the support of Disrupt!Canvas, four factors are also very important: people, method, time, and data. People of diverse profiles and from diverse areas of the company, with the support of a C-Level, if it's possible, to use to produce better insights. Small Startups can invite partners to participate. The method can be an online meeting, a presential workshop or other, what is important is: there is no bad idea. A profusion of good and not-so-good ideas sometimes paves the road to produce good ones.

Time should be spent to explain the tool, the market context, and to bring every participant to the same page. And to collect data as well. Data from different areas of a company and markts, illustrate and stimulate high-level discussions about the disrupt potential of a business.

FUTURE RESEARCH DIRECTIONS

When coined the phrase "Software is eating the world", Marc Andressen (2011) have illustrated the statement with numbers about software companies that became giants of bookselling (amazon.com), video service (netflix.com), and music distribution (apple.com/itunes, spotify.com).

Five years later, Satell (2016) wrote on Forbes about how ecosystems of talent, information, and technology were changing the basis of competition. The famous post was named "The platforms are eating the world".

In 2021, Blockchain is about to change the game in Payments, Exchanges, Documentation, Digital Identity, Supply Chain Management and more, in markets like Healthcare, Retail, Real Estate, and others, with a predicted growth by US$15.1 Billion by 2024 (Blockchain Market Size, 2020). Now, it is Blockchain that is eating the world (Schneider, 2019).

Smart Contracts are a feature of the second-generation blockchain (Decentralized Applications (Dapps), n.d.). Also known as Dapps, they have the potential to substitute the existing platforms that run in "the cloud" with decentralized, transparent blockchain platforms (Chohan, 2021). Dapps can capture part of the value created in a more direct form, by earning fees for cryptocurrency transactions, instead of changing free services for personal information, attention, and access to stored data.

A possible research direction could be the actual or potential impact of Dapps on businesses. The product of this study could be an update on Disrupt!Canvas, or an upgrade to a "Dapps Version"; or even the creation of a new tool, as a natural evolution, to perform this kind of analysis.

CONCLUSION

Disruptive innovation is something relatively rare, hard to identify, and even more hard to put into practice. On the other hand, human necessities are limitless, problems are maybe the most abundant thing in the world, and the field of problems to be explored is enormous.

Intermediaries that run a profitable business from the inside of their citadels, worrying more about avoiding cannibalization than about listening to small and subserved niches, are abundant. The analysis of all these variables in an integrated way can be a valuable tool to analyze a business or a business idea, and some of its possibilities.

Canonical examples like Uber, Netflix, or Airbnb can be useful to illustrate the application of the Canvas with famous companies and services, and the examples from unicorns serve to update the concepts with the most recent business tendencies. By using the Disrupt!Canvas in the context of a Workshop or Strategic Planning meeting, possibly some design thinking technics like brainstorming, can produce valuable insights to the organization. The simple study of the building blocks and the concepts that exist in the background can, by its turn, serve as an inspiration for innovative and why not, potentially disruptive ideas.

REFERENCES

Anderson, C. (2004, January 10). The Long Tail. *Wired*. https://www.wired.com/2004/10/tail/

Andreessen. (2011, August 20). *Why Software Is Eating the World*. Andreessen Horowitz. https://a16z.com/2011/08/20/why-software-is-eating-the-world/

Bain, J. S. (1956). *Barriers to new competition: Their character and consequences in manufacturing industries*. Harvard University Press. doi:10.4159/harvard.9780674188037

Becker, M., & Bröcker, J.-O. (2021). *Business Model Canvas—Overview of the main advantages and disadvantages* (IUCF Working Paper No. 6/2021). ZBW - Leibniz Information Centre for Economics. http://hdl.handle.net/10419/234963

Beigel. (n.d.). Bitpanda Review (2021 Updated). *99 Bitcoins*. Retrieved September 7, 2021, from https://99bitcoins.com/bitcoin-exchanges/bitpanda-review/

Binance Research. (2021). *2021 Crypto User Index*. Author.

Bitpanda. (n.d.). *Bitpanda—Start investing today*. Retrieved September 9, 2021, from https://www.bitpanda.com/en

Blockchain Market Size. (2020). [Research]. marketresearchengine. https://www.marketresearchengine.com/blockchain-market

Buzzell. (1983). Is Vertical Integration Profitable? *Harvard Business Review*. https://hbr.org/1983/01/is-vertical-integration-profitable

CaillaudB.JullienB. (2001). Chicken and egg: Competing matchmakers. *Available at* SSRN 278562.

Canton, J. (2016). *Future smart: Managing the game-changing trends that will transform your world*. Academic Press.

Carman, A. (2021, March 18). *Spotify says over 13,000 artists' catalogs earned at least $50K in royalties last year*. The Verge. https://www.theverge.com/2021/3/18/22336087/spotify-loud-clear-website-launch-pay-artists-streaming-royalities

Chohan, U. W. (2021). *Decentralized Finance (DeFi): An Emergent Alternative Financial Architecture* (*SSRN* Scholarly Paper ID 3791921). Social Science Research Network. doi:10.2139/ssrn.3791921

Coleman, M., & Taylor, M. (2016). *Competition world—A global survey of recent competition and antitrust law developments with practical relevance* [Survey]. Norton Rose Fulbright. https://www.nortonrosefulbright.com/en/knowledge/publications/ 9574b9f5/what-are-the-competition-implications-of-digital-disruption

Collibra. (n.d.). *Collibra: Helping Organizations Become United by Data*. Retrieved September 9, 2021, from https://www.collibra.com/

Cusumano, M., Yoffie, D., & Gawer, A. (2020). The Future of Platforms. *MIT Sloan Management Review*.

Decentralized applications (dapps). (n.d.). Retrieved September 9, 2021, from https://ethereum.org

Foster, M. K. (2021). Design Thinking: A Creative Approach to Problem Solving. *Management Teaching Review*, *6*(2), 123–140. doi:10.1177/2379298119871468

Gans, J. (2016). *The disruption dilemma*. The MIT Press. doi:10.7551/mitpress/9780262034487.001.0001

Gawer, A. (2020). Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. *Long Range Planning*, *102045*. Advance online publication. doi:10.1016/j.lrp.2020.102045

Gawer, A., & Cusumano, M. (2008). How Companies Become Platform Leaders. *MIT Sloan Management Review*, *49*, 28–35.

Gawer, A., & Cusumano, M. A. (2007). Strategies for Platform-Leader Wannabes. *Globalization and Japan´s Science and Technology Strategy*, 19.

GoStudent. (n.d.). *Nachhilfe mit 96% Erfolgsquote | GoStudent*. Retrieved September 9, 2021, from https://www.gostudent.org//

Hofmann, M. (2020). *Prozessoptimierung als ganzheitlicher Ansatz: Mit konkreten Praxisbeispielen für effiziente Arbeitsabläufe*. Springer Gabler.

infobip. (n.d.). *Build meaningful customer relationships across any channel*. Infobip. Retrieved September 9, 2021, from https://www.infobip.com/

Kang, M. Y. (2020). Sustainable Profit versus Unsustainable Growth: Are Venture Capital Investments and Governmental Support Medicines or Poisons? *Sustainability*, *12*(18), 7773. doi:10.3390u12187773

Karimi, J., & Walter, Z. (2015). The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry. *Journal of Management Information Systems*, *32*(1), 39–81. doi:10.1080/07421222.2015.1029380

Klarna International. (n.d.). *Klarna International | Safe & easy-to-use payment solutions*. Retrieved September 9, 2021, from https://www.klarna.com/international/

Koen, P. A., Bertels, H. M. J., & Elsum, I. R. (2011). The Three Faces of Business Model Innovation: Challenges for Established Firms. *Research Technology Management*, *54*(3), 52–59. doi:10.5437/08953608X5403009

Kretschmer, T., Leiponen, A., Schilling, M., & Vasudeva, G. (2020). Platform ecosystems as meta-organizations: Implications for platform strategies. *Strategic Management Journal*, smj.3250. Advance online publication. doi:10.1002mj.3250

Lazzaro, A. (2021, January 18). How to Choose a Realistic Revenue Model for Your Online Platform. *Bplans Blog*. https://articles.bplans.com/online-platform-revenue-model-options/

Libert, B., & Beck, M. (2017, January 13). 7 Essential Steps For Digital Transformation. *Forbes*. https://www.forbes.com/sites/barrylibert/2017/01/13/7-essential-steps-for-digital-transformation/

Liebowitz, S. J., & Margolis, S. E. (1994). Network Externality: An Uncommon Tragedy. *The Journal of Economic Perspectives*, *8*(2), 133–150. doi:10.1257/jep.8.2.133

Lunar. (n.d.). *Lunar: Your other bank*. Retrieved September 9, 2021, from https://lunar.app/en/

Menz, M., Kunisch, S., Birkinshaw, J., Collis, D. J., Foss, N. J., Hoskisson, R. E., & Prescott, J. E. (2021). Corporate Strategy and the Theory of the Firm in the Digital Age. *Journal of Management Studies*, *58*(7), 1695–1720. doi:10.1111/joms.12760

Middleton. (2015). *Five ways digital technologies are lowering barriers to entry* [Blog]. Digitally Cognizant. https://digitally.cognizant.com/five-ways-digital-technologies-are-lowering-barriers-to-entry

Odoo. (n.d.). *Open Source ERP and CRM | Odoo*. Odoo S.A. Retrieved September 7, 2021, from https://www.odoo.com/

Omnicore Agency. (2021, August 11). YouTube by the Numbers (2021): Stats, Demographics & Fun Facts. *Omnicore*. https://www.omnicoreagency.com/youtube-statistics/

Osterwalder, A., Pigneur, Y., & Clark, T. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Wiley.

Perry, M. K. (1989). Vertical integration: Determinants and effects. In *Handbook of Industrial Organization* (Vol. 1, pp. 183–255). Elsevier., doi:10.1016/S1573-448X(89)01007-1

Pleo. (n.d.). *Smarter spending for your business*. Pleo. Retrieved September 9, 2021, from https://www.pleo.io/en

Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses* (1st ed.). Crown Business.

Rietveld, J., & Schilling, M. A. (2021). Platform Competition: A Systematic and Interdisciplinary Review of the Literature. *Journal of Management*, *47*(6), 1528–1563. doi:10.1177/0149206320969791

Rohlik. (n.d.). *Online supermarket Rohlik.cz—Nejrychlejší doručení ve městě*. Rohlik.cz. Retrieved September 9, 2021, from https://www.rohlik.cz/vitejte

Ruco, A. (2021). *Disrupt-canvas*. https://github.com/alexruco/disrupt-canvas

Sanwal. (2020, June 10). *50 Startup Unicorn Companies in 2020*. CB Insights Research. https://www.cbinsights.com/research/report/future-unicorn-startups-billion-dollar-companies/

Satell, G. (2016, September 2). Platforms Are Eating The World. *Forbes*. https://www.forbes.com/sites/gregsatell/2016/09/02/platforms-are-eating-the-world-3/

Schneider, S. (2019, February 24). *How blockchain is eating the world*. https://medium.com/hackernoon/how-blockchain-is-eating-the-world-82ca87d26429

Stackpole, T. (2021, June 4). Inside IKEA's Digital Transformation. *Harvard Business Review*. https://hbr.org/2021/06/inside-ikeas-digital-transformation

ADDITIONAL READING

Allen, B. J., Chandrasekaran, D., & Gretz, R. T. (2021). How can platforms decrease their dependence on traditional indirect network effects? Innovating using platform envelopment. *Journal of Product Innovation Management*, *38*(5), 497–521. doi:10.1111/jpim.12597

Chen, Y., Pereira, I., & Patel, P. C. (2021). Decentralized Governance of Digital Platforms. *Journal of Management*, *47*(5), 1305–1337. doi:10.1177/0149206320916755

Filser, M., Kraus, S., Breier, M., Nenova, I., & Puumalainen, K. (2021). Business model innovation: Identifying foundations and trajectories. *Business Strategy and the Environment*, *30*(2), 891–907. doi:10.1002/bse.2660

Klein, S. P., Spieth, P., & Heidenreich, S. (2021). Facilitating business model innovation: The influence of sustainability and the mediating role of strategic orientations. *Journal of Product Innovation Management*, *38*(2), 271–288. doi:10.1111/jpim.12563

Rietveld, J., & Schilling, M. A. (2021). Platform Competition: A Systematic and Interdisciplinary Review of the Literature. *Journal of Management*, *47*(6), 1528–1563. doi:10.1177/0149206320969791

Saidakhror, G., Abbos, S., Nuriddin, R., Muqaddas, J., Bobur, S., Nurbek, K., & Fakhriddin, A. (2021). World Experience of Development Trends of Digital Economy. *Annals of the Romanian Society for Cell Biology*, 5200–5206.

Shi, X., Li, F., & Chumnumpan, P. (2021). Platform Development: Emerging Insights From a Nascent Industry. *Journal of Management*, *47*(8), 2037–2073. doi:10.1177/0149206320929428

KEY TERMS AND DEFINITIONS

Agile Methodologies: Set of principles and practices intended to improve the effectiveness of development processes, based on incremental and interactive steps.

API (Application Program Interface): A connection between computers or between computer programs.

Blockchain: A decentralized, distributed, and oftentimes public, digital ledger consisting of records called blocks that are used to record transactions.

Circular-Economy: A model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible.

Commits: Savepoints within Git's version control.

Creative Destruction: The dismantling of long-standing practices to make way for innovation.

Crypto Native: A cryptocurrency investor that has the necessary knowledge to use crypto financial instruments in an independent way.

Decentralized Applications: Apps that have their backend code (smart contracts) running on a decentralized network and not a centralized server.

Disintermediation: The removal of intermediaries in economics from a supply chain, or "cutting out the middlemen" in connection with a transaction or a series of transactions.

Fintech: A public offering in which shares of a company are sold to institutional investors and usually also retail investors.

IPO (Initial Public Offering): A public offering in which shares of a company are sold to institutional investors and usually also retail investors.

Unicorn: Privately held startup company valued at over $1 billion.

Venture Capital: A form of private equity and a type of financing that investors provide to startup companies and small businesses that are believed to have long-term growth potential.

APPENDIX 1. DISRUPT!CANVAS - COLLIBRA.COM

Collibra delivers the only end-to-end Data Intelligence platform to accelerate digital business transformation.

Building Block 1: Problem Statement

Manage data in a trustful, consistent way

Building Block 2: Existing intermediaries

Consulting firms are hired as "authorized partners" of big techs to deploy solutions like SAP or SalesForce.

Building Block 3: Underexplored resources

Knowledge workers processing data to prepare reports from no integrated systems.

Building Block 4: Underserved niches

Medium companies or startups were out of the target market of integrated management systems.

Building Block 5: Entry barriers

Robust software structures were necessary to deploy an integrated solution and keep it safe. Cloud computing and Open-Source software are affordable and effective.

Building Block 6: Faster and Broader Connections

In this case, the connections are most inside the client organizations. Tools that use to work separately like Time Tracking and Project Management Systems and even isolated worksheets can be integrated.

Building Block 7: Sustainable value model

Collibra combines the classic "partner" model (small, licensed firms) and a digital platform for compatible add-ons in the form of an app store.

Building Block 8: Efficiency gains

Knowledge workers can spend less time managing information and more time on analysis, improvement, and learning.

Building Block 9: Expanded market

Small and medium companies and startups can have integrated management systems; independent programmers can make code for compatible, authorized add-ons in a niche formerly dominated by big techs.

APPENDIX 2. DISRUPT!CANVAS - BITPANDA.COM

Bitpanda is a centralized crypto exchange that provides users access to digital assets.

Building Block 1: Problem Statement
Have access to sophisticated financial instruments.

Building Block 2: Existing intermediaries
Cryptocurrency exchanges

Building Block 3: Underexplored resources
Mobile phones are powerful and easy-to-use machines that bank apps use for banking only, not to manage the financial life of clients more fully.

Building Block 4: Underserved niches
Non-crypto natives.

Building Block 5: Entry barriers
Financial services were a locked sector, with too much regulation and gatekeepers.

Building Block 6: Faster and Broader Connections
Banks are intermediates, that connect lenders with borrowers. Banks lend money and sell de debts, sell insurance and then sell the risk. Bitpanda connects customers and other fintech by APIs.

Building Block 7: Sustainable value model
Banks are intermediates, that connect lenders with borrowers. Banks lend money and sell de debts, sell insurance and then sell the risk. Bitpanda connects customers and other fintechs with APIs.

Building Block 8: Efficiency gains
BitPanda offers complex services with usability and convenience, saving energy and time.

Building Block 9: Expanded market
Crypto Natives are a very small market composed of 10 million early adopters all over the world. BitPanda focuses on a broader universe, the digital natives that one to take advantage of the time by starting to invest early.

APPENDIX 3. DISRUPT!CANVAS - KLARNA.COM

Klarna is an e-commerce payment solutions platform for merchants and shoppers.

Building Block 1: Problem Statement
How to shop online in an easier way.

Building Block 2: Existing intermediaries
Big providers of payment systems like credit card companies.

Building Block 3: Underexplored resources
Retailers there were out of credit card service's target market.

Building Block 4: Underserved niches
Small stores, local stores, small manufacturers, artists.

Building Block 5: Entry barriers
Having the necessary volume to become a client of a payment system

Building Block 6: Faster and Broader Connections
Automated connections allow the exchange of information with a larger number of clients, generating data with little marginal costs.

Building Block 7: Sustainable value model
A fee is paid per transaction

Building Block 8: Efficiency gains
With less documentation, less human interaction, and automated data transfers.

Building Block 9: Expanded market
New payment systems can be created and integrated into the platform, as so as new businesses that can send products and receive payments online.

APPENDIX 4. DISRUPT!CANVAS - ODOO

Odoo offers an integrated suite of business apps built through an open-source development model.

Building Block 1: Problem Statement
How to manage a business in an integrated way.

Building Block 2: Existing intermediaries
Enterprise Resource Planning (ERP) system providers.

Building Block 3: Underexplored resources
Qualified human resources dedicated to administrative processes.

Building Block 4: Underserved niches
Each sector of business is dominated by super-specialized software (SalesForce, Office, SAP) that weakly integrates. Medium-small businesses and new startups are out of the radar.

Building Block 5: Entry barriers

Long-term relationships with enterprise businesses.

Building Block 6: Faster and Broader Connections

Automated support allows the company to have several small customers. Open Source software programming networks (GitHub) are a way to have improvements and bug fixing at no cost.

Building Block 7: Sustainable value model

The software is open-source, which reduces the entry friction. The startup makes money by offering a paid "enterprise version" for download, and by providing specialized support, even ad-hoc and by subscription.

Building Block 8: Efficiency gains

Protection against piracy, version control, software source code storage, bug fixing, and commissions to consultant partner companies are very expensive, and Odoo avoids all of these costs by working under an Open Source Platform Strategy.

Building Block 9: Expanded market

Small companies and startups can have access to these services, formerly an enterprise exclusivity.

APPENDIX 5. DISRUPT!CANVAS - GOSTUDENT

GoStudent is a platform for online teaching and is the future of tutoring.

Building Block 1: Problem Statement

How to boost student's productivity.

Building Block 2: Existing intermediaries

Local tutor's hubs.

Building Block 3: Underexplored resources

People with the necessary skills to be tutors were in simpler jobs. High potential students had no access to good tutors from other places.

Building Block 4: Underserved niches

People with special needs, and students that live in remote villages.

Building Block 5: Entry barriers

Providing one-to-one lessons was historically a local business. This geographic barrier has been broken by the explosion of online learning (on the demand's side) and remote worker (on the side of the offer), in 2020.

Building Block 6: Faster and Broader Connections

The lessons are still synchronized but have now the support of WhatsApp groups, screen sharing, and other features. Connections are much broader, from local hubs to a global platform.

Building Block 7: Sustainable value model

The platform earns a fee per class.

Building Block 8: Efficiency gains

No physical dislocation, no time on transportation, no calendar conflicts; no material books or notebooks.

Building Block 9: Expanded market

More students can have a tutor, in many more places and to many more budgets. Professionals of different fields can work as tutors as a second job.

APPENDIX 6. DISRUPT!CANVAS - INFOBIP.COM

Infobip specializes in omnichannel engagement powering a range of messaging channels, tools, and solutions for advanced customer engagement.

Building Block 1: Problem Statement

How to manage customer interactions from various contact points.

Building Block 2: Existing intermediaries

Specialized Contact Centers.

Building Block 3: Underexplored resources

Data generated on the contact with customers.

Building Block 4: Underserved niches

Small businesses with no volume or incomes to pay for a contact center service.

Building Block 5: Entry barriers

Human contacts are expensive, and contact centers use to have long-term contracts with their client companies.

Building Block 6: Faster and Broader Connections

The connections between companies and users, performed by a contact center, are quite limited, making the service expensive for medium-small companies. Additionally, automation generates data that can drive optimization and decision-making.

Building Block 7: Sustainable value model

Among others, Infobip works with a subscription-based model.

Building Block 8: Efficiency gains

Data generated by interactions produce valuable insights

Building Block 9: Expanded market

To manage contacts became accessible for small businesses. On the supply side, small software companies can produce apps to be used as add-ons for the Infobip solution.

APPENDIX 7. DISRUPT!CANVAS - ROHLIK.COM

Rohlik is a grocery delivery company that provides same-day delivery services in 90 minutes.

Building Block 1: Problem Statement

How to shop grocery products online.

Building Block 2: Existing intermediaries

Local Marketplaces and supermarket chains.

Building Block 3: Underexplored resources

Local products are being consumed only in its neighborhoods.

Building Block 4: Underserved niches

Small businesses have no access to e-commerce.

Building Block 5: Entry barriers

To provide grocery products for supermarket chains, a small farmer must have a big volume and follow excluding standards. With Rohlik every small grocery is on the radar.

Building Block 6: Faster and Broader Connections

A local grocery can be connected to a virtually unlimited number of consumers through the Rohlik.

Building Block 7: Sustainable value model

Rohlik is a retailer and also a marketplace that earns a fee from local businesses to expand their markets, instead of trying to put them out of business.

Building Block 8: Efficiency gains

Automated interactions allow the connection with an almost unlimited number of producers.

Building Block 9: Expanded market

Small villages, far from urban centers have low or even no local commerce and are being connected with producers by the Rohlik platform.

APPENDIX 8. DISRUPT!CANVAS - LUNAR.APP

Lunar is a digital bank that offers a mobile-based banking app that helps consumers manage their personal finances.

Building Block 1: Problem Statement

How to lend or invest money.

Building Block 2: Existing intermediaries

Traditional banks; "renewed" banks and fintechs that want to be the first bank of millennials.

Building Block 3: Underexplored resources

A mobile phone can do much more than just check an account or send a withdraw order.

Building Block 4: Underserved niches

Millennials that already have a bank account.

Building Block 5: Entry barriers

Finance is a very regulated market, with several gatekeepers.

Building Block 6: Faster and Broader Connections

Lunar works as intermediaries between clients and capital holders, and as a free financial management service provider. This free app works for the company as a powerful lead generation tool, connecting thousands of potential customers, and as a strong of data, allowing insights about consumer behavior.

Building Block 7: Sustainable value model

The company offers 3 different plans, two monthly paid a free one.

Building Block 8: Efficiency gains

Relationship with customers and investors were some of the higher costs of financial services providers. Lunar intends to be a "second bank", working as a bridge between clients and services, including the "primary" bank. Time, money, and talent are fully dedicated to the mobile app.

Building Block 9: Expanded market

Junior professionals that could have a bank only to receive wages or allowances are now exposed to more complex products, with the support of a gamified mobile app.

APPENDIX 9. DISRUPT!CANVAS - PLEO.IO

Pleo offers smart payment cards for employees to buy work-related products while keeping the company in control of spending.

Building Block 1: Problem Statement

How to perform and manage corporate expenses.

Building Block 2: Existing intermediaries

Credit Card Companies.

Building Block 3: Underexplored resources

Qualified human resources dedicated to archaic administrative payment processes.

Building Block 4: Underserved niches

Small companies and small startups were out of the radar.

Building Block 5: Entry barriers

Financial system gatekeepers.

Building Block 6: Faster and Broader Connections

Automated connections allow the exchange of information with a larger number of users; almost every employee in a company can have a corporate card, with low marginal costs.

Building Block 7: Sustainable value model

The platform earns a fee per transaction

Building Block 8: Efficiency gains

With easy-to-use credit cards, employees can pay for trips, rides, meals, and small purchases with less control and documentation.

Building Block 9: Expanded market

Small local fintechs can work as payment service providers; small companies and startups can have access to these services.

APPENDIX 10

Figure 2. Previews version of Disrupt!Canvas diagram

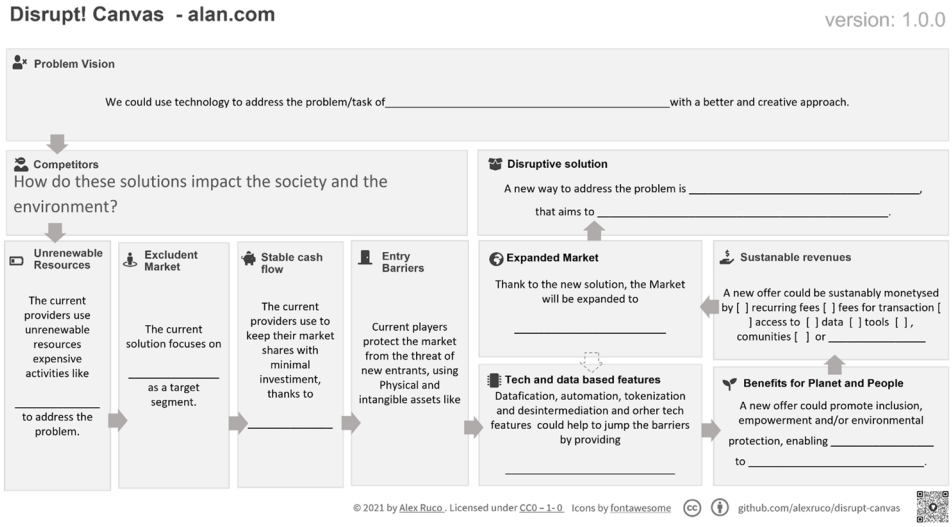


Figure 3. Enhanced version of Disrupt!Canvas diagram

Chapter 4
Big Data in Digital Media Platforms

Yasemin Özkent
https://orcid.org/0000-0002-8617-8429
Selcuk University, Turkey

ABSTRACT

Located in the center of contemporary information and technology society, big data causes evolutionary transformations in many areas. A potential competitive advantage is provided through big data analytics to revolutionize social, cultural, political, and economic relations. Just like other industries, television has also been affected by this digital transformation. The integration of television into technology can be observed in areas such as content production and distribution occurring through big data processing in digital media platforms. The digital transformation process in television was covered through the usage areas of big data in digital platforms and within the scope of current applications in this study. The importance of big data for media industry, which is closely related to technology, was presented through the innovations it provided to the new broadcasting ecosystem. With its theoretical approach, the study is aiming to examine the conceptualization of big data and the improvement and use of big data in digital media platforms.

INTRODUCTION

According to the new *Digital 2020* report jointly published by *We Are Social and Hootsuite*, while more than 4.5 billion people use the Internet, social media platforms have more than 3.8 billion users as of early 2020. Around 60% of the global population is online. Compared to the previous year, the number of Internet users grew by around 7%, while that of social media users by 9% (Kemp, 2020). This information makes us understand why no consensus on the definition of big data is reached despite all efforts. The common ground of all studies conducted throughout more than twenty years is that great quantities of data are produced each day owing to the digitalization of most day-to-day processes and that the most significant data instance is yet to be reached. The second point of agreement is that big data keeps records of large amounts of data and compiles various data types, creating meaningful results. Big data

DOI: 10.4018/978-1-7998-9008-9.ch004

analytics provides a potential competitive advantage that radically changes social, cultural, political, and economic relations (Coté et al., 2016, p. 5). These data are fed by electronic transactions, applications, emails, texts, documents, videos, audios, pictures, clickstreams, public and private sector records, search terms, social network interactions, health records, scientific data, sensors, and smartphones (Gandomi & Haider, 2015). As one can see, the central pillar of digitalization is big data analytics. Increased economic efficiency is one of the most critical features of big data. This feature is seen as a significant opportunity because it provides a competitive advantage to many industries. Data and algorithms manage processes such as processing individuals' purchasing tendencies and decisions they take in daily or business life.

In this age where data is of great importance, it is essential to increase awareness, facilitate access to data, and work on this subject. Apart from the abundance of data, what is also essential is the processability and quality of data, making the data meaningful by maintaining data security at the same time, detecting errors and deficiencies, and taking measures to eliminate such errors and deficiencies. In addition, as the naming of data changes and improves, changes occur in the techniques and technologies used. These changes also pose some problems for consumers. Some ethical values have become a matter of debate. That big data essentially cause this to be a source not only for scientific research but also for the industrial field. In particular, the fact that the information on the Internet and social media accounts of users is shared with profit-oriented organizations without users' consent is one of the most debated topics of recent years (Custers, 2016, pp. 1-3). At this point, it is necessary to mention GDPR-EU Regulation 2016/679 as binding legislation on data protection and privacy. This legislation, which entered into force in 2016, aims to prevent data breaches. Accordingly, no personal data can be processed unless express consent is obtained from the relevant personal data owner (General Data Protection Regulation, 2016).

Constituting the main pillar of digitalization, big data storage is considered to be a significant opportunity as it provides many industries with a competitive advantage and value-generating analytics (Strohbach et al., 2016, p. 121). Like other industries, digital technology has also influenced the television industry, therefore going through a transformative process (Lippell, 2016, pp. 245-246). The most significant opportunity of digital media platforms working with the subscription system in terms of big data is directly contacting consumers to create content tailored for their requests (Mikos, 2016). The integration of television into technology occurs in many aspects ranging from content creation to distribution channels. Owing to the fact that meaningful predictions can be made by processing big data, platform users and potential users are understood better (Zhu et al., 2017). Big data leads to this outcome not only with its volume but also with its considerable data variety (Strohbach et al., 2016, p. 136). The analysis of data concerning aspects such as watching habits, number of views, repeat watching, leaving unfinished, skipping, rewinding, and pausing also helps with identify the lines of the original content to be produced.

The present study discusses through which features big data influences the television industry. Big data practices help one understand viewer tastes is examined with a particular focus on existing video streaming platforms. Today, the largest subscription video-on-demand service is Netflix (Lobato, 2019) which is also the best example of offering personalized suggestions by using the possibilities of big data and the great advantage of holding nearly two hundred million subscribers (Alexander, 2021). The advantage of big data is the volume of the data it obtains by reaching more people (Philip et al., 2014). The analyses allow digital media platforms to create custom content by determining a strategy that will create a viewing habit among their users and to predict the audience potential of the content. At this stage, there is a need for advanced infrastructure and methodology and an original perspective and expert workforce to conduct analyses. Big data predicts future behaviors by analyzing past behaviors and

creates a decision-making model, accordingly. Another advantage of digital platformsis that they can offer videos with niche titles for relatively small user groups, although they address people of various demographics in a large catalog (Osur, 2016, pp. 9-11). In addition, meaningful relationships can be established through the dynamic data flow. The strategies used by digital platforms to make sense of big data and the data analysis methods employed are discussed under several titles.

The purpose of the study is to reveal current big data practices on video-on-demand services. The study initially covers the conceptualization of big data followed by a discussion of basic characteristics of big data; ultimately, the application fields in digital platforms are summarized under various titles. Additionally, new opportunities and disadvantages arising from this use are evaluated within ethical considerations and critical approaches. In the end, the study lists suggestions for using big data in digital platforms based on the addressed theoretical approaches.

WHAT IS BIG DATA?

The concept of "Big Data" was coined in 2005 by Roger Magoulas of O'Reilly Media as a result of the attempt to define the complexity arising from the inability of traditional methods to manage large amounts of data due to limited capacities and considerable quantities of data. Although the research on the concept began in the 1970s, it started to be mentioned in publications in 2008 (Chaorasiya & Shrivastava, 2015, p. 1). Necmi Gürsakal, on the other hand, stated that the concept was first used in 2000 by Francis X. Diebold during the World Econometrics Congress with his study titled *Big Data Dynamic Factor Models for Macroeconomic Measurement and Forecasting* (2013, p. 20). One might argue that big data showed actual development right before its use as a concept with the Internet becoming widespread in the late 1990s. During this period, the Internet network combined communities and companies parallelly with humans, requiring increased data production and storage. This, therefore, marked the beginning of the process whereby data are reproduced, processed, stored, and consumed at an unprecedented pace each year (Walker, 2015, p. 4).

The concept of big data essentially signifies the conversion of the data that are unable to be stored using traditional storage devices to a processable format in a way allowing for the production of meaningful outputs. These data may be structured, semi-structured, or unstructured prior to their processing (Ünal, 2015, p. 3). The structured data are processed through analytical platforms and can be classified as evaluation lists. The most significant feature of structured data is that they are rule-based and aggregated by other data types. As for unstructured data, they signify the data of an unknown format consisting of any visualand audio available online (Russom, 2011, p. 18).

Danah Boyd & Kate Crawford define big data as a technological, cultural and scientific phenomenon based on the mutual interaction of technological, analytical and mythological elements. The technological element aims to maximize algorithmic precision in order to collect, analyze and compare extensive data sets. The analysis element makes use of wide-scale data sets to have a say in economic, societal etc. spaces. According to the mythological element, extensive datasets create novel notions in line with the spirit of reality and objectivity and are presented in forms with high knowledge and understanding (2015, p. 200).

The conceptual foundation of big data consists of the datafication of large quantities of information that cannot be measured, stored and analyzed beforehand. The scope of this information covers anything under the sun. Data can be collected on anything that may not be considered as information such as the

location of an individual or the vibration of an engine and the information in this respect can be converted into the data format to be quantified (Schönberger & Cukier, 2013, p. 23-27). The gradual development of electronic environments leads to changes in data processing, sizes, techniques and technologies used, storage, and association. With this change, data constitute a phenomenon that can be described as "the raw material of the age" based on which many methods are developed, no longer being simple pieces of data, and that contributes added value to many areas (Terzi et al., 2017, p. 14). Therefore, one might argue that big data amasses unimaginable quantities of data and that the largest data instance is yet to be obtained.

The use of big data, signifying a lot for the present-day world, is not limited to technology. The mention of big data in addition to money and gold during the *2012 World Economic Forum* signifies a novel class of economic assets. However, finding the economic value of data for individuals and organizations has not been easy. This is because the abundance, complexity and the change rate of the data affect the decision-making process. Data transform the understanding of competition and adopts remarkable changes in fields such as access to information, interpretation, reporting, and application. Therefore, one must be wary of unknown and unpredictable changes (Johnson, 2012, pp. 51-53). The use of big data is not limited to the economy. It covers a variety of field including healthcare, banking, aviation, public space, private sector, production, consumption, and telecommunications (Terzi et al., 2017, p. 18).

One of the most important characteristics of big data is that it improves efficiency. A systematically defined instance of data may lead to efficiency in different areas. One of these areas is the resolution of existing problems to develop information technologies. Another area is the use of social media content to improve goods and services. Big data is also used in areas such as fraud detection in online transactions and risk assessment in line with transactions within the financial market (Chaorasiya & Shrivastava, 2015, p. 2). Furthermore, data and purchasing tendencies of individuals depending on data algorithms govern processes such as the processing of the decisions taken in one's daily or business life. In recent years, the focus has been on analytical methods to extract meaning from big data storages in various areas. In fact, certain considerations of how big data will change private life are also discussed (Walker, 2015, p. 4).

The use of big data in personal spaces also brings about certain ethical challenges. For instance, companies monitoring every move of their employees with the aim of increasing efficiency gives rise to a kind of surveillance[1] detrimental to mental health. Furthermore, it is also considered that online applications will go beyond social media, equipping people with technological devices that make them function as cameras like digital watches or glasses. The increasing difficulty of protecting individual privacy is one of the ethical handicaps of big data. Therefore, people change the way they behave when they believe to be online or in monitored spaces. Big data thus affects the way one lives by various means (Michael & Miller, 2013, p. 23). In this regard, one might argue that big data constitutes a multifaceted concept that can be assessed economically, politically, philosophically and sociologically.

COMPONENTS AND ANALYSIS OF BIG DATA

The ever-expanding scope of big data also changes the way it is defined. However, some elements based on which the concept has emerged seem to be likely to maintain their presence. The elements proposed by Pavan Sridhar & Neja Dharmaji as the four components of big data consist of volume, velocity, variety and veracity. Firstly, volume is the aspect concerning the size of the date constituted of measurement units like terabyte, zettabyte, gigabyte and petabyte. Volume entails the most significant issue for big

data since the place and means where/through which the data will be stored poses a problem. Velocity has emerged from the need for analyzing the data swiftly to obtain more benefits from the data produced. Variety is the aspect developed against the challenges regarding collective use and analysis emerging from the fact that the data are comprised of structured or semi-structured data instances such as texts and audio. As for the element of veracity, it deals with the quality and suitability of the data obtained. This means that not all data pieces are transformed into information (Sridhar & Dharmaji, 2013, p. 2). With the addition of value to these elements, one might state that big data consists of "5 Vs", namely volume, velocity, variety, veracity, and value. The value component signifies the process whereby big data, mostly characterized by a low value density, obtains a high value through analysis (Gandomi & Haider, 2015, p. 139). It is possible to state that the data not leading to value creation are meaningless. The value created may vary depending on the production purpose, content, and the application field of the data. The fact that data have the properties of volume, velocity, variety, veracity and value makes it difficult to create value using traditional methods, leading to the need for analyzing the data by means of big data technologies (Terzi et al., 2017, pp. 20-21).

The acquisition of outcomes with high added value following the collection and processing of raw data is called data analysis. Constituting the most critical stage of big data studies, this stage has led to various topics within the body of literature. The principal topics which researchers focus on within the scope of data analysis include machine learning, text mining, predictive analytics, statistical analysis, and data mining (Özbayoğlu, 2017, p. 122). On the other hand, some services are used to process big data. Hadoop is the most common model used to process big data sets that can be spread over hundreds of machines, starting with one machine (Fadnavis & Tabhane, 2015, p. 443). Hive, on the other hand, is Hadoop's data warehouse for processing large datasets stored in the file system. Spark is a project that aims to process big data faster than Hadoop (Kukreja, 2016). Also, kafka, python, scala et al. technologies related to processing big data with projects are developing rapidly.

The analyzer must place the data on the schema to render them comprehensible prior to the analysis. Due to this feature, big data can be considered as "reading schema" and "writing schema." Depending on the problems they encounter, data scientists are expected to select from a wide range of technological methods such as data mining and statistical and graphical analysis (Cackett, 2013, p. 15). One of the crucial methods, data mining bears strategic significance for big data, which aims to discover the information within databases and to obtain useful information from big data masses. Furthermore, it allows one to discover the connected patterns on the database. Its fundamental objective is to predict future behavior by analyzing past behavior and to create a decision-making model in this regard (Koyuncugil & Özgülbaş, 2009, p. 24).

Text analytics/mining, another significant method, concentrates on communication and deals with texts whereby individuals express their opinions. It aims to extract information from these texts published on the Web. In particular, the fact that 80% of business-related information is stored as texts demonstrates the high commercial potential of text mining. Its application is based on the definition of keywords through the scanning of the text concerned. It is used for a wide range of purposes including text categorization, text clustering, concept extraction, sentiment analysis, and document summarization (Rybchak & Basystiuk, 2017, p. 73). Social media platforms, e-mail correspondences, blogs, online forums, questionnaires, corporate documents, news articles, and call center logs are the sources from which the method obtains the most information (Gandomi & Haider, 2015, p. 140). The high-quality text outputs it obtains are quite innovative and open for development.

The basic components of the big data universe also known as "the 5 Vs" constitute a suitable testing method most frequently used regarding the question of which analysis method is to be used by the data approach (Cackett, 2013, p. 14). Today, the production of huge amounts of data has brought about certain problems concerning data analysis. The problems emerge due to the fact that storing data is useless unless the data concerned is subjected to an analytical process to obtain meaningful and useful outcomes. In this respect, in addition to the methods delineated above, one might say that novel methods are being developed in order to benefit more from big data.

BIG DATA AND DIGITAL MEDIA PLATFORMS

Companies competing in the fields of production, service, and technology in traditional business models now engage in competition regarding the achievement of data supremacy, the creation of markets, and the way to use data to control the market. The primary competition area of companies like Amazon, Netflix, Linkedln, Zillow, Apple, Google, Uber, Facebook, eBay and Foursquare is data supremacy; these companies aim to develop and expand their data assets to adapt to the changing markets. Data companies from which services are procured collect data on individuals and companies without a direct source of clients or income. Only data founders may render digital measurement possible as the companies are not of adequate size and capacity to generate the required data. Therefore, companies essentially create their data assets to increase revenues, configuring the data in a conscious manner (Walker, 2015, p. xxiv).

As seen in the arguments above, today, big data analytics influences almost every sector. Obtaining insight via data providers before investing in a new business venture is advantageous for the television industry. In this respect, big data analytics is vital for the strategies followed by media companies. According to Abhay Bhadani & Jothimani Dhanya, while the basic area based on which the data are produced consists of content and user viewing behavior, the area of use is the attraction of more viewers (2016, p. 7). The media industry uses big data analytics to an extent allowing them to have a central status in the cycle of media and cultural products (Morris, 2015, p. 447). This section of the study provides an overview of big data from the perspective of digital media platforms.

Creating Big Data Infrastructure

Today, data collection and production are necessary to obtain profits from the media. The success of digital media platforms depends on their data production, i.e., the creation of useful data by analyzing the large amounts of data at hand. Digital platforms are in an advantageous position regarding data collection as they use the subscription model. The most significant aspect distinguishing big data from traditional data is the establishment of meaningful associations within a big and mobile data flow. The first point to be taken into consideration in this respect is to use different data together and to focus on useful data. Russell Walker lists the features of a successful data collector in the digital broadcasting industry as follows:

- Developing data exchange with clients over the digital platform through web sites, mobile applications and online transactions.

- Not overlooking the importance of passive data while obtaining active data. Accessing data on client and market trends such as operational data, time stamps, IP addresses, and smartphone applications.
- Get more efficiency by using operational and marketing data together.
- Innovating with respect to the data by creating data products providing one with novel perspectives and following the latest developments.
- Creating new fields of use by reversing the data. Using the data to engage in data trade or to maintain the stability of the success obtained (2015, pp. 182-183).

The data sources listed based on Netflix, regarded by Xavier Amatriain as the "primary example of the mainstream applicability of large-scale data mining", but applicable for all digital platforms can be summarized as follows:

- Obtaining global or regional populations from scores and ratings collected from subscribers.
- Identifying various time ranges or grouping subscribers based on regions or other similarity measures in order to calculate popularity.
- Making use of the search terms of subscribers.
- Making use of rich metadata such as the cast, director, genre, parental scoring, and comments for each element.
- Examining the places where the elements recommended using presentation and viewing data are shown to analyze how these placements affect the operations of other users. Making additional analyses using the interactions taking place in line with suggestions such as sliding, hovering over and item, clicking, and times spent on certain pages.
- Measuring interactive connections such as social data and social network connections.
- Including external data such as box office performance and critical reviews considered as traditional data as well as the information demographic features, location, and language in the data analytics (2013, pp. 4-5).

Establishing the Recommender System Using Big Data Analytics

The term "recommender system" was introduced for the first time in the late 1990s in the literature on information systems (Maddodi & Prasad, 2019, p. 43). It is the most crucial field to which large-scale data mining is applied (Amatriatin, 2013, p. 2). Concerning customer satisfaction, recommendations based on user and target audience behavior particularly play a vital role in customer satisfaction in e-commerce. Large retailers like Amazon, Alibaba and eBay make use of the recommender system to offer their visitors products similar to those they searched for or purchased recently. This system is used not only by web stores but by any other industry. In addition to social media platforms producing large quantities of data, the customization need of digital media platform users also plays a key role in the development of the recommender system. The system emerged not only due to the objective of achieving customer satisfaction but also due to the failure of individuals to make a selection among multiple alternatives. In the context of Netflix, a consumer research study revealed that a regular Netflix user loses their interest after spending 60 seconds and examining around 10-20 titles (Postmus, 2018, p. 4). The risk of the user opting out of the service significantly increases in this case. At this point, the advantage of digital media platforms come to the fore as they are able to offer videos with niche titles targeting smaller user

groups despite appealing to individuals with various demographic features with an extensive catalogue (Gomez-Uribe & Hunt, 2015, p. 2).

According to Gediminas Adomavicious & Alexander Tuzhilin (2005, p. 735), the approximation theory and various scanning methods can be used on the elements yet to be rated in order to make multiple predictions. Recommender systems are generally formulated in line with rating predictions. The recommendations within the system are classified as follows:

- **Content-based recommendations:** This recommender system presents the user content similar to the ones in the user's viewing history. In other words, it makes recommendations in line with the information it collects from the user.
- **Collaborative recommendations:** Such a recommender system suggests content within the framework of the elements recommended by similar profiles—or individuals having similar tastes in the past.
- **Hybrid approaches:** This method combines the collaborative and content-based approaches.

Video streaming platforms usually make use of the hybrid recommender system. This system aggregates multiple approaches to attain the best result in many areas. This process involving combining multiple algorithms into a single algorithm is called an ensemble. Hybrid filtering is a common ensemble method among recommender systems (Postmus, 2018, p. 7). Burke (2007, p. 380) identifies seven different types of hybrid recommendation techniques:

- **Weighted:** This hybrid technique combines the score of different recommendation components to achieve high veracity.
- **Switching:** In this system, a choice is made among recommendation components and the selected one is applied.
- **Mixed:** This system presents recommendations from different recommenders collectively. This is the simplest system.
- **Feature Combination:** Such a system combines features derived from different knowledge sources and feeds this combination to a single recommendation algorithm.
- **Feature Augmentation:** This approach aims to compute a feature or set of features. One output may be a part of the input to the next technique.
- **Cascade:** Adopting a gradual process, this recommender system is based on priority. The scoring is implemented between the content with lower priority and those with higher priority.
- **Meta-level:** Being order-sensitive, this system applies one recommendation technique; then, the form to be used by the next model as input is produced.

According to Srivatsa Maddodi & Krishna Prasad, the data collected from subscribers with the content-based filtering method can be ranked as follows:

- Collecting user search data.
- Ranking the content from the least frequently used to the most frequently used.
- Selecting the better one out of two elements.
- Acquiring the information on the likes and dislikes of the user.
- Analyzing user search data.

- Tracking the users viewing history (2019, p. 45).

The Customized Recommender System: "Mass Customization"

Recommender systems are able to present personalized suggestions to the user by considering the data collected from users and their profiles as parameters. Regarded as another dimension of data mining, this system functions focusing on providing the user with what they want. Customization algorithms allow the user to feel more special. Digital platform channels collect large amounts of personal data to provide their subscribers with customized recommendations. The best example of customized suggestions is Netflix, having a considerable advantage with almost 200 million subscribers. According to Gabrielle Sadeh, the customized recommendation base of Netflix takes the following into account:

- The date and time on/at which the content is viewed,
- The device with which the content is viewed,
- The information on how the structure of the content viewed vary depending on the device,
- Other content searches on the platform,
- Re-watched content episodes,
- Whether the content is paused; if paused, the position of the pause,
- User location data,
- The way the date and week on/in which the content is viewed affect the content type,
- Metadata from third parties like Nielsen,
- Social media data obtained from Facebook and Twitter (Sadeh, 2019).

Besides the data listed by Sadeh, the parameters indicated by Maddodi & Prasad are as follows:

- The content viewed by the user,
- When a user fast forwards a content,
- The time spent by the user to view the content,
- Searching habits of the user,
- Comments and ratings provided by the user (Maddodi & Prasad, 2019, p. 46).

Customized recommendations provided for in line with the parameters indicated by both studies allow the user to engage in a mutual and dynamic relationship with the system. Particularly, the periodic configuration of the algorithm distances the user from the thought that the algorithm is purely mechanic. Saving the platform user from merely being an autonomous representative using a paid service, the system positions the user as a more aestheticized representative (Lawrence, 2015, p. 360).

Analyzing personal tastes along with popular content is crucial while providing customized recommendations because users may both be interested in what is popular and wish to see a unique collection curated based on their personal tastes. In this case, one might need to use more complex methods consisting of multiple data conditioning techniques. Taking this important point into consideration, Walker argues that fulfilling user expectations may be possible through "mass customization" making use of linear models (Walker, 2015, p. 172). Furthermore, ranking content in order of popularity within a city or region forced not only the digital platform but also other content creators (e.g., film producers) to consider repositioning. The opportunity to personalize experiences and recommendations for each

customer has brought about the approach of "mass customization." Understanding user tendencies help with the marketing of under-recognized films while allowing one to comprehend marketing opportunities (Walker, 2015, p. 175-176).

Amatriain's approach towards the popularity-individuality dilemma suggests that the best real-time order of a series of elements can be found using the popular ranking system. Using this method, ranking algorithms are optimized by allocating the highest scores to the top titles. A ranking is generated based on the high probability of a subscriber watching the content viewed by many other people. Therefore, a customized ranking better than product popularity is obtained to satisfy users with different tastes. This ranking prediction model is created through a linear combination using both the popularity of the content and user ratings together (Amatrian, 2013, p. 3). Thus, one might claim in line with the arguments of Walker & Amatriain that the development of the recommender system through a linear model is a crucial step to provide users with the best ranking.

CREATING ORIGINAL CONTENT

Creating original content is the fundamental starting point of digital media platforms. Big data analytics is one of the basic criteria used for deciding on which original content to create. Digital media platforms have considerable advantages in this respect when compared to traditional television. The data obtained from users concerning actions such as pausing, forwarding, rewinding, re-watching, and stopping guide the process in which original content is created. At the same time, this advantage functions as a competitive tool against both traditional television and other video streaming platforms.

As far as the examination of the content created by BluTV founded in 2015 in terms of big data is concerned, the fact that it acquires the series titled *Sıfır Bir Adana* streamed on Youtube and that it started shooting the series titled *Behzat Ç.* concluded six years ago represents the company approach towards data usage in content creation. This is because there is a large quantity of data on various digital platforms concerning both television series. Based on this analysis, a strategy fostering the viewing habit among the users of the video streaming platform is identified, leading to the presentation of both series as content unique to BluTV. The analyses allowed the company to make predictions regarding the viewership potentials of the content.

At a global scale, one might say that Netflix retains the most data on the consumption of television content. Through big data, Netflix is capable of addressing the demands of much more clients than provided by Nielsen ratings for content creators. The first major example of the application of big data to online broadcasting platforms is the Netflix original starting to be aired in 2013 titled *House of Cards*. The decision to reproduce the BBC series of the 1990s was made owing to an algorithm analyzing trillions of Netflix data points (Havens, 2014, p. 6). Even though the fact that Netflix invested around US$ 100 million for the first two seasons without reviewing a single episode is considered to be a great risk, it demonstrated its extent of trust in its data collection and arrangement capacities.

According to David Carr, the investment of Netflix in *House of Cards* may be based on three things obtained at the end of its data analysis. The data indicated that those watching the films in which Kevin Spacey acts also follow the movies directed by David Fincher. Furthermore, these users are also interested in popular series. The TV series aired in the 90s is the most broadcasted content in 40 countries. These data allowed Netflix to see that a great viewership is guaranteed even before starting to produce the series. Therefore, Netflix was able to detect the "Venn diagram intersection" suggesting that buying

the series would be a good move as far as original programming is concerned. As can be seen, the claim is supported by big data allowing the recognition of viewers (Carr, 2013).

Exchanging Data with Users

The most significant advantage of digital media platforms is their capacity to engage in direct data exchange with consumers. While creating their accounts, platform users share information on their interests and film-watching habits. Furthermore, they also upload their addresses and credit card information to the system. Potentially evaluated as an effective data capture method, this situation is unprecedented in the traditional media industry. The use of all data collected from users to create new content may improve the functioning and customer satisfaction of the platform. As the extent of data exchange expands from an individual focus to viewing habits within the family and to daily-weekly-yearly viewing behavior, the addition of IP addresses has brought about new types of data allowing the analysis in association with the consumer. These data foster loyalty among consumers, reducing potential risks for the platform in the future (Walker, 2015, p. 170).

At this point, the Netflix original titled *Black Mirror: Bandersnatch* (2018) may be a great example of data exchange. This episode of the series allows the viewer to have the characters make certain choices in line with their requests. According to Howard, the "choose-your-own-adventure" approach adopted by the episode taking place as an interactive viewing activity signifies a remarkable step towards meta-aesthetics. This method allowed the platform not only to monitor its users and record their preferences but also to obtain considerable data. It was able to collect data on how to develop its narrative model through its online content (2019). Containing important information on the interests and tastes of the consumer, these data can both be used in the production of future content and provides Netflix with advantages against its competitors.

EVALUATING THE OPPORTUNITIES AND CHALLENGES OF BIG DATA FOR DIGITAL MEDIA PLATFORMS

Jon Bond & Ben Clarke (2017) associate the perfect collaboration of big data and content creation with three reasons:

1. Better data lay the foundations of more creative products.
2. Better data allows one to select better targets by helping the content or product created affect the masses more effectively.
3. Big data significantly reduces the risk level of great advertising investments. Recently, investors have been making use of the quality data pool that profoundly changes risk management. This method is the greatest weapon of companies making mass trials.

Evidently, online broadcasting platforms are distinguished from traditional media environments in terms of their media production logic, attaining a central position within the present-day broadcasting ecosystem. According to Celia Quico, these platforms redefine the user as a part of the data, in a way integrating it to the data set. On the other hand, innovations like recommender systems and content customization also bring about certain disadvantages along with all these advantages discussed above.

As these systems make predictions regarding viewer tastes and become better in this prediction, it will probably continue making content recommendations reinforcing closed tastes instead of expanding their taste ranges. In this case, the "filter bubble" effect coined by Eli Pariser (2011) and defined as "a personal information ecosystem appealing to the person it thinks" will emerge. When compared to traditional television channels, the viewer zapping through channels may be luckier in terms of finding something unexpected that they may like. This is because the viewer may expand their interests and open their minds [to new possibilities] by zapping (Quico, 2019, p. 51).

In a way, the users whose preferences are only associated with the content they viewed are also prone to the risk of getting used to the "consuming" content. Such a passive mode of consumption does not require the user to spend time to develop their tastes, preventing the development of the viewer's innovative and interpretive aspect leading to greater aesthetic pleasure in the long term (Lawrence, 2015, p. 361). According to Gomez-Uribe & Hunt, a successful business must take into consideration what actually works while paying attention to what their customers say. In fact, customers might simply attain the target among a few challenging options while requestion comprehensive search and browsing tools. Therefore, using collective intuition to select the best variant of a recommendation algorithm might be misleading. Thus, one might argue that making classifying algorithm variants as good or bad is an endeavor open for criticism (Gomez-Uribe & Hunt, 2015, pp. 2-3).

The developments in digital technologies have given rise to new concepts in recent times. "Platform capitalism" coined and conceptualized by Srnicek in its eponymous book published in 2016. According to Srnicek, this key concept indicates data as a special raw material emerging as a result of the evolution of capitalism in the 21st century. Today, data collection, storage and analysis have a remarkable infrastructure. The rise of companies retaining and controlling huge amounts of data constitutes the new stage of capitalism (Srnicek, 2017, p. 23). Adopting a similarly critical perspective, Shoshana Zuboff discusses the concept of "surveillance capitalism", focusing on the heterogeneous, unstructured, liberalized and unknown features of big data. She dwells on the inadequacy of the approach considering big data as a technological object, effect or talent. According to Zuboff, big data is an aspect of "surveillance capitalism" used as a tool of societal origin for generating revenue and market dominance that serves to predict human behavior (2015, pp. 75-76). Zuboff's consideration of surveillance capitalism as an advanced dimension of capitalism is ground-breaking for future critical approaches concerning big data.

SOLUTIONS AND RECOMMENDATIONS

The present study examined the role of big data in content creation and distribution on digital media platforms. It evaluates the strategies followed by digital platforms based on big data and the potential meaningful data analyses under various titles. In this respect, the suggestions concerning the use of big data on digital platforms in line with the theoretical approaches discussed in this study can be listed as follows:

- The fact that big data will increase the efficiency of the media industry in the future cannot be disregarded. An assessment in consideration of the status quo regarding media consumption may lead to the argument that the new generation of narrators effectively and successfully using data will retain their advantages.

- Even though big data gives one an idea about the present tastes of viewers, the tastes in the distant future cannot be predicted. Therefore, the algorithms must be updated parallelly to the development of the data. Different types of data from a variety of sources must be used while employing big data; analysis methods must be optimized.
- Data must be exchanged with users to improve the quality of the original content and to retain competitive advantage; more refined and creative content must be produced. Therefore, the risk factor may be decreased for the investments in the content.
- One might argue that the use of big data in the television industry involves strategies that are yet to be explored. Based on this argument, data usability might be increased in novel areas.
- Not disregarding factors like innovation, variety, popularity, and facility and collaborating with various infrastructure providers is crucial for ensuring customer loyalty.
- Awareness of big data must be cultivated; training programmes tailored for the media industry must be organized to increase the specialization in this subject matter.

FUTURE RESEARCH DIRECTIONS

In this study, the use of big data on Netflix platform was investigated. Just one platform's scope of work makes it impossible to compare with other content. In this regard, the study suggests future studies to examine big data for other platforms. Thus, the way global digital media platforms use big data can be evaluated from a wider perspective.

CONCLUSION

The television industry is going through a profound transformation. According to Quico (2019); advancing with huge amounts of data, the media industry goes towards a novel approach where "the consumer is king", leading to the change of the function of traditional television to "entertain, educate, and inform." The advancements in technology rendering data mining more accessible have positioned big data as an important source in the media environment. Today, each behavior on the digital medium can be analyzed to create algorithms. Creating content, configuring algorithms, and using customized recommender systems by analyzing data are of central importance for the production and circulation of media content. In fact, these components are the primary competitive advantages of digital television broadcasting. Considering the recent developments, the possibilities associated with big data seem to be almost endless. The technological possibilities and capabilities provided by innovative technologies in data collection, storage, and processing and their inclusion in digital content production are likely to change the future of television.

REFERENCES

Adomavicius, G., & Tuzhilin, A. (2005). Toward the Next Generation of Recommender Systems: A Survey of the State-of-the-Art and Possible Extensions. *IEEE Transactions on Knowledge and Data Engineering*, *17*(6), 734–749. doi:10.1109/TKDE.2005.99

Alexander, J. (2021). *Netflix Surpasses 200 Million Subscribers, But Has More Competition Than Ever in 2021 The More Important Question is How Many Are Staying*. https://www.theverge.com/2021/1/19/22238877/netflix-200-million-subscribers-q4-earnings-bridgerton-emily-paris-cobra-kai-queens-gambit

Amatriain, X. (2013). Big & Personal: Data and Models behind Netflix Recommendations. *BigMine*, *13*, 1–6. doi:10.1145/2501221.2501222

Bhadani, A., & Jothimani, D. (2016). Big Data: Challenges, Opportunities and Realities. In M. K. Singh & K. G. Dileep (Eds.), *Effective Big Data Management and Opportunities for Implementation* (pp. 1–24). IGI Global. doi:10.4018/978-1-5225-0182-4.ch001

Bond, J., & Clarke, B. (2017). *House Of Creativity: Netflix Casts Big Data In Transformation Role*. https://cmo.adobe.com/articles/2017/1/no-house-of-cards-big-data-fuels-big-creativity-at-netflix-.html#gs.bidnst

Boyd, D. & Crawford, K. (2015). Büyük Veri Üzerine Eleştirel Sorular: Kültürel, Teknolojik ve Bilimsel Bir Olgu Hakkında Eleştirel Sorgulamalar (B. Savcı, Trans.). *Folklor/Edebiyat Dergisi*, *21*(83), 199-215.

Burke, R. (2007). Hybrid Web Recommender Systems. Peter Brusilovsky. In The Adaptive Web. (pp. 377-408). Berlin: Springer-Verlag.

Cackett, D. (2013). *İnformation Management and Big Data, A Reference Architecture.* Oracle.

Carr, D. (2013). Giving Viewers What They Want. *The New York Times*. https://www.nytimes.com/2013/02/25/business/media/for-house-of-cards-using-big-data-to-guarantee-its-popularity.html

Coté, M., Gerbaudo, P., & Pybus, J. (2016). Introduction. Politics of Big Data. Digital Culture & Society, 2(2), 5-15. doi:10.25969/mediarep/947

Custers, B. (2016). Click Here to Consent Forever: Expiry Dates for Informed Consent. *Big Data & Society*, *3*(1), 205395171562493. doi:10.1177/2053951715624935

Fadnavis, R. A., & Tabhane, S. (2015). Big Data Processing Using Hadoop. *International Journal of Computer Science and Information Technologies*, *6*(1), 443–445.

Gandomi, A., & Haider, M. (2015). Byond the Hype: Big Data Concepts, Methods and Analtics. *International Journal of Information Management*, *35*(2), 137–144. doi:10.1016/j.ijinfomgt.2014.10.007

Gomez-Uribe, C. A., & Hunt, N. (2015, December). The Netflix Recommender System: Algorithms, Business Value, and Innovation. *ACM Trans. Manage. Inf. Syst.*, *6*(4), 13–19.

Gürsakal, N. (2013). *Büyük Veri*. Dora.

Havens, T. (2014). Media Programming in an Era of Big Data. *Media Industries Journal*, *1*(2), 5–9. doi:10.3998/mij.15031809.0001.202

Howard, K. (2019). *Black Mirror: How Netflix Is Using Your Bandersnatch Data*. https://www.denofgeek.com/tv/black-mirror-netflix-collected-bandersnatch-data/

Johnson, J. E. (2012). Big Data + Big Analytics = Big Opportunity. *Financial Executive*, (July/August), 50–53.

Kemp, S. (2020). *Digital 2020: Global Digital Oweview*. https://datareportal.com/reports/digital-2020-global-digital-overview

Koyuncugil, A. S., & Özgülbaş, N. (2009). Veri Madenciliği: Tıp ve Sağlık Hizmetlerinde Kullanımı ve Uygulamaları. *Bilişim Teknolojileri Dergisi*, *2*(2), 21–32.

Kukreja, M. A. (2016). *Apache Hive: Enterprise SQL on Big Data frameworks*. doi:10.13140/RG.2.1.3387.8008

Lawrence, E. (2015). Everything is a Recommendation Netflix, Altgenres and the Construction of Taste. *Knowledge Organization*, *42*(5), 358–364.

Lippell, H. (2016). Big Data in the Media and Entertaintment Sectors. In New Horizons for a Data-Driven Econımy: A Roadmap for Usage and Exploitation of Big Data in Europe (pp. 245-263). SpringerOpen.

Lobato, R. (2019). *Netflix Nations The Geography of Digital Distribution*. New York University Press.

Maddodi, S., & Prasad, K. K. (2019). Netflix Bigdata Analytics - The Emergence of Data Driven Recommendation. *International Journal of Case Studies in Business, IT, and Education*, *3*(2), 41–51. doi:10.47992/IJCSBE.2581.6942.0050

Michael, K., & Miller, K. W. (2013). Big Data: New Opportunities and New Challenges (guest editors' introduction). *Computer*, *46*(6), 22–24. doi:10.1109/MC.2013.196

Mikos, L. (2016). Digital Media Platforms and the Use of TV Content: Binge Watching and Video-on-Demand in Germany. *Media and Communication*, *4*(3), 154–161. doi:10.17645/mac.v4i3.542

Morris, J. W. (2015). Curation by Code: Infomediaries and the Data Mining of Taste. *European Journal of Cultural Studies*, *18*(4-5), 446–463. doi:10.1177/1367549415577387

Osur, L. (2016). *Netflix and the Development of the Internet Television Network* (Dissertations). Syracuse University. https://surface.syr.edu/etd/448

Özbayoğlu, M. (2017). Derin Öğrenme ile Büyük ve Açık Veri Analizi. In Ş. Sağıroğlu & O. Koç (Eds.), *Büyük Veri ve Açık Veri: Temel Kavramlar* (pp. 115–131). Grafiker.

Philip Chen, C. L., & Zhang, C.-Y. (2014). Data-intensive Applications, Challenges, Techniques and Technologies: A Survey on Big Data. *Information Sciences*, *275*, 314–347. doi:10.1016/j.ins.2014.01.015

Postmus, S. (2018). *Recommender System Techniques Applied to Netflix Movie Data.* Research Paper Business Analytics.

Quico, C. (2019). Television Reshaped by Big Data: Impacts and Implications for Netflix-Like Platforms in the Age of Dataism. *International Journal of Film and Media Arts*, *4*(1), 48–55. doi:10.24140/ijfma.v4.n1.04

Regulation (EU). (2016). *2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC* (General Data Protection Regulation) (Text with EEA relevance). https://data.europa.eu/eli/reg/2016/679/oj

Russom, P. (2011). *Big Data Analytics*. TDWI Research.

Rybchak, Z., & Basystiuk, O. (2017). Analysis of Methods and Means of Text Mining. Econtechmod. *An International Quarterly Journal*, *6*(2), 73–78.

Sadeh, G. (2019). *How Netflix Uses Big Data to Create Content and Enhance User Experience*. https://www.clickz.com/how-netflix-uses-big-data-content/

Schönberger, V. M., & Cukier, K. (2013). *Büyük Veri: Yaşama Çalışma ve Düşünme Şeklimizi Dönüştürecek Bir Devrim* (B. Erol, Trans.). Paloma.

Sridhar, P., & Dharmaji, N. (2013). A Comparative Study on How Big Data is Scaling. *International Journal of Enhanced Research in Science Technology and Engineering*, *2*(8), 87–96.

Srnicek, N. (2017). *Platform Capitalism*. John Wiley & Sons.

Strohbach, M., Daubert, J., Ravkin, H., & Lischka, M. (2016). Big Data Storage. In New Horizons for a Data-Driven Econımy: A Roadmap for Usage and Exploitation of Big Data in Europe (pp. 119-143). SpringerOpen. doi:10.1007/978-3-319-21569-3_7

Terzi, R., Sağıroğlu, Ş., & Demirezen, M. U. (2017). Büyük Veri ve Açık Veri: Temel Kavramlar. In Ş. Sağıroğlu & O. Koç (Eds.), *Büyük Veri ve Açık Veri Analitiği: Yöntemler ve Uygulamalar* (pp. 13–31). Grafiker.

Ünal, F. (2015). *Büyük Veri ve Semantik*. Abaküs.

Walker, R. (2015). *From Big Data to Big Profits Success with Data and Analytics*. Oxford University Press. doi:10.1093/acprof:oso/9780199378326.001.0001

Zhu, C., Cheng, G., & Wang, K. (2017). Big Data Analytics for Program Popularity Prediction in Broadcast TV Industries. *IEEE Access: Practical Innovations, Open Solutions*, *5*, 24593–24601. doi:10.1109/ACCESS.2017.2767104

Zuboff, S. (2015). Big Other: Surveillance Capitalism and Prospects of an Information Civilization. *Journal of Information Technology*, *2015*(30), 75–89. doi:10.1057/jit.2015.5

KEY TERMS AND DEFINITIONS

Big Data: Various data types are brought together by recording large amounts of data, obtaining meaningful results. Big data analytics provides a potential competitive advantage that radically changes social, cultural, political, and economic relations.

Digital Media Platforms: Digital broadcasting media appearing with the improvement of internet technologies.

Globalization: The world entering a universal stage by ascending national borders by modifying in almost every field such as economy, politics, and communication.

Mass Customization: It is when digital platform channels collect large amounts of personal data to provide customized recommendations to their subscribers.

Netflix: A subscription-based broadcasting service providing online series and movies.

Netflix Series: Content service available to the all world after being produced for broadcast on Netflix platform.

Original Content: Original content produced for publication on the platform.

Recommender System: Recommendations based on user and target audience behavior regarding customer satisfaction.

ENDNOTE

[1] Today, the issues of surveillance and power in George Orwell's *1984* (Orwell, 1949) are discussed with regards to big data. The society created by Orwell is governed by *Big Brother*, an omniscient and omnipresent leader. The omnipresent telescopic screen mentioned in the book is considered to correspond to the smartphones of the present day.

Chapter 5
Digital Technologies in Italian Cultural Institutions

Daniela Federici
University of Cassino and Southern Lazio, Italy

Valentino Parisi
University of Cassino and Southern Lazio, Italy

ABSTRACT

The application of digital technologies plays a crucial role in offering solutions to enhance the economic potential of the cultural sector, through new modalities for distribution and reception of cultural experiences. The question of whether and how ICT adds value to collections, museums, and cultural sites and promotes access and communication with users/visitors is an open one. This chapter aims to provide empirical evidence on the effects of technological innovations in the economic performance of cultural institutions. To this end, the authors use data of Italy's statistical office covering the universe of Italian cultural organizations in the year 2018. The findings suggest that new digital technologies play a role in enhancing the value and relevance of cultural heritage and its influences over the socio-economic context.

INTRODUCTION

There is a general consensus that "cultural heritage" is a resource that can trigger economic, social and environmental benefits to society. Cultural heritage is a key contributor to the attractiveness of cities, towns and rural areas in terms of private sector inward investment, developing cultural creative quarters and attracting talents. It represents a crucial source of creativity and innovation, generating new ideas and creating innovative services — ranging from digitization of cultural assets to exploiting the virtual reality technologies — with the aim of interpreting historic environments and buildings and making them accessible to citizens and visitors.

DOI: 10.4018/978-1-7998-9008-9.ch005

In this paper, culture heritage is conceived in a broad sense as "cultural activities" (including museum institutions, galleries, archaeological sites, monumental complexes). They foster growth and employment, contribute to innovation, entrepreneurship and skills development, support urban and rural regeneration, stimulate exports, maintain cultural identity, and enhance cultural diversity.

The application of digital technologies plays a crucial role in offering solutions to enhance the economic potential of the cultural sector, through new modalities for distribution and reception of cultural experiences. In addition, they open new opportunities to develop art forms, create new sources of economic and cultural value, and incentive new business models.

New Information Communication Technologies (ICT) are vital for the protection, conservation, restoration, research, dissemination and promotion of tangible and intangible cultural assets (Borowiecki and Navarrete, 2017), coming from all types of cultural institutions. However, the question of whether and how ICT add value to collections, museums, and cultural sites and promote access and communication with users/visitors is an open one. The role of ICT on cultural heritage is a relatively new field of research, and, as digital ecosystems are constantly evolving, no general definition has yet emerged (McMasters, 2008). As one may expect, museums and other heritage institutions are being changed rapidly to provide advanced visualization, interactive and social-media services.

We focus on digital technologies because these innovative tools permit to deepen the relationships with existing audiences. Furthermore, they enable arts and cultural organizations to achieve important increases in the audiences. At the same time, innovations call on for the development of new financial and business models for cultural institutions.

Cultural activities are characterized by their specific products: they focus on the "*production and distribution of goods and services of artistic and cultural nature, and can be classified in many ways*" (Guerzoni, 1998, p. 241). Though this is particularly evident in the case of museum institutions, in general cultural activities are characterized by managing a complex supply, combining the aptitude to preserve culture (for the enjoyment and education of future generations) with the provision of services for access and fruition of cultural products (e.g. exhibition to the public) that augment their value.

Within this context, the following research questions occur:

- Does digitization affect the performance and efficiency of cultural institutions?
- What challenges and which opportunities for heritage organizations come along with the digital shift?
- Does digitization offer opportunities in encouraging new and experimental work?

Cultural production and consumption patterns are being redesigned by the digital revolution, pushing cultural organizations to rethink modalities to relate with visitors. From the financial point of view, they deal with greater accountability for funding, with increased emphasis on performance and efficiency, as well as growing pressure to find new ways to enlarge the revenue potential. In addition, ICT play an increasingly important role in fostering cultural heritage research and educational activities, as well as programs and actions in cultural institutions' learning environments (Sylaiou and Papaioannou, 2019).

This paper aims to provide empirical evidence on the effects of technological innovations in the economic performance of cultural institutions. To this end, we use data of Italy's statistical office covering the universe of Italian cultural organizations in the year 2018. Data include various information on the museums' financing sources, ticketing policies, whether museums use digital support, etc.

Cultural organizations need management strategies that are unique to the area in which they operate. We are aware of the relationship between new communication technologies and cultural organizations' strategic management. However, this aspect is beyond the scope of our analysis, as the dataset does not contain the relevant information.

Our findings suggest that new digital technologies create new sources for economic value and new opportunities for cultural organizations' research activities.

The remainder of the paper is structured as follows. Section 2 describes the literature background. Section 3 illustrates the data, while section 4 presents the empirical methodology. In section 5, we discuss the results and section 6 concludes.

BACKGROUND

The 1954 UNESCO Convention on the Protection of Cultural Property during Armed Conflicts still used the notion of cultural property, defined broadly as:

"…movable and immovable property of great importance to the cultural heritage of every people, such as monuments of architecture, art or history, whether religious or secular; archaeological sites; groups of buildings which, as a whole, are of historical or artistic interest; works of art; manuscripts, books and other objects of artistic, historic or archaeological interest; as well as scientific collections and important collections of books or archives or of reproductions of the property defined above". (UNESCO, 1954).

The Council of Europe Framework Convention on the Value of Cultural Heritage for Society (Faro Convention, 2005) highlighted the social and economic benefits of preserving cultural heritage as a prerequisite for achieving sustainable development.

Today, cultural heritage is perceived as an important vehicle for development, since "cultural tourism contributes to economic development," "cultural heritage builds social cohesion," "mobilizes communities around its care and management," etc. (UNESCO, 2010).

Cultural heritage studies are an interdisciplinary and heterogeneous field with researchers working in different disciplines such as art history, archaeology, architecture, history, conservation studies, museology, anthropology, ethnology, tourism studies, economics and so on. Cultural institutions' literature has recently been focused on a more complex and dynamic view, which frames heritage in terms of practices and performance. One way to assess the value produced by cultural organizations is to distinguish between the economic value generated by their activities and the cultural value of their products (Throsby, 2010). As the World Bank suggests, cultural goods have economic value and a potential that can be grasped, assessed, as well as increased by adequate policies and effective valuation (2001, p. 55).

One of the primary motivations of our paper is to contribute to the knowledge of how technological changes connect to the core functions of cultural organizations (Bakhshi and Throsby, 2012; Fernandez-Blanco and Prieto-Rodriguez, 2020). New technologies have opened up the possibilities for cultural institutions to exploit their cultural assets and create additional economic value. Attention is focused, particularly, on the ways in which the digital environment has enhanced the economic potential of the heritage organizations in attracting people, through the creation of new cultural products and new modalities for the distribution and reception of cultural experiences.

The use of new technologies refers to a range of activities both in the organizations themselves and on the Web. Specifically, emerging trends such as wearable technology, smart devices, smart materials, sensors and 3D printing begin to open up new capabilities to create, personalize and distribute culture. In the physical institution, such activities comprise virtual reality experiences, wireless connectivity, interactive devices, solid, laser, light shows and so on. On the Web, the functions include on-line access to collections in virtual museums, streamed multi-media contents specialized audio-functions, speech activated devices, the use of social media networks (Facebook, Twitter, Youtube) and online shopping (tickets, merchandise). Examples of the technological advancements in virtual museums represent a very effective instrument for communication of cultural contents thanks to their playful and educational approach (Barbieri et al., 2017).

In their study on culture of innovation in arts and cultural organizations, Bakhshi and Throsby (2010) conceptualize innovation as a response to disruptions in the "value chain" that characterizes their production and distribution processes. The value chain highlights the trade-offs which cultural institutions face in pursuing their missions (access versus revenue generation, creative vision versus responsiveness to audience, artistic experimentation versus revenue maximization, and public value versus revenue generation). Changes in consumer behavior, rapid technological progress and shifts in the funding environment change the trade-offs, forcing cultural institutions to re-evaluate their strategies.

Our work pursues a twin aim. Firstly, we explore the potential of new communication technologies in expanding the audience reach. There are three dimensions to this sort of innovation (McCarthy and Jinnett 2001; Loran 2005): audience broadening, audience diversifying and audience deepening, i.e. increasing and/or intensifying the engagement of audiences. The latter may be achieved through enhanced interactivity with audiences on social networks and creative websites. The engagement of cultural institutions with new technologies allows the shift from simple electronic information material to multi-media platforms allowing reaching a wider community of visitors (Minghetti et. al. 2001; Chung, et al., 2014). Secondly, we analyze the role of ICT tools in expanding new research and educational opportunities of cultural institutions. Cultural value can be disaggregated into several aspects and measured also by the intensity of the research and educational activity carried out by the organization.

Measuring the performance and efficiency of cultural institutions is a difficult task given the complexity and the variety of missions, activities and goals (Basso and Funari, 2004; Barrio et al. 2009). One way to measure the performance of cultural organizations is estimating technical efficiency. Indeed, several authors provide estimates of technical efficiency of museum (Mairesse and Eeckau, 2002; Basso and Funari, 2004; Barrio et al., 2009). For a recent review, see Basso et al. (2018) and Guccio et al. (2020). More recently, the literature studied the relationship between ICT innovation and efficiency of cultural institutions. In particular, Guccio et al. (2020) explore the effects of new technology applications on the technical efficiency of Italian state-owned museums. Their findings show that ICT services are positively associated with performance of museums to attract the public. Camarero and Garrido (2014) find evidence to support the idea that learning orientation, innovation strategy, and relationship orientation affect the economic and social performance of European museums.

The use of new technologies has influenced the market strategies of cultural institutions. Just think of the use of the internet to provide services and product information, sell tickets or promote new activities. In this context, we refer to the aspects related to the presence of websites that through two-way communication with the public allow high-frequency relationship between providers and users of cultural services. Kabassi (2017) provides a useful review of evaluation approach to measure the effectiveness of museums websites in being attractive for visitors.

Many cultural institutions use social networking sites, like Facebook and Twitter, to deepen consumers' relationships to share experiences. Padilla-Meléndez and del Águila-Obra (2013) present a theoretical framework to analyze the online strategies in the case of museums in using Web and social media, their sources of online value and some measurements of internet performance. The framework of this research can be applied to similar organizations as well as to other services related to information and education.

Furthermore, Blasco Lopez et al. (2019) analyze the impact of innovation and market orientation for Spanish and Latin American museum performance and provide evidence of a positive effect of innovation on market orientation.

DATA DESCRIPTION

The empirical analysis developed in this chapter is based on the Italian Museums and Cultural Institutions survey (*Indagine sui musei e le istituzioni similari*) carried out since 2011 by the Italian Statistical Office (ISTAT). We use micro-data of the year 2018 as these data contain detailed information relevant to the objectives of this research. Overall, our data include 4,903 museums and similar institutions. The survey concerns the structural features of museum structures, ownership, management, human and financial resources, services for the public, with important information for digital services, organization in networks, as well as relations with the territory. The survey is census-based.

The choice of variables for appropriate performance measurement is essential and should take into account the different nature of cultural institutions (Gstraunthaler and Piber, 2012). Therefore, to gain a better understanding of the performance evaluation process, we include the type of organization, whether they are private or state-owned.

Table 1 displays the main features of the cultural institutions present in the dataset.

From Table 1 we see that museums and similar institutions are dispersed all over the country. The majority is located in Northern (45.5%) and Central Italy (27.8%). According to the survey, 3,878, are classified as museums or galleries (79% out of the total), whereas 6.7% are classified as archeological parks, 12.8% as monumental complexes, and 1.4% as Eco-museums[1]. The figures in Table 1 show that museum structures are mainly state-owned (61.8%), employ on average about 12 workers, and in 2018 recorded 28,949 visitors of which 6,062 (20.9%) were foreigners.

As for financial resources, 35.5% out of the total benefits from public financing, 22.8% from private funding. Additional financial sources come from services like bookshops, royalties, advertising, as well as various forms of concessions or artwork lending (28% out of the total museum establishments).

The survey allows us to capture information on the use and extent of ICT. We distinguish between services provided *in situ*, i.e. during the visit, and services provided though the website that could be accessed independently of the visit.

Table 2 displays the breakdown of museum structures engaging in research activities, carrying out market surveys, offering digitalized services.

From Table 2 we note that a relevant share of museum structures engages in research activities (40.8%), while 34% of the total carries out surveys to learn about the characteristics and satisfaction of visitors.

Overall, 51.2% of them report to have a website and 53.3% to have a social media account. Moreover, 38.3% of the total provide links to digital maps as well as structure's localization, whereas 23.7% provide interactive displays. Lastly, we note that a small share of facilities provides advanced service such as on-line ticket office (14.8%), offer virtual visits (9.8%), provides Wi-Fi free services or access through

QR code (6.8%). The figures suggest that Italian cultural heritage institutions are still lacking the use of digital technologies[2]. One possible explanation for the limited use of digital tools in cultural institutions stems from the prominent role of the State in governance and funding. Indeed, the literature suggests that state museums are more focused on the outcome of the protection and conservation of historically significant assets in their mission (Fedeli and Santoni, 2006; Frey and Pommerehne, 1989).

A remarkable heterogeneity stems from the cultural institutions present in the dataset in the website content and on the implementation of ICT services. Among the range of activities and services offered, we also consider variables related to the research conducted, such as research activities carried out within the museum and laboratories, and variables related to the ability to interact with the territory and promotional activities (visitor satisfaction surveys). In trying to improve efficiency and performance, cultural organizations are looking for new ways to exploit their revenue potential. As a proxy of these aims, we consider the role of enacting research activities.

As it is evident, the dataset has the advantage of making available a multiplicity of indicators that capture actually observed actions, endowments, and behaviors, rather than subjective measures that may present problems of bias.

Table 1. Main features of the museums and similar establishments present in the dataset (year 2018).

	North		**Centre**		**South**		**Islands**		**Total**	
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**
Museum, gallery	1,872	48.3	1,054	27.2	583	15.0	369	9.5	3,878	79.1
Archeological park	73	22.3	89	27.2	64	19.6	101	30.9	327	6.7
Monumental complex	237	37.7	209	33.2	105	16.7	78	12.4	629	12.8
Eco-museum	49	71.0	13	18.8	6	8.7	1	1.4	69	1.4
State-owned	1,263	41.7	902	29.8	478	15.8	385	12.7	3,028	61.8
Private	861	51.7	422	25.3	254	15.2	129	7.7	1,666	34.0
With public funding	768	44.2	549	31.6	188	10.8	234	13.5	1,739	35.5
With private funding	643	57.5	313	28.0	103	9.2	59	5.3	1,118	22.8
With earnings from additional services/ sources	671	48.4	428	30.9	131	9.5	155	11.2	1,385	28.2
Number of employees (mean)	11.9	-	10.8	-	13.5	-	11.9	-	11.8	-
Number of visitors (mean)	21,442	-	43,990	-	31,128	-	19,847	-	28,949	-
Number of foreign visitors (mean)	4,261	-	10,245	-	5,245	-	4,980	-	6,062	-
% of foreign visitors (over total visitors)	19.8	-	23.2	-	16,8	-	25.0	-	20.9	-
Total	**2,231**	**45.5**	**1,365**	**27.8**	**758**	**15,5**	**549**	**11.2**	**4,903**	**100,0**

Source: Own calculations from Istat data

Table 2. Museum structures engaging in research activities, carrying out market surveys, offering digitalized services (year 2018).

	Yes		No		
	N	**%**	**N**	**%**	**Total**
Website	2,510	51.2	2,393	48.8	4,903
On-line catalogue	610	12.4	4,293	87.6	4,903
On-line tickets	726	14.8	4,177	85.2	4,903
Virtual visits	480	9.8	4,423	90.2	4,903
Social media	2,611	53.3	2,292	46.7	4,903
Digital maps	1,877	38.3	3,026	61.7	4,903
Interactive displays	1,163	23,7	3,740	76.3	4,903
WI-FI services, QR code	334	6.8	4,569	93.2	4,903
Engaging in research activities	2,002	40.8	2,901	59.2	4,903
Carrying out marketing surveys	1,668	34.0	3,235	66.0	4,903

Source: Own calculations from Istat data

EMPIRICAL STRATEGY

We focus on the ways in which the digital environment strengthens the economic potential of the cultural institutions. Specifically, to evaluate the economic performance we consider two outcome variables, the number of visitors and the revenue from ticket selling. To the best of our knowledge, the link between ICT diffusion and the propensity to engage in research and dissemination activities has been so far neglected. In our view, the notion of performance also involves the ability of institutions to generate value in research and knowledge transmission (Fernandez- Blanco and Prieto-Rodriguez, 2020). The dataset allows us to have available indicators that capture these objectives. In particular, we refer to research and to a range of specialized laboratories.

To this end, we run three regressions. In the first two, we fit a linear regression model to estimate the impact of ICT on: (1) the number of visitors, (2) the income of the facility. The model has the following form:

$$\log y_i = \beta_0 + \beta_1 \boldsymbol{D}_i + \zeta \boldsymbol{X}_i + \gamma F_i + \varepsilon_i, \quad (1)$$

where $logy_i$ is the log of the outcome variable, $\boldsymbol{D}_i$ the set of variables proxing digital technology adopted by the organizations, $\boldsymbol{X}_i$ a vector of control variables capturing the main features of the structure, F_i province fixed effects capturing territorial differences in enhancement of cultural heritage, εi_t the vector of i.*i.d.* errors. In the linear regressions, we consider two outcome variables: (1) the log of the number of visitors; (2) the log of the median value of the class in which income from tickets sales falls. The vector D***i*** includes the following variables: having a website, on-line catalogue, selling on-line tickets, offering virtual visits, having an account on the social media, providing digital maps, interactive displays, WI-FI services. The vector X***i*** includes the following variables: the size of the structure measured by the number of employees, the type of structure (museum or gallery, archaeological park, museum complex, Eco

museum), whether the structure is public or private, whether the structure belongs to a network, rents its spaces for private initiatives, offers material in English, sells seasonal tickets, adheres to transparency rules, benefits from public or private financing, sells additional services, carries out marketing surveys.

In the third regression, we fit a probit model to estimate the probability that the organization engages in research activity:

$$Pr\left(y=1\right)=Pr\left(\boldsymbol{x}'_i\beta+u>0\right)=F\left(\boldsymbol{x}'_i\beta\right), \tag{2}$$

where $F(.)$ is the standard cumulative normal and u is standard normally distributed. In the Probit model, we use the same set of variables described above and, additionally, the number of paying visitors.

We refer to table 5 in the Appendix for a detailed description of the variables used in the analysis while Table 3 displays the main statistics for the variables used in the empirical analysis.

Table 3. Summary statistics of applied variables.

Variable	Mean	SD	Min	Max
Income from ticket sales(log)	4.02	4.54	0	13.81
Research	0.59	0.49	0	1
Visitors (log)	7.24	3.04	0	16.01
Paying visitors (log)	3.98	4.34	0	15.27
Size (n employees, log)	1.58	1.01	1.01	6.72
Type	1.37	0.76	1	4
State-owned/private	1.35	0.48	1	2
Network	0.25	0.43	0	1
Rent	0.21	0.41	0	1
Material in English	0.52	0.50	0	1
Seasonal tickets	0.82	0.38	0	1
Transparency, accountability	0.35	0.48	0	1
Public financing	0.35	0.48	0	1
Private financing	0.23	0.42	0	1
Revenue from additional services/sources	0.28	0.45	0	1
Marketing	0.20	0.40	0	1
Interactive displays	0.24	0.43	0	1
WI-FI services, QR code	0.07	0.25	0	1
Website	0.51	0.50	0	1
On-line catalogue	0.13	0.33	0	1
On-line tickets	0.15	0.36	0	1
Virtual visits	0.10	0.30	0	1
Social media	0.53	0.50	0	1
Digital maps	0.38	0.49	0	1

Source: Own calculations from Istat data

Table 6 in the appendix displays the pairwise correlation matrix. All correlations are well below 0.5 suggesting minimal concern about multicollinearity. The Variance Inflation Factor (VIF) analysis confirms this result[3].

EMPIRICAL RESULTS

Table 4 reports the results of the regressions. In describing the estimation results, we first focus on the coefficients of the digital technology variables and then turn to the remaining variables.

Table 4. Regression results (dependent variables are in the columns headings).

	Linear regression		**Probit**
	Log visitors	**Log income**	**Research activities**
Size (n employees)	0.010***	0.014***	0.010***
	(0.003)	(0.004)	(0.003)
Type (base: museum, gallery)			
Archaeological site	0.587***	0.652***	-0.221**
	(0.111)	(0.231)	(0.098)
Monumental site	1.126***	1.502***	-0.590***
	(0.094)	(0.190)	(0.076)
Eco-museum	-0.054	0.920**	0.420**
	(0.199)	(0.465)	(0.214)
Private museum (base: state-owned)	0.095	0.173	-0.223***
	(0.058)	(0.125)	(0.056)
Network	0.088	0.068	0.064
	(0.059)	(0.134)	(0.058)
Space rent	0.513***	1.087***	0.253***
	(0.064)	(0.158)	(0.070)
Material in English	0.519***	1.192***	0.217***
	(0.059)	(0.129)	(0.052)
Seasonal tickets	-0.069	-0.052	-0.098
	(0.089)	(0.193)	(0.107)
Transparency, accountability	0.441***	0.365***	0.187***
	(0.059)	(0.140)	(0.064)
Public financing	0.223***	-0.064	0.352***
	(0.053)	(0.129)	(0.055)
Private financing	0.139**	-0.115	0.386***
	(0.063)	(0.149)	(0.068)

continues on following page

Table 4. Continued

	Linear regression		Probit
	Log visitors	**Log income**	**Research activities**
Revenue from additional services	0.639***	2.561***	0.174**
	(0.064)	(0.160)	(0.069)
Marketing	0.253***	0.496***	0.376***
	(0.066)	(0.152)	(0.074)
Interactive displays	0.348***	0.593***	0.187***
	(0.059)	(0.139)	(0.064)
Wi-Fi services, QR code	0.204**	-0.175	0.281**
	(0.090)	(0.212)	(0.112)
Website	0.288***	0.474***	0.223***
	(0.057)	(0.131)	(0.054)
Online catalogue	-0.077	-0.420**	0.242***
	(0.070)	(0.172)	(0.082)
Online tickets	0.577***	1.218***	0.027
	(0.078)	(0.182)	(0.079)
Virtual visits	0.027	-0.200	0.159*
	(0.085)	(0.191)	(0.091)
Social media	0.223***	0.823***	0.411***
	(0.061)	(0.143)	(0.056)
Digital maps	0.060	-0.032	0.285***
	(0.054)	(0.127)	(0.054)
Paying visitors			-0.002
			(0.008)
Constant	7.311***	2.714***	0.003
	(0.240)	(0.713)	(0.263)
Fixed effects	Province	Province	Province
R squared	0.468	0.476	
Observations	4,903	4,903	4,903

Source: Own estimates

Note: this table presents results of the linear regression (see eq. 1) and the marginal effects of the probit regression (see eq. 2). See appendix for details on variables construction. In the regressions, we control for Province fixed effects. Robust standard errors are reported in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$

We begin with the results of the linear regressions. Given that the dependent variable is expressed in the natural logarithm, the interpretation of the coefficients must be done with caution. Roughly, we can say that if the regressor is a dummy, given a coefficient $\beta 1$ the difference $\left((e^{\beta_1}-1\right)*100$ measures the percent change in the level of the dependent variable ($\Delta\%y$).

Results in Table 4 show that having a website, selling on-line tickets, having a social media account, providing visitors with interactive displays or virtual reconstructions of the exhibitions increase both

the number of visitors and the organization's revenue stream. The magnitude of the effects is relevant. For instance, having a website versus not having a website increases a structure's income by 60%. Thus, having a website is a crucial way to interact with the audience and reach out to new audiences. Rellie (2004), explains as the presence of the Web for the Tate Gallery made it recognizable, increasing the revenue streams. Furthermore, having a website increases visitors by 33%, whereas selling on-line tickets increases income by 259% and visitors by 78%. Carrying out marketing services to test the public's satisfaction and offering interactive displays also have a positive and relevant impact on a facility's outcome. For all the variables described above, the coefficients are statistically significant at the 1% level.

We note that offering virtual visits of the exhibitions/facility, providing visitors with digital maps, do not exert a statistically significant effect on the number of visitors or income. Additionally, providing Wi-Fi and QR code technologies increase the number of visitors as they offer potentially opportunities to transform public experiences in museum-like spaces (Perez-Saragustin et al., 2016).

As for on-line catalogue and virtual visits, the potential impact on performance may be ambiguous because such services can either encourage or substitute visits[4].

As expected, larger institutions attract more visitors and earn higher income (Camarero et al., 2011), as well as renting an institution's spaces for private events, providing information material in English, and adhering to transparency rules.

Unsurprisingly, given the heterogeneous nature of the cultural institutions considered and the wide range of activities they engage in, they differ in their ability to attract visitors. Looking specifically at the type of institution, our findings suggest that with respect to museums and galleries, archaeological and monumental sites seem to reach a larger share of audience.

Although a detailed analysis of the institutional and managerial setting is beyond the scope of our paper, a first conclusion is that there appears to be no statistically significant difference between public and private cultural organizations in terms of performance.

We note that extending services supplied (bookshops) or raising revenue through advertising, royalties, copyrights, and artwork lending, leads to higher number of visitors and increased income, as expected. As hypothesized, public and private funding have a positive impact on performance.

Lastly, we note that selling seasonal tickets does not seem to be rewarding in terms of both the number of visitors and revenue.

Let us now analyse the relationship between digital technology and the propensity of cultural organizations to conduct a range of research and informational activities. One dimension of the performance of cultural institutions also concerns the propensity to carry out research in the field of conservation practice, history, engagement and interaction with audiences, and so on.

The probit regression results in Table 4 show that, in all cases, "being digitized" increases the likelihood of carrying out research activities. For instance, social media accounts raise the probability of engaging in research activity by 41%. Consistent with this result, the majority of the other ICT categories plays a positive role in enhancing research behaviour.

Looking at the estimates for the control variables, we can see museums, galleries, and state-owned cultural facilities exploit more research aims. Moreover, other sources that raise the attitude in research practices are renting space for private initiatives, providing material in English, and transparency regulations. We also observe that, for the most part of the variables considered, the marginal effect is statistically significant at the 1% level.

Finally, we note that both public and private funding have a positive effect on the propensity to conduct research.

SOLUTIONS AND RECOMMENDATIONS

Below are the aspects on which innovation has a potential impact that can be grasped, as our empirical analysis has shown:

- Audiences: new technologies offer the opportunity to increase and deepen engagement with audiences.
- Research: there is room to exploit innovation for new and experimental initiatives by cultural institutions.
- Value creation: innovation may contribute to define a range of methodologies to measure the economic and cultural value to assess the impact of cultural heritage, economically, socially, and environmentally.
- Management: innovation may encourage the adoption of new business models and search of new financing strategies.

There is an emerging need to expand the notion of audience. Indeed, given that access to cultural heritage can be virtual, *in situ*, and blended, this comes with different requirements for engaging in cultural experiences. Thus, digital technologies set new basis for how organizations carry out their activities, create and provide products and services, and for how they communicate with audiences.

The adoption of new technologies requires a change in traditional business models as well. For example, innovation may also be funded with new financing structures with greater involvement of private investors.

Policymakers should take a broader approach to investment in cultural institutions aimed at identifying barriers to innovation and, if necessary, address financial contribution to experimentation. Traditionally, this is not the way how public funders have seen their role in the cultural sector.

Measures aimed at increasing autonomy, resource management and accountability for objectives could encourage the adoption of new technologies to improve the value and attractiveness of heritage. In this context, we note that in 2014 Italian cultural institutions were affected by a reform in their governance. In particular, the reform provided a group of museums with a greater degree of managerial, technical, and financial autonomy. Moreover, the policy reform enhanced also the importance of education and research mission. This is the road along which it is useful to continue in order to improve the attractiveness of the heritage.

FUTURE RESEARCH DIRECTIONS

Analysis of the performance and efficiency of cultural organizations has developed a great deal in recent years. However, the association between ICT and performance of cultural institutions remains still poorly investigated at the empirical level. Our work has intended to help fill the gap.

Future research is needed to fully understand why certain digital innovation tools are more effective at attracting audiences. It would also be useful to analyze whether private management may be more inclined than public management to adopt ICT services and thereby increase economic performance.

Other aspects that can be further investigated include the economic impact of cultural institutions in terms of business output, value added (national, regional, local), wealth, personal income, and employ-

ment. In this regard, it is crucial to adopt a holistic approach to measure the economic value embodied in cultural heritage.

The estimations carried out in this chapter should be seen as a first stage in an ongoing process. To this end, to improve our understanding about the impact of digital technologies on cultural organization performance we aim to extend the analysis to a wider period by using panel data techniques. This would allow us to emphasize the dynamic nature of the relationship between ICT adoption and the efficiency of cultural organizations.

CONCLUSION

Italy's artistic and cultural heritage is unparalleled in terms of richness, variety and quality. From the economic point of view, it represents a potential competitive advantage, for both the direct returns it can produce and the activities it generates. While keeping in mind the primary nature of heritage as a public good, the economic and political debate is centered on the need to improve its enhancement and its international attractiveness. The adoption of new technologies by the cultural institutions has boosted the economic potential of the cultural sector through the creation of new cultural products, new modalities for the distribution, consumption and reception of cultural experiences.

The opportunities for new technologies to generate new sources of economic value is clear from our results. The findings call on to continue investing, supporting and promoting cultural heritage, recognizing it as an economic and social catalyzer and as a powerful tool for the sustainable development of society as a whole.

It has changed the role cultural institutions play in cultural, social and economic fields and the underlying issues require new theoretical, inter-disciplinary and operational approaches. Among others, the shift on the notion of cultural heritage, from a static approach to a dynamic and participatory one, entails the need for new integrated heritage management strategies. This analysis represents a first step in a potentially fruitful line of research. While there is established evidence that ICT significantly affects cultural institutions' performance, we still know little on the channels through which this influence unfolds. In order to address these issues, future research is needed.

As we have shown, the performance of cultural institutions activities is intimately linked to key issues such as innovation, knowledge and open up economic externalities. Thus, there is a need for policymakers to adopt new public and private funding approaches addressed at investments in innovation and knowledge in the cultural sector. Furthermore, our results demonstrate that new technologies open up possibilities for carrying out research activities. There are avenues to encourage these goals. Arts funders should support the sector's capacity to innovate in research and experimental work to elevate these activities to a core function of cultural institutions. In conclusion, our results suggest the need for a broader approach to innovation investment policy in the cultural sector.

REFERENCES

Bakhshi, H., & Throsby, D. (2010). *Culture of Innovation: An Economic Analysis of Innovation in Arts & Cultural Organisations*. NESTA.

Barbieri, L., Fabio, B., & Muzzappa, M. (2017). Virtual Museum System Evaluation through User Studies. *Journal of Cultural Heritage*, *26*, 101–108. doi:10.1016/j.culher.2017.02.005

Barrio, M., Herrero, L., & Sanz, J. (2009). Measuring the Efficiency of Heritage Institutions: A Case Study of a Regional System of Museums in Spain. *Journal of Cultural Heritage*, *10*(2), 258–268. doi:10.1016/j.culher.2008.08.012

Basso, A., Casarin, F., & Funari, S. (2018). How well is the museum performing? A joint use of DEA & BSC to measure the performance of museum. *Omega*, *81*, 67–84. doi:10.1016/j.omega.2017.09.010

Basso, A., & Funari, S. (2004). A Quantitative Approach to Evaluate the Relative Efficiency of Museums. *Journal of Cultural Economics*, *28*(3), 195–216. doi:10.1023/B:JCEC.0000037997.23746.f2

Blasco Lopez, M. F., Virto, N. R., & San-Martin, S. (2019). The Cornerstones of Museum Performance. A Cross-National Analysis. *Museum Management and Curatorship*, *34*(2), 211–233. doi:10.1080/09647775.2018.1516562

Borowiecki, K. J., & Navarrete, T. (2017). Digitization of Heritage Collections as Indicator of Innovation. *Economics of Innovation and New Technology*, *26*(3), 227–246. doi:10.1080/10438599.2016.1164488

Camarero, C., & Garrido, M. J. (2014). Learning and relationship orientation: An empirical examination in European museums. *Journal of Philanthropy and Marketing*, *19*(2), 92–109.

Camarero, C., Garrido, M. J., & Vicente, E. (2011). How Cultural Organizations' Size and Funding Influence Innovation and Performance: The Case of Museums. *Journal of Cultural Economics*, *35*(4), 247–266. doi:10.100710824-011-9144-4

Chung, T. L., Marcketti, S., & Fiore, A. M. (2014). Use of Social Networking Services for Marketing Art Museums. *Museum Management and Curatorship*, *29*(2), 188–205. doi:10.1080/09647775.2014.888822

Council of Europe. (2005). *Framework Convention on the Value of Cultural Heritage for Society, Treaty Series - No. 199*. Author.

Evrard, Y., & Krebs, A. (2018). The authenticity of the museum experience in the digital age: The case of the Louvre. *Journal of Cultural Economics*, *42*(3), 353–363. doi:10.100710824-017-9309-x

Fedeli, S., & Santoni, M. (2006). The Government's Choice of Bureaucratic Organisation: An Application to Italian State Museums. *Journal of Cultural Economics*, *30*(1), 41–72. doi:10.100710824-006-9005-8

Fernandez-Blanco, V., & Prieto-Rodriguez, J. (2020). Cost of Production. In R. Towse & T. Navarrete Hernandez (Eds.), *Handbook of Cultural Economics* (3rd ed.). Edward Elgar Publishing.

Frey, B. S. (2003). *Arts and Economics: Analysis & Cultural Policy* (2nd ed.). Springer.

Frey, B. S., & Pommerehne, W. W. (1989). *Muses and Markets: Explorations in the Economics of theArts*. Basil Blackwell.

Garrido, M. J., & Camarero, C. (2014). Learning and Relationship Orientation: An Empirical Examination in European Museums. *International Journal of Nonprofit and Voluntary Sector Marketing*, *19*, 92–109.

Gstraunthaler, T., & Piber, M. (2012). The Performance of Museums and Other Cultural Institutions. *International Studies of Management & Organization*, *42*(2), 29–42.

Guccio, C., Martorana, M., Mazza, I., Pignataro, G., & Rizzo, I. (2020). Is Innovation in ICT Valuable for the Efficiency of Italian Museums? *European Planning Studies*. Advance online publication. doi:10.1080/09654313.2020.18.65.277

Guerzoni, G. (1998). L'arte e la cultura. In *Manuale di Organizzazione Aziendale. Le tipologie aziendali*. UTET.

Kabassi, K. (2017). Evaluating Website of Museums: State of the Art. *Journal of Cultural Heritage*, *24*, 184–196.

Loran, M. (2005). Use of Websites to Increase Access and Develop Audiences in Museums: Experiences in British National Museums. *E-journal of the Humanities and Philology Studies of the UOC*, *7*, 23–29.

McCarthy, K., & Jinnett, K. (2001). *A New Framework for Building Participation in the Arts*. RAND.

McMaster, B. (2008). *Supporting Excellence in the Art*. Department for Culture, Media, and Sport.

Minghetti, V., Moretti, A., & Micelli, S. (2001). Reeingineering the museum's role in the tourism value chain: Towards an IT business model. *Journal of Information Technology and Tourism*, *4*(1), 131–143.

Nauta, G.J., van den Heubel, W., & Teunisse, S. (2017). D.*4 Report on ENUMERATE Core Survey 4*. Europeana DSI 2-Assess to Digital Resources of European Heritage.

Navarrete, T. (2013). Museums. In R. Towse & C. Handke (Eds.), *Handbook on the Digital Creative Economy* (pp. 330–343). Edward Elgar Publishing.

Padilla-Meléndez, A., & del Águila-Obra, A. R. (2013). Web and Social Media Usage by Museums: Online Value Creation. *International Journal of Information Management*, *33*(5), 892–898.

Pérez-Sanagustín, M., Parra, D., Verdugo, R., García-Galleguillos, G., & Nussbaum, M. (2016). Using QR Codes to Increase User Engagement in Museum-Like Spaces. *Computers in Human Behavior*, *60*, 73–85.

Reeves, M. (2002). *Measuring the Economic and Social Impact of the Arts: A Review*. The Arts Council of England.

Rellie, J. (2004). One Site Fits All: Balancing Priorities at Tate Online. In D. Bearman & J. Trant (Eds.), *Museums and the Web*. Archives and Museums Informatics.

Sylaiou, S., & Papaioannou, G. (2019) ICT in the Promotion of Arts and Cultural Heritage Education in Museums. In Strategic Innovative Marketing and Tourism. Springer.

Throsby, D. (2001). *Economics and Culture*. Cambridge University Press.

Throsby, D. (2010). *The Economics of Cultural Policy*. Cambridge University Press.

UNCTAD. (2010). *Creative Economy Report*. UNDP-UNCTAD. http://archive.unctad.org/en/docs/ditctab20103_en.pdf

UNESCO. (1954). *Convention on the Protection of Cultural Property during Armed Conflicts*. Hague.

World Bank. (2001). *Cultural Heritage and Development. A Framework for Action in the Middle East and North Africa*. World Bank.

ADDITIONAL READING

Borowiecki, K. J., & Navarrete, T. (2017). Digitization of heritage collections as indicator of innovation. *Economics of Innovation and New Technology*, *26*(3), 227–246. doi:10.1080/10438599.2016.1164488

Del Barrio, M., Herrero, L., & Sanz José, A. (2014). Measuring the efficiency of heritage institutions: A case study of a regional system of museums in Spain. *Journal of Cultural Heritage*, *10*(2), 258–268. doi:10.1016/j.culher.2008.08.012

Evrard, Y., & Krebs, A. (2018). The authenticity of the museum experience in the digital age: The case of the Louvre. *Journal of Cultural Economics*, *42*(3), 353–363. doi:10.100710824-017-9309-x

Hutter, M., & Throsby, D. (2008). *Beyond price: value in culture, economics, and the arts*. Cambridge University Press.

Paolini, P., Mitroff Silvers, D., & Proctor, N. (2013). Technologies for cultural heritage. In I. Rizzo & A. Mignosa (Eds.), *Handbook on the economics of cultural heritage* (pp. 272–289). Edward Elgar Publishing. doi:10.4337/9780857931009.00024

Towse, R., & Hernandez, N. (Eds.). (2020). *Handbook of Cultural Economics* (3rd ed.). Edward Elgar Publishing.

KEY TERMS AND DEFINITIONS

ICT: Information and communication technologies encompassing both the internet-enabled sphere as well as the mobile one powered by wireless networks.

ICT Services: Forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic tools.

Network: Management of a cultural facility implemented in an integrated manner with other institutions through formal acts that provide for the sharing of human, technological or financial resources.

Performance: Performances of cultural institutions in attracting visitors; revenue-generation.

Probit: A probit model is a statistical method to perform regression for binary outcome variables (0, 1). The probit model estimates the probability a value will fall into one of the two possible binary (i.e. unit) outcomes.

ENDNOTES

1 Institutions dedicated to studying, protecting, and publicizing the overall collective memory of a geographically bounded community and its historical and current relationship to the environmental resources of the area.

2 For a comparison between Italy and other EU countries engaged in digitalization activities, see Nauta et al. (2017).

3 All variables indicate values well below 10, the standard cut-off threshold to check on the degree of multicollinearity.

4 For the specific case of museums, see Navarrete, 2013. However, the literature shows that considering specific-museum cases, such as Tate Modern and Louvre, a complementary rather than a substitution effect might prevail (Bakhshi and Throsby, 2010; Evrad and Krebs, 2018).

APPENDIX

Table 5. Description of variables

Income from ticket sales	Class of income from ticket sales (in Euro): 1=less than 1,000; 2=1,001-2,500; 3=2,501-5,000; 4=5,001-10,000; 5=10,001-20,000; 6=20,001-50,000; 7=50,001-100,000; 8=100,001-500,000; 9=500,001-1,000,000; 10=over 1,000,000
Visitors (log)	Number of visitors (in log)
Paying visitors (log)	Number of paying visitors (in log)
Research	Indicator variable taking the value 1 if enacting in research activities or educational workshop, 0 otherwise
Size (n employees, log)	Number of employees
Type	Categorical variable taking the value 1 if museum, 2 if archeological park, 3 if monumental complex, 4 if Eco-museum
State-owned/private	Indicator variable taking the value 1 if public, 0 if private
Network	Indicator variable taking the value 1 if belonging to a network, 0 otherwise
Rent	Indicator variable taking the value 1 if the museum rents its spaces for private events, 0 otherwise
Material in English	Indicator variable taking the value 1 if the museum distributes material in English
Seasonal tickets	Indicator variable taking the value 1 if the museum offers seasonal tickets (subscription)
Transparency, accountability	Indicator variable taking the value 1 if the museum adheres to transparency rules (so-called services card)
Public financing	Indicator variable taking the value 1 if the museum benefits from public funding
Private financing	Indicator variable taking the value 1 if the museum benefits from private funding
Revenue from additional services	Indicator variable taking the value 1 if the museum offers additional services (i.e. bookshop, lends its artwork, etc.) or has revenue from royalties, concessions, advertising
Marketing	Indicator variable taking the value 1 if the museum has carried out marketing surveys (public's satisfaction) in the last five years
Interactive displays	Indicator variable taking the value 1 if the museum offers interactive displays, virtual reconstructions, 0 otherwise
WI-FI services, QR code	Indicator variable taking the value 1 if the museum offers digital support like Wi-Fi services, bluetooth, QR code, 0 otherwise
Website	Indicator variable taking the value 1 if the museum has a website, 0 otherwise
On-line catalogue	Indicator variable taking the value 1 if the museum's catalogue is available on-line, 0 otherwise
On-line tickets	Indicator variable taking the value 1 if the tickets can be purchased on-line, 0 otherwise
Virtual visits	Indicator variable taking the value 1 if virtual visits of the museum (through Internet) are available, 0 otherwise
Social media	Indicator variable taking the value 1 if the museum has an account on main social-media, 0 otherwise
Digital maps	Indicator variable taking the value 1 if the museum offers Web services like lings to digital maps, location of the museum, 0 otherwise

Table 6. Pairwise correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24	24
1	Visitors (log)	1.00																							
2	revenue (log)	0.57	1.00																						
3	Research	0.30	0.17	1.00																					
4	Size (n empl., log)	0.38	0.28	0.21	1.00																				
5	Type	0.21	0.15	-0.08	0.02	1.00																			
6	Public/private	-0.02	0.00	-0.01	-0.04	-0.06	1.00																		
7	Network	0.13	0.12	0.07	0.00	0.08	-0.21	1.00																	
8	Rent	0.39	0.34	0.19	0.25	0.12	-0.01	0.03	1.00																
9	Material in English	0.33	0.35	0.19	0.11	0.01	0.02	0.08	0.18	1.00															
10	Seasonal tickets	-0.31	-0.35	-0.17	-0.22	-0.04	0.01	-0.10	-0.23	-0.15	1.00														
11	Transparency	0.31	0.21	0.18	0.20	0.08	-0.18	0.17	0.20	0.10	-0.13	1.00													
12	Marketing	0.26	0.26	0.18	0.12	0.01	-0.08	0.12	0.15	0.23	-0.16	0.22	1.00												
13	Paying visitors (log)	0.61	0.96	0.18	0.29	0.16	-0.00	0.13	0.35	0.35	-0.35	0.22	0.27	1.00											
14	Public financing	0.28	0.20	0.27	0.18	0.01	-0.13	0.15	0.20	0.18	-0.13	0.21	0.17	0.20	1.00										
15	Private financing	0.25	0.19	0.29	0.22	-0.03	0.20	0.02	0.26	0.17	-0.19	0.08	0.09	0.19	0.25	1.00									
16	Rev. from add. services	0.44	0.48	0.27	0.23	0.05	0.01	0.12	0.41	0.30	-0.23	0.20	0.28	0.47	0.30	0.30	1.00								
17	Interactive displays	0.24	0.23	0.21	0.13	-0.07	-0.07	0.06	0.13	0.20	-0.14	0.14	0.23	0.23	0.18	0.16	0.24	1.00							
18	WI-FI serv., QR code	0.10	0.12	0.11	0.08	-0.03	-0.03	0.05	0.08	0.14	-0.06	0.05	0.15	0.11	0.13	0.09	0.13	0.24	1.00						
19	Website	0.32	0.30	0.28	0.15	-0.03	0.15	0.05	0.19	0.29	-0.17	0.12	0.19	0.30	0.21	0.23	0.31	0.20	0.12	1.00					
20	On-line catalogue	0.11	0.07	0.15	0.07	-0.05	0.03	0.03	0.08	0.11	-0.09	0.08	0.09	0.08	0.06	0.10	0.11	0.12	0.09	0.21	1.00				
21	On-line tickets	0.34	0.31	0.17	0.21	0.06	0.00	0.13	0.18	0.18	-0.20	0.19	0.16	0.32	0.14	0.12	0.24	0.17	0.11	0.24	0.14	1.00			
22	Virtual visits	0.13	0.09	0.14	0.09	-0.04	0.04	0.05	0.09	0.09	-0.06	0.08	0.09	0.09	0.12	0.13	0.10	0.14	0.10	0.20	0.21	0.14	1.00		
23	Social media	0.36	0.37	0.30	0.17	0.01	0.02	0.13	0.25	0.31	-0.18	0.19	0.23	0.37	0.29	0.25	0.38	0.24	0.14	0.42	0.15	0.24	0.14	1.00	
24	Digital maps	0.26	0.23	0.25	0.13	0.01	-0.00	0.12	0.15	0.25	-0.13	0.12	0.20	0.23	0.22	0.16	0.26	0.20	0.13	0.31	0.18	0.23	0.16	0.39	1.00

Chapter 6
Digital Transformation and Skill Acquisition: Enablers and Barriers for Today's Workforce

Kateřina Maršíková
https://orcid.org/0000-0003-2306-2303
Technical University of Liberec, Czech Republic

Anastasiia Mazurchenko
https://orcid.org/0000-0003-2044-1607
Technical University of Liberec, Czech Republic

ABSTRACT

The chapter brings a review of literature on primary and secondary data analysing the aspect of digital transformation from the point of view of human resources (HR). It describes the perspective of employees and their digital skills acquisition, as well as the perspective of employers and their readiness for digital transformation. It also introduces barriers to digital skills acquisition. The primary data used in this chapter is presented on a sample of Czech companies and employees in order to illustrate the current situation in this field. The authors concentrate on answers to the following research questions: What digital competencies were identified as those mainly needed for current employees and how they acquire them? What are the main barriers to closing digital skills gaps at work? How has the Covid-19 pandemic changed the requirements for employees' digital skills? The literature review results are supported by global secondary data analysis on demand for skills at the workplace in European countries.

DOI: 10.4018/978-1-7998-9008-9.ch006

INTRODUCTION

The accelerating digital transformation creates challenges for employers in hiring people with the skills, competencies and knowledge needed to thrive in a changing working environment. European skills and jobs survey conducted by the European Centre for the Development of Vocational Training (2021a, p. 11) has stated that each fifth European employee needs to have advanced digital skills (mainly innovation, communication, numeracy and literacy skills) for doing his job. Skills gaps in the labour market are considered the primary barrier (55.4%) to adopting new technologies (Zahidi et al., 2020, p. 35). Moreover, there is a disparity between the skills acquired by employees and the skills required to do their job (European Commission, 2019). Due to the Covid-19 pandemic, organisations whose business could be carried out digitally moved towards remote working environments. Teltscher (2020, p. 1) claims that "the accelerated speed towards digitisation in the corporate sector goes hand in hand with a growing demand for employees with specialised digital skills who need to install, maintain and secure information and communication systems and provide technical support to the workforce". Considering that the relevance of employee professional activities and related skills is constantly changing due to the dynamic development of digital technologies, employee training and learning are becoming a topical issue in the digital era.

The Covid-19 pandemic and its wide-ranging impacts have accelerated digital skills demand in most occupations in various sectors, especially non-ICT ones. Effective digital skills have proven to drive resilience, helping workers and entire organisations adapt to the new realities. The share of digital skills on the total skills demand in online job advertisements has grown from 20% in 2019 to 23% in 2020 (European Centre for the Development of Vocational Training, 2020). It makes digital skills a cluster with the most pronounced shift. Furthermore, the share of individuals with moderate or advanced digital skills varies in countries across Europe. For example, in Sweden, Denmark and Norway, the share of individuals with intermediate or advanced digital skills exceed 40% compared to Bulgaria or Romania, where it is less than 20% (European Centre for the Development of Vocational Training, 2021b).

In addition, Teltscher (2020, p. 1) states that "the pandemic spurred innovation in digital tools and platforms and increased digitalisation of business processes, products and services. As the pandemic has continued, there is a growing focus on the use of digital technologies". From the managing human resource point of view, various tools for communication, sharing information and managing knowledge and teams, and organising remote work were implemented. Unified communications and collaboration (UCC) technologies are one of the most often used. It is software that enables enterprise communication in real-time and asynchronous cooperation proficiency. As an example, MS Teams can be used (Ilag, 2021). Specifically in the research and academic environment, working remotely will usually have to become familiar with more sophisticated tools than cell phones and chat channels. One example is Git, an open-source version-control system (Hunter, 2019). Furthermore, microcredentials are traced in modern companies. Microcredentials are described as a new way to build the profile of the individual skills (portfolio) by learning at their own pace and according to their priorities (European Centre for the Development of Vocational Training,, 2021c). All these factors mentioned above put a high requirement on companies' management of all levels.

This chapter aims to identify the companies' attitude to the expedited digital transformation and specify their employees' digital skills considering the ongoing Covid-19 pandemic. In this chapter, the authors are going to concentrate on answers to the following research questions:

- Question 1: What digital competencies were identified as those needed for current employees, and how do they acquire them?
- Question 2: What are the main barriers to closing skills gaps and the employees' digital skills development at work?
- Question 3: How has the Covid-19 pandemic changed the intensity of using digital technologies, and in connection with it, changed the need for employees' digital skills and their training and development?

The objective of the chapter is to answer these questions. The authors used a detailed literature review, primary and secondary data analysing the aspect of digital transformation from the point of view of human resources. The chapter describes the perspective of employees and their digital skills acquisition, employers' opinion, and their readiness for digital transformation. The primary data used in this chapter is presented on a sample of Czech companies and employees to illustrate the current digital transformation in human resources, emphasising key competencies and factors that influence digital transformation.

THE ROLE OF COMPETENCE IN DIGITAL TRANSFORMATION: LITERATURE REVIEW

The topic of digital transformation has become increasingly important in recent months in connection with the growing intensity of digital technologies and tools. This section aims to introduce key terms as a background to understand the topic.

Digital transformation can be understood as a complex and interdisciplinary field. It includes not only conversion of processes and business models but also changing organisational learning and education. As a result, building expertise and trust through communication and cooperation allow working smarter than before (Wolff et al., 2019; Sen, 2020). *Digital transformation* is defined by Solis (2014), as "the realignment of, or new investment in, technology and business models to more effectively engage digital customers at every touchpoint in the customer experience lifecycle". Altogether *digital transformation* reflects the capacity of organisations to adapt to changing customer requirements and apply technologies for significant improvements in all business segments (Maheshwari, 2019). Yucel (2018) states that *digital transformation* is characterised by the digital initiatives corporations take on, the technologies adopted by them. Its characteristics include corporate objectives, policies and culture, managing risks and staff skillsets. Such a complex issue places great demands on all resources in organisations (i.e. human, technical, financial).

The nature of work and the modern workplace are strongly influenced by digital technologies. They change methods of communication, knowledge sharing and managing business relationships (Sen, 2020). In general, *digital technologies* are emerging technologies such as cyber-physical systems, cloud computing, big data, artificial intelligence, virtual and augmented reality, etc. (Khin & Ho, 2019). There is no doubt that As an adequate assessment, methods and activities are essential for efficient implementation of *digital technologies* into the process of employee training and development (Wheeler, 2019). Successful technology-enhanced learning is heavily dependent on various factors. They include employees' desire to adhere to the security, ethical and privacy concerns of learning analytics and getting feedback for continuous improvement (Jagannathan, 2021). The intensity, manner and forms of using digital technologies depend on the organisation's environment and are different in various areas and fields of

society. Except for those definitions mentioned above, *digital technology* may be determined as a complex system of tools and strategies that can be organised to advance learning and teaching (Luppicini, 2021). Such a definition is relevant in a specific case of educational institutions. All this confirms that modern organisations should concentrate more on upgrading digital, cognitive and social competencies by employees in accordance with the requirements of the new digital era (Balog & Demidova, 2021).

Digital transformation cannot be successful without the sufficient digital competencies of all employees. Research and practice suggest different definitions and classifications of digital skills and competencies. Based on the European Union (EU) classification, *digital competence* (also referred to as digital literacy) encompasses basic digital skills, covering information and data literacy, online communication and collaboration, digital content creation, safety and problem-solving. *Digital competence* is about applying those digital skills, knowledge and attitude confidently, critically and responsibly in a defined context (e.g. education). Moreover, since 2006, digital competence has been one of the eight key competencies for lifelong learning in the EU (Brolpito, 2018). However, Janssen et al. (2013) draw particular attention to the fact that there is a difference between the existing and required staff digital competencies.

Moreover, the concept of *digital competencies* is multifaceted. This is explained by the fact that each employee has an individual set of competencies, and each job position requires different employee competencies (Oberländer et al., 2020). As a result, there is no unified definition of digital competencies. Bondar et al. (2021) believe that *digital competence* unites skills, technologies, knowledge, attitudes, learning theory, the process of education and interconnection between all these components. Moreover, *digital competencies* might be regarded as a tool backing organisational goals realisation, changes in job quality, company competitiveness and innovational development (Hubschmid-Vierheilig et al., 2020). Alam et al. (2018) found that *digital competence* is the capacity of stakeholders to grasp emerging digital technologies. Moreover, *digital competencies* are strongly connected with applying information and communication technologies, which emphasises the priority of training and development in this field (Nemeskéri et al., 2020).

The increasing role of digital skills can be seen clearly in keeping up with new technologies that renew how organisations operate. From the practical point of view, *digital skills* are built while utilising digital technologies. They are focused on enhancing abstract and logical thinking and applying basic learning algorithms (Bondar et al., 2021). The important skills essential for powerful digital transformation include robotisation, nanotechnology, the internet of things and digitalisation (Sousa & Rocha, 2019). Moreover, *digital skills* such as coding and programming, developing robotic technologies, deployment of information and communication technologies skills in business practice and cloud computing are becoming a priority for the majority of industries(The Australian Industry and Skills Committee, 2021). Due to the Covid-19 pandemic, the demand for digital skills has increased significantly. They are promptly becoming required in virtually all sectors and occupations. Such competencies promote the employee and company induction process to the ongoing change (European Centre for the Development of Vocational Training, 2021d).

Human resources play a crucial role in successful digital transformation. It is essential to realise that transformation is much more complex than using digital means. This complexity needs to be managed. The initiative of digital transformations must come from the company's management and be implemented at all operational activities (Ablyazov et al., 2018). Successful digital transformation also requires an appropriate corporate culture. It takes place when management supports innovation, encourages new technologies, changes its daily approach to the work process and shares risks with the company's employees. The authors Mazurchenko et al. (2020), in their previous research of the employees' digital

competencies development, distinguish the following areas that represent the nature of the ongoing digital transformation: digital or algorithmic thinking, human-robot interaction, effective communication, creative problem-solving adaptability and ethical awareness. The Covid-19 pandemic has demonstrated that the range of specific skills in response to the dynamics of the new digital technologies development has been expanded and advanced substantially. This turn raises the question of what competencies are needed to manage digital transformation today (Wolff, 2019; Bondar et al., 2021). The authors Kasparova (2019), Sen (2020), Luppicini (2021), Agrawal et al. (2020) and Wolff et al. (2019) come with the scope of digital skills in connection with the fast-growing technological trends in organisations (see Table 1). It is clearly seen that digital transformation is a continuous process that needs systematic adoption.

Table 1. Digital skills framework corresponding to the technological trends in organisations

Area	Typical skills
Hybrid human-machine teams	• Identifying the need for human intervention, transparency, adaptive self-management skills, balancing the human and technical experience.
Digital thinking	• Information literacy, data evaluation, handling with data, queries.
Technical awareness	• A basic understanding of critical tech, data visualisation, applied machine learning, advanced analytics.
Cognitive skills	• Critical thinking, sound project management, autonomy, creative problem-solving.
Learning in the flow of work	• Learning into collaboration software, search functionality, microlearning and experience of day-to-day working.
Adaptability and resilience skills	• Self-awareness, self-reliance, self-confidence, time management, mental wellness, learning experience.
Technoethics and technology planning	• Knowledge of the technical facts and values, optimising technological system operations, technology mediation.

Source: (Kasparova, 2019; Sen, 2020; Luppicini, 2021; Agrawal et al., 2020; KPMG, 2020)

Wolff et al. (2019) conclude that digital transformation requires competence development in several areas of digital means, tools and technologies. Such specific and various competencies are needed for any employee. Nevertheless, the description of competencies for a particular area of professionals is a continuous effort (Noonan, 2017; Rajala, 2012; Wolff, 2019). There is an effort to create competency models and profiles, but it is relatively complicated to standardise competencies.

In order to demonstrate the impact of the digital transformation on key competencies, the authors chose the occupation of human resource professionals. Requirements for their new competencies have increased even more in connection with dynamic changes related to the specifics of the Covid-19 pandemic. Table 2 shows trends in skills needed for current and future HR professionals.

Generally, the digital skills gap existed, and demand for employees with basic, intermediate or advanced digital skills remained high for a long period. However, this trend has been increased even more with the Covid-19 pandemic (Teltscher, 2020).

Table 2. Key core HR specialists' skills for future

Area	Capabilities needed
Data literacy and analytics	• Ability to interpret human resources data, establish effective HR KPIs and contribute to a business strategy based on value-adding data analysis.
Skills intelligence	• Being able to conduct surveys depicting skills development, their utilisation and matching at workplaces, and the long-term labour market trends.
Digital culture building	• Capability to support employees' digital skills development by setting an example, coaching, encouraging the workforce to deal with digital initiatives.
Virtual colleague relationships	• Readiness to alter agile hybrid working models that exploit both remote and office working to support organic idea sharing between individual employees and departments.
Technological agility	• Ability to use artificial intelligence, big data and other technological advancements and transform their advantages into strategic business value.

Source: (Academy to Innovate HR, 2021; European Centre for the Development of Vocational Training, 2021d; Schultz, 2021)

Digital Skill Acquisition: What Matters?

This part of the chapter focuses on aspects of digital transformation in the area of human resources. It shows how digital transformation influences needs for key competencies development and how employees and employers evaluate this process so far. The section also identifies and maps the competencies required for employees from the employee and employee point of view. It specifies barriers and challenges for their acquiring and development, including the Covid-19 pandemic aspect. The last part of this section pays attention to the training and development issue as a critical element supporting digital transformation from the human resources point of view. There are mentioned skills required to cope successfully with digital transformation.

To map the situation in digital transformation, the authors focus on an in-depth, valid and comprehensive study of the topic based on the primary data. First of all, a systematic literature review on the field of digital transformation and skill acquisition in the international context was conducted. The literature review results are supported by analysing the global secondary data on demand for skills at the workplace in European countries (see Table 3). The primary data about the impact of new digital technologies on employee competence development collected by the authors in 2020 in Czech construction, automotive and finance and insurance companies is a source of information in this chapter. The authors also gathered primary data from employees in business and in the academic sphere in 2021 to reveal the aspect of competencies in digital transformation and training from respondents more comprehensively.

According to data from the Czech Statistical Office (2019, p. 1) on the development of digital competencies, almost 28% of Czechs over the age of 16 were educated in computer skills. In an international comparison with the Czech Republic in 2018, with a quarter of people who used the method of self-study to acquire computer skills, they even placed second behind Finland, with a third of self-students in the given area (Czech Statistical Office, 2019, p. 3).

Barriers of Digital Transformation and Digital Competencies Development

Many barriers hinder the growth of digital transformation in global organisations. This part of the chapter aims to identify barriers to developing digital competencies and thus to ensure digital transformation effectively.

Table 3. Digital transformation competencies: secondary data overview

Year	Authors	Respondents	Main findings
2021	LinkedIn	1,260 L&D professionals, 814 learners and 3,080 people managers from 27 countries.	Resilience and adaptability to rapid-fire change, technology skills and digital fluency are the priority skills in the surveyed countries.
2020	Aon	1,551 employees (i.e. 44% work in HR, 12% in IT) mainly from large organisations from different industries around the world.	59% of HR professionals claim that their organisations do not have the defined set of skills needed for their digital transformation, nor have they established a process to access them.
2020	KPMG	1,288 HR executives from 59 countries operating in 31 industries.	Employee skills shortages around artificial intelligence, data analytics and cyber security are among the hardest to fill.
2020	Teltscher	Not specified.	The digital skills gaps has been heightened and the Covid-19 pandemic boosted a need for employees in all industries to have strong digital skills.
2019	Wolff	Students, academics, professionals and companies from Spain, Ukraine, Germany, Belgium, Kazakhstan.	52.9% of the companies see a need for better competencies for their staff's digital transformation.
2019	The Economist Intelligence Unit	512 senior business and government leaders in North America, Europe, the Middle East and Africa and the Asia Pacific.	More than half of the respondents are unsatisfied with their organisations' progress on developing digital competencies.
2017	Hoberg et al.	116 executives from 18 countries; the four countries with the most respondents were: Germany (22%), United States of America (19%), India (17%) and China (10%).	Digital security (88%), mobile technologies (87%), business change management (84%) and big data analytics (84%) are among the major skills needed for digital transformation.

Source: (LinkedIn, 2021; KPMG, 2020; Aon, 2020, p. 6; Teltscher, 2020; Wolff, 2019, p. 1127; The Economist Intelligence Unit, 2019; Hoberg et al., 2017, p. 5)

Based on the data gathered from the organisations from 15 industries and 26 countries of the world, Zahidi et al. (2020) have identified the most common limitation of the new digital technologies adoption process. They include skills gaps in the labour market (55.4%) and skills gaps among organisations' leadership (41.6%) and insufficient understanding by employees of opportunities that digital technologies can bring to organisations (38.9%). Furthermore, barriers to acquiring digital skills may also be represented by a lack of trust in digital technologies and internet safety and a lack of technical support at the workplace (Parliamentary Office of Science and Technology, 2021). In the case of small and medium-sized enterprises (SMEs), mismatched training offers with the SMEs' needs, financial resources constraints, employee digital immaturity and absence of a structured approach to skills development in organisations impede digital competencies' development most (European Commission, 2020). Furthermore, the cost of digital skills training provided by external agencies, the lack of time due to employee workload and employee knowledge gaps are also significant obstacles to successful digital transformation (European Entrepreneurs CEA-PME, 2020). The Covid-19 pandemic brought an unexpected situation and required a fast reaction. However, businesses' inability to adapt quickly was the most significant barrier even before the pandemic. 53% of senior executives surveyed maintain that this was a critical barrier to the success of their projects. Legacy systems and lack of corporate vision for digital or risk-aware culture also remain significant barriers (Harvard Business Review, 2017).

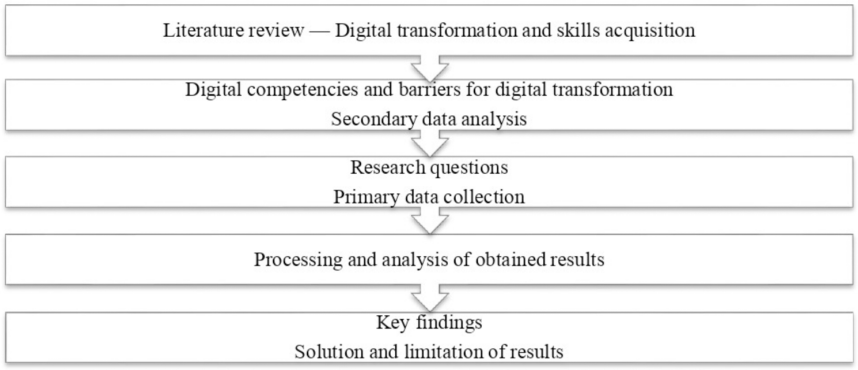
In their study, Monteiro & Leite (2021) focus attention on the barriers to digital competence development within the university context. Limited possibilities to develop digital competencies in a university

environment, and the lack of incentive to do so (32.2%), were mentioned as significant by students. However, the lack of time (8.9%) and knowledge and experience with digital technologies (7.8%) do not have a huge influence. From the university staff point of view, the absence of the skills and knowledge connected to digital transformation is a more important obstacle than a lack of institutional and collegial support hindering digital technologies use (Hämäläinen et al., 2021). There is no doubt that the Covid-19 pandemic has accelerated the need to understand the advantages of synergy with digital technologies. The need for digital technology usage daily has skyrocketed, especially in the university environment. Maintaining the motivation for their use at the workplace is an ongoing challenge.

Digital Transformation and Skill Acquisition: Methods of the Research

The literature review presented above is based on a systematic approach to digital transformation and skills acquisition both theoretically and practically. This part of the chapter aims to show the phases of the research methodology which the authors used for the whole concept of the chapter. In the first phase, scientific papers indexed in the Web of Science and Scopus databases were analysed. The approach is described in Figure 1.

Figure 1. Digital transformation: research methodology
Source: (Authors' own research, 2021)



Scientific papers were selected and analysed to define key terms and specify aspects and barriers for digital transformation and skills acquisition. In the second phase, the secondary information sources about trends in digital transformation from the HR point of view and employee digital competencies in companies worldwide were studied and processed. Barriers to digital skills acquisition were also identified within the literature review.

Key findings are further supported with selected primary data collected within Czech companies, employees and also academics. The primary data research has been developed based on the results of previous studies and included the following steps. The primary data collection was carried out under the CAWI (Computer Assisted Web Interview) method in three different phases:

- quantitative data from companies in July-October 2020,
- quantitative data from employees in businesses (May-June 2021) – a random sample of part-time students of the Faculty of Economics of the Technical University of Liberec (EF TUL), who have worked full time,
- quantitative data from employees in the academic sphere – academics and other staff at the university (June-July 2021).

Online electronic surveying, so-called CAWI or a survey on a web form, was selected as the main method for primary data collection (Kozel et al., 2011). All three surveys were prepared based on secondary data analysis. The questionnaires consisted of closed questions with one or more possible answers, scales that express the respondents' attitude to the researched issue, open questions and identification questions to characterise the companies involved in the research. For this chapter, the authors explored the same issues across all respondent target groups and compared the responses to selected questions. This chapter mainly analysed the responses to multiple-choice questions (see Figure 2, Table 6 and Table 7).

The companies' survey started with preparing the database of all Czech economic entities available in the MagnusWeb Bisnode on June 1, 2020. First of all, businesses in a state of insolvency, bankruptcy or liquidation were removed from the representative sample because the employees' development in response to the digital transformation is not a relevant topic for them. In the next step, the functionality of the websites of these companies was verified. Only those with a working website and a specified e-mail were contacted by using the CAWI method (an online questionnaire in Survio was used to collect answers). For questioning companies, a structured anonymous questionnaire that included 19 questions was used. Closed questions with one or more possible answers, scales that express the respondents' attitude to the researched issue, four identification questions to characterise the companies involved in the research, and one open question have been presented in the questionnaire. The 5-point Likert scale was used to measure the respondents' attitude to how much they agree or disagree with particular statements by choosing one of the options between 'strongly agree', 'agree', 'neither agree nor disagree', 'disagree' and 'strongly disagree' (Mazurchenko & Zelenka, in press). For the purpose of this chapter, only the selected results of four questions are analysed in the following section.

The response rate was also supported by communication from the local Chambers of Commerce in Czech cities Liberec and Jablonec nad Nisou. The quantitative data from companies were collected and processed by the online Survio software in July-October 2020. As a result, a total of 107 responses were obtained. Consequently, the return rate of the questionnaire was 1.96% from the whole population of 5,443 Czech companies in selected industries. Such a low response rate is explained by the fact that the companies' attention was focused on coping with new working conditions due to the Covid-19 pandemic.

The second survey was aimed at the full-time employees, who were at the same time part-time students at the Faculty of Economics of the Technical University of Liberec (EF TUL). The authors also work at the EF TUL. Thus it was possible to reach the respondents. They were randomly selected using the function RANDBETWEEN in Excel. This anonymous survey aimed to discover employee opinions about digitalisation, its tools and training and the development of digital competencies at work.

The third survey aimed to find out the situation with digital transformation and competencies in the academic environment. As a sample, the authors used the data obtained from employees of the EF TUL (both academic and non-academic). These employees were contacted in June-July 2021. The rate of return by these respondents was 44.2%. Essential information about all three surveys is described in Table 4.

Table 4. Description of company and employee digital competence surveys

Time period	Survey title	Target group	Number of contacted respondents	Number of responses
July-October 2020	Digital competencies in business practice	Czech companies mainly from the automotive (3,270), construction (2,104), banking and insurance sectors (69).	5,443	107
May-June 2021	Digital readiness of current employees	Employees – selected from part-time students.	171	31
June-July 2021	Employees' digital readiness at EF TUL	Academic (80) and non-academic staff (15) of EF TUL.	95	42

Source: (Authors' own research, 2021)

The classification by sector of companies actively operating in the Czech Republic that participated in this survey is demonstrated in Table 5. The main group of respondents was companies from the manufacturing sector (including the automotive industry) and construction, and significant was also a group of companies in the financial and insurance sector. All these sectors were also identified by the authors as those where digital transformation plays an important role (Mazurchenko & Zelenka, in press). In the financial sector, the demand for employees' skills and competencies required for effectively utilising digital technologies is becoming a focus area in the conditions of the transformation of the financial services (Folea & Pejkovska Kaeva, 2019). The education sector, including higher education, was also the one significantly affected by the sudden imperative to move activities (mainly teaching and learning) from face to face interactions to distanced structures and digitally supported teaching at all educational levels had to be established within several weeks (Sá et al., 2021).

Table 5. Czech companies' – respondents' classification by sector

Sector	Number of responses in %
Manufacturing	36.45%
Construction	25.23%
Financial and insurance activities	12.15%
Professional, scientific and technical activities	6.54%
Wholesale and retail trade	4.67%
Information and communication	1.87%
Real estate activities	1.87%
Education	1.87%
Remaining sectors	9.35%
Total	100.00%

Source: (Authors' own research, 2021)

All these three surveys aimed to map the situation of digital transformation, skill acquisition and tools used in the digital era from the company (their managers) and employee point of view. Questionnaires consist of various questions specifically formulated based on the respondent. For this chapter, only four questions were selected because the responses enable one to compare the point of view of companies, employees and academics. Thus, the possibility to compare the perspectives of various respondents is valuable. To illustrate the structure of questions, an example of the questionnaire prepared for the employees from the academic working environment is shown in Appendix 1.

KEY FINDINGS BASED ON DATA ANALYSIS

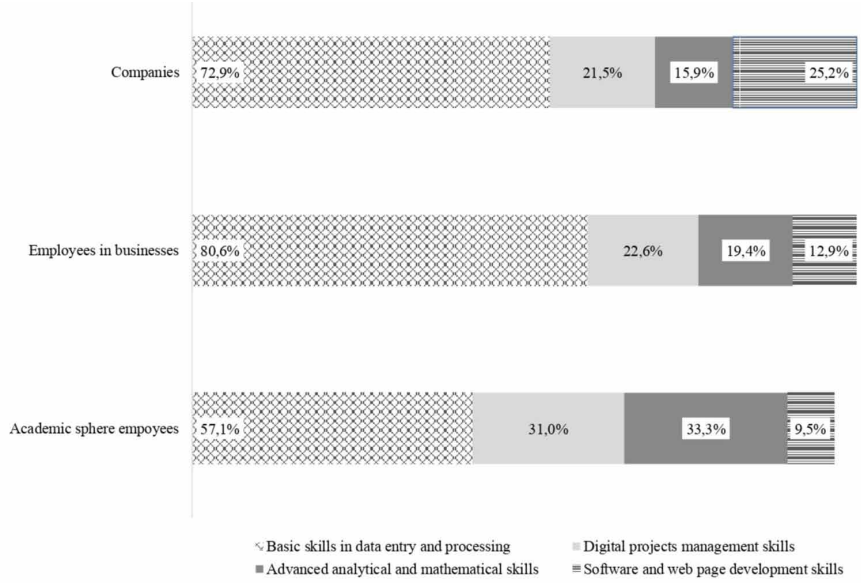
Process digitalisation is currently present everywhere. Digital transformation was accelerated and put under pressure by the Covid-19 pandemic. This part of the chapter brings the main selected findings that illustrate the digital transformation situation in the last months, taking into account the influence of the Covid-19 pandemic on Czech companies and employees. It demonstrates the perspective of employers (companies) and employees on how they perceive digital transformation and its aspects. For this purpose, the authors used the primary data from all three surveys carried out in 2020-2021. To compare the situation from different perspectives, the comparison of an opinion of employees from a business sector and academic sphere towards the employers' point of view is brought in these selected questions. In the literature review, data analysis competencies were identified as the crucial area of digital transformation skills.

Basic digital skills can be understood as competencies in interaction with basic digital tools. When these tools are based on mobile and smartphone devices, these skills are also referred to as mobile skills. Basic skills cover the hardware and software know-how required to use various technological assets computers, smartphones, software (word processors, applications), online operations (Internet, search engines, social networks, e-commerce, privacy), and communication media (cellular and Internet protocol networks) (Chaouchi & Bourgeau, 2020). To illustrate the situation in the digital transformation in managing human resources, the data collected by the authors by Czech companies and employees were used. Both in the business and academic environment, basic data entry and processing skills were primarily required and needed (see Figure 2).

In the business environment, companies and employees also identified problem-solving in a digital environment as a frequent requirement for their employees. Digital strategy and leadership skills were also identified as required (although on a lower level). Specifically, in the financial sector, basic data entering, processing, digital literacy but advanced data skills identified companies as those often required. Automotive engineering specialists will require skills and knowledge connected with data networks, electrical engineering, software architecture, digital signal processing, artificial intelligence, and robotics (Pavlasek, 2020). Also, data presented in this part from the Czech industry and construction businesses confirmed that internal training of the existing employees is the most popular measure to close gaps in employees' digital competencies. For this purpose, every fifth company also plans to recruit new employees who already have the required digital competencies (Mazurchenko & Zelenka, in press).

Comparing data of employees from the business and academic environment, for the educational environment, the digital skills needed for teaching are considered as those crucially for people working at the academic sphere of employees of EF TUL.

Figure 2. Employee digital skills required at the workplace
Source: (Authors' own research, 2021)



As described in the previous part, organisations face various barriers in digital transformation. For digital transformation to succeed, it is necessary to develop the digital competencies of employees. Table 6 shows what Czech companies identified as the main barriers. Employees in the business environment and academic area experience a critical lack of time due to the employee workload. For people working at the university, this is the most significant barrier to developing their skills. This also confirm findings of Sá et al. (2021), where work overload was identified as one of the most referred challenges. Also, these authors identified the need to change the organisation´s culture and leadership as a challenge (Sá et al., 2021).

On the contrary, it is interesting to see the difference between the opinion of employees and employers on the resistance to change. Employers consider this aspect the second most common. However, this was not identified as one of the priorities from the employee's point of view. Employees also see the technical support, misbalance between training content, its lower quality and lack of first-line manager support as essential. Companies also identified a low priority for business management, high costs and the lack of suitable companies for high-quality training and digital transformation consulting as other barriers.

The Perspective of Organisations in Digital Skills Acquisition

Companies were also questioned about the need for digital skills acquisition. It is essential that the survey helped to show that most of the companies perceive the need to develop digital competencies as very important.

As Figure 3 shows, approximately every third Czech company representative from the selected industries claimed that the application of digital technologies increases the demand for staff training and development in this field. 41.9% of employees who participated in this survey are also part-time students at the EF TUL who definitely agree that their employer should invest more into developing their digital

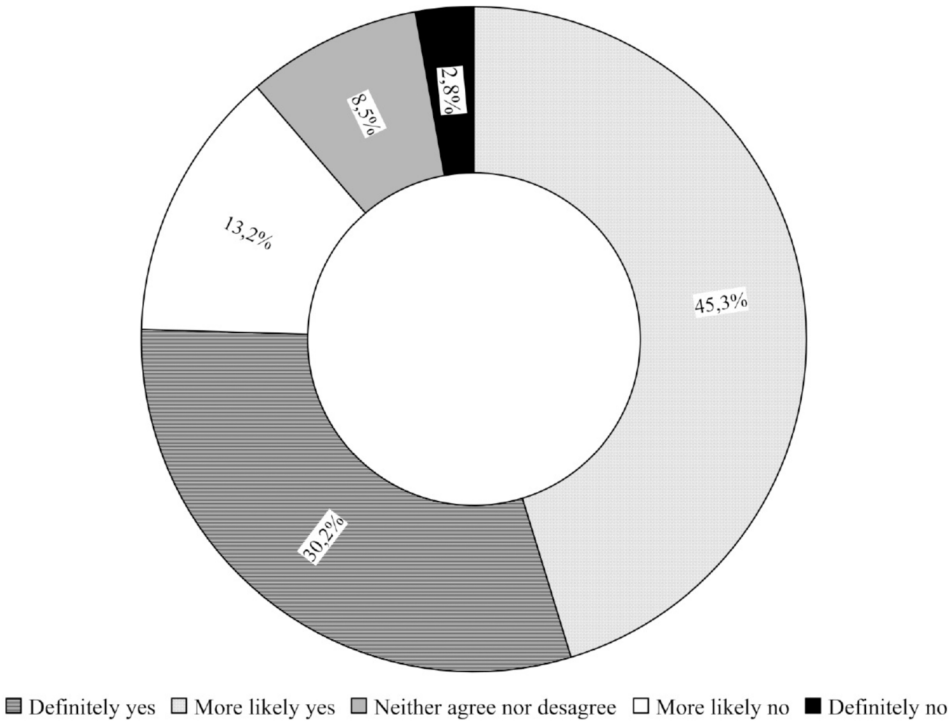
skills, and around half of them (48.4%) more likely support this idea. At the same time, only 12.5% of the respondents from among employees of the EF TUL strongly believe that they are provided with sufficient support for the use of digital technologies in their work, opposing how each third employee finds it satisfactory.

Table 6. Main barriers to developing digital skills at work

Type of barriers	Companies	Employees in businesses	Academic sphere employees
Lack of time due to employee workload	59.5%	38.7%	73.8%
Employee resistance to change	44.9%	6.4%	14.3%
Lack of technical support in the workplace	-	32.2%	33.3%
Matching training course content with the employer needs	-	32.2%	9.5%
Insufficient quality of digital training courses provided by the employer	-	25.8%	9.5%
Lack of fist-line manager support	-	25.8%	14.3%
Low priority for business management	19.1%	-	-
Understanding the need for training in digitalisation	-	16.1%	7.1%
High costs associated with training in digitalisation	13.4%	-	-
Lack of appropriate external educational organisation	5.6%	-	-

Source: (Authors' own research, 2021)

Figure 3. Need for digital skills training in Czech companies
Source: Mazurchenko, Zelenka & Maršíková (2020)



Companies confirmed that they prioritise internal ways of training their employees (see Table 7). It is also interesting to point out that employees stated that the most common acquisition of new digital competencies was most often made through self-study and informal help of colleagues within the academic environment. Also, information retrieval, such as how to use digital technologies, was used. This can also be seen as a consequence of some of the barriers that employees mentioned.

Table 7. Most frequent methods of acquiring digital skills at work

Method of acquiring digital skills	Companies	Employees in businesses	Academic sphere employees
Internal training provided by the employer	40.2%	51.6%	11.9%
Informal help from colleagues and friends	12.1%	25.8%	45.2%
External training paid by the employee	-	16.1%	4.7%
Educational courses for free	6.5%	-	-
Self-study and other methods	-	6.4%	76.2%
External training paid by the employer	-	-	2.4%

Source: (Authors' own research, 2021)

Regarding research question 3 analysing the influence of the pandemic, the respondents from the academic environment confirmed that during the Covid-19 pandemic, the intensity of digital technologies increased rapidly. More than 85% started to use online communication platforms like Zoom, MS Teams or Google. At the same time, the intensity of using media for sharing documents increased significantly, and nearly 80% of respondents confirmed that they use it much more often or often. 75% also started to utilise time management tools like Google calendar. They also confirmed that this requested greater scope and more profound knowledge of their digital skills. In comparison, employees from the corporate sector stated that for them using tools for online communication in real-time was much more intensive (80%). The Covid-19 pandemic did not have the same effect (as increasing intensity) for academics in the case of using other digital technologies (task and project management, document sharing and meeting scheduling). To some extent, it can be assumed that these technologies were used in greater intensity in the Czech corporate environment (limited to the sample of respondents) even before the Covid-19 pandemic.

DISCUSSION AND RECOMMENDATIONS

Both secondary and primary data proved an influence of the Covid-19 pandemic on the digital transformation from the point of view of people and their skills. Data across Europe presented by the European Centre for the Development of Vocational Training (2021b) showed that ICT knowledge and digital skills are needed in all professions. Mostly they are requested from ICT professionals and ICT technicians, followed by research, engineering and clerical occupations. Digital skills helped workers who were not critical before the Covid-19 pandemic (for example, teachers, clerical and other office workers) to shift to remote working (European Centre for the Development of Vocational Training, 2021b). Also, data collected by the authors among the academics and corporate employees in the Czech Republic showed

that in connection with the increasing intensity of using digital technologies, these employees intensify their development of digital skills. In the case of the companies' employees, it was mainly with the support of internal education and development or external training. Employees in the academic environment most often develop their digital skills through self-study or informal help from colleagues. Companies are aware of getting back to the so-called "new normal". According to the Skills-OVATE survey across 28 European countries between (2018 – 2020), using computers and digital tools for collaboration was the most common required digital skill (European Centre for the Development of Vocational Training, 2021b). Based on the LMC survey in the Czech Republic in 2021, bigger companies plan to invest in developing skills, including digital, more than before the pandemic and will use online training and learning (LMC, 2021). The authors are aware of the limitation of results presented from the primary data. The findings presented in this paper cannot be generalised and have limitations in the sample size and the method of respondent selection. The primary data bring only information on a limited sample of Czech respondents and cannot be generalised. Secondary data mainly represent findings from the European states. However, the results presented in this chapter (both in the secondary and primary data) deal with a very topical issue. Proposed findings illustrate the situation in the field of digital transformation with an emphasis on the influences in the field of human resources development. They bring new incentives for further research to deepen in its scope. The data presented in the chapter confirmed that companies see digitalisation as crucial and perceive the importance of regularly developing their employees' digital competencies and should consider it a strategic aspect of their further development. Systematic implementation of training and development in the area is crucial for future success.

The findings in the chapter illustrated digital transformation related to digital skill in connection with the Covid-19 pandemic. There has been an intensive use of digital technologies, and the need for digital skills and their development is identified based on secondary and primary data in this chapter. The respondents' answers showed that they perceive it as essential to have support in the development of these skills from employers. Therefore, employers can be encouraged to support the development of these skills in their employees systematically. Employers should communicate sufficiently any change associated with the introduction and use of digital technologies in organisations.

The need for an intensification of digital technologies pushed by the pandemic should now be reflected in their systematic implementation in the period of the so-called new normal. New approaches used in digital technologies and the transition to flexible forms of employment (including remote working) now should be integrated into organisations' strategies to become an integral part of it. It is crucial that the organisation's management is aware of this and supports its employees in developing the digital transformation.

FUTURE RESEARCH DIRECTIONS

In the theoretical and practical implications, the chapter pointed out current digital transformation trends from the point of view of human resources affected by the pandemic. Data presented in the chapter (both secondary and primary) showed that digital skills acquisition, on the example of Czech businesses, had been significantly affected by the Covid-19 pandemic both from the employees' and employers' points of view. The chapter mapped the digital transformation in terms of trends, support for digital competencies and barriers. Further research should focus on examining the specific longer-term effects of the digital change of the Covid-19 pandemic.

The issue of quality, speed or the implementation of steps in digital transformation and the acquisition of competencies will be key topics in the coming months and years. From the HR point of view, it is crucial to balance the new hybrid world of work. Working remotely, online, using the digital competencies that employees have been intensively acquiring in recent months will be essential to balance employee well-being and mental health.

Digital literacy, in particular, is a powerful tool to empower individuals and to equip them with competencies that allow them to have successful personal and professional lives and thus ensure success also for businesses (Sá et al., 2021). Post pandemic environment should benefit from the lesson given in the rapid digital transformation during the pandemic. The employees need to keep and develop digital competencies of the 21st century as information, communication, collaboration, critical thinking, creativity and problem solving (Van Laar et al., 2020).

Further research should focus on a more in-depth analysis of digital transformation and skill acquisition and comparison of pandemic and post-pandemic phases from the human resource management aspect, including the effects on employee well-being and mental health. The authors' further research will explain the digital culture concept in organisations and its implementation on a strategies level. It is also essential to pay attention to sustainability in a digital society and future digital culture from the future perspective.

CONCLUSION

The current situation described both based on the literature review and primary data example has shown that many companies have adapted quickly to working remotely or in a hybrid environment. Teltscher (2020, p. 1) emphasises that "policy-makers, industry, academia and other educational institutions, as well as the international development community have recognised this need and should prepare strategies to cater to it". It can be stated that the Covid-19 pandemic significantly accelerated several areas of digital transformation and greatly affected the situation in the field of human resources management. In the context of digital transformation, working in an online environment is now a vital issue for employees' mental health and well-being. The findings presented in this chapter support the research which has been published in this area in the last months. They demonstrate the increasing importance of digital transformation and skill acquisition in different working environments. Key challenges (barriers) which both employees and employers are aware of are also identified in the chapter, illustrated on the example of respondents from the Czech Republic. Elimination of barriers together with sufficient technical support, intensive training of employees, and the adoption of the digital attitude to an organisation's culture can be considered prerequisites for successful digital transformation and sustaining the changes that have occurred (and were often forced) in connection with the Covid-19 pandemic.

ACKNOWLEDGMENT

This research was supported by the Student Grant Competition of the Technical University of Liberec [grant number SGS-2021-1001].

REFERENCES

Ablyazov, T., Asaturova, J., & Koscheyev, V. (2018). Digital technologies: New forms and tools of business activity. In *Proceedings of the 4th International Scientific Conference: The Convergence of Digital and Physical Worlds - Technological, Economic and Social Challenges* (*vol. 44*, pp. 1-9). EDP Sciences. 10.1051hsconf/20184400004

Academy to Innovate HR. (2021). *HR 2025 competency model framework: Become a T-shaped HR professional.* https://www.aihr.com/blog/hr-competency-framework/

Agrawal, S., De Smet, A., Lacroix, S., & Reich, A. (2020). *To emerge stronger from the COVID-19 crisis, companies should start reskilling their workforces now*. https://www.mckinsey.com/~/media/mckinsey/business%20functions/organization/our%20insights/to%20emerge%20stronger%20from%20the%20covid%2019%20crisis%20companies%20should%20start%20reskilling%20their%20workforces%20now/to-emerge-stronger-from-the-covid-19-crisis.pdf?shouldIndex=false

Alam, K., Erdiaw-Kwasie, M. O., Shahiduzzaman, M., & Ryan, B. (2018). Assessing regional digital competence: Digital futures and strategic planning implications. *Journal of Rural Studies*, *60*, 60–69. doi:10.1016/j.jrurstud.2018.02.009

Aon. (2020). *Scaling the digitally-ready workforce. Aon's 2020 digital readiness report.* https://insights.humancapital.aon.com/assessing-digital-readiness/scaling-the-digitally-ready-workforce-report

Australian Industry and Skills Committee. (2021). *Digital skills: Overview*. https://nationalindustryinsights.aisc.net.au/national/digital-skills

Balog, M. M., & Demidova, S. E. (2021). Human capital development in the context of the Fourth Industrial Revolution. In *Proceedings of International Science and Technology Conference Series: Earth and Environmental Science* (vol. 666, pp. 1-8). IOP Publishing. 10.1088/1755-1315/666/6/062120

Bondar, I., Komarnitskyi, I., Rusavska, V., Batchenko, L., & Honchar, L. (2021). Formation and development of digital skills in university education: A systematic approach. *Lapage Em Revista, 7*(B), 47-56. doi:10.24115/S2446-622020217Extra-B882p.47-56

Brolpito, A. (2018). *Digital skills and competence, and digital and online learning.* https://www.etf.europa.eu/sites/default/files/2018-10/DSC%20and%20DOL_0.pdf

Chaouchi, H., & Bourgeau, T. (2020). Will all jobs require programming skills in the growing digital society? In M. McDonald (Ed.), *Digital skills insights 2020* (pp. 11–26). International Telecommunication Union.

Czech Statistical Office. (2019). *Rozvoj digitálních dovedností* [Development of digital skills]. https://www.czso.cz/documents/10180/102150416/062023-19.pdf/a0dfeba2-c779-4779-810d-b7cbde244803?version=1.2

European Centre for the Development of Vocational Training. (2020). *Coronavirus and the European job market: How the pandemic is reshaping skills demand.* https://www.cedefop.europa.eu/en/news-and-press/news/coronavirus-and-european-job-market-how-pandemic-reshaping-skills-demand

European Centre for the Development of Vocational Training. (2021a). *Introduction and presentation by Kostas Pouliakas - Digital skills, Covid19 and automation: Evidence from latest Cedefop research.* https://www.cedefop.europa.eu/files/workshop_3_introduction_and_pouliakas.pdf

European Centre for the Development of Vocational Training. (2021b). *Digital skills: Challenges and opportunities*. https://www.cedefop.europa.eu/en/news/digital-skills-challenges-and-opportunities-during-pandemic

European Centre for the Development of Vocational Training. (2021c). *Microcredentials: are they here to stay?* https://www.cedefop.europa.eu/en/news/microcredentials-are-they-here-stay

European Centre for the Development of Vocational Training. (2021d). *Briefing note – trends, transitions and transformation.* https://www.cedefop.europa.eu/files/9157_en.pdf

European Commission. (2019). *Digital skills: New professions, new educational methods, new jobs*. https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60738

European Commission. (2020). *Skills for SMEs: Cybersecurity, internet of things, and big data for small and medium-sized enterprises.* https://op.europa.eu/en/publication-detail/-/publication/82aa7f66-67fd-11ea-b735-01aa75ed71a1/language-en

European Entrepreneurs CEA-PME. (2020). *DataSkills4SMEs: All data skills survey results*. https://www.dataskills4smes.eu/2020/11/03/all-dataskills-survey-results/#

Folea, A., & Pejkovska Kaeva, M. (2019). Analysis of the digital skills in the EU labor market. A case study of the banking sector. *European Journal of Economics and Business Studies*, *5*(2), 66–78. doi:10.26417/ejes.v5i2.p66-78

Hämäläinen, R., Nissinen, K., Mannonen, J., Lämsä, J., Leino, K., & Taajamo, M. (2021). Understanding teaching professionals' digital competence: What do PIAAC and TALIS reveal about technology-related skills, attitudes, and knowledge? *Computers in Human Behavior*, *117*, 1–15. doi:10.1016/j.chb.2020.106672

Harvard Business Review. (2017). *High-performance sourcing and procurement driving value through collaboration.* https://hbr.org/resources/pdfs/comm/scoutrfp/HighPerformanceSourcing.pdf

Hoberg, P., Krcmar, H., & Welz, B. (2017). *Skills for digital transformation. Research report 2017*. http://www.corporate-leaders.com/sitescene/custom/userfiles/file/Research/sapskillsfordigitaltransformation.pdf

Hubschmid-Vierheilig, E., Rohrer, M., & Mitsakis, F. (2020). Digital competence revolution and human resource development in the United Kingdom and Switzerland. In M. Loon, J. Steward & S. Nachmias (Eds.), The future of HRD. Volume I: Innovation and technology (pp. 53-91). Palgrave Macmillian. doi:10.1007/978-3-030-52410-4_3

Hunter, P. (2019). Remote working in research: An increasing usage of flexible work arrangements can improve productivity and creativity. *EMBO Reports*, *20*(1), 1–4. doi:10.15252/embr.201847435 PMID:30530631

Ilag, N. B. (2021). Tools and technology for effective remote work. *International Journal of Computers and Applications*, *174*(21), 13–16. doi:10.5120/ijca2021921109

Jagannathan, S. (2021). The future of learning is here – are you ready? In S. Jagannathan (Ed.), *Reimagining digital learning for sustainable development how upskilling, data analytics, and educational technologies close the skills gap* (pp. 335–358). Routledge. doi:10.4324/9781003089698-36

Janssen, J., Stoyanov, S., Ferrari, A., Punie, Y., Pannekeet, K., & Sloep, P. (2013). Experts' views on digital competence: Commonalities and differences. *Computers & Education*, *68*, 473–481. doi:10.1016/j.compedu.2013.06.008

Kasparova, E. (2019). Digital skills and their development in the Czech Republic. *Periodicals of Engineering and Natural Sciences*, *7*(2), 637–643. doi:10.21533/pen.v7i2.522

Khin, S., & Ho, T. C. F. (2019). Digital technology, digital capability and organisational performance: A mediating role of digital innovation. *International Journal of Innovation Science*, *11*(2), 177–195. doi:10.1108/IJIS-08-2018-0083

Kozel, R., Mynářová, L., & Svobodová, H. (2011). *Moderní metody a techniky marketingového výzkumu* [Modern methods and techniques of marketing research]. Grada Publishing.

KPMG. (2020). *The future of HR in the new reality. It's time to start playing the long game.* https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/10/the-future-of-hr-in-the-new-reality.pdf

LinkedIn. (2021). *Workplace learning report 2021: Skills building in the new world of work.* https://learning.linkedin.com/resources/workplace-learning-report

LMC. (2021). *Vývoj na pracovním trhu: Hlavní data, změny a trendy* [Labour market developments: Main data, changes and trends]. https://hrforum.cz/wp-content/uploads/2021/09/LMC_Toma%CC%81s%CC%8C-Dombrovsky%CC%81.pdf

Luppicini, R. (2021). Education for a digital world: Current challenges and future possibilities. In R. Luppicini & A. K. Haghi (Eds.), *Education for a digital world: Present realities and future possibilities* (pp. 197–206). Apple Academic Press.

Maheshsvari, A. (2019). *Digital transformation: Building intelligent enterprises*. John Willey & Sons Inc.

Mazurchenko, A., & Zelenka, M. (2021, July 31). (in press). Employees' digital competency development in the construction and automotive industrial sectors. *Central European Business Review.* Advance online publication. doi:10.18267/j.cebr.284

Mazurchenko, A., Zelenka, M., & Maršíková, K. (2020). Influence of technological changes on digital competences in organisations. In *Proceedings of the 28th Interdisciplinary Information management Talks IDIMT-2020* (*vol. 49*, pp. 41-48). Trauner Verlag.

Monteiro, A. R., & Leite, C. (2021). Digital literacies in higher education: Skills, uses, opportunities and obstacles to digital transformation. *Revista De Educación a Distancia*, *21*(6), 1–20. doi:10.6018/red.438721

Nemeskéri, Z., Zádori, I., Tibold, A., & Szécsi, G. (2020). HRD for an ageing workforce. In M. Loon, J. Steward & S. Nachmias (Eds.), The future of HRD. Volume II: Change, disruption and action (pp. 177-198). Palgrave Macmillian. doi:10.1007/978-3-030-52459-3_7

Noonan, M. (2017). *Competency Models - What are they anyhow and what's the big deal?* https://stccg.com/wp-content/uploads/2017/08/Competency-Models.pdf

Oberländer, M., Beinicke, A., & Bipp, T. (2020). Digital competences: A review of the literature and applications in the workplace. *Computers & Education*, *146*, 1–13. doi:10.1016/j.compedu.2019.103752

Parliamentary Office of Science and Technology. (2021). *Developing essential digital skills.* https://researchbriefings.files.parliament.uk/documents/POST-PN-0643/POST-PN-0643.pdf

Pavlasek, P. (2020). Competency-based automotive/mobility engineering education: Implementation of creative project in modular model. In *Proceedings of the IEEE* (pp. 1–6). Institute of Electrical and Electronics Engineers. 10.1109/ELEKTRO49696.2020.9130344

Rajala, S. A. (2012). Beyond 2020: Preparing engineers for the future. *Proceedings of the IEEE*, *100*(Special Centennial Issue), 1376–1383. doi:10.1109/JPROC.2012.2190169

Sá, M. J., Santos, A. I., Serpa, S., & Miguel Ferreira, C. (2021). Digitainability—Digital competences post-Covid-19 for a sustainable society. *Sustainability*, *13*(17), 1–22. doi:10.3390u13179564

SchultzC. M. (2021). *The future of HR*. https://www.intechopen.com/online-first/75587

Sen, S. (2020). *Digital HR strategy: Achieving sustainable transformation in the digital age*. Kogan Page.

Solis, B. (2014). *The 2014 state of digital transformation.* https://www.briansolis.com/2014/07/2014-state-digital-transformation/

Sousa, M. J., & Rocha, A. (2019). Digital learning: Developing skills for digital transformation of organisations. *Future Generation Computer Systems*, *91*, 327–334. doi:10.1016/j.future.2018.08.048

Teltscher, S. (2020). Introduction. In M. McDonald (Ed.), *Digital skills insights 2020* (pp. 1–9). International Telecommunication Union.

The Economist Intelligent Unit. (2019). *Benchmarking competencies for digital performance: An EIU study of digital-competency hurdles and solutions.* https://digitalcompetency.economist.com/wp-content/uploads/2019/04/Benchmarking-competencies-for-digital-performance-full-report.pdf

Van Laar, E., Van Deursen, A. J. A. M., Van Dijk, J. A. G. M., & De Haan, J. (2020). Determinants of 21st-century skills and 21st-century digital skills for workers: A systematic literature review. *SAGE Open*, *10*(1), 1–14. doi:10.1177/2158244019900176

Wheeler, S. (2019). *Digital learning in organisations: Help your workforce capitalise on technology*. Kogan Page.

Wolff, C., Omar, A., & Shildibekov, Y. (2019). How will we build competences for managing the digital transformation? In *Proceedings of the IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications IDAACS* (vol. 2, pp. 1122-1129). Institute of Electrical and Electronics Engineers. 10.1109/IDAACS.2019.8924432

Yucel, S. (2018). Estimating the benefits, drawbacks and risk of digital transformation strategy. In *Proceedings of IEEE International Conference on Computational Science and Computational Intelligence* (vol. 2, pp. 233-238). Institute of Electrical and Electronics Engineers. 10.1109/CSCI46756.2018.00051

Zahidi, S., Ratcheva, V., Hingel, G., & Brown, S. (2020). *The future of jobs report 2020.* https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

ADDITIONAL READING

European Centre for the Development of Vocational Training. (2019). *The skills employers want*. https://www.cedefop.europa.eu/files/9137_en.pdf

Gfrerer, A., Hutter, K., Füller, J., & Ströhle, T. (2020). Ready or not: Managers' and employees' different perceptions of digital readiness. *California Management Review*, *63*(2), 23–48. doi:10.1177/0008125620977487

Ivaldi, S., Scaratti, G., & Fregnan, E. (2022, January 10). Dwelling within the fourth industrial revolution: Organisational learning for new competences, processes and work cultures. *Journal of Workplace Learning*, *34*(1), 1–26. doi:10.1108/JWL-07-2020-0127

Levit, A. (2019). *Humanity works: Merging technologies and people for the workforce of the future*. Kogan Page.

Nachit, M., & Okar, C. (2020). Digital transformation of human resources management: A roadmap. In *Proceedings of IEEE International Conference on Technology Management, Operations and Decisions ICTMOD* (vol. 1, pp. 1-6). Institute of Electrical and Electronics Engineers. 10.1109/ICTMOD49425.2020.9380608

Rubach, C., & Lazarides, R. (2021). Addressing 21st-century digital skills in schools – Development and validation of an instrument to measure teachers' basic ICT competence beliefs. *Computers in Human Behavior*, *18*, 1–17. doi:10.1016/j.chb.2020.106636

Sotnikova, Y., Nazarova, G., Nazarov, N., & Bilokonenko, H. (2020). Digital technologies in HR management. *Management Theory and Studies for Rural Business and Infrastructure Development*, *42*(4), 527–535. doi:10.15544/mts.2020.54

KEY TERMS AND DEFINITIONS

Barrier for Digital Transformation: The main obstacle to the achieving of the expected results from the implementation of digital technologies into the working environment.

Digital Culture: A set of competencies that characterise the ability to utilise technologies for a comfortable life in a digital environment, for interacting with society and solving digital problems in professional activities.

Digital Skills: Generally accepted models of behaviour that enable people to use digital technologies in education, work and social activities.

Digitalisation: An integration of new digital technologies into existing business processes to improve their efficiency.

Employee Training: A continuous process of gaining new knowledge, assimilating new skills and methods of work by staff.

Skills Gaps: A difference between skills that companies demand and expect their employees will have and skills these employees actually have.

Technological Trend: An actual direction in the evolution of technologies in a particular area to be faced by organisations in the next few years.

APPENDIX

Employees´ Digital Readiness

Questionnaire for employees from the academic environment
Working with digital technologies

1. **Do you consider developing digital skills (under the faculty strategic plan for 2021-2025) as important? Select one answer.**
   - Definitely yes
   - More likely yes
   - Neither agree nor disagree
   - More likely no
   - Definitely no

2. **How do you assess the current level of your digital skills at work? Select one answer.**
   Under the concept of digital skills, you can understand the ability to process data found on the Internet, active online communication, the creation and sharing of digital content (e.g. text, images, data files, etc.), the foundations of questioning, ensuring the safety of the equipment or application used, as well as solving problems arising from the digital technologies' use.
   - Expert
   - Advanced
   - Intermediate
   - Basic
   - No level

3. **Evaluate the following statements about your use of digital technologies (DT) at work on EF TUL. Select one answer in each line.**
   5 – Definitely agree, 4 – More likely agree, 3 – Neither agree nor disagree, 2 – More likely disagree, 1 – Definitely disagree, 0 – I cannot answer.

Table 8. Question-related to the use of digital technologies

	5	4	3	2	1	0
You use DT because your work requires it.						
You have the freedom to decide which DT to use at work.						
Introducing a new DT into your work is an advantage (i.e., improving its quality).						
You can share helpful tips on using DT with colleagues.						

Digital skills in the current work environment at EF TUL

4. **What digital skills are most needed for you in your work? Select one or more answers.**
   - Basic skills in data entry and processing
   - Digital skills needed for teaching
   - Comprehensive data analysis and mathematical skills
   - Skills to manage people in a digital environment
   - Digital skills in project management
   - Website Development and programming skills
   - Other (please specify)

5. **How do you assess the changing intensity of the following digital technologies' use in your work due to a Covid-19 pandemic? Select one answer in each line.**
   5 – Using a lot more often, 4 – Using more often, 3 – No change, 2 – Using less, 1 – Using much less, 0 – Not using at all.

Table 9. Question-related to the influence of the pandemic on the intensity of using digital technologies

	5	4	3	2	1	0
Real-time communication and collaboration (Zoom, Google Meet, MS Teams, Discord, Slack).						
Task management and project management (Trello, Orgpad, Asana, MS Planner, Miro).						
Document sharing and storage (MS OneDrive, Google Disk, DropBox).						
Scheduling of meetings and time (Google Calendar, One Note, Timely).						

6. **Which of the following tools have you used in the last year of your teaching? Select one or more answers.**
   - Google Meet
   - Google Classroom
   - Google Forms
   - Google Jamboard
   - E-learning
   - Kahoot
   - Mentimeter
   - Padlet
   - Zoom
   - Microsoft Teams
   - Slido
   - Other (please specify)

7. **You believe that the Faculty provides you with sufficient support for the use of digital technologies in your work. Select one answer.**
   Under the concept of digital technology, you can imagine the electronic tools, systems, equipment and resources that generate, store, or process data. Well-known examples include software programs, social media, mobile phone applications, multimedia, etc.
   - Definitely agree
   - More likely agree
   - Neither agree nor disagree
   - More likely disagree
   - Definitely disagree

Development of digital skills in the workplace

8. **How often do you improve (get new) digital skills so that you can perform your work well? Select one answer.**
   - Continuously
   - Once a week
   - Once every 2-3 weeks
   - Once every 1-3 months
   - Less than once every 3 months
   - There is no need to update my skills to do my job well

9. **How do you acquire digital skills in your workplace? Select one answer in each line.**

Table 10. Question-related to the influence of the pandemic on the intensity of using digital technologies

	Often	From time to time	Exceptionally	Not at all
Internal training provided by the employer (e.g. within the ROLIZ project, e-learning, etc.).				
External training paid by the employer.				
Through informal help from colleagues and friends.				
External training that you pay for yourself.				
Self-study.				
Another way.				

10. **What are the main barriers to developing your digital skills at work? Select one or more answers.**
    - Lack of time due to workload
    - Lack of superior support
    - Lack of technical support in the workplace
    - Insufficient quality of educational courses for digitalisation provided by the EF TUL

- Lack of motivation to complete training in the field of digitalisation
- Alignment of the content of the training course with the needs of EF TUL
- Understand the need for education in the field of digitalisation
- Other (please specify)

11. **What positives and negatives do you perceive in connection with the development of digitalisation in your work? Please specify.**

Respondent profile

12. **How long have you been working at the Faculty of Economics of the Technical University of Liberec? Select one answer.**
    - Less than 1 year
    - 1 – 5 years
    - 6 – 10 years
    - 10 – 20 years
    - More than 20 years

13. **What category does your job position belong to? Select one answer.**
    - Academic staff member
    - Non-academic staff member

14. **Please select your age:**
    - Less than 20 years
    - 21 – 30 years
    - 31 – 40 years
    - 41 – 50 years
    - More than 50 years
    - I prefer not to answer

Chapter 7
Human Resources in the Digital Era: Hybrid Work Environment as a "New Normal"

Petra Rydvalová
https://orcid.org/0000-0002-4816-208X
Technical University of Liberec, Czech Republic

Kateřina Maršíková
https://orcid.org/0000-0003-2306-2303
Technical University of Liberec, Czech Republic

Jaroslav Demel
Technical University of Liberec, Czech Republic

ABSTRACT

The chapter focuses on aspects of digital transformation connected with managing human resources (HR). It aims to present trends brought to the working environment using technologies and tools to manage people and their knowledge. Firstly, the authors aim to specify selected areas of HR management influenced by the development of information technologies based on the literature review and a professional opinion. Four areas were selected: a hybrid world of work, robotic/intelligent process automation (RPA/IPA), talents, and knowledge management in the digital era. The research statements were prepared for the round table discussion with experts and a survey using the CAWI method. Practitioners' opinion was compared with theoretical findings and statements. Despite the research limitations, the results bring topical information and complement the professionals' views. Overall, respondents agree that discussed trends in HR bring new opportunities, freedom, and flexibility, but also some challenges. RPA/IPA solutions free people from routine work and give space for creativity.

DOI: 10.4018/978-1-7998-9008-9.ch007

INTRODUCTION

Companies have realised the importance of workplace transformation, which reflects modern work styles, user preferences, and maturing technologies (Attaran et al., 2020). Technology affects people across different cultures and at all points of the lifespan, transforming how they interact, develop, and work (Bryan et al., 2017). As it was analysed, e.g. in Pisa 2021 Creative Thinking Framework (third draft), people are unique in their creativity and ability to bring new solutions to the world's problems. Entering the digital age is a consequence of that. Creativity, ingenuity, entrepreneurship, discovery, all this is based on the natural state of affairs (Organisation for Economic Cooperation and Development, 2019). It is the essence of man's natural learning from birth. It is a process of chaining motives, the result of which is motivated behaviour, where the intention is to apply positive motivation and avoid demotivation. The question is whether there will be a place for the development of these skills in the digital age. The topic of their development will also need to be addressed.

The chapter aims to assess the perception of the state and trends in selected areas of Human Resource Management in the digital age based on the literature review, secondary data, and an opinion of a sample of professionals in the Czech Republic. The key topic of the chapter is the discussion of issues of the coexistence of people and digital technologies in the work environment. A form of the hybrid world of work is offered as a new opportunity which also brings many challenges (Wheatley et al., 2021). Greater scope for creativity could arise, for example, by saving routine work using robotic process automation (acronym RPA) and intelligent process automation (acronym IPA). The topic is also related to the definition of space for working with talents in the digital age. The use of new information technologies and approaches to them are thus closely linked to the field of human resources management. In general, experts and researchers are beginning to speak of the post-pandemic age as a new norm (People Management Forum, 2021). However, a new norm must be established, as stated in 1918 by Henry A. Wise Wood, who first published this dilemma (National Electric Light Association, 1918, p. 604-605).

The assessment tool used in this chapter is the evaluation of qualitative data obtained from the discussion table method and supplemented by data from a survey (CAWI approach) among the discussion table listeners. Detailed description is provided in the methodology part of this chapter.

The following sub-objectives have been defined to meet the main objective of the chapter:

Sub-Objective 1: Specification of selected areas of human resources management influenced by the development of information technologies on the basis of literary research and assessment with the expert group of the discussion table (see Figure 1).

Sub-Objective 2: Survey design, defining research questions and making statements based on them.

Sub-Objective 3: Implementation of a round table discussion with experts and surveys to find out the opinions among the listeners.

Sub-Objective 4: Evaluation of the survey and findings from the round table discussion and comparison with the theoretical opinion gained from the literature review.

To achieve the goals, a methodological procedure was defined (see the research scheme in Figure 2). The research presented in this chapter is based on theoretical knowledge and a long-term close connection of the authors' professional activities with the business environment. Based on this, the authors decided to examine the perception of the state and trends in the development of information technology and Internet platforms for Human Resource Management using the method of group creative thinking.

The chapter thus presents the perception of the state and trends that Human Resource Management brings in the digital age. It talks about the impact of the development of information technology on hu-

man resources in the business and academic environment, bringing the opinion of a professional public. The authors provide key findings comparing the view of theorists with the experience of practitioners based on long-term cooperation between them and the authors. This approach set a direction for further research activities in this area after the pandemic HR world reaches a new normal. However, the authors are aware of the research limits, which can be characterised as follows. The resulting reflection focuses on targets in a selected focus group. It can be regionally defined by experts from the Czech Republic who have long-term cooperation with the Technical University of Liberec. The reason was also the need for local knowledge of the business environment. Therefore, it is necessary to accept the fact that different socio-territorial realities may experience different results.

The first part of the chapter defines the literature background on the topic of human resources in the digital age and new approaches to business. Subsequently, a methodological procedure for fulfilling the set main goal and sub-goals is presented in connection with the research scheme. Later, the findings from the discussion table are compared with a literature search and include a critical reflection of the theoretical and practical opinion. In the last phase, the survey results are transformed into recommendations and definitions for the future direction of research.

BACKGROUND

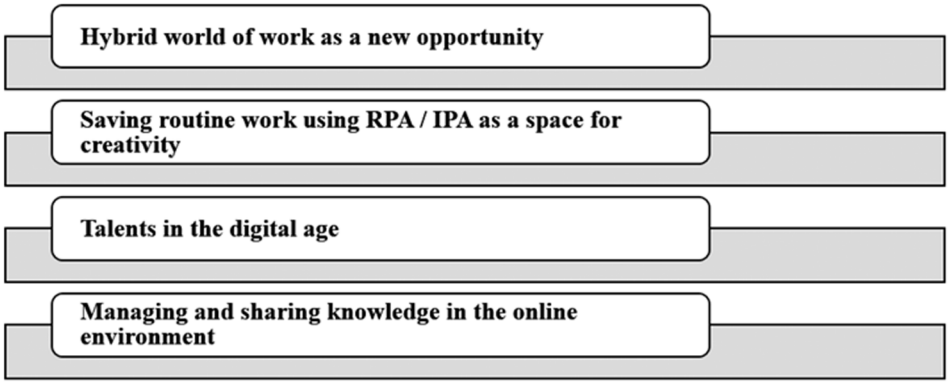
Many studies deal with the current trends in managing human resources in the last years, including the pandemic (e.g. Przytuła et al., 2020). There is no doubt that the digital transformation has been significantly influencing the area of human resources. According to data of Eurostat from the year 2018 presented in Sostero et al. (2020), about five per cent of the European Union (EU) workforce usually worked from home at least sometimes in 2002; in 2019, it was already 11% on average. However, in 2019 there were still almost nine out of ten employees who never worked from home. Eurostat data in 2019 also showed significant regional differences in the uptake of telework in Europe, ranging from less than five per cent in Bulgaria, Romania and Cyprus, to more than 35 percent in the Netherlands and Sweden. The differences include the industrial structure and differences within sectors, the distribution of employment by firm size, and workers' digital skills (Sostero et al., 2020).

The trend of working remotely, teleworking and working from home, and managing knowledge, talents and using artificial intelligence and technologies has been forced to fasten also by the Covid-19 pandemic since 2020. The Covid-19 pandemic has led to a massive increase in the use of home telework. Hybrid forms are more likely in the future. Remote working can be performed both by dependent and independent workers, not necessarily from home. Teleworking instead is strictly related to employees (Samek Lodovici et. al, 2021). It increased the requirements for the technical support, tools and equipment. Microsoft defined seven urgent trends every leader needs to know in 2021, among which also belong: flexible work is here to stay, talent is everywhere in a hybrid work world, and the way forward is to invest in space and technology to bridge the physical and digital worlds. In the survey "The Work Trend Index", Microsoft presented data about trends in the working environment. An independent research firm conducted it, Edelman Data x Intelligence, among 31,092 full-time employed or self-employed workers across 31 markets between January 12, 2021 and January 25, 2021. There were identified also challenges as a digital overload (which was even climbing at the beginning of 2021), lack of social contacts, loneliness or more stress (Microsoft, 2021).

Rowland-Campbell (2017) argues that as technology changes, the perceived role of the human being changes and has been evolving for a long time. In her text, she refers to the publication of Auerswald, who talks about "human coding" as a mechanism. Auerswald (2017) explains that if we have data about human behaviour activities, this data may now be collected, analysed, evaluated, and reused. Anything formulated as an algorithm gives room for machine analysis and, increasingly, machine action. In this context, the term "social machine" is used for systems that do not distinguish human input from the computational process. This further changes the relationship of humans to things, to privacy, to themselves and to each other. A big issue is how to deal with information access and control for social machines. As stated by Hendler and Berners-Lee (2010), this issue poses a challenge for researchers in the field of artificial intelligence. The continued evolution of social machines requires developing mechanisms that allow data and knowledge to be shared more freely without fear of being misused. What talents one would need to understand or build a social machine is considered, for example, by Shadbold et al. (2019). Four thematic areas and related issues were selected from a wide range of topics (see Introduction).

The literature review identified trends in managing human resources influenced by digital transformation. This subchapter aims to describe selected trends in managing human resources in the digital age to provide a theoretical framework used in the practical implications in the second part of this chapter. The chapter's topic is divided into four main parts (see Figure 1).

Figure 1. Selected trends in managing human resources in the digital era
Source: Authors' own processing, 2021



The issues discussed in this part include trends identified within the literature review. As the situation in the pandemic in 2020–2021 has changed the world of work, employees, as well as organisations, had to face a controversial case of the sudden significant change in working habits.

HUMAN RESOURCES IN THE DIGITAL AGE - NEW APPROACHES IN BUSINESSES

The Hybrid World of Work as a New Opportunity

The concept of the hybrid world of work has gradually become a new normal in managing human resources. It was also identified as one of the key issues discussed in the scientific literature in the pandemic period, e.g. a deep analysis of aspects of the remote work and worker well-being has been discussed with the worldwide authors in the publication Wheatley et al. (2021). Hybrid working means more flexibility. It is a form of working which allows employees to split their time into working in the office and remotely (MacKenzie, 2021). It brings advantages both for companies and employees and some companies confirm that measuring the productivity in the hybrid world of work shows positive results (People Management Forum, 2021). Remote work is not a new phenomenon, although it was never performed on this scale before. The pandemic has brought a rapid and forced change in many businesses and their culture.

Benefits for employees include more autonomy, better work-life balance, reduced absence rate, saved cost related to commuting to work. For employers, it means cost savings on office, space, reduced absence rate, and it may even help attract and retain new talents (MacKenzie, 2021).

Saving Routine Work Using Robotic/Intelligent Process Automation as a Space for Creativity

First, it is necessary to define the terms that will allow the subsequent discussion of the second topic, "Saving routine work using RPA/IPA as a space for creativity". Specifically, these are the terms: intelligence, artificial intelligence, artificial neural network, acronyms RPA, IPA. The attention is drawn to inspiring discussions around the definition of these concepts: intelligence and artificial intelligence. The aim is to state the scope framework for the round table discussion compared with the theoretical approach.

A prominent scientist in artificial intelligence, Pei Wang, based the first one the term "intelligence". Wang (2020, pp. 74) presents the following description of intelligence: "*Intelligence is the capacity of an information-processing system to adapt to its environment while operating with insufficient knowledge and resources*."

It is the definition of the concept of general intelligence which is crucial for the following text. Legg and Hutter (2007) explore informal definitions of "intelligence". Their report analysed the approach to the meaning of intelligence by psychologists and AI researchers and analysed the collective definitions of various organisations (encyclopaedias, dictionaries, etc.). They then asked themselves whether it is possible to give a single definition of intelligence. In response, they presented a formal definition of so-called universal intelligence: "*Intelligence measures an agent's ability to achieve goals in a wide range of environments.*" (Legg & Hutter, 2006, pp. 2). Functions, such as the ability to learn and adapt or understand, are expressed indirectly in this definition, i.e. defining the ability to achieve goals in a wide range of environments (Legg & Hutter, 2007). Note: the agent is the one who acts (from the Latin "agar").

Yampolskiy (2020) proposes the following definition of artificial intelligence - acronym AI (Yampolskiy, 2020, p. 68) in connection with the text of Wang (2019): "*Artificial Intelligence is a fully controlled agent with a capacity of an information-processing system to adapt to its environment while operating*

with insufficient knowledge and resources." However, P. Wang (2020) contradicts this definition, especially in its second part in the "fully controlled" area.

Mikolov (2020), a prominent Czech expert in the field of artificial intelligence, points out that the problem of defining AI is complicated, and it might be easier to describe what AI is not. At the end of his feedback on Wang (2019), he states that users of the system's usefulness interest us most. Based on this, he defined the term "Useful AI": "…*Useful artificial intelligence is a computer system that requires the least amount of human intervention and physical time to adapt to perform a new, useful task*" (Mikolov, 2020, p. 51).

In interviews on artificial intelligence, Tomas Mikolov states that artificial intelligence is largely about machine learning and artificial neural networks. At present, AI is definitely not able to adapt to other conditions. Artificial neural networks can be defined as mathematical models. AI should be a program that will be able to learn with human intervention. Computer machines are fast. One builds an algorithm, creates a database, but what will not be in the program and in the database will not invent the current state of AI. The algorithm does not understand what it does. So far, it is just robotisation (translation from the original interview in the Czech language, Brzybohatá, 2019). Robotisation and digitisation (a conversion of data and processes) currently allow the use of virtual robots called RPA. In addition to physical robots-machines, it is possible to use the services of robots-SW (licenses). And in the modes:

- **ATTENDED robots**: Waiting for instruction, the worker monitors the work of the robot on the computer;
- **UNATTENDED robots**: Unattended, has no interface, only seeing inputs and outputs.

Robotic Process Automation (RPA) is an autonomous SW robot programmed with a description of the process, controls, and rules. The term is explained by, for example, Dilmegani (2017). RPA is about:

- automation of routine activities using a software robot;
- changing the view of knowledge workers;
- combining different software environments within one system.

Following RPA, for example, Berruti et al. (2017, p. 2) define Intelligent Process Automation (acronym IPA) as: *"At its core, IPA is an emerging* is an autonomous SW robot, which is programmed with a description of the process, controls, and rules *that combines fundamental process redesign with robotic process automation and machine learning."* Berruti adds that it fully includes five technologies:

- Robotic Process Automation,
- Machine Learning (controlled algorithms that make independent predictions from structured input-output datasets based on new inputs),
- Smart Workflow (a process management software tool that integrates tasks performed by a group of people and machines),
- Natural-language Generation (software engines for creating human-technology interaction based on rules for translating observations from data into plain text),
- Cognitive Agents (technology combining machine learning and natural language generation with building a virtual workforce, called an agent, using a telephone or via chat).

Talents in the Digital Age

Nowadays, it is a fundamental task to attract and retain talents. For many organisations, the situation in the labour market has been challenging in this aspect. They fight for the talents, search for ways how to find them, attract them and retain them, supporting their learning and development. What is a definition of a "talent" from the working environment point of view? *Talented people are scarce, and business enterprises have always competed for this "rare resource*" (Ansar & Baloch, 2018, p. 175). As these authors inform in their paper, talent management (TM) as a term is not an entirely new invention. It was used in a 1957 document of the American Management Association. The term "Talent" was also used in business literature in the 1970s (Ansar & Baloch, 2018).

Digital transformation of society is in full swing in the 21st century. Talent management could exploit both the benefits of applications, resources, and tools and the viral nature of social networks, which are reachable anywhere in the world. Investment is needed to balance the differences, and the diverse performance levels create an imbalance, leading companies to constantly seek out the differential value between employees and potential candidates (Martínez-Morán et al., 2021).

The mere presence of talent or qualified workers does not ensure success/enhancement in performance. Organisations need to invest in proper utilisation of the talent for the advantage of the organisation (Ansar & Baloch, 2018).

Managing and Sharing Knowledge in the Online Environment

A remote working environment has brought another challenge for working teams and specific requirements for high-quality leadership. First-level managers had to change the attitude of sharing information and knowledge across teams and organisations. Knowledge is retained by employees and companies should have a system, tools and processes to support knowledge sharing among them.

Connelly and Kelloway (2003) point out that knowledge sharing is separate from information sharing, which typically involves management making information about the organisation available to employees at every level. Whereas knowledge sharing contains an element of reciprocity, information sharing can be unidirectional and unrequested. Knowledge sharing must be voluntary (Kelloway & Barling, 2000). However, it is not necessarily spontaneous in organisations (Connelly & Kelloway, 2003). Organisations should have technologies to support sharing of knowledge and include the organisational culture in the digital age. Knowledge sharing helps develop a knowledge-intensive culture by encouraging and aggregating behaviours as a crucial part of the knowledge management scheme (Alavi & Leidner, 2001).

As Chennamaneni (2006) states, a number of factors influence the knowledge-sharing behaviours of individuals. These factors can be considered as soft ones (i.e. provision of incentives and motivations to inspire knowledge sharing, personal values and self-identity, organisational culture, trust, national culture, organisational resources like space, time and access to knowledgeable people in the organisation). It is also crucial to have these factors, which means technologies and modern tools (Chennamaneni, 2006). Especially in remote work, they play an essential role.

Human Resources (HR) practices affect knowledge sharing (Yang & Wu, 2006). Knowledge sharing is known to inspire innovative behaviours (Huarng & Mas-Tur, 2016).

Many companies see this a crucial part of the managerial work as the employees and their knowledge is a substantial part of the human capital in companies and thus a part of an intangible asset.

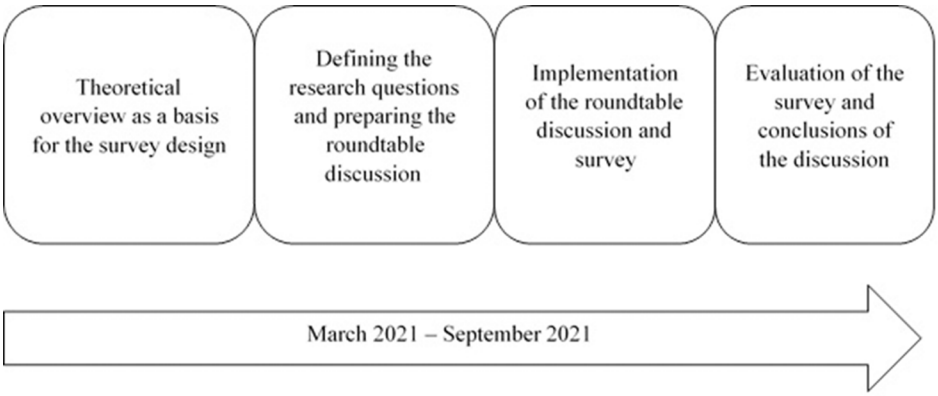
Trend in Managing Human Resources: Methodology and Data

The presented topic has the character of complex or challenging to get a grasp of, for which it is not easy to select criteria in advance or to identify the problem completely. It is a situation where it is necessary to solve the problem in the greatest possible complexity. For this reason, it is appropriate to use creative problem-solving methods that include group solutions (Robson, 2002). However, it is essential to set the parameters of such a solution, as stated, for example, by Proctor (2020). A round table discussion form was chosen for the group solution of the problem. The research scheme is shown in Figure 2.

The structure of the discussion was defined on the basis of a literature search. The focal group for the round table discussion was defined by the need for experts in particular fields. Specifically, there were experts in the areas of: IIoT (Industrial Internet of Things), ITS (Information Technology Support), information systems setup, Human Resources agenda, digital marketing, talent search, flexible work culture increasing company efficiency and well-being and setting up HR processes.

A meeting of academics and business professionals on the topic within the round table discussion took place on September 13, 2021, in a hybrid form using new technologies to obtain the views of participants in the discussion. In addition to the debate, a survey (CAWI method) of perception of the topic was conducted within this research. Based on the results of the round table discussion and the evaluation of the survey, conclusions were drawn on how the professional public perceive the challenges of the digital age, providing a unique and up-to-date view on this current issue and allowing best practices to be shared.

Figure 2. The research scheme used in the chapter
Source: Authors' own research, 2021



Selected HR Trends in the Digital Era: Research Statements

Based on the detailed literature review, several trends in managing human resources in the digital era were identified. Depending on the direction of the research trend, they go more to the technological or human aspect. To collect the qualitative and quantitative primary data, the round table discussion method and the CAWI method were used. Their principles are described below.

Round Table Discussion Method

Emotions are associated with robotics and artificial intelligence in terms of Human Resource Management. Although we as humans feel like intellectually based, rational beings, they usually act intuitively and emotionally. The moment a person solves a complex problem creates barriers based on assumptions, influenced by what is happening around us, information from the media, etc.

In such a situation, it is appropriate to use operational problem solving, such as the Kepner-Tregoe method (Kepner-Tregoe Consulting, 2021), which individuals and teams use to solve complex situations. Its first step is Situate Appraisal (SA), followed by Problem Analysis (Root Cause Analysis), Decision Analysis, Potential Problem/Opportunity Analysis. In this text, the authors focus only on the situation evaluation section, the basis for the possible following steps.

To evaluate the problem-solving situation, i.e. to answer the question "What's going on?", the group problem-solving approach was used, which helps streamline the process, overcome crisis moments, and make better use of the group's potential. Specifically, the round table discussion method was chosen.

A round table discussion is an organised interview conducted by one moderator with several selected speakers who bring different opinions and audience opinions. The audience watches the discussion but can also be involved in the debate and possible research. From his own experience, Newman (2014) recommends focusing the preparation of the discussion table on the following four attributes for effective management of the discussion table: clear focus, comprehensive agenda, strong moderator and selective invitations. All listed features have been met.

The methodological procedure of the round table discussion was realised according to the approach of Cresswell et al. (2013). The actual course of the discussion table can be defined as follows:

- **Ethics and consent**: The experts selected for the discussion were acquainted by the moderator one week before the event with the discussion scenario with the call for possible modifications and subsequent consent. On the day of the event, consent to participate was obtained from the other participants (physically = signature, or online = connection). Participants were invited to discuss, exchange experience and explore opinions on the topics addressed. The main goal of the discussion was to exchange experience, pass on the information and raise awareness to the topic.
- **Design:** It was an event within an international conference with a multidisciplinary overlap, both professionally and sectorally (meeting of the academic and business environment). The topics were divided into four areas, and each topic discussion took place for 30 minutes (from 3 pm to 5 pm) under the guidance of the moderator. Each area was first briefly introduced by a pre-selected speaker. Emphasis was placed on exploring perspectives and ensuring dynamics (Silverman, 2013).
- **Participants:** The participants had a diverse professional focus, with an interest in and/or experience in digitising human resources management systems. The basis for the creation of the research sample was the database itself based on contacts from previous related academic research projects and the network of partners of the Association of Small and Medium Sized Enterprises and Crafts (Association of Small and Medium-Sized Enterprises and Crafts CZ, 2021).
- **Setting:** TUL, September 13, 2021, within the international conference Liberec Economic Forum (LEF) 2021. The round table discussion took place in a hybrid form - physically and online, in Czech, with simultaneous translation into English (Liberec Economic Forum, 2021).

- **Data collection and handling:** Before the beginning of the discussion, participants were informed about the availability of the survey on the website using a QR (Quick Response) code. Physically present participants had the opportunity to complete the questionnaire also in a paper form. First, each of the four topics was introduced, then the participants discussed the topic. The course of the meeting was recorded in the form of minutes. Subsequent research (CAWI method) was performed anonymously (see more about CAWI in the next part).
- **Data Analysis:** There was a confrontation of findings for individual areas and subsequently the evaluation of the survey.
- **Results and strategic context:** Based on the findings, the concepts, priorities and risks in robotics and digitisation with an impact on human resource management were defined. For more details on all topics, see the following sections.

CAWI Method

Based on Sowa et al. (2016), the Computer-Assisted Web Interview (CAWI) is a research method that is the result of the evolution of the previously used popular methods: Paper and Pencil Interviews (PAPI) and Computer Assisted Telephone/Personal Interviews (CATI/CAPI). The CAWI method involves creating a research questionnaire, which is to be shown on the website in such a way as to be available online (in the case of the primary data collection of the authors in the Survio platform) for respondents to fill out. Questions and answers in the questionnaire are standardised and previously predefined. The authors selected this method together with PAPI method to find out an opinion on four statements from the academic and business professionals, both Czech and international. The authors are aware of the limitations of this method. Sowa et al. (2016), based on the opinion of Mider, highlight that the CAWI is more of a survey study where respondents fill in a questionnaire without involving the person conducting the survey. Also, selecting a research sample that would allow for the generalisation of statistical results is complicated. For this chapter, the CAWI method and the questionnaire was used as a complementary way to obtain the opinion of the professional public.

Research Statements for the Discussion Table: How Practitioners See the Trends in HR

Identifying key trends in human resource management in the digital age both in the literature review and discussed expert experience has helped identify five research statements. These were the basis for the round table experts' discussion as well as for the survey via an online questionnaire in Survio platform to survey reactions of the discussion round table listeners. All statements were answered only in YES/NO format.

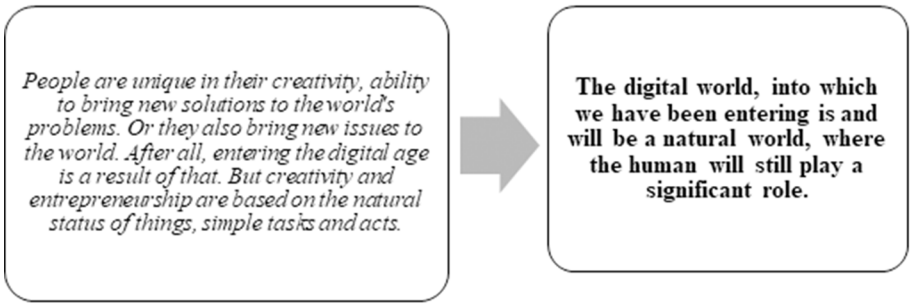
The research statements were set up in such a way as to maintain a connection with the overarching title/topic of the given part of the block, as well as to provoke one's own opinion. The panellists were completely acquainted with this scenario and, in addition to comments on the initial analysis of the problem, always carried out by one of them, prepared the ground for the respondents' agreement or disagreement. Because respondents could not prepare for this statement, they reacted spontaneously but at the same time influenced by the different opinions of the discussing panellists.

The topics, statements and questions were not chosen at random, they were based on the literature review supported with what had happened in the previous short but shocking Covid-19 pandemic, i.e. the

need to work remotely and to stop production capacity mainly due to the lack of people. Thinking about how to switch to robotic and automatic production supported by artificial intelligence. And also, how to find or quickly bring up talents who could work in such conditions. Furthermore, how to transfer an enormous amount of knowledge within companies - intergenerational, interdisciplinary and interpersonal.

Introduction to the topic was brought by several questions/initial assumptions from which was identified a general statement (see Figure 3 – Figure 7). These questions/ assumptions (left side frame of the figure) were created in consultation with practitioners. Right side frame provides the final statement, which the panellists commented. These figures (3-7) were displayed on the screen behind the participants throughout the discussion, always on the given problem/topic, and were, in the true sense, complementary to what was happening verbally in the discussion. Moreover, preparing the respondents (round table participants) for his unequivocal statement - yes or no - provided in the online survey (results are shown in Figure 8).

Figure 3. The research statement "digital world"
Source: Authors' own research, 2021



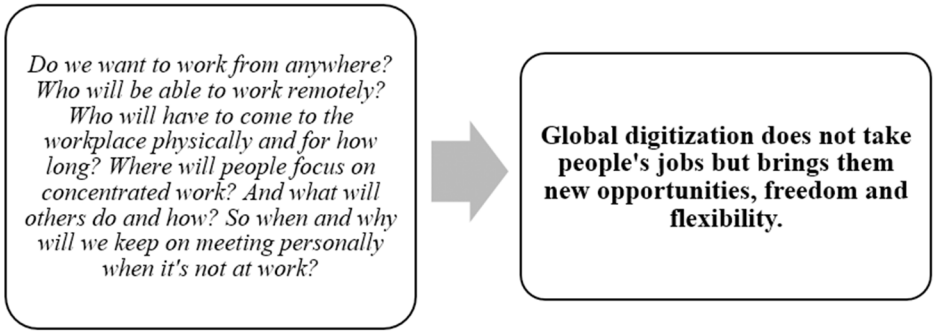
Hybrid World of Work

Working from anywhere and changing managerial work is a crucial decision that will affect the organisation for many years to come. It is a time that requires a clear vision, plan and principles to move towards extreme flexibility (Microsoft News Center, 2021).

Llave and Messenger (2018) talk about the revolution in work and life caused by information and communication technologies and the constant connectivity that New ICTs have caused. He announces the detachment of work from traditional office spaces and a new independence of work from remote place. Covid-19 accelerated everything. Sako (2021) says that, with its *contribution*, remote working (Llave and Messenger talk about telework in 2018, Chen and Nath even talk about nomadic organisational culture back in 2005) became a sudden necessity for many employers and employees and immediately began to transform into work from anywhere. This will require deep changes in organisational life.

This transition appears to have been remarkably smooth for some employees, but some are "unhappy with loneliness and the blurred boundary between work and leisure" (Sako, 2021, p. 20). Far faster, the world of constant dynamism and change has arrived, not far from Latour's hybrid world (Blok and Jensen, 2011). Both positive and challenging aspects are also discussed by authors in the *Handbook of Research on Remote work and Worker Well-being in the Post-Covid-19 Era* by Wheatley et al. (2021).

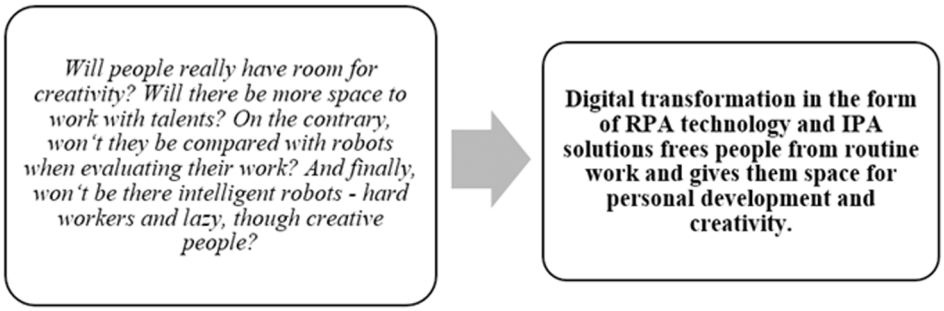
Figure 4. The research statement "hybrid world of work"
Source: Authors' own research, 2021



Saving Routine Work Using RPA/IPA as a Space for Creativity

The benefits of such innovation range from the robot's tireless work through its accuracy and speed to the possibility of precise control and audit. Each action is recorded, and the data is ready for further analysis. Probably the most interesting benefit is that one gets rid of routine work (Charypar, 2017).

Figure 5. The research statement "RPA/IPA"
Source: Authors' own research, 2021



Berutti et al. (2017) note that IPA "takes the robot out of humans." That it is just a set of next-generation enhancements and tools for business processes that help employees eliminate repetitive, replicable, and routine tasks.

IPA is essentially a combination of five new and key technologies (Berutti et al., 2017):

- **Robotic Process Automation (RPA):** an automation software tool that automates routine tasks.
- **Smart workflow:** a process management software tool that integrates tasks performed by groups of people and machines.
- **Machine learning:** algorithms that identify patterns in structured data, such as daily performance, through "supervised" and "unsupervised" learning.

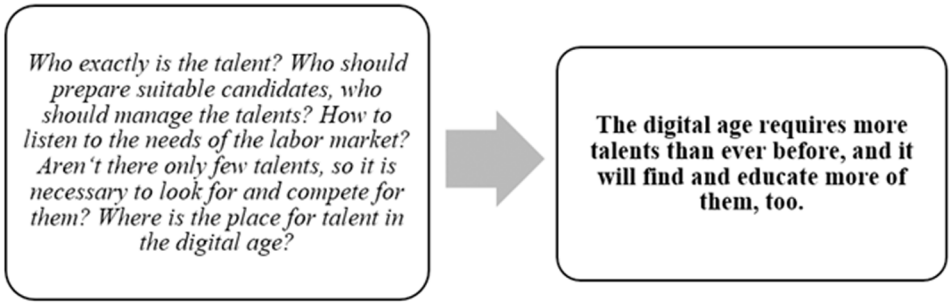
- **Natural Language Generation (NLG):** software tools that create seamless interactions between people and technology by following rules for translating observations from data to text.
- **Cognitive agents:** technologies that combine machine learning and natural language generation to build a fully virtual workforce (or "agent"). It is then able to perform tasks, communicate, learn from datasets and even make decisions based on "emotion detection."

According to Naveen Reddy et al. (2019), RPA is an associated evolving type of business process automation technology supporting the image of software systems robots or artificial intelligence (AI) workers. At the same time, they confirm that most operating teams receiving RPA have assured their employees that automation will not lead to their dismissal. Instead, the staff is relocated to try to do many other fascinating jobs. I emphasise that knowledge workers do not feel vulnerable by automation: they have accepted it and seen robots as teammates.

Talent Management

More and more employers are having difficulty filling job vacancies, arguing that it is difficult to find suitable candidates. All work fields are affected. Employers cannot find a qualified workforce with the proper hard and soft skills ratio. Keeping pace requires faster and more targeted skills development and talent management.

Figure 6. The research statement "managing talents"
Source: Authors' own research, 2021



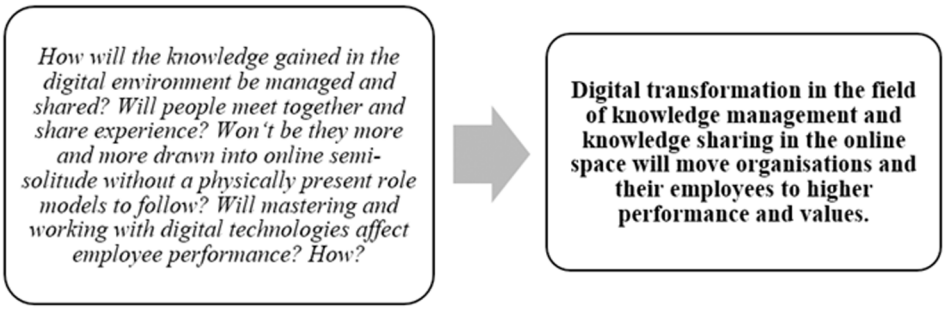
Kane et al. (2017) state that many traditional talent management processes have not been designed for today's increasingly digital world. Finding the right people, whether from outside or in their ranks, is one of the major problems of many companies. Ways to meet the needs of such employees must be designed. Today's employees are looking for opportunities that will allow them to develop and demonstrate the skills and abilities needed to succeed in the digital world. If the company does not offer them, they leave.

A new generation of workers, admit Foung et al. (2020), has been already growing up under the influence of the digital era. They have different values from traditional employees, which results in problems in selecting, training and retaining talent in human resource management.

Knowledge Sharing

It is not only about digital literacy, orientation in the online space, the ability of people to use Information and Communication Technologies (ICT) to find, evaluate, create and share information, sharing and managing knowledge, and evaluating performance. Digital transformation is expected to provide companies with higher performance and increase in capacity, for example, by alternative workers.

Figure 7. The research statement "knowledge sharing"
Source: Authors' own research, 2021



Based on these statements in the left boxes, the professional public answered online and in the paper format YES/NO answers. The discussion among round table participants was carried out based on additional questions in the box on the right.

In 2012, Wang and Wang tested a model that showed that knowledge sharing not only has a positive effect on performance directly, but also affects innovation, which in turn contributes to the company's performance (Wang, Z. & Wang, N., 2012).

Tønnessen et al. (2021) point out that Covid-19 and the resulting social distance are leading to major disruptions in the world of work. Their study suggests that internal and external digital knowledge sharing are important predictions of creative performance in the context of working from home during a pandemic. Increased use of digital platforms then helps to increase creative performance in this situation.

PEOPLE IN THE DIGITAL ERA: KEY FINDINGS OF THE THEORY AND DISCUSSION TABLE

The literature review and the primary qualitative data gained from the discussion table, together with critical statements from the authors in the literature and practitioners participating in the discussion table were further compared in this subchapter. The aim is to contribute to the presentation of opinion trends to the professional public on the basis of secondary data (literature review part) and up-to-date primary data from a selected limited sample in the environment of the Czech Republic. In the first part of this subchapter there are presented key findings from literature review and round table discussion of professionals (see tables 1- 4). Tables 1-4 are based on the literature review, authors' definitions and round

table discussion. At the end of the chapter, there are the findings supported also by the small sample of answers from the round table participants (see Figure. 8.) who should present their opinion of the selected HR trends in the digital era (just for the reason to illustrate the opinion of a professional public).

On the basis of defined topics for discussion, experts in particular areas were approached in April 2021 with a request for cooperation in the research, see Figure 2. All of them agreed to participate. Specifically, they were:

- **Petr Brynda, Hahn Automation** is an experienced systems engineer who has worked on several projects in the field of IIoT (Industrial Internet of Things), ITS (Information Technology Support) and Automotive ADAS (Advanced Driver Assistance Systems) in recent years.
- **Barbora Čermáková** is responsible for the complete HR (Human Resources) agenda of the Czech branch of the global marketing agency Publicis Groupe.
- **Filip Gröschl, DPDHL Regional IT Sourcing Manager** is an expert on information systems with the soul of a philosopher, or vice versa?
- **Pavel Jireček from Telekom Services Europe** is an expert in human resources. Although Pavel Jireček studied foreign affairs and was set up for a career in the international business, his lifelong professional focus is the area of human resources.
- **David Porš (SMWORKS DIGITAL AGENCY)** is the head of the Liberec band of pioneers in digital marketing, who has been building the SMWORKS brand for more than ten years.
- **Philipp Roden** is the director of the Liberec business incubator Lipo.ink. Since 2005 he has been working in the field of Management Consulting and Talent Search.
- **Zdenka Studená** is a founder of FLEXJOBS CONSULTING, who works with a vision of a flexible work culture that increases the efficiency of companies and people well-being. Now she cooperates with either Czech companies or international corporations and helps them to set up HR processes.

The round table discussion record is available via the Faculty of Economics TUL (2021) Facebook. Tables 1-4 bring the main findings of both groups of experts from business and theorists. The rules and challenges of the four selected topics are defined: the hybrid world of work, using Robotic Process Automation and Intelligent Process Automation, talents in digital time and management sharing knowledge in the online environment.

Table 1 provides an overview of opinions from the theory and practice point of view related to the topic of the hybrid world of work.

In the literature, benefits and challenges are also discussed. During the expert discussion, the participants emphasised the essential rules of the practical hybrid world of work. Setting up the hybrid work in companies is a matter of leadership, which sets its rules. The hybrid world of work is the right direction, but companies have not much experience. They need instructions/methodology on how to set it up. It is essential to point out that Covid-19 distorted it, it was not a hybrid world, and now organisations have been coming back to normal. This period opens the opportunity to implement this approach to strategies and organisational culture. The topic is also quite new in theory. The authors in the literature emphasise the need for defining online and offline roles (see e.g. Wheatley et al., 2021)

In Table 2, there is a comparison of the theoretical opinion and results of the expert discussion in the field of using robotic and intelligent automation.

Table 1. Hybrid world of work as an opportunity: comparison of theory and practice

Topic	Theoretical opinion	Opinion of practitioners/ Expert discussion
The hybrid world of work as an opportunity	Hybrid concept, in which it is a reflection of offline roles, opportunities and pressures, as well as the usefulness and usability of what is online (Thorpe& Gordon, 2012).	• Hybrid is the most efficient way to work because you can do simpler activities through digital tools and others, naturally human activities, you can continue to do face to face.
	A hybrid working model involves a mixture of both remote and office or onsite working, with management, engagement and development of a workforce split between different locations (Miller, 2021).	• People will still play a major role in this world, but only if they can use the hybrid concept and handle with digital technologies.
	The organisation has given the freedom for teams to choose between hybrid work and in-office and every team will decide to choose between the two (Kemp, 2021).	• The hybrid world can solve the world's social, ecological, and economic problems, but it needs to be set up correctly and sustainably.
	According to Alexander et al. (2021) organisations are clear that post-pandemic working will be hybrid.	• Challenge: the background and maintenance of work habits and morals of people on the one hand and the workload on the other. It also depends on the job position and the team.
		• Personal contact must be maintained and communication driven to answer why and how is the hybrid deployed.
		• Simple work operations can be set up in a hybrid world easily, strategic things much worse.

Source: (Thorpe & Gordon, 2012; Miller, 2021; Kemp, 2021; Alexander et al., 2021; Liberec Economic Forum, 2021)

Table 2. RPA/IPA as a space for creativity: comparison of the theory and practice

Topic	Theoretical opinion	Opinion of practitioners/ Expert discussion
Saving routine work using RPA / IPA as a space for creativity	"RPA means automation of white collar tasks via software bots." (Dilmegani, 2017).	• Process robotic and intelligent automation can be a good servant but a bad master.
	RPA is about: • automation of routine activities using a software robot; • changing the view of knowledge workers; • combining different software environments with one system (Dilmegani, 2017).	• Digitisation is the conversion of reality into numbers.
	Anything that can be formulated as an algorithm gives room for machine analysis and, increasingly, machine action (Auerswald, 2017).	• What further limits us is computing power, algorithm quality, amount of data, storage.
	"Intelligence measures an agent's ability to achieve goals in a wide range of environments." (Legg & Hutter, 2006, p. 2). *"A useful AI is a computer system that requires the least amount of human intervention and physical time to adapt to a new, useful task"* (Mikolov, 2020, p. 51).	• Intelligence and artificial intelligence are two different definitions: the first - thinking, creativity, perception, interpretation of reality, the second - accurate and factual reporting, and accurate processing of large amounts of data.
	RPA is about: • automation of routine activities using a software robot; • changing the view of knowledge workers; • combining different software environments with one system (Dilmegani, 2017).	• There are three levels of AI analysis - technological, algorithmic (process - mathematically accurate models, nothing more), processing of large amounts of data.
	Auerswald (2017), who talks about "human coding" as a mechanism. Auerswald (2017) explains that if we have data about activities about human behaviour, this data can now be collected, analysed, evaluated, and reused.	• What matters is someone who understands technology and can recognise the correct data, the right information = people, nobody else.
		• Thus, the creativity of people is further developed. However, data processing, critical thinking, the ability and skill to learn should be developed so that we would always be able to control a technology that has an increasing ability to learn.
		• These are just algorithms and must not serve the highest offer. Machine intelligence is controlled by data supplied by humans.

Source: (Dilmegani, 2017; Auerswald, 2017; Legg & Hutter, 2006; Mikolov, 2020; Liberec Economic Forum, 2021)

In the literature (Dilmegani, 2017; Mikolov, 2020; Auerswald, 2017), it is also discussed that the continued evolution of social machines requires developing mechanisms that allow data and knowledge to be shared more freely without fear of being misused. Probably the most exciting benefit is shielding a person from routine work. So, will there be more room to work with talents? In this context, the term "social machine" is used for systems that do not distinguish human input from the computational process.

The practitioners state that most companies have already been developing the ethical side of AI, robotisation and digitisation as a process of converting information from a physical format into a digital one. It helps to overall digitalisation, it means to a process of leveraging digitisation to improve business processes (Burkett, 2017). Moreover, companies have been replacing the educational process of schools. They have been investing heavily in education, training and development. Part of new business projects includes a focus on the competence of people in this direction.

When comparing the defined terms from the professional literature and the round table discussion, whether people are endangered by artificial intelligence can be stated. Instead, IS/IT experts discuss what can be described as artificial intelligence and what cannot. Concerns about where digitisation and robotics will lead have the benefits of these innovations. In the case of RPA, activities that can be robotised are addressed in professional texts. The participants of the discussion table drew attention to the need to understand the given processes. They emphasised the quality of the data further processed by the machine and the need to change education towards critical thinking.

Table 3. Talents in the digital time: comparison of theory and practice

Topic	Theoretical opinion	Opinion of practitioners/ Expert discussion
Talents in the digital time	Talent is a desirable quality in all human beings, and organisations need workers with the right "Talent" (Ansar & Baloch, 2018). The word talent is used to refer to personal skill, to the ability to work, or competence that distinguishes one person from another (Gallardo-Gallardo et. al, 2013).	• It is possible to say that everyone is talented as everyone is equipped differently, and his/her talent can be used differently. It is necessary to develop this talent further, individually, to be able to listen to people. It is crucial to develop the potential of whom we have in the company before gaining other people. People can learn and be developed by interacting with each other. Learning by mistakes works well. Experiential learning should already be introduced in schools.
	Within the context of the world of labour, we may speak of "superior job performance" (Cappelli & Keller, 2017).	• It is not only a vertical development towards higher positions but also a horizontal one.
		• The company must give the opportunity to grow, provide the right information and space for learning.
		• The education system in schools is set up to find out what people do not know, cannot do instead of finding out and developing what they know and can.

Source: (Ansar & Baloh, 2018; *Gallardo-Gallardo et al., 2013; Capelli & Keller, 2017; Liberec Economic Forum, 2021)*

From practitioners' point of view, it is essential to acquire talents and not to lose them. Therefore, they must be work from the very beginning to support their learning process. Digitisation can help a lot, create space for people to develop, develop their talent, and develop what they can do. They also emphasise the need to identify the talent and start their development already based on the educational systems.

Definition of talent in the literature points out the quality of an individual, uniqueness in something and special competence and skills. The comparison provides the Table 3.

The practitioners' state that it is necessary to have engaged people before artificial intelligence takes the engagement. Companies should give people a choice, offer more solutions, provide flexibility, balance the digital environment with personal, and keep a human face. The authors in the literature often emphasise the importance of transfer of knowledge and the communication scheme, and the suitable means and tools (see Table 4).

Table 4. Management and knowledge sharing: comparison of theory and practice

Topic	Theoretical opinion	Opinion of practitioners/ Expert discussion
Management and sharing of knowledge in the online environment	A process when an individual disseminates knowledge (i.e., know-what, know-how, and know-why) to others (Becerra-Fernandez & Sabherwal, 2014).	• Share information and knowledge that firmly defines society, which is the same for large and small companies. Large companies already have the tools or external options for this. Small companies sometimes miss opportunities and lose their know-how.
	Transfer of knowledge between individuals, groups, or organisations through various means of communication or communication channels (Abubakar et al., 2019).	• Setting up the company´s vision, people's commitment, leadership, rituals, the meaning of work, which must be communicated. The company does not lose its essence in the online environment so that people do not lose loyalty, do not leave and do not take know-how with them.
	Behaviour set that involves exchanging information or helping others (Connelly & Kelloway, 2003).	• Online environment needs to be balanced by employees' involvement in important, strategic matters, personal sharing and transfer.
		• Personal meetings of people can also strengthen online competencies, transfer them in person. For employees and customers who do not respond to the digitisation of the world, personal advice can help, for instance, in the mentor-mentee system.

Source: (Becerra-Fernandez & Sabherwal, 2014 *Abubakar et al., 2019; Connely & Kelloway, 2003; Liberec Economic Forum, 2021*

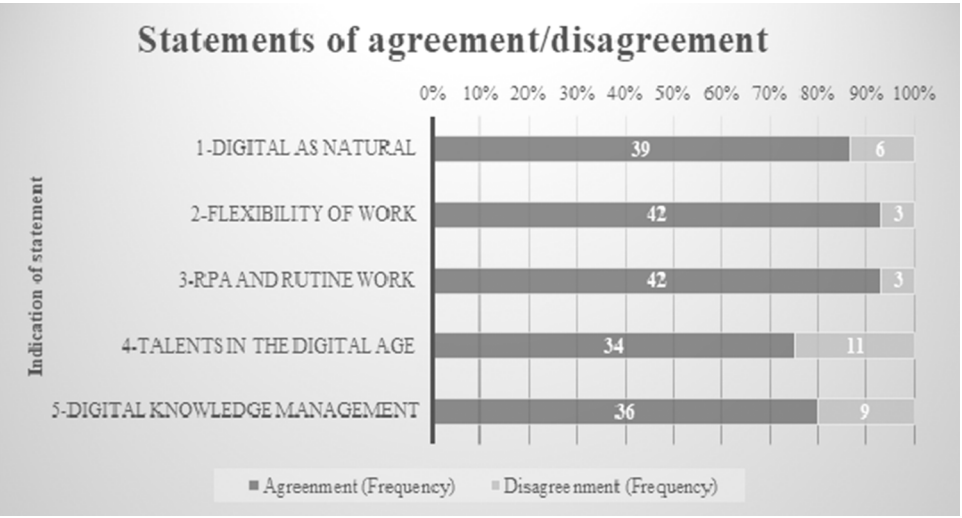
Opinion of the Round Table Discussion Participants

As mentioned above, during the round table discussion, participants were asked to join the survey on the website using a QR (Quick Response) code. Participants in the room had the opportunity to complete the questionnaire also in paper form. Only two of them used this option.

The survey contained five statements related to the discussion and described in detail in the part "Research statements for the discussion table: how practitioners see the trends in HR" in Figures 3, 4, 5, 6 and 7. First, each of the topics was introduced, then the professional participants of the round table discussed the topic. The opinion of the audience (academics, professionals from the business and students interested in this topic) was collected via a link or QR code using the CAWI method and the paper option (PAPI). The respondents answered immediately after each topic. They were supposed to give their opinion on the selected trend. The supplementary survey aimed to determine the perception of research chosen statements within the round table. The authors are aware of the significant limitations of the interpretation of the presented results and the impossibility to generalise the results in any way. However, the aim was to illustrate the opinion of the experts discussing the round table with the opinion of this targeted professional public.

In total, the authors received 45 answers. There were 75 people participating in the round table (except the moderator and the panellists). All 45 responses were valid (the rate of return 60%). Figure 8 presents the results of the survey.

Figure 8. Statements about trends in managing human resources in the digital age
Source: Authors' own research, 2021



As Figure 8 shows, 87% of respondents agree that digital is natural. In other words, the digital world, into which we have been entering, is and will be a realistic world, where humans will still play a significant role. Even more respondents (more than 90%) agree that global digitisation does not take people's jobs but brings them new opportunities, freedom and flexibility and digital transformation in the form of RPA technology and IPA solutions frees people from routine work. It gives them space for personal development and creativity.

The statement about talents was a bit more controversial, where only 76% agreed that the digital age requires more talents than ever before, and it will find and educate more of them. 80% of respondents confirm that digital transformation in knowledge management and knowledge sharing in the online space will move organisations and their employees to higher performance and values. The survey has shown overall very positive results in all five statements. The authors can conclude that the respondents agreed that digital transformation would positively affect the organisation and character of work, managing talents, and sharing knowledge. However, the authors are aware that the structure of the respondents might influence the overall positive feeling about these HR trends (the people with interest in the topic participated in the event). Although the results cannot be considered representative, they bring beneficial effects in the whole context of this chapter and a comparison of practitioners' approach.

SOLUTIONS AND RECOMMENDATIONS

The topic "Human Resources in the Digital Age" is not black and white. Digitalisation generates a positive image towards the talent to be attracted, ensures employee commitment, gives employees and departments greater autonomy and accelerates the implementation of new roles in people management (Schalk et al., 2013). The pandemic threw humans into a rapid change, and there were a lot of mistakes, challenges and risks involved, but also an opportunity to learn a lot.

Results of trends in managing human resources in the digital age both from the theory and practice point of view show that these trends are seen as very important and unavoidable to respect in current working life. Moreover, as also Przytuła et al. (2020) confirm, the pandemic has changed the prepared strategic plans for development of many organisations and now they need to be revised, changed and reshaped. The pandemic forced the speed of the digital transformation in the field of managing human resources and digital transformation. Companies and their employees who handle the hybrid work system will benefit from it. The social impact shows that if a hybrid works, it helps to address issues such as environmental impact (in terms of commuting), managing family worries, etc. That is to properly use technology to improve the quality of life, find the balance in the online world and care about employee well-being. Companies face, in many cases, an overload of remote workers. On the other hand, sometimes they find it challenging to motivate people to be efficient and appropriate in using their working time in the home environment. The experience from the pandemic shows that companies should now focus more on well-being and social connectivity to help employees cope with the stressful period (Dahik et al., 2020). Other findings presented in Przytuła et al. (2020) emphasise how important it is to include this approach to the organisation culture and ensure that remote working people are part of the organisation. As Wheatley et al. (2021) point out, managers will need to consider reorganising workplaces to more hybrid working routines (in the working environment where remote working is possible). These factors can be viewed and recommended as crucial for the further direction and set a new normal of the HRM concept in organisations.

FUTURE RESEARCH DIRECTIONS

The choices leaders make in this next phase of hybrid work will impact an organisation's ability to compete for the best talent, drive creativity and innovation, and create an inclusive work environment for years to come. It will require a significant mental shift (Microsoft, 2021). As mentioned in the methodology of this chapter, the presented results are the first step (evaluation of the current situation) to solve the complex problem of hybrid work style and set up procedures for its use after the Covid-19 pandemic. The authors perceive this state as "new normal". The authors focused on the evaluation of the situation by confronting literature review (mainly from the academic environment) and direct discussion of experts from practice. From the point of view of the Kepner-Tregoe method (Kepner-Tregoe Consulting, 2021), it is then necessary to analyse the root causes of exposed weaknesses (such as concerns about new technologies, non-existent systems for hybrid work style, lack of competence in critical thinking, etc.), and their evaluation with analysis on possible opportunities/problems to determine a solution to the situation.

CONCLUSION

In recent years, with the significant contribution of the Covid-19 pandemic, there is no doubt that we have been fully engaged in the digital age and entering the hybrid world of work. The new labour market situation calls for new approaches. The main goal of this chapter was to evaluate the perception of the state and trends in selected areas of Human Resource Management. Sub-goals were defined to meet the main chapter goal. Namely, based on the literature review, a specification of crucial areas of Human Resource Management affected by the development of information technologies based on the literature review was done by authors and their assessment by an expert group. Next, research questions were prepared for the round table discussion with experts and an online survey of discussion´ participants. Finally, an evaluation of data gained from the experts´ opinion and the survey and their comparison with the theoretical statements from a literature review was performed.

The research and the opinions of a selected sample of experts confirmed that employers' ability to respond flexibly to the working environment and set up processes in the hybrid world of work had been an essential factor for successful Human Resources Management in rapidly changing conditions. It can be helped by the effective deployment of RPA/IPA in cooperation with people, intensifying the use of talent management, understood in a much broader sense than before. And last but not least, this will require open, transparent and genuinely supported knowledge sharing in organisations.

Discussions with experts and survey findings proved the correct identification of key areas related to trends in Human Resource Management in a New Normal and their resonance among the professional public (the round table discussion participants were academics and managers, and employees of companies). The majority view confirms that digitisation in the work environment is no longer a theoretical area of research but a topic that needs to be addressed in a daily working environment. The chapter's contribution is also a comparison of theoretical assumptions with the opinions of experts and the professional public on a limited sample of respondents. Despite the limits of generalisation of results, the chapter provides precious and up-to-date information on selected trends in human resource management. It opens space for further research and development of the presented ideas.

REFERENCES

Abubakar, M., Elrehail, H., Alatailat, M. A., & Elci, A. (2019). Knowledge management, decision-making style and organisational performance. *Journal of Innovation & Knowledge*, *4*(2), 104–114. doi:10.1016/j.jik.2017.07.003

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *Management Information Systems Quarterly*, *25*(1), 107–136. doi:10.2307/3250961

Alexander, A., Cracknell, R., De Smet, A., Langstaff, M., Mysore, M., & Ravid, D. (2021). *What executives are saying about the future of hybrid work?* https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/what-executives-are-saying-about-the-future-of-hybrid-work

Ansar, N., & Baloch, A. (2018). Talent and talent management: Definition and issues. *IBT Journal of Business Studies*, *14*(2), 174–186. doi:10.46745/ilma.jbs.2018.14.02.14

Association of Small and Medium-Sized Enterprises and Crafts. (2021). https://amsp.cz/?lang=en

Attaran, M., Attaran, S., & Kirkland, D. (2020). Technology and organisational change: Harnessing the power of digital workplace. In E. C. Idemudia (Ed.), *Handbook of research on social and organisational dynamics in the digital era* (pp. 383–408). IGI Global. doi:10.4018/978-1-5225-8933-4.ch018

Auerswald, P. E. (2017). *The code economy: A forty-thousand year history*. Oxford University Press.

Becerra-Fernandez, I., & Sabherwal, R. (2014). *Knowledge management systems and processes*. Routledge. doi:10.4324/9781315715117

Berruti, F., Nixon, G., Taglioni, G., & Whiteman, R. (2017). *Intelligent process automation: The engine at the core of the next-generation operating model.* https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/intelligent-process-automation-the-engine-at-the-core-of-the-next-generation-operating-model

Bryan, V. C., Musgrove, A. T., & Powers, J. R. (Eds.). (2017). *Handbook of research on human development in the digital age*. IGI Global. doi:10.4018/978-1-5225-2838-8

Brzybohatá, A. (2019). *Naučil překládat Google, teď pracuje na umělé inteligenci pro Facebook* [He learned to translate Google, now he is working on artificial intelligence for Facebook] [Personal interview]. https://www.idnes.cz/zpravy/domaci/google-facebook-microsoft-zuckerberg-translator-vedec-cech-mikolov-tomas.A181211_141650_domaci_brzy

Burkett, D. (2017). *Digitisation and Digitalisation: What Means What?* https://workingmouse.com.au/innovation/digitisation-digitalisation-digital-transformation/

Cappelli, P., & Keller, J. R. (2017). The historical context of talent management. In D. G. Collings, K. Mellahi, & W. F. Cascio (Eds.), *The Oxford handbook of talent management* (pp. 23–42). Oxford University Press.

Chen, L., & Nath, R. (2006). Nomadic culture: Cultural support for working anytime, anywhere. *Information Systems Management*, *22*(4), 56–64. doi:10.1201/1078.10580530/45520.22.4.20050901/90030.6

Chennamaneni, A. (2006). *Determinants of knowledge sharing behaviors: Developing and testing an integrated theoretical model* [Doctoral dissertation]. The University of Texas, Arlington, TX, United States.

Connelly, C. E., & Kelloway, E. K. (2003). Predictors of employees' perceptions of knowledge sharing cultures. *Leadership and Organization Development Journal*, *24*(5), 294–301. doi:10.1108/01437730310485815

Cresswell, K. M., Slee, A., Coleman, J., Williams, R., Bates, D. W., & Sheikh, A. (2013). Qualitative analysis of roundtable discussions on the business case and procurement challenges for hospital electronic prescribing systems. *PLoS One*, *8*(11), 1–10. doi:10.1371/journal.pone.0079394 PMID:24260213

Dahik, A., Lovich, D., Kreafle, C., Bailey, A., Kilmann, J., Kennedy, D., Roongta, P., Schuler, F., Tomlin, L., & Wenstrup, J. (2020). *What 12,000 employees have to say about the future of remote work*. https://www.bcg.com/publications/2020/valuable-productivity-gains-covid-19

Dilmegani, C. (2017). *What is RPA? In-depth definition & guide to RPA in 2022*. https://research.aimultiple.com/what-is-robotic-process-automation/

Foung, W.-T. Y., Yeh, Y.-S., & Jaw, B.-S. (2020). Talent management model in digital age: Strategic internal entrepreneurial mechanism. In *Proceedings of the 8th International Conference on Entrepreneurship and Business Management ICEBM 2019 UNTAR* (vol. 145, pp. 202-206). Atlantis Press. 10.2991/aebmr.k.200626.037

Gallardo-Gallardo, E., Dries, N., & González-Cruz, T. F. (2013). What is the meaning of 'talent' in the world of work? *Human Resource Management Review*, *23*(4), 290–300. doi:10.1016/j.hrmr.2013.05.002

Hendler, J., & Berners-Lee, T. (2010). From the semantic web to social machines: A research challenge for AI on the World Wide Web. *Artificial Intelligence*, *174*(2), 156–161. doi:10.1016/j.artint.2009.11.010

Huarng, K.-H., & Mas-Tur, A. (2016). New knowledge impacts in designing implementable innovative realities. *Journal of Business Research*, *69*(5), 1529–1533. doi:10.1016/j.jbusres.2015.10.011

Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. (2017). Winning the digital war for talent. *MIT Sloan Management Review*, *58*(2), 17–19.

Kelloway, E. K., & Barling, J. (2000). Knowledge work as organisational behavior. *International Journal of Management Reviews*, *2*(3), 287–304. doi:10.1111/1468-2370.00042

Kemp, J. (2021). *Column: Hybrid working likely to be worst of both worlds.* https://www.reuters.com/article/uk-global-cities-kemp-idUSKCN2D71NF

Kepner-Tregoe Consulting. (2021). *Problem solving for operations.* https://blog.kepner-tregoe.com/problem-solving-for-operations/

Legg, S., & Hutter, M. (2006). A formal measure of machine intelligence. In *Proceedings of the 15th Annual Machine Learning Conference of Belgium and the Netherlands* (pp. 73-80). Ghent University.

Legg, S., & Hutter, M. (2007). A collection of definitions of intelligence. *Frontiers in Artificial Intelligence and Applications*, *157*, 17–24.

Liberec Economic Forum. (2021). *Lidi v Digi*. https://www.youtube.com/watch?v=jEVNdp_Sql0

Liberec Economic Forum. (2021). https://lef.tul.cz

Llave, O. V., & Messenger, J. (2018). Working anytime, anywhere: The effects on the world of work. *Occupational and Environmental Medicine*, *75*(2), 219–220. doi:10.1136/oemed-2018-ICOHabstracts.623

MacKenzie, J. (2021). *Hybrid working after Covid-19: Home is where the work is.* https://a.uk.practicallaw.thomsonreuters.com/w-031-0840?transitionType=Default&contextData=%28sc.Default%29

Martínez-Morán, P. C., Fernández.-Rico Urgoiti, J. M., Díez, F., & Solabarrieta, J. (2021). The digital transformation of the talent management process: A Spanish business case. *Sustainability*, *13*(4), 1–16. doi:10.3390u13042264

Microsoft. (2021). *The Next Great Disruption Is Hybrid Work – Are We Ready*? *2021 Work Trend Index: Annual Report.* https://ms-worklab.azureedge.net/files/reports/hybridWork/pdf/2021_Microsoft_WTI_Report_March.pdf

Microsoft News Center. (2021). *Microsoft releases findings and considerations from one year of remote work in Work Trend Index.* https://news.microsoft.com/2021/03/22/microsoft-releases-findings-and-considerations-from-one-year-of-remote-work-in-work-trend-index/

Mikolov, T. (2020). Why is defining artificial intelligence important? *Journal of Artificial General Intelligence*, *11*(2), 50–51. doi:10.2478/jagi-2020-0003

Miller, K. (2021). *Adapting to hybrid working: Top tips for business making the long-term shift to hybrid working.* https://www.ngi.org.uk/wp-content/uploads/2021/03/CBI-Adapting-to-Hybrid-Working-a-practical-guide.pdf

National Electric Light Association. (1918). *Beware. National Electric Light Association Bulletin: 5th Issue*. National Electric Light Association.

Naveen Reddy, K. P., Harichandana, U., Alekhya, T., & Rajesh, S. M. (2019). A study of Robotic Process Automation among Artificial Intelligence. *International Journal of Scientific and Research Publications*, *9*(2), 392–397. doi:10.29322/IJSRP.9.02.2019.p8651

Newman, K. (2014). *13 tips for planning and hosting successful roundtables.* https://www.eventmanagerblog.com/organising-successful-roundtables

Organisation for Economic Co-operation and Development. (2019). *Pisa 2021 creative thinking framework (third draft).* https://www.oecd.org/pisa/publications/PISA-2021-creative-thinking-framework.pdf

People Management Forum. (2021). *HR v novém normálu* [HR in the new normal]. https://konference.hrforum.cz/wp-content/uploads/2021/09/brozura_2021_FINAL.pdf

Proctor, T. (2020). Creative problem-solving techniques, paradigm shift and team performance. *Team Performance Management*, *26*(7/8), 451–466. doi:10.1108/TPM-06-2020-0049

Przytuła, S., Strzelec, G., & Krysińska-Kościańska, K. (2020). Re-vision of future trends in human resource management (HRM) after Covid-19. *Journal of Intercultural Management*, *12*(4), 70–90. doi:10.2478/joim-2020-0052

Robson, M. (2002). *Problem-solving in groups*. Gower Publishing.

Rowland-Campbell, A. (2017). *Who represents the human in the digital age?* https://www.thinknpc.org/resource-hub/who-represents-the-human-in-the-digital-age/

Sako, M. (2021). From remote work to working from anywhere. *Communications of the ACM*, *64*(4), 20–22. doi:10.1145/3451223

Samek Lodovici, M., Ferrari, E., Paladino, E., Pesce, F., Fracassetti, P., Aram, E., & Hadjivassiliou, K. (2021). *The impact of teleworking and digital work on workers and society. Special focus on surveillance and monitoring, as well as on mental health of workers.* https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662904/IPOL_STU(2021)662904_EN.pdf

Schalk, R., Timmerman, V., & Van Den Heuvel, S. (2013). How strategic considerations influence decision making on e-HRM applications. *Human Recourse Management Review*, *23*(1), 84–92. doi:10.1016/j.hrmr.2012.06.008

Shadbolt, N., O'Hara, K., De Roure, D., & Hall, W. (2019). *The theory and practice of social machines*. Springer. doi:10.1007/978-3-030-10889-2

Silverman, D. (2013). *Doing qualitative research: A practical handbook*. Sage.

Sostero, M., Milasi, S., Hurley, J., Fernández-Macías, E., & Bisello, M. (2020). *Teleworkability and the Covid-19 crisis: a new digital divide? A Joint European Commission–Eurofound Report*. https://ec.europa.eu/jrc/sites/default/files/jrc121193.pdf

Sowa, P., Pędziński, B., Krzyżak, M., Maślach, D., Wójcik, S., & Szpak, A. (2016). The computer-assisted web interview method as used in the national study of ICT use in primary healthcare in Poland – reflections on a case study. *Studies in Logic. Grammar and Rhetoric*, *43*(1), 137–146. doi:10.1515lgr-2015-0046

Thorpe, M., & Gordon, J. (2012). Online learning in the workplace: A hybrid model of participation in networked, professional learning. *Australasian Journal of Educational Technology*, *28*(8), 1267–1282. doi:10.14742/ajet.763

Tønnessen, Ø., Dhir, A., & Flåten, B.-T. (2021). Digital knowledge sharing and creative performance: Work from home during the Covid-19 pandemic. *Technological Forecasting and Social Change*, *170*, 1–13. doi:10.1016/j.techfore.2021.120866 PMID:35068596

Wang, P. (2019). On defining Artificial Intelligence. *Journal of Artificial General Intelligence*, *10*(2), 1–37. doi:10.2478/jagi-2019-0002

Wang, P. (2020). On defining Artificial Intelligence—Author's response to commentaries. *Journal of Artificial General Intelligence*, *11*(2), 73–86. doi:10.2478/jagi-2020-0003

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert Systems with Applications*, *39*(10), 8899–8908. doi:10.1016/j.eswa.2012.02.017

Wheatley, D., Hardill, I., & Buglass, S. (Eds.). (2021). *Handbook of research on remote work and worker well-being in the post-Covid era*. IGI Global. doi:10.4018/978-1-7998-6754-8

Yampolskiy, R. V. (2020). On defining differences between intelligence and artificial intelligence. *Journal of Artificial General Intelligence*, *11*(2), 68–70. doi:10.2478/jagi-2020-0003

Yang, H.-L., & Wu, T. C. T. (2006). Knowledge sharing in an organisation - Share or not? In *Proceedings of the International Conference on Computing & Informatics* (pp.1-7). Institute of Electrical and Electronic Engineers.

ADDITIONAL READING

Blok, A., & Jensen, T. E. (2011). *Bruno Latour: Hybrid thoughts in a hybrid world*. Routledge. doi:10.4324/9780203835272

Botella-Carrubi, D., & Tudela-Torras, M. (2019). Talent revolution: New challenges in people management. In M.-A. Galindo-Martín, M.-T. Mendez-Picazo, & M.-S. Castaño-Martínez (Eds.), *Analysing the relationship between innovation, value creation, and entrepreneurship* (pp. 247–267). IGI Global.

Doguc, O. (2019). Robot process automation (RPA) and its future. In U. Hacioglu (Ed.), *Handbook of research on strategic fit and design in business ecosystems* (pp. 469–492). IGI Global.

Grzegorczyk, M., Mariniello, M., Nurski, L., & Schraepen, T. (2021). Blending the physical and virtual: A hybrid model for the future of work. *Policy Contribution*, *14*(21), 1–22.

Horáková, T., & Maršíková, K. (2021). Importance of knowledge management in COVID-19 pandemic: A case of small and medium-sized enterprises. In A. Ujwary-Gil & B. Godlewska-Dzioboń (Eds.), *Challenges in Economic Policy, Business, and Management in the COVID-19 Era* (pp. 79–108). Institute of Economics, Polish Academy of Sciences.

Manpower Group. (2021). *The talent shortage*. https://go.manpowergroup.com/talent-shortage

Spataro, J. (2021). *Hybridní práce je tu. Jste na ni připraveni?*[Hybrid work is here.Are you ready for it?]. https://www.microsoft.com/cs-cz/microsoft-365/blog/2021/03/02/hybrid-work-is-here-are-you-ready/

Ulmanová, J. (2017). Digitální gramotnost a úloha tacitních informací v řízení znalostí v oblasti BOZP [Digital literacy and the role of tacit knowledge in the knowledge management in OSH]. *Journal of Safety Research and Applications*, *10*, 1–6.

KEY TERMS AND DEFINITIONS

Critical Thinking: It is a key competence in the digital age, which is based on reflection, knowledge, the ability to evaluate evidence and effective communication. It should be trained throughout the education system.

Digital Leadership: A designation of the abilities of a person/individual, but also of an organisation/society, a style of behaviour/action. People come first, then technology and processes. A competitive advantage can be gained in the model: trust-value-speed-action. When there is trust, we gain quality, value, when we do not need time to verify status, we can act instead.

Hybrid World of Work: A working environment where the corporate culture and scheme allow to combine both office work and using of home office. This concept can vary based on the industry.

New Normal: New normal refers to the state of human society that has taken place since the global crisis. The crucial question is how to set this new normal? Is it possible?

Routine Work: Simple tasks performed repeatedly that do not require the involvement of creative elements in the work. These tasks can be easily replaced by robot work.

Talent in the Digital Era: The ability to handle some activity in the digital era better than the average person. Talents do exist in a variety of areas and activities of the working environment. It is crucial to support the potential of talents.

Virtual World: A complex concept using technology-supported tools for communication and content creation in an online environment that respects social networks.

Chapter 8
The Critical Role of the Chief Information Officer in Smart Management of Digital Transformation

Raghu Nandan Chawla
Birla Institute of Technology and Science, Pilani, India

Deepak Saxena
https://orcid.org/0000-0002-9331-3799
Birla Institute of Technology and Science, Pilani, India

Praveen Goyal
Birla Institute of Technology and Science, Pilani, India

ABSTRACT

Organisations are increasingly attempting to digitally transform their business models. Effective management of these new-age business models requires specific skills. In this regard, among all the C-suite leaders, the role of the Chief Information Officer (CIO) is the most impacted. The role itself is getting transformed from traditional infrastructure and application management to becoming a strategic business partner. As a result, expectations from the CIOs have increased manifold though many organisations remain dissatisfied with the delivery of digital transformation. Thus, specific to CIO role perspective, both in practice and literature, there exists a gap between what is expected versus what is delivered. To address this gap, through this study in context of digital transformation (DT), the authors deliberate on how the role of the CIO is transforming, outlining novel responsibilities and vital leadership skills that will be perquisite to contribute effectively for the future CIO position.

DOI: 10.4018/978-1-7998-9008-9.ch008

INTRODUCTION

In today's dynamic environment, organisations are significantly impacted by the changes happening in their surroundings. These changes or disruptions come from a variety of factors involving their macro and micro environments. As a response to these environmental disruptions, the organisations innovate new ways of doing business. Businesses are increasingly adopting the new age digital technologies to transform their business by establish better customer relationships, to accelerate new product designs and to create new revenue streams (Yoo et al., 2012; Hinterhuber & Nilles, 2021). This adoption of digital technologies is continuously reframing their legacy business processes, resulting in the adoption of new business models by generating novel customer insights, designing personalized offerings, collaborating with suppliers for cost-effective and efficiently networked digital supply chain (Huang et al. 2014), and for mechanizing the operations by robotic process automation (Sjodin et al., 2018). In effect, the digital technologies have started driving the way modern businesses operate.

A Chief Information Officer (CIO) survey conducted by Constellation Research (Hinchcliffe, 2020) reports that digital transformation remains the top priority in terms of budget allocation, with more than three-fourth of surveyed reporting it as their utmost priority. Similarly, a survey of the manufacturing industry conducted by IndustryWeek (2021) suggests that more than 70 percent are in the process of digital transformation. The dynamic external environmental exigencies provide further impetus to digital transformation. Given such a level of urgency and importance given by the industry, this chapter looks at the crucial role of CIO in the smart management of digital transformation.

Digital Transformation (DT) entails the development of digital business models that enable new approaches for capturing corporate value based on data-driven insights (Davenport & Harris, 2017; Ross et al., 2016; Pagani, 2013), generated in real-time by digital devices. Porter and Heppelmann (2015) emphasise the importance of these high-end smart and connecting devices in revolutionising the products design and usage. This unique aspect of DT differentiates it from IT-enabled business transformation, where the focus is mostly on system automation rather than reinventing the business (Proctor, 2017, Wessel et al., 2021, Chawla and Goyal, 2021). New age digital technologies generate business synergies by merging data gathering, analysis, and communication through enterprise systems and applying the insights for business decision-making (Bharadwaj et al., 2013; Saxena, 2021). Hence, it calls for strategic interventions coupled with technological considerations. As the customers, suppliers and employees are becoming more demanding, organisations now target personalised engagements with each of their business partners through innovative communication channels such as social media platforms and personalised mobile apps. Irrespective of industry size or type, DT is disrupting business at all levels, resulting in traditional core competencies gradually becoming less effective. The inflexible and conventional management methods, organisational structures, and regulations may become barriers to organisational progress, demanding agility in modern times.

Consequently, organisations need to incessantly redefine and reinvent themselves, both strategically and technically, to counter these disruptions (Hinterhuber & Nilles, 2021). This requires organisational leadership to set up of clear vision, ensuring focused execution and cultural adoption of digital business processes, in short, digitally transforming their business. Because DT is a multifaceted and complicated phenomenon, 'one-size-fits-all' approach would not suffice and it is not neither feasible nor desirable to design a widely accepted implementation methodology. Because DT is highly contextual, the organisational leadership is responsible for establishing the framework for the digital journey in the specific organisation context. As the recognised IT leader, the Chief Information Officer (CIO) is usually entrusted

with setting DT at their organisations (McCarthy et al., 2021). Organisations look at the CIOs' expertise to lead DT effectively; this has significantly elevated expectations for the CIOs' role. As a results, CIOs' role is moving from being an IT department administrator to becoming strategic business partners. They are expected to manage with numerous viewpoints including, but not limited to, strategy, innovation, technology, IT infrastructure, stakeholders, workplace culture, and personnel (Saxena & McDonagh, 2022). Working so many dimensions simultaneously often leads to confusion, misalignment, workforce churn, and cost overruns. Thus, DT's multidimensionality brings newer complexities and challenges to the CIO's role.

Though the research on CIOs' role in DT has received attention in the recent past and many researchers have tried to explore, explicate, and expound the role of CIOs, a common agreement on this subject is yet missing. While some studies have outlined the evolution of the CIO's role with respect to time and organisational maturity (e.g. Ross & Feeny, 1999; Chun & Mooney, 2009), limited attention is given to the changing role of CIO in the context of DT. Existing literature on the topic is very scattered as DT itself is a vast and dynamic phenomenon. Therefore, it becomes necessary to explore the intellectual structure and provide a holistic picture of prevailing research under this domain. Hence, this study attempts to address the research question below:

RQ: *What is the role of CIOs in the smart management of digital transformation?*

Our objective is to connect the dots between prevailing multidimensional and fragmented literature on CIO role and digital transformation, and, in so doing, bring forth consolidated insights on the latest industry trends and academic research.

As the research under the domain of CIO is very vast and the research on DT is still evolving, we approached the research question following a narrative review. The narrative research permits identifying the studies to explore the area of interest without defining any predetermined search strategy or a specific review basket (Demiris et al., 2019). This helps the researchers in organically developing the review instead of being confined to the dominant trends. Moreover, it also allows the researchers to quickly find and synthesise the most relevant information while staying within the stipulated timelines (Coster et al., 2017). Khangura et al. (2012) define a rapid review as a quick synthesis method in which some components of the traditional systematic review are removed to produce information in a shorter period. This is achieved by limiting period, language or reporting the results narratively (Tricco et al., 2015).

The keyword selection for this research was made in two steps. First, we used past literature reviews and other studies to identify terms relevant to the concept of DT. Next, we looked for studies that focused specifically on the role of the CIO in DT. A comprehensive list was prepared to consolidate keywords from both sets. In the second step, the selected keywords were further refined with a panel of scholars to get their confirmation and ideas for any keywords left out. Finally, "Digital Transformation", "CIO Role in Digital transformation", "IT Leadership", and "Digital Transformation leadership" were selected as keywords for this study. Next, after keyword finalisation, the data for the study was extracted from Science Direct, Scopus, and Google Scholar. We selected these databases as these are very comprehensive for conducting scientific research (Halevi et al., 2017). We restricted the search period from 1980 to 2021 (Aug). This was because the CIO role emerged in early 80s (Chun & Mooney, 2009), and the concept of DT got popularised with the emergence of the baseline technologies like the internet (Hausberg et al., 2019). We selected the former of these two to get a broader coverage of articles. The initial search was conducted in Aug 2021 with the selected keywords. We then reviewed the abstracts to ensure it was relevant to our area of interest. Further, we inspected the cited references from the shortlisted articles to build an integrated view of understanding. Finally, after thoroughly reviewing the relevant literature,

we logically consolidated our understanding, which is being presented in the following sections. The remainder of the chapter is organised as follows. The next section reviews digital transformation and its strategic nature. Subsequently, the role of CIO and digital transformation leadership are presented, followed by the roles of CIOs in the context of digital transformation. Finally, we discuss the solution and recommendations followed by a discussion on future research directions.

BACKGROUND

The term digital describes internet-based outward-oriented technology, which directly impacts business operations and models (Matt et al., 2015; Hinterhuber & Nilles, 2021). The concept of digital transformation (DT) is originally derived from business transformation. Muzyka et al. (1995) define transformation as a fundamental change in organisational logic which gets originated from the fundamental change of behaviours. In the context of DT, organisations make the novel use of digital technologies to radically improve their business practices and sustain this change by a fundamental cultural adoption. This may often result in redefining the legacy business processes or designing new business processes to create value for the business. Some of these new-age digital technologies include social media, mobility, analytics, cloud and the internet of things (IoT) (Davenport & Harris, 2017; Ross et al., 2016). Over the years, many researchers have defined DT in a diverse manner, and there is no commonly agreed definition of DT as of the date in the literature. One common theme that emerges from these definitions is that DT refers to the innovative use of digital technologies for value addition, like customised product offering, or design better operations (Chawla & Goyal, 2021, Hinterhuber & Nilles, 2021). It is now generally accepted that DT is a broader phenomenon that influences the business from multiple aspects (Saxena & McDonagh, 2022). Therefore, instead of providing an overarching definition of DT, in this section we outline different facets of DT.

DT is Not Merely About the Technology

The main objective of DT is to extract real-time insights from data and use them for organisational decision making (Proctor, 2017). This aspect of DT makes it different from the IT-enabled business transformation, where the primary focus is the automation of routine work (Hinterhuber & Nilles, 2021). One of the primary advantages digital technologies have over the old information system applications is their standard platform compatibility (Riasanow et al., 2021). This means that many different types of digital applications can be created and deployed on the same shared infrastructure, which can further act as a platform to build additional applications (Yoo et al., 2010). For example, there are many applications that the users can use on the same android smartphone to cater to different needs. Further, by reprogramming, these applications can then further share insights for a better user experience bringimg cost and design efficiencies. The ease of application development and operational interactivity that these digital technologies offer have made their adaptability universal. Resultantly, digital technology-based innovations have become a part of all the business domains such as strategy, operations, marketing, finance, and information technology. Organisations are increasingly leveraging this to their advantage by designing innovative products and customer offerings swiftly. Digital technologies are disrupting all organisations and their functions in some way or the other irrespective of the scale or scope of their business (Haffke et al., 2016; Hinterhuber & Nilles, 2021; Saxena, 2021). As a response to these disrup-

tions, the organisations are reinventing themselves to embrace these digital technologies. With business strategy moving towards digitalisation, IT is getting involved in strategic initiatives such as enterprise systems, supply chain management systems, customer relationship management systems, or big data analytics systems (Davenport & Harris, 2017). The strategic business applications on new technologies such as Artificial Intelligence or Business Intelligence are increasingly being designed, developed and adopted. Consequently, IT's role is moving from a support role to a strategic enabler of business, elaborated in the following section.

Digital Transformation is Strategic in Nature

Digital technologies bear a pivotal role in strengthening the technological disruption of the industries (Karimi & Walter, 2015). This is specifically true because DT impacts a wide variety of business and social disciplines. In practice, DT is an amalgamation of multiple digital technologies. However, merely deploying technology is not of much use to the organisation, rather its strategic use makes it valuable for the business (Kane et al., 2015). The most crucial task to achieve successful DT is to precisely define business problems that will be solved by digitalisation (Artemenko, 2020, Setia et al., 2013). Thus, strategy becomes the fundamental core of DT (Kane et al., 2015; Loonam et al., 2014) with technology as an essential element. Accordingly, the modern business strategy should necessarily entail the digital aspect directly into its business strategy, which is different from the IT strategy which is generally placed at a functional level (Bharadwaj et al., 2013). For instance, a manufacturing organisation may collect the key parameters from various sensors deployed at a manufacturing line using an IoT application, analyse the data using big data techniques, and finally communicate the insights using digital dashboards (Adamik & Nowicki, 2018). However, it is essential to note that what insights would be helpful and how to get those insights is primarily a strategic decision. This illustrates that DT involves technology to custom build digital applications as per business suitability in conjunction with the strategy to decide how and what tactical direction is taken for organisation growth. Further, it is imperative to note that even though the technology is old, the synergies are created through the combinations of information generation, processing and analysis (Bharadwaj et al., 2013). Thus, gradually DT has become one of the strategic tools for organisations to compete effectively in the marketplace (Adamik & Nowicki, 2018; Nwankpa & Roumani, 2016).

DT is Resulting in New Business Models

The decreasing cost of technology platforms, and the emergence of shared cloud-based models and computing capability advancements have presented a lucrative sea field of opportunities to the organisations (Riasanow et al., 2021). Taking advantage of these opportunities, organisations have already started designing their business models around these digital technologies, thereby taking advantage of the real-time insights generated by these intelligent solutions. Organisations are innovating novel digital business models and becoming leaner, agile, and strategic. Industries such as media, telecom, music, hospitality, and healthcare have undergone significant transformations (Agarwal et al., 2010, Berman, 2012; Favoretto et al., 2021). Organisations such as Airbnb, BlaBlaCar, PayPal, Zomato, or Ola have designed their revenue streams across completely digital channels (Chawla & Goyal, 2021; Saxena et al., 2020; Walsh et al., 2020). Amazon, once known primarily for e-retailing, now has AWS – its cloud service – as the biggest revenue contributor (Billard, 2021).

DT Facilitates Co-Creation with Customers and Suppliers

DT enables close associations with business partners. By leveraging digital technologies, many collaborative business models have come up taking advantage of shared data insights. For instance, the emergence of customer city code based portals enables the business to optimise their freight costs by consolidating shipments for deliveries of their products. Similarly, internet-based portals are designed to collaborate for just in time inventory to optimise inventory costs and space. Consequently, there has been the emergence of a lot of customer and supplier relationship management applications that facilitate co-creation in business-to-business space (Saha & Goyal, 2019). The novel use of connecting technologies like robotic process automation (RPA), IoT, and analytics have ensued significant enhancements in manufacturing (Adamik & Nowicki, 2018; Caniato, 2016; Davenport & Harris, 2017; Hofmann et al., 2020; Porter & Happelmann, 2014; Sjodin et al., 2018). Thus, organisations are moving beyond their physical boundaries to take advantage of collaborative business models (Lenka, 2017) and themselves becoming a part of the integrated offerings.

One of the important insights that can be drawn from the discussion above is that organisations choose different paths by selecting and using different technologies to create value for themselves. Which path the organisations will choose depends upon their strategic priority. Therefore, DT presents opportunities across various business aspects such as organisational, strategy, technological, business models, and cultural alignments. Managing these business aspects demands a particular skillset from CIOs to effectively and efficiently accomplish digital transformation. The next section discusses the crucial role of CIOs for smart management of digital transformation.

CIO and Digital Transformation

McCarthy et al. (2021) define Chief Information Officer (CIO) as the acknowledged head of IT for the organisation. The organisation needs a variety of IT applications to complement its business. The need for these IT applications might be backed by enumerated reasons, such as establishing new business processes, achieving operational efficiency and process control, sales requirements, recordkeeping, legal aspects, competitive pressures, etc. In its simplest form, each of these applications need IT infrastructure for their deployment and use. Traditionally, the manager accountable for managing this IT infrastructure to keep the applications live has been termed as chief information officer, though some other terms such as Chief Technology Officer or Chief Digital Officer are also sometimes used for similar roles. For simplicity, however, the term CIO is used throughout the chapter.

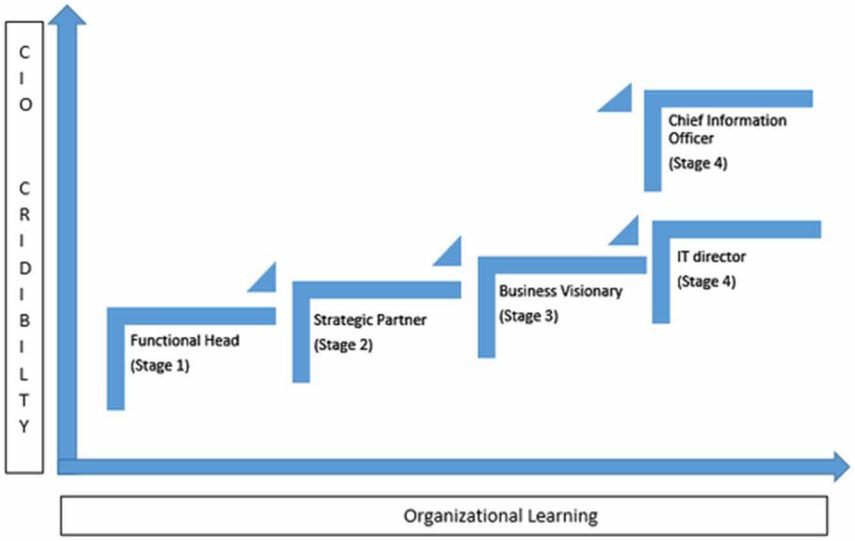
Evolution of the CIO Role

In his ground-breaking study, Mintzberg (1971) observed managers at work and proposed eight responsibilities that all managers, regardless of their position or function, need to perform. This role classification research drew a lot of attention from academics and researchers alike in a variety of business disciplines. Gradually, information technology researchers took notice of this seminal study, and managerial functions were applied to the IT sphere as well (Hütter & Riedl, 2017). Ives and Olson (1981), in their study of IS manager's role, mention his role as a technician with critical responsibilities of coordination, motivation and planning for an isolated and non-important support function (IT). As the organisations expanded and with the addition of more resources, IS manager's role kept growing horizontally. In Mid 1980s these

executives tussled with the organisations for their vertical growth as they too were managing a complete function but had significantly less credibility. This got organisational attention and ultimately led to the emergence of the CIO as a title (Chun & Mooney, 2009). With the emergence of new technologies and increased the adoption of computing devices during the early 1990s, the organisations started realizing the value that IT could bring to the organisation. Accordingly, CIOs started getting more attention. As a result, CIOs' role started shifting from a core technical role to a strategic IT planner and architect. Their increasing involvement in strategic initiatives also impacted their organisational position, and, in turn, many organisations' reporting was directly attached to the CEO (Applegate & Elam, 1992). Hence, we see that the CIO's role has gradually evolved from IS executive to MIS manager to Chief Information Officer, and has been very dynamic due to internal and external factors (Chun & Mooney, 2009).

CIOs generate organisational value in key business areas by ways of contributing to ongoing business initiatives, managing executive relationships, communicating IS performance and building IT vision for the organisation (Earl & Feeny, 1994). Feeny and Willcox (1998) note nine core capabilities that CIOs need to possess to effectively manage IT. These nine capabilities are categorized under three major domains of the CIOs' responsibilities – Business and IT vision, Design of IT architecture, and Delivery of IS. Ross and Feeney (1999) classify three roles of CIOs as functional head, strategic partner and business visionary and note that transition from the latter roles to the former happens when increased credibility is achieved over time (Figure 1). However, it has to be noted that attaining mastery in one role is a prerequisite to moving to the next level. Extending this model, Chun and Mooney (2009) propose two possible role extensions from the business visionary role as chief innovation officer and director of IT. While the chief innovation officer role encompasses responsibilities towards cross-functional integration, innovation management and formulating digital strategy, the role of IT director is centered at managing IT support and cost management with reporting to CFO.

Figure 1. The Role of CIO - Credibility with organisational learning (adapted from Ross & Feeny, 1999; Chun & Mooney, 2009)



An inference that can be drawn from Figure 1 is that IT's primary role has traditionally been limited to keep the lights on (MIT technology review insights, 2020), and IT was considered a commodity with no additional value (Carr, 2003). The role was recognised as a back-office runner with almost no active contribution to core business. Computing services were merely considered support services that existed behind the scenes in the organisation. The C-suite perception of IT was limited to up keeper of the data centre, network and database services. As the internet services got popular, the IT security task was added to this perception, but it remained limited to a support role.

However, industry demands are changing radically in the modern era. Present-day organisational economics is derived from data-driven decisions with close integration of IT with business (Adamik & Nowicki, 2018; Artemenko, 2020; Hinterhuber & Nilles, 2021; Nwankpa & Roumani, 2016; Saxena, 2021). Now, the business strategy is designed to best utilise digital capabilities. Organisations are profoundly changing the way they deliver value based on the insights on real-time analytics (Davenport & Harris, 2017). With the advent of tracking cookies and big data, now the customers get engaged even before the product inquiry and are tracked throughout their lifetime journey with the organisations. Products are digitally designed, keeping customer requirements under consideration. Similar changes are evident in the supply chain where the traditionally physical processes are now driven by smart sensor-driven processes (Klötzer & Pflaum, 2017). It is estimated that during the years 2013 to 2015, more than ninety percent of the world's data was generated (Becker et al., 2018), and it is forecasted that over 100 billion devices will connect to the internet by 2025 (Diamandis, 2015). These increased data-driven organisational demands have made business more dependent upon IT. In turn, this has lifted the expectations, and the role of IT functions in the organisations. The CIO being the head of the IT function is considered accountable for building and driving the organisation's IT vision, be the organisation a top runner or a close follower. Understandably, these business expectations have added complexity to CIOs' role today and for everyone down the line in the hierarchy of IT function.

Chen et al. (2010) note CIOs' active involvement in both foundational responsibilities (supply-side) as well as innovation and digitalisation competencies (demand-side responsibilities). To effectively deliver the supply side responsibilities, CIOs need to possess expert technical competencies (De Haes & Van Grembergen, 2009). While technical skills are a must, CIOs must contribute strategically to business (Sobol & Klein, 2009) by bringing strategic business objectives under their knowledge and skills (Applegate & Elam, 1992). Gottschalk (1999) argues that CIOs must contribute strategically to business by developing relationships with other executives. Therefore, CIOs' hierarchical position and their structural relationship with the TMT becomes critical to the CIOs involvement in strategy. CIOs are far more knowledgeable about technology than anyone else on the board. Therefore, CIOs educate TMT about technological aspects specific to organisational context (Preston & Karahanna, 2009) and co-create the digital vision. Additionally, CIOs share insights about competitors' technological advancement to keep the TMT appraised about possible competitive moves. Further, in the steering committee meetings, CIOs represent IT, present ongoing digital projects' status, and negotiate support from peers. This interaction with TMT brings two fold benefits – first, the TMT gains insights into emerging technologies and the progression and adoption of digital technologies in their organisations. Secondly, CIOs learn tactical aspects of business strategy and TMT's vision which they gradually leverage to design and execute the digital business strategy.

Armstrong and Sambamurthy (1999) argue that the organisation's infrastructure sophistication allows it to incorporate IT applications into its competitive strategies. With their technical expertise, CIOs establish necessary IT infrastructure while rationalising the cost (Chun & Mooney, 2009). Organisations

must properly regulate their digital efforts and continuing operations in order to derive value from IT. CIOs develop a practical governance framework to effectively monitor and control digital activities. Through the effective governance structure, CIOs target to improve business collaboration, risk management, and resource deployment for crucial business operations (Weill, 2004). In order to contribute better, CIOs are taking on additional tasks such as external technology partner support and collaboration with non-IT peers, in addition to their traditional functions (Weill & Woerner, 2013). They use their professional network to look at technological offers and trends to address corporate needs. They then apply this knowledge to innovate at their workplace (Li et al., 2012).

Peppard et al. (2011), in their seminal study "clarifying the ambiguous role of the CIO", note that the suitability of CIOs' role type for a particular organisation is determined mainly from two factors, First, the criticality of IT for competitiveness and second, the maturity of IT leadership of the organisation. Both these factors are critically influenced by the digital acquaintance of the top management team. In the same study, the authors explain five different role types that CIOs can be categorised based on their role scope, factors considered critical to success, their performance matrix, workplace challenges and their relationship to the CxO's. The five distinct CIO roles defined by Peppard et al (2011) are discussed now.

Utility Director

The utility director role maps to the traditional IT support role to keep the lights on. The role's focus is to keep the IT applications up and to run, maintain IT infrastructure, and monitor service levels agreements. Operating in this role, the CIOs usually have their reporting to CFOs, and hence IT is subject to cost-controls. The interaction with the top management team is minimal, and the interactions are prominently limited to operational support staff.

Evangelist CIO

The evangelist CIO sells the idea of information transforming the organisation. The core objective under this role is to educate the peers and change their mindset about the benefits that information technology can generate for the business. This is accomplished by sharing with them the future vision and conducting application demonstrations. The interaction with the top management team is more diminutive. Establishing credibility in business colleagues is foremost essential.

Innovator CIO

As organisations start realising the importance of IT, it becomes essential to deliver new meaningful business applications. The innovator CIO generates and delivers the ideas for the competitive advantage of the business. Establishing innovative processes and better technology use is the primary focus area for the innovator CIO. To deliver this, the innovator CIO has formal and informal interactions with the top management team.

Facilitator CIO

As digital innovation progress and organisations start using the innovations; they start getting a competitive advantage. Gradually these information generation capabilities have to become a culture. For

this, the business has to be encouraged to own the IT-enabled innovation culture. This should be backed by necessary training and competent resources. The facilitator CIO acts as a trusted partner to the top management team for IT business innovation.

Agility Director CIO

The agility director prominently supports the organisations where the demand for IT is high in organisations where the top management has a decent know how of IT. The agility director CIO acts as a technical advisor to meet their expectations swiftly. The design of agile, integrated services and service level agreement are the main areas for the contribution in this role. Delivering the solution with cutting edge technology is the primary responsibility of an agility director CIO. The agility director CIO acts as a trusted advisor to the top management team.

Considering these changes, recent literature envisages a new position of Chief Digital Officer (CDO) for leading digital initiatives (Horlacher & Hess, 2016; Rickards et al., 2015; Sibanda & Ramrathan, 2017) in the organisation. The emergence of this unique position signifies organisational attention to digital transformation (Haffke et al., 2016). Positioning the rightly skilled leaders is one of the essential prerequisites for successful DT, yet only one-third of the organisations have created a CDO position (McKinsey, 2018). However, it is argued in this chapter that the CIO is a better candidate for leading DT by virtue of being already established in the position, and having a better understanding and know-how of the business processes and IT landscape. Further, CDOs always looks at CIOs for necessary infrastructure deployment for DT initiatives and hence synergies between the two are essential (Horlacher & Hess, 2016). Notwithstanding this debate, this chapter considers the most senior IT executive, who leads the digital transformation of the organisation, as the CIO, irrespective of his/her actual job title. To contextualise the role of the CIO in digital transformation, the next section discusses digital transformation leadership.

Digital Transformation Leadership

As noted earlier, DT is not merely about implementing technology and requires a strategic focus (Kane et al., 2015; Loonam et al., 2014; Hinterhuber & Nilles, 2021). Further, DT requires a change in people's behaviour (Hansen et al., 2011). With increased technology awareness and ubiquity of digital applications and platforms, everyone has become tech-savvy (Capitani, 2018). Modern customers own their personalised digital gadgets and expect a personal connection for products purchase and services delivery. The suppliers demand integrated information channels for better collaborations. The same is the case with employees. Almost everyone in the workforce expects their workplace applications to be digitally advanced to work efficiently. Managing this requires an agile mindset at all organisation levels (Salvetti & Bertagni, 2020). Specifically, the leadership position demands a specific focus on innovation and experimentation and adaptability to digital skills to ensure the success of DT efforts. In practice, many factors influence the success of DT, but skilled and competent leadership is among the most critical factors (El sawy et al., 2016; McCarthy et al., 2021).

The Digital Transformation leadership (DTL) can be defined as "*doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem*" (McCarthy et al., 2021, p.2). One of the primary objectives of DTL is to decide on the organisation's directional focus of DT (Heavin & Power, 2018). The prerequisite for the effective strategic contribution for the DTL would be to have a

strong know-how of the organisational core competencies and the business models that are functional in the organisation. Only then can the digital leader can formulate a strong IT vision to complement the business technically and empower them to do their work better.

From the management perspective, DTL involves some specific roles and responsibilities. In literature, these are explained as demand side and supply side aspects. The supply-side responsibilities can be understood as the traditional CIOs' responsibilities of IT management; these are the IT support responsibilities that a CIO is supposed to deliver. At the same time, the demand side responsibilities are the innovation-oriented capabilities targeted to bring a positive impact on the organisational outcomes. Chen et al. (2010) emphasize attaining both the supply side and demand side objectives of the CIO's role. Fulfilling these objectives require that the CIOs must manage the trade-off between IT exploitation and IT exploration. In other words, they must realise business values by exploiting the capabilities of available IT resources and at the same time exploring the new opportunities by the innovative use of IT (Haffke et al., 2016).

Here, it is imperative to understand the core functions or tasks that the CIO should perform as a digital leader supporting digital transformation. These functions are conferred to CIOs from the top management in anticipation to drive DT in their organisation (Becker et al., 2018). Gartner (2021) presents the four key sets of activities that a CIO performs about DT:

Business IT Strategist

One of the primary responsibilities of the CIO is to work collaboratively with other department heads, identify the business DT opportunities, decide on their organisational fitment, and articulate and communicate the strategic digital vision in a top-down way (Dery et al., 2017). In this role, the CIO acts as the orchestrator of building the digital business foundation. S/he attains the role of idea generator with the prime responsibility of building a digital portfolio to the best fit organisational landscape. Reporting to the CEO or CFO and building digital vision, s/he acts as the IT advisor to the top management team (TMT) to ensure that digital transformation efforts get priority (Loonam et al., 2014).

Team Skilling

Along with strategic orientation, executing DT demands a strong skillset in people's management. These skillsets demand strong know-how of new digital technologies and how to put them in use for the organisation. To ensure successful DT delivery, CIOs must warrant that appropriate learning platforms are available and relevant skillsets are available within the team. By incorporating an agile mindset (Salvetti & Bertagni, 2020), team members' roles need to be reorganised from time to time. At the same time, the focus is on inculcating a digital culture and its adoption across the organisation. These human and cultural aspects of the CIOs' role make it even vital for the organisation.

Implementer

The traditional IT support models cannot support novel digitally enabled business models. Consequently, once the digital strategy is formulated and the organisational digital vision has consented, the CIO assumes the responsibility to lead and accomplish the digital initiatives within the stipulated budget. The CIO must ensure that IT delivers are in close sync with the need of the business (Artemenco, 2020).

The strategic partnership of IT with business leadership (Bharadwaj et al., 2013) needs to evolve in an integrated and responsive manner. In this role, CIO designates and disseminates the tasks to his team members, ensuring the successful delivery of ideas generated and the business agreed on DT initiatives.

Legacy Applications Management

The IT as a department is responsible for running business-critical applications. However, not all business-critical applications can be digitised at the same time. Further, some of these applications, such as infrastructure, are also a prerequisite to deploying new digital applications. Hence, alongside DT efforts, the CIO also needs to pay attention to legacy applications (Chen & Wu, 2011) to support ongoing business operations.

Based on an extensive literature review, McCarthy et al. (2021) note eight DTL characteristics: digital strategist, digital culturalist, digital architect, customer centrist, organisational agilist, data advocate, business process optimizer, and digital workplace landscaper. These are the core traits that business and IT leaders should possess. Among these, digital strategist and digital architect are considered the foremost characteristics of DTL. Digital strategist, as the most frequently listed characteristic, requires that DT leaders exhibit long-term thinking by formulating a strategic vision for DT and ensuring its alignment to business goals (Hess et al., 2016). Digital architect characteristics emphasizes the need for technical and innovation competency of leaders. Next, the emergent characteristics of organisational agility, digital culturalist and customer-centrist focus on the alignment of human or physical resources and customised digital offerings to ensure customer-centricity. This is followed by data advocate, business process optimiser and digital workplace landscaper characteristics, focusing on the data-driven leadership approach to redefine the business processes (McCarthy et al., 2021). It is interesting to note that while the DTL characteristics are not tied to any specific organisational position, many roles (although not in the exact terms) are also noted for the CIOs in the literature, making her/him as an ideal candidate for leading DT. The next section elaborates on this theme further.

Why CIO is an Ideal Candidate For Leading DT

One of the pertinent challenges that organisations face is that the business functions often operate in silos (Saxena & McDonagh, 2022). This means the individual functions, say operations or finance in an organisation, have a tendency to look at themselves as the whole unit rather than looking at the big picture. Therefore, the integration of a specific function with other functions behaviourally becomes difficult and requires technological solutions such as Enterprise Resource Planning (ERP) systems. This gap results in a lack of synergy and deters the productive use of technologies for the organisations. However, this is also evident that, with the increasing influence of digital technologies, all functions have their peculiar IT requirements. Hence, in the absence of a cohesive strategy, the organisational units get their own IT requirements customised, such as a credit record-keeping application for finance or a vehicle identification plate printing application for operations. This results deployment of localised solutions, further propagating the silos (Saxena & McDonagh, 2022).

When it comes to management and support of these localised IT solutions, the business, in the absence of technical skills, looks at IT. This proves detrimental in the long run as the number of applications to manage remains high and stands beyond cost-effective management. The other approach that the organisation may follow is to have IT as a centralised unit, which means that all IT related requirements are

directly addressed to the IT department, expecting to find the solution for the requirement. This approach is not totally ideal as this demands a high level of IT expertise with agile delivery within the department (Salvetti & Bertagni, 2020). In both cases, organisations need expert IT leadership. Irrespective of IT acting centrally or de-centrally in the organisation, horizontally as a function, it touches all other organisational functions equally. This places the CIO in the perfect locus to support the organisation in the quest to establish digital business models (MIT technology review insights, 2020).

With increased influence of digital technologies, organisations realise that in the future, working in silos would be a potential deterrent to their success as the digital business models need collaborative efforts from all business units (Hinterhuber & Nilles, 2021). Sensing this, IT has started playing the role of integrator by facilitating integrated digital business processes. Moreover, organisations are now moving to a data-driven business model relying upon the use of analytics (Davenport & Harris, 2017), which requires them to define a clear digital strategy cantered upon analytical capabilities and business intelligence. As the head of IT, the CIO is the best fit for designing and orchestrating the digital strategy. The next generation of CIOs are expected to have digital leadership skills coupled with business acumen. Even though it takes a lot of cross-functional skills to be successful in establishing a digital vision, successful CIOs achieve this by closely collaborating with other business vertical heads. Therefore, gradually the CIO's role is transforming itself as DT Leader (Horlacher & Hess, 2016).

Specifically, in the case of data analytics, organisations take their decisions based on ease of implementation, its use and cost (Artemenko, 2020; Davenport & Harris, 2017). In the context of the CIO's role, this is implicit because the first intent is that the digital solution being offered should be easy to implement with minimal maintenance requirements. Next, the solution should have a high ease of use for the organisational user to model data from multiple aspects to get targeted insights. Further, digital leaders must possess a clearly defined investment criterion to drive the organisation's DT from a long term strategic perspective rather than short term achievements (Sebastian et al., 2017; Saxena & McDonagh, 2019). Essentially, the overall solution should be cost-effective, fitting into the allocated budget and maintenance-friendly. The CIO as a digital leader contributes strategically to analyse and sanction these digital initiatives, often in collaboration with the Chief Financial Officer or Chief Marketing Officer. In this way, the CIO brings cohesiveness to the business strategy and vision (Loonam et al., 2014).

As digital technologies find their central place in business, the role of the CIO is getting more complex. One potential reason behind this is that with added digital complexity, they always aim to simplify the business functionalities. This has elevated CIOs' role to a significantly critical level by adding more dimensions. The next section discusses the future evolution of CIO's role.

Evolution of CIO Role in the Future

In the digital age, the dynamics driving the CIO's role has changed, including business tasks, application development technology, infrastructure norms, and team skills. The role is completely revolutionised, with the digital component attaining more weightage in overall responsibilities. It entails special skills to govern and manage modern-day IT. Therefore, CIOs are reinventing themselves as a modern day leader of DT (Capitani, 2018). To address the organisational DT needs, CIOs play multiple roles during their DT journey. They act as business visionaries, IT strategists, technology evaluators, mentors and partner relationships builders (Calum, 2018). Thinking continuously about how technology can better be leveraged for business, they act as change agents too. It may be noted, though, that there is no fixed list of responsibilities that can be listed for the CIO. It is entirely circumstantial on the industry sector,

organisation type, organisational context and the size of the business. The role of the CIO also depends on the organisational context, as the organisations bundle diverse responsibilities to them depending upon their requirements (Tumbas et al., 2017).

Almost all digital initiatives emerge prominently from the business and then led by IT for delivery. Consequently, this demands CIOs to drive cross-boundary collaborations (Dennis and Walsh, 2015). Therefore, the future role of CIOs will drive them to act as co-creators (Gartner, 2021) and create business synergies in collaboration with business heads, their technical teams and technology partners. The value so created will be of crucial importance to the organisation. Once the organisations attain digital maturity, the role of CIOs will be more of a technology integrator. This is because, once the organisations have digital technologies in place, they will prefer to channelize the new requirements to prevailing technology rather than evaluating new technological solutions because of the ease of maintenance and infrastructure constraints associated with new deployment. In this regard, Calum (2018) presents two potential trends in relation to the future of the CIOs' role. First, as more technological solutions are adopted, the overall IT landscape will become complex. To manage the technical intricacies, the CIOs' role will get shifted towards more technical aspects. The other thought is that, as DT has business in its genesis, the emphasis will be on people and processes, and therefore future CIOs will be more prone towards business orientation. Nevertheless, it is beyond a doubt that the CIOs' role will continue to flourish with digital transformation.

With time, digital technologies are becoming popular and affordable. Data analytics and artificial intelligence applications now have a more vibrant role in business strategy and operations. Leveraging the insights from the data, the organisations are expanding beyond their boundaries in more collaborative ways for data-driven decision making (Chun and Mooney, 2009; Davenport & Harris, 2017; Eden et al., 2019; Piccinini et al., 2015). Developing and managing new IT applications will direct the efforts of the CIO to strengthen the relationships with the IT partners. With this, CIOs will also have increased responsibility for managing IT security, IT governance, and other obligations by laws such as Sarbanes-Oxley and country-specific IT acts. As this is attained, IT will become a core business function, and the business C suite executives will have more understanding and involvement in IT. Eventually, CIOs will be expected to have contributions in revenue generation initiatives through the IT and the CEOs will be expected to have a good understanding of the IT initiatives. Most importantly, the future role of CIOs will also depend on their organisational reputation (Haffke et al., 2016) as the CEO may decide to appoint another leader to command digital business initiatives.

SOLUTIONS AND RECOMMENDATIONS

To address increasing uncertainty in economic and competitive aspects, organisations are adopting digital technologies and putting the insights from these technologies to create business value. This extends the role of the CIO beyond the limits of IT to business strategy. Organisations have to reinvent themselves continuously to stay competitive and cost-effective. This dependency has also been aggravated because, the business heads might know their functional nitty gritty very well. However, they do not have the astute technical competence to decide and deploy various technical solutions. Transforming this gap into an opportunity, the CIO should learn more profound aspects of business and should become the driver of change (Borremans et al., 2018; Loonam et al., 2014). CIOs should build a radially transformative vision to complement the business strategy. To ensure that DT gets key organisational priority, they

must maintain strong relationships with TMT and C-suite peers. Establishing trust, they need to focus more on educating the TMT and business executives about the digital marketplace's offerings to equip them to foster innovation in their respective business domains, resulting in better business performance.

The total cost of ownership (TCO) of digital infrastructure is falling due to lower costs, and more dependable infrastructure is expected to bring in a massive increase in the use of smart devices that serve as a platform for digital technologies. Since DT requires flexible application architectures (Sambamurthy et al., 2003), infrastructure agility is a foremost requirement for implementing DT applications successfully. CIOs should therefore carefully plan their budgets and IT spending (Leidner et al., 2008). Further, the cloud application deployment will continue to offer much more agility and flexibility than traditional infrastructure. Therefore, CIOs should critically evaluate on-premise vs cloud deployments. However, since the cloud is provided by external agencies, resulting in almost no or minimal control of CIOs over these, the IT security becomes a prominent concern. Consequently, data confidentiality, integrity, and availability (Solomon & Chapple, 2004) become essential considerations for CIOs. This becomes even critical as with greater networked collaborations, the organisational boundaries become thinner, and data is shared with business partners across the globe. While there are already industries such as healthcare and finance which are regulated for information security compliances, with increased digitalisation worldwide, the governments and legal agencies will set up compliance standards such as ITGC (IT General control) and Sarbanes Oxley (SOX). Hence, managing IT security will be CIOs top priority.

Going ahead as the organisations will prominently compete on technology, CIOs will have to strive hard to achieve technology differentiation through digitalisation to get a competitive edge. To achieve this, they will need to be more involved with the business to make innovation as organisational culture. As Smaltz et al (2006) suggest, CIOs should design their communication to interact with users in business terminology in a clear, compelling and persuasive manner. Bringing the cultural shift, they need to encourage business teams to experimentation with digital technologies more and more.

Make vs buy decisions and partnering with a competent technology provider will also be a crucial activity that the future CIOs will spend their time on. CIOs will need to be more politically active to establish trustworthy relationships with business executives and customers, suppliers, and technology partners to synergise better collaborations. CIOs will rely on trusted technology partners to provide the talent pool, which will otherwise be difficult to source from the market as digital skills will always be in demand. To ensure this, CIOs should start building their strong and trustworthy partner networking abilities right from now. Moreover, the technology partners will also tend to be knowledgeable agents for CIOs as they bring their offerings to CIOs from time to time and keep CIOs updating them about recent developments in the digital landscape. The technological landscape will continue to change quickly until organisations achieve digital maturity. This entails IT to be agile to support the business demands. By virtue of their creativity, flexibility and lean structure, the start-ups will be pivotal to support future CIOs for accelerated piloting and deployment of new technological applications. Therefore, CIOs should start adopting DevOps and agile project management practices right from now. On the other side, the start-ups positioning themselves around digital technologies will stand out to make this shift permanent in the entire industry. Industries across fintech, media, analytics and healthcare are already revolutionized by start-ups using disruptive technological applications such as artificial intelligence, robotic process automation and machine learning. Consequently, the CIOs' role in the start-ups demands an even higher degree of agility, innovation, application design optimization, efficiency and cost-effectiveness. From

the customer and supplier perspective, the interaction links will be less, CIOs should be ready and tuned to direct engagements to better address their expectations and co create value.

The future CIOs also need to start preparing themselves for the role for exploring artificial intelligence (AI), Machine learning (ML) applications as these technologies are potentially driving the way for the next stage of digital transformation. They should also improve their skills on searching for newer and better solutions continuously to astutely evaluate what technology can offer and how it should be purposefully used. As more technologies will emerge, the technical skillset will be scarce. Effective team management would be a challenge. Further, ensuring that organisations are adaptable to the digitally agile ways inculcating the digital culture and convincing the workforce for digital ways will be a prime responsibility of future CIOs.

In summary, there would be a definite shift from the back-office support technical role to a more management-oriented competitive business function role (Cristina, 2019). To take advantage of this shift to the fullest, both the organisation and CIOs should cohesively plan the journey with clear objectives to achieve.

FUTURE RESEARCH DIRECTIONS

The future CIOs will also address the digital needs, craft the digital vision and build leadership capabilities for the organisations. But the objectives for each of the organisations will be unique to it. Therefore, there cannot be any one-size-fits all approach to DT. While the present chapter explores the role in general terms, there is also a need for industry-specific research on CIOs' roles (Allen, 2021). For example, the CIO of a manufacturing organisation may want to digitise the operations, while a service industry based CIO will have more importance on customer centricity and hence to design better customer offerings. Likewise, the digital applications based on underlying digital technologies such as big data, analytics, IoT, cloud computing, social media, AI & ML, robotic process automation (RPA), augmented reality (AR)/ virtual reality (VR), 3D printing, Blockchain etc. will be increasingly used in business transformation. With multiple applications deployed simultaneously in business, CIOs will have to consider many aspects such as the technology selection, application management and their consolidation. Future researchers can deliberate upon how future CIOs can make these decisions effectively. Similarly, the developing economies will have the adoption issues while they may be following the technology adoption trend from digitally developed economies; the longitudinal research should cover the key issues and suggest mitigation. Since DT is a practice-based subject, more insights from case studies should be encouraged.

CONCLUSION

As organisations move towards digital transformation, their requirements and expectations from IT also change. It has become increasingly important to pay timely attention to business needs and implement the right technological solutions. The organisational focus on digital business transformation is adding complexity to the role of CIOs. Unlike in the past, where the CIO role was confined to managing IT infrastructure, the role of the CIO has shifted towards strategy. As new digital technologies and solutions emerge in practice, the organisations fine-tune their digital strategy (Borremans et al., 2018), determining the path that the organisation will choose to attain DT. This chosen path drives the CIO's role and its

responsibilities in the particular organisational context. Therefore, the digital era CIOs will have newer responsibilities of digitalising and strategizing which were traditionally not considered as a part of IT (Weill & Woerner, 2018).

Ever since its evolution, the role of the CIO's role has experienced significant pressures, many ups and downs within organisational dynamics. This chapter discussed the evolution of CIOs' role, particularly in the context of digital transformation. With the emergence of digital technologies, the CIOs' role will continue to evolve and will remain dynamic. The CIOs of the future will keep contributing more on strategic aspects, supporting technological issues, manage IT budgets and resources (Leidner, Beatty and Mackay, 2003; Ross and Weill, 2002; Mokhtarzadeh et al, 2018; Sirisomboonsuk et al., 2018), IT security (Ross and Weill, 2002; Feng & Wang, 2019), firming the relationships with the business (Holmes, 2006; Agarwal and Sambamurthy, 2002; Luftman et al., 2017) and thereby delivering value to the business (Kohli and Devaraj, 2004; Hensen & Dong, 2020; Puspitasari & Jie, 2020) through smart and innovative solutions.

REFERENCES

Adamik, A., & Nowicki, M. (2018). Preparedness of companies for digital transformation and creating a competitive advantage in the age of Industry 4.0. In *Proceedings of the International Conference on Business Excellence* (Vol. 12, No. 1, pp. 10-24). 10.2478/picbe-2018-0003

Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010). Research commentary—The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research*, *21*(4), 796–809. doi:10.1287/isre.1100.0327

Agarwal, R., & Sambamurthy, V. (2002). Principles and models for organizing the IT function. *Management Information Systems Quarterly*, *1*(1), 1.

Allen, B. (2021). *A CIO's guide to making digital transformation work*. Retrieved on June 12, 2021 from https://www.ciodive.com/news/cio-digital-transformation-guide/599806

Apogaeis. (2020). *Digital Transformation & the Role of a Chief Information Officer (CIO)*. Retrieved on June 15, 2021 from https://www.apogaeis.com/blog/digital-transformation-the-role-of-a-chief-information-officer-cio

Applegate, L. M., & Elam, J. J. (1992). New information systems leaders: A changing role in a changing world. *Management Information Systems Quarterly*, *16*(4), 469–490. doi:10.2307/249732

Armstrong, C. P., & Sambamurthy, V. (1999). Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. *Information Systems Research*, *10*(4), 304–327. doi:10.1287/isre.10.4.304

Artemenko, E. (2020, September). The roles of top management in digital transformation. *IOP Conference Series. Materials Science and Engineering*, *940*(1), 012014. doi:10.1088/1757-899X/940/1/012014

Bassellier, G., & Benbasat, I. (2004). Business competence of information technology professionals: Conceptual development and influence on IT-business partnerships. *Management Information Systems Quarterly*, *28*(4), 673–694. doi:10.2307/25148659

Becker, W., Schmid, O., & Botzkowski, T. (2018, January). Role of CDOs in the digital transformation of SMEs and LSEs-An empirical analysis. *Proceedings of the 51st Hawaii International Conference on System Sciences*. 10.24251/HICSS.2018.573

Berman, S. J. (2012). Digital transformation: Opportunities to create new business models. *Strategy and Leadership*, *40*(2), 16–24. doi:10.1108/10878571211209314

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Digital business strategy: Toward a next generation of insights. *Management Information Systems Quarterly*, *37*(2), 471–482. doi:10.25300/MISQ/2013/37:2.3

Billard, B. (2021). AWS is now a bigger part of Amazon's overall success than ever. *TechRadar*. Available at: https://www.techradar.com/news/aws-is-now-a-bigger-part-of-amazons-overall-success-than-ever

Borremans, A. D., Zaychenko, I. M., & Iliashenko, O. Y. (2018). Digital economy. IT strategy of the company development. In *MATEC Web of Conferences* (Vol. 170, p. 01034). EDP Sciences.

Calum, N. (2018). *The CIO and Digital Transformation*. Retrieved on July 15, 2021 from https://www.spencerstuart.com/research-and-insight/the-cio-and-digital-transformation

Caniato, F., Gelsomino, L. M., Perego, A., & Ronchi, S. (2016). Does finance solve the supply chain financing problem? *Supply Chain Management*, *21*(5), 534–549. doi:10.1108/SCM-11-2015-0436

Capitani, G. (2018). CIO's: Drivers or Followers of Digital Transformation? In *CIOs and the Digital Transformation* (pp. 69–83). Springer. doi:10.1007/978-3-319-31026-8_5

Carr, N. G. (2003). IT doesn't matter. *EDUCAUSE Review*, *38*, 24–38. PMID:12747161

Carroll, S. J., & Gillen, D. I. (1987). Are the classical management functions useful in describing managerial work? *Academy of Management Review*, *12*(1), 38–51. doi:10.2307/257992

Chawla, R. N., & Goyal, P. (2021). Emerging trends in digital transformation: A bibliometric analysis. *Benchmarking*. Advance online publication. doi:10.1108/BIJ-01-2021-0009

Chen, D. Q., Preston, D. S., & Xia, W. (2010). Antecedents and effects of CIO supply-side and demand-side leadership: A staged maturity model. *Journal of Management Information Systems*, *27*(1), 231–272. doi:10.2753/MIS0742-1222270110

Chen, Y. C., & Wu, J. H. (2011). IT management capability and its impact on the performance of a CIO. *Information & Management*, *48*(4-5), 145–156. doi:10.1016/j.im.2011.04.001

Chun, M., & Mooney, J. (2009). CIO roles and responsibilities: Twenty-five years of evolution and change. *Information & Management*, *46*(6), 323–334. doi:10.1016/j.im.2009.05.005

Coster, J. E., Turner, J. K., Bradbury, D., & Cantrell, A. (2017). Why do people choose emergency and urgent care services? A rapid review utilizing a systematic literature search and narrative synthesis. *Academic Emergency Medicine*, *24*(9), 1137–1149. doi:10.1111/acem.13220 PMID:28493626

Cristina, L. (2019). *What does the future CIO role look like?* Retrieved on July 12, 2021 from https://www.cio.com/article/3300761/what-does-the-future-cio-role-look-like.html

Davenport, T., & Harris, J. (2017). *Competing on analytics: Updated, with a new introduction: The new science of winning*. Harvard Business Press.

Demiris, G., Oliver, D. P., & Washington, K. T. (2019). Defining and Analyzing the Problem. In *Behavioral Intervention Research in Hospice and Palliative Care. Building an Evidence Base*. Academic Press. doi:10.1016/B978-0-12-814449-7.00003-X

Dennis, D., & Walsh, F. (2015). Align Business Strategy with Information Technology. *Guidelines of IT Management*, *23*, 1–16.

Dery, K., Sebastian, I. M., & van der Meulen, N. (2017). The Digital Workplace is Key to Digital Innovation. *MIS Quarterly Executive*, *16*(2).

Diamandis, P. H. (2015). *The world in 2025: 8 predictions for the next 10 years.* Singularity University.

Earl, M. J., & Feeny, D. F. (1994). Is your CIO adding value? *Sloan Management Review*, *35*, 11–11.

Eden, R., Jones, A. B., Casey, V., & Draheim, M. (2019). Digital transformation requires workforce transformation. *MIS Quarterly Executive*, *18*(1), 4. doi:10.17705/2msqe.00005

El Sawy, O. A., Kræmmergaard, P., Amsinck, H., & Vinther, A. L. (2016). How LEGO built the foundations and enterprise capabilities for digital leadership. *MIS Quarterly Executive*, *15*(2).

Favoretto, C., de Sousa Mendes, G. H., Godinho Filho, M., de Oliveira, M. G., & Ganga, G. M. D. (2021). Digital transformation of business model in manufacturing companies: Challenges and research agenda. *Journal of Business and Industrial Marketing*. Advance online publication. doi:10.1108/JBIM-10-2020-0477

Feeny, D. F., & Willcocks, L. P. (1998). Core IS capabilities for exploiting information technology. *Sloan Management Review*, *39*(3), 9–21.

Feldman, E., Reid, E. M., & Mazmanian, M. (2020). Signs of our time: Time-use as dedication, performance, identity, and power in contemporary workplaces. *The Academy of Management Annals*, *14*(2), 598–626. doi:10.5465/annals.2018.0148

Feng, C. Q., & Wang, T. (2019). Does CIO risk appetite matter? Evidence from information security breach incidents. *International Journal of Accounting Information Systems*, *32*, 59–75. doi:10.1016/j.accinf.2018.11.001

Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, *55*(2), 1.

Gartner. (2021). *CIOs Role in Digital Transformation*. Retrieved on August 14, 2021 from https://www.gartner.com/en/information-technology/role/cio-it-executives

Gilbert, C., De Winne, S., & Sels, L. (2011). The influence of line managers and HR department on employees' affective commitment. *International Journal of Human Resource Management*, *22*(8), 1618–1637. doi:10.1080/09585192.2011.565646

Grover, V., Jeong, S. R., Kettinger, W. J., & Lee, C. C. (1993). The chief information officer: A study of managerial roles. *Journal of Management Information Systems*, *10*(2), 107–130. doi:10.1080/07421222.1993.11518002

Haffke, I., Kalgovas, B. J., & Benlian, A. (2016). *The Role of the CIO and the CDO in an Organization's Digital Transformation*. Academic Press.

Halevi, G., Moed, H., & Bar-Ilan, J. (2017). Suitability of Google Scholar as a source of scientific information and as a source of data for scientific evaluation—Review of the literature. *Journal of Informetrics*, *11*(3), 823–834. doi:10.1016/j.joi.2017.06.005

Hansen, A. M., Kraemmergaard, P., & Mathiassen, L. (2011). Rapid Adaptation in Digital Transformation: A Participatory Process for Engaging IS and Business Leaders. *MIS Quarterly Executive*, *10*(4).

Heavin, C., & Power, D. J. (2018). Challenges for digital transformation–towards a conceptual decision support guide for managers. *Journal of Decision Systems, 27*(sup1), 38-45.

Hensen, A. H., & Dong, J. Q. (2020). Hierarchical business value of information technology: Toward a digital innovation value chain. *Information & Management*, *57*(4), 103209. doi:10.1016/j.im.2019.103209

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2016). Options for formulating a digital transformation strategy. *MIS Quarterly Executive*, *15*(2).

Hinchcliffe, D. (2020). *The CIO Outlook for 2021: Delivering Business ROI at Scale*. Retrieved on June 18, 2021 from https://www.constellationr.com/research/cio-outlook-2021-delivering-business-roi-scale

Hinterhuber, A., & Nilles, M. (2021). DIGITAL transformation, the HOLY GRAIL and the disruption of business models. *Business Horizons*. Advance online publication. doi:10.1016/j.bushor.2021.02.042

Hofmann, P., Samp, C., & Urbach, N. (2020). Robotic process automation. *Electronic Markets*, *30*(1), 99–106. doi:10.100712525-019-00365-8

Holmes, A. (2006). The Global State of Information Security 2006. *CIO*, *19*(23), 82.

Horlacher, A., & Hess, T. (2016, January). What does a Chief Digital Officer do? Managerial tasks and roles of a new C-level position in the context of digital transformation. In *2016 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 5126-5135). IEEE.

Huang, M. C., Yen, G. F., & Liu, T. C. (2014). Reexamining supply chain integration and the supplier's performance relationships under uncertainty. *Supply Chain Management*, *19*(1), 64–78. doi:10.1108/SCM-04-2013-0114

Hütter, A., & Riedl, R. (2017) Chief Information Officer Role Effectiveness: Literature Review and Implications for Research and Practice. In Chief Information Officer Role Effectiveness. Springer Briefs in Information Systems. Springer. doi:10.1007/978-3-319-54753-4_1

Industryweek. (2021). *Bring Digital to Life in Manufacturing*. https://ebmmanu.pathfactory.com/iw_ifs/manufacturing-ebook?partnerref=ROS

Ives, B., & Olson, M. H. (1981). Manager or technician? The nature of the information systems manager's job. *Management Information Systems Quarterly*, *5*(4), 49–63. doi:10.2307/249327

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, not technology, drives digital transformation. *MIT Sloan Management Review and Deloitte University Press*, *14*, 1–25.

Karimi, J., & Walter, Z. (2015). The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry. *Journal of Management Information Systems*, *32*(1), 39–81. doi:10.1080/07421222.2015.1029380

Khangura, S., Konnyu, K., Cushman, R., Grimshaw, J., & Moher, D. (2012). Evidence summaries: The evolution of a rapid review approach. *Systematic Reviews*, *1*(1), 1–9. doi:10.1186/2046-4053-1-10 PMID:22587960

Kinicki, A. J., & Vecchio, R. P. (1994). Influences on the quality of supervisor–subordinate relations: The role of time-pressure, organizational commitment, and locus of control. *Journal of Organizational Behavior*, *15*(1), 75–82. doi:10.1002/job.4030150108

Klötzer, C., & Pflaum, A. (2017). *Toward the development of a maturity model for digitalization within the manufacturing industry's supply chain*. Academic Press.

Kohli, R., Devaraj, S., & Mahmood, M. A. (2004). Understanding determinants of online consumer satisfaction: A decision process perspective. *Journal of Management Information Systems*, *21*(1), 115–136. doi:10.1080/07421222.2004.11045796

Leidner, D. E., Beatty, R. C., & Mackay, J. M. (2008). How CIOs manage IT during economic decline: Surviving and thriving amid uncertainty. *MIS Quarterly Executive*, *2*(1), 7.

Lenka, S., Parida, V., & Wincent, J. (2017). Digitalization capabilities as enablers of value co-creation in servitizing firms. *Psychology and Marketing*, *34*(1), 92–100. doi:10.1002/mar.20975

Li, D., Ding, F., & Wu, J. (2012). *Innovative Usage of Information Systems: Does CIO Role Effectiveness Matter?* Academic Press.

Loonam, J., McDonagh, J., Kumar, V., & O'Regan, N. (2014). Top managers & information systems: 'Crossing the Rubicon'! *Strategic Change*, *23*(3-4), 205–224. doi:10.1002/jsc.1971

Luftman, J., Lyytinen, K., & Zvi, T. B. (2017). Enhancing the measurement of information technology (IT) business alignment and its influence on company performance. *Journal of Information Technology*, *32*(1), 26–46. doi:10.1057/jit.2015.23

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. doi:10.100712599-015-0401-5

McCarthy, P., Sammon, D., & Alhassan, I. (2021). Digital Transformation Leadership Characteristics: A Literature Analysis. *Journal of Decision Systems*, 1–30. doi:10.1080/12460125.2021.1908934

McKinsey. (2018). *Unlocking success in digital transformations*. Retrieved on June 21, 2021 from https://.mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations

Mintzberg, H. (1971). Managerial Work: Analysis from Observation. *Management Science*, *18*(2), B97–B110.

Mokhtarzadeh, N. G., Mahdiraji, H. A., Beheshti, M., & Zavadskas, E. K. (2018). A novel hybrid approach for technology selection in the information technology industry. *Technologies*, *6*(1), 34. doi:10.3390/technologies6010034

Muzyka, D., De Koning, A., & Churchill, N. (1995). On transformation and adaptation: Building the entrepreneurial corporation. *European Management Journal*, *13*(4), 346–362. doi:10.1016/0263-2373(95)00029-K

Nwankpa, J. K., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. *Proceedings of International Conference on Information Systems 2016*.

Peppard, J., Edwards, C., & Lambert, R. (2011). Clarifying the Ambiguous Role of the CIO. *MIS Quarterly Executive*, *10*(1).

Piccinini, E., Hanelt, A., Gregory, R., & Kolbe, L. (2015). *Transforming industrial business: The impact of digital transformation on automotive organizations*. Academic Press

Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, *92*(11), 64–88.

Preston, D., & Karahanna, E. (2009). How to develop a shared vision: The key to IS strategic alignment. *MIS Quarterly Executive*, *8*(1).

Proctor, J. (2019). *Digital Transformation vs. Business Process Reengineering (BPR)*. Retrieved on July 10, 2021 from https://www.inteqgroup.com/blog/digital-transformation-vs-business-process-reengineering

Puspitasari, I., & Jie, F. (2020). Making the information technology-business alignment works: A framework of IT-based competitive strategy. *International Journal of Business Information Systems*, *34*(1), 59–82. doi:10.1504/IJBIS.2020.106796

Riasanow, T., Jäntgen, L., Hermes, S., Böhm, M., & Krcmar, H. (2021). Core, intertwined, and ecosystem-specific clusters in platform ecosystems: Analyzing similarities in the digital transformation of the automotive, blockchain, financial, insurance and IIoT industry. *Electronic Markets*, *31*(1), 89–104. doi:10.100712525-020-00407-6

Rickards, T., Smaje, K., & Sohoni, V. (2015). *'Transformer in chief': The new chief digital officer*. Academic Press.

Ross, J., Sebastian, I., Beath, C., Scantlebury, S., Mocker, M., Fonstad, N., ... Moloney, K. (2016). *Designing digital organizations*. Academic Press.

Ross, J. W., & Feeny, D. F. (1999). *The Evolving Role of the CIO, CISR, WP No. 308*. Sloan School of Management.

Ross, J. W., & Weill, P. (2002). Six IT decisions your IT people shouldn't make. *Harvard Business Review*, *80*(11), 84–95. PMID:12422792

Saha, V., & Goyal, P. (2019). How Co-creation drives the success of public service initiatives? A case-study based analysis. *Journal of Nonprofit & Public Sector Marketing*, 1–21.

Salvetti, F., & Bertagni, B. (2020). Leadership 5.0: An Agile Mindset for a Digital Future. *Int. J. Adv. Corp. Learn*, *13*(2), 57–66. doi:10.3991/ijac.v13i2.17033

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *Management Information Systems Quarterly*, *27*(2), 237–263. doi:10.2307/30036530

Saxena, D. (2021). Big Data for Digital Transformation of Public Services. In Disruptive Technology and Digital Transformation for Business and Government (pp. 250-266). IGI Global. doi:10.4018/978-1-7998-8583-2.ch013

Saxena, D., & McDonagh, J. (2019). Evaluating ERP Implementations: The Case for a Lifecycle-based Interpretive Approach. *Electronic Journal of Information Systems Evaluation*, *22*(1), 29–37.

Saxena, D., & McDonagh, J. (2022). Communication breakdowns during business process change projects–Insights from a sociotechnical case study. *International Journal of Project Management*. doi:10.1016/j.ijproman.2021.11.011

Saxena, D., Muzellec, L., & Trabucchi, D. (2020). BlaBlaCar: Value creation on a digital platform. *Journal of Information Technology Teaching Cases*, *10*(2), 119–126. doi:10.1177/2043886919885940

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., & Fonstad, N. O. (2020). How big old companies navigate digital transformation. In *Strategic Information Management* (pp. 133–150). Routledge. doi:10.4324/9780429286797-6

Setia, P., Setia, P., Venkatesh, V., & Joglekar, S. (2013). Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance. *Management Information Systems Quarterly*, *37*(2), 565–590. doi:10.25300/MISQ/2013/37.2.11

Sibanda, M., & Ramrathan, D. (2017). Influence of information technology on organization strategy. *Foundations of Management*, *9*(1), 191–202. doi:10.1515/fman-2017-0015

Sirisomboonsuk, P., Gu, V. C., Cao, R. Q., & Burns, J. R. (2018). Relationships between project governance and information technology governance and their impact on project performance. *International Journal of Project Management*, *36*(2), 287–300. doi:10.1016/j.ijproman.2017.10.003

Sjodin, D. R., Parida, V., Leksell, M., & Petrovic, A. (2018). Smart Factory Implementation and Process Innovation: A Preliminary Maturity Model for Leveraging Digitalization in Manufacturing Moving to smart factories presents specific challenges that can be addressed through a structured approach focused on people, processes, and technologies. *Research Technology Management*, *61*(5), 22–31. doi:10.1080/08956308.2018.1471277

Solomon, M. G., & Chapple, M. (2004). *Information security illuminated*. Jones & Bartlett Publishers.

Technology Review Insights, M. I. T. (2020). *CIOs are uniquely poised to lead digital transformation*. Retrieved on August 12, 2021 from https://www.technologyreview.com/2020/04/01/974969/cios-are-uniquely-poised-to-lead-digital-transformation

Thornton, G. C., & Cleveland, J. N. (1990). Developing managerial talent through simulation. *The American Psychologist*, *45*(2), 190–199. doi:10.1037/0003-066X.45.2.190

Tricco, A. C., Antony, J., Zarin, W., Strifler, L., Ghassemi, M., Ivory, J., Perrier, L., Hutton, B., Moher, D., & Straus, S. E. (2015). A scoping review of rapid review methods. *BMC Medicine*, *13*(1), 1–15. doi:10.118612916-015-0465-6 PMID:26377409

Tumbas, S., Berente, N., & vom Brocke, J. (2017). Three types of Chief Digital Officers and the reasons organizations adopt the role. *MIS Quarterly Executive*, *16*(2).

Walsh, C., Saxena, D., & Muzellec, L. (2020). AirBnB: Managing trust and safety on a platform business. *Irish Journal of Management*, *39*(2), 126–134. doi:10.2478/ijm-2020-0004

Weill, P. (2004). Don't just lead, govern: How top-performing firms govern IT. *MIS Quarterly Executive*, *3*(1), 1–17.

Weill, P., & Woerner, S. L. (2018). Is your company ready for a digital future? *MIT Sloan Management Review*, *59*(2), 21–25.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, *22*(1), 102–129. doi:10.17705/1jais.00655

Yoo, Y., Boland, R. J. Jr, Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, *23*(5), 1398–1408. doi:10.1287/orsc.1120.0771

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary—the new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, *21*(4), 724–735. doi:10.1287/isre.1100.0322

ADDITIONAL READING

Andersson, P., Movin, S., Mähring, M., Teigland, R., & Wennberg, K. (2018). *Managing digital transformation*. SSE Institute for Research, Stockholm School of Economics.

Herbert, L. (2017). *Digital transformation: Build your organization's future for the innovation age*. Bloomsbury Publishing.

Hunter, M. G. (2007). *Contemporary Chief Information Officers: Management Experiences*. IGI Global. doi:10.4018/978-1-59904-078-3

Hunter, M. G., & Tan, F. B. (2007). *Strategic Use of Information Technology for Global Organizations*. IGI Global. doi:10.4018/978-1-59904-292-3

Muller, H. (2011). *The transformational CIO: Leadership and innovation strategies for IT executives in a rapidly changing world*. John Wiley & Sons.

Sandhu, K. (2021). *Disruptive Technology and Digital Transformation for Business and Government*. IGI Global. doi:10.4018/978-1-7998-8583-2

Vaz, N. (2021). *Digital Business Transformation: How Established Companies Sustain Competitive Advantage from Now to Next*. Wiley.

Yoong, P. (2010). *Leadership in the Digital Enterprise: Issues and Challenges*. IGI Global. doi:10.4018/978-1-60566-958-8

KEY TERMS AND DEFINITIONS

Business Model: A conceptual map of organisational offerings, supplies, customers, and revenue sources to facilitate the existence and survival of a business.

Business Value: A basic idea of what contribution does the business make for its stakeholders, i.e., for suppliers, employees, customers, and wider society. The value is often in monetary terms but can also be non-monetary and intangible.

Chief Information Officer (CIO): Designated head of IT in organisation, may or may not be in a key role depending upon the strategic role of IT in the organisation.

CIO Role: Diverse set of activities that the CIOs need to undertake in an organisation.

Co-Creation: Creation of business value by business organisation collaborating with customers or suppliers or both.

Digital Transformation: The novel use of digital technologies for fundamentally transforming the business model to the extent that digital technology forms the core of business.

Digital Transformation Leadership: Traits and activities require to initiate and sustain digital transformation of business.

Section 2

Digital Transformation Outcomes

Chapter 9
The Impact of Digital Transformation on Business Strategy:
A Closer Look on Success Determinants

Hugo Ribeiro
https://orcid.org/0000-0002-0410-6430
Aveiro University, Portugal

ABSTRACT

The purpose of this document is to systematically review and summarize the literature that studies the impact of digital transformation on companies' business strategies, centered on the key capabilities for a successful digital strategy, as well as on the determinants of success. The systematic review of literature was based on a sample of 39 articles extracted from the Web of Science. The results indicate that leadership, innovation, and organizational structure are the key skills most referenced in the literature for the implementation of a digital business strategy. The trans-functional role of IT, as well as the strategic posture of the company, were also identified as determinants of success. This study provides us with a comprehensive analysis of the success factors of digitalization in companies and helps to identify potential research opportunities. The chapter ends with a research agenda for future studies.

INTRODUCTION

The age of globalization encourages companies to embrace and exploit the opportunities presented by digital strategies. The world seems limitless and scientific and technological development is unstoppable (Muafi, Grabara, Sudiyarto, & Siswanti, 2019). However, for organizations to succeed in digital transformation[1], they need to redesign and redefine their business strategies. To drive the digitization of business processes, products, and services, it is essential to develop a better understanding of digital business strategies (Yeow, Soh, & Hansen, 2018).

DOI: 10.4018/978-1-7998-9008-9.ch009

Business strategy has evolved significantly over the last twenty-five years. Organizations have learned to analyze their environment, define their position, develop business advantages, and understand the pressures to maintaining advantage in the face of challenging competitive threats (Casadesus-Masanell & Ricart, 2010). However, factors such as globalization, deregulation, and technological change, to name a few, are profoundly changing the business arena. As suggested by Li et al., (2016), digital technology is increasingly empowering organizations without boundaries in collaborative business environments and forcing new business strategies. Digital technology has changed the boundaries, economies of scale and strategic focus of companies, rules for value creation and supplier-customer interaction.

Being present in a national market without a digital strategy is just a survival approach, but it is almost impossible to penetrate the international market without digital leadership (Fosic, Trusic, & Sebalj, 2017). Overall, digital business strategies help transform markets and support innovation in modern economies by interfacing with customers, partners, and suppliers (Romanelli, 2018). Current digital trends are leading companies to redefine their product and business portfolio by digitizing products and services (Gutierrez-Leefmans, Nava-Rogel, & Trujillo-Leon, 2018).

According to (Romanelli, 2018), governments, businesses and communities need to leverage technology and adopt a digital strategy to improve, sustain growth and create social and public value together. In business, digitization is changing the competitive landscape in many industries. Digitization goes beyond the benefits companies derive from digital platforms, but also reflects the ways in which digital media and platforms influence the restructuring of business, society, and culture (El Sawy et al., 2016). Digitally savvy customers are demanding more, while the threat of digital disruption from new companies is increasing (Sia, Soh, & Weill, 2016). Digital platforms are enabling cross-border disruption in the industry, leading to new forms of business strategies (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013). Since all businesses use digital technology in some form, no business is immune to digital disruption, and the evolution of digital technology will present unique opportunities and challenges to all leaders (Karimi & Walter, 2015), opening up new opportunities for knowledge sharing and value creation and emphasizes the concept of enterprise and digital ecosystem (Romanelli, 2018).

In the future, there will likely be no difference between a business strategy and a digital business strategy. Bharadwaj et al. (2013) define digital business strategy as the corporate strategy that is formulated and executed by leveraging digital resources to create differentiated value. In this context, companies are expected to take advantage of all the opportunities that digitization offers to gain a competitive advantage and pursue a digital business strategy whenever it proves beneficial to the development of the company.

A digital business strategy is broader, more integrated and comprehensive than other functional strategies (Bharadwaj et al., 2013). It is multifunctional in nature and therefore requires the development and reconfiguration of concurrent IT and business resources across different organizational processes (Sia et al., 2016). It is neither a project nor the responsibility of a unique "digital" department, but a core belief that must permeate the entire organization. In a survey of 4800 executives in the US, El Sawy et al. (2016) confirmed that the key to the success of digital transformation lies in issues of strategy, culture and talent development rather than technological issues.

Sia et al. (2016) are among the authors who point out that best practices for pursuing a digital business strategy are still in their infancy. Most organizations simply respond ad hoc to new digital threats and opportunities within some organizational roles (Sia et al., 2016). Karimi & Walter (2015) argue that in order to capture the value of digital transformation, organizations must move beyond small applications and become truly digital enterprises. The difficulty in convincing organizational members to adopt

new strategic policies is a behavioral flaw in the journey of companies towards superior opportunities (Gavetti, 2012).

Digital disruption can help various industries to improve, enhance and redefine their physical or traditional products and services through digital content, reformulate value propositions for their customers and create new revenue streams to ensure their survival (Karimi & Walter, 2015). Digitization is mainly a (continuous) process, but also a state, and there can be different stages of digitization. At the beginning, digitization efforts are typically ad-hoc and out-of-place. Then, some companies increasingly undertake and commit to more comprehensive digitization (El Sawy et al., 2016).

Digital business strategy is not just about optimizing the operation of the company internally or responding to one or two competitors, but clearly results from the awareness and responsiveness to the competitive environment of digital business (Yeow et al., 2018). Therefore, it is important to understand the factors that explain the success of adopting a digital business strategy. Despite the widespread recognition of the importance of its adoption, the literature on success factors is particularly fragmented, which prevents a full understanding of the complementarity of the contributions made in the literature to date. Based on this research gap, the aim of this article is to review the existing investigation on the impact of digital transformation on firms' business strategies through a systematic literature review.

This article contributes to the literature in several ways. It provides an integrated overview of the current state of research by summarizing and discussing the contributions scattered in the literature. It also valuable insights for scholars and practitioners by identifying key determinants of digitization strategy success. Finally, it affords a background for future research on this topic.

The article is organized as follows. The next section describes the methodology used. Subsequently, the descriptive analysis of the articles selected for the systematic review of the literature is presented. Then, the main findings are offered. The article concludes with recommendations for future research..

METHODOLOGY

This review adopted the basic guidelines established by Tranfield, Denyer & Smart (2003) for a systematic literature review, which includes three phases: (1) planning the review, with particular emphasis on narrowing the scope of the study; (2) conducting the review, especially establishing the review protocol and identifying key search terms and data analysis; (3) reporting and disseminating the results using a cross-sectional approach. By systematically searching and categorizing the relevant literature, such reviews provide reproducible and reliable assessments of the current state of a research area.

Formulation of the Research Question

The first step in conducting a systematic literature review is to define the area of study and the research questions, which must be clear in order to establish and delineate the focus of the study. The chosen topic was "digital business transformation". The research questions were then defined:

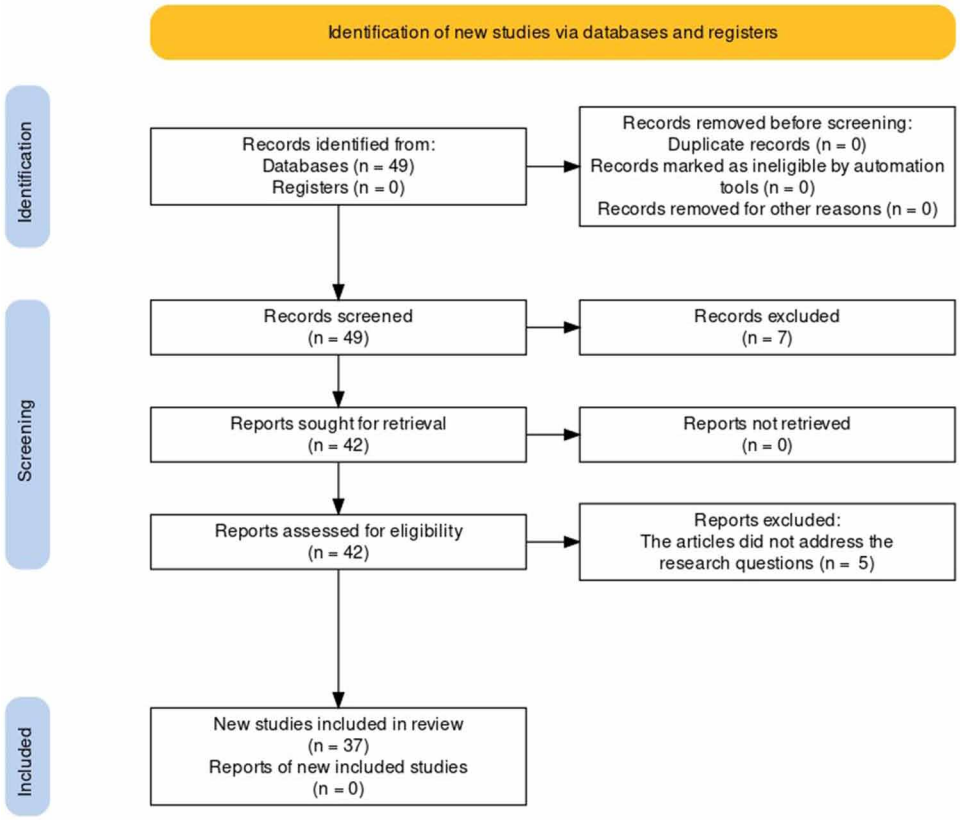
- What are the key capabilities for implementing a digital business strategy?
- What are the determinants of the success of a digital business strategy?

Searching for Studies

Relevant articles were identified and selected from Clarivate's Web of Science Core Collection database in December 2019. We began by identifying keywords and search terms based on the purpose of the review. To search for published studies, we used the word "digital" in conjunction with "business transformation". The Web of Science database was used as the source of information, and there was no restriction on the date of publication. A total of 142 results were returned. The search was then refined by limiting the results to the categories of "Management", "Business", "Business Finance" and "Economics". We now had 59 results. Finally, we selected only those documents that were classified as "articles" and written in English. The final selection was 49 articles.

Then we analyzed the abstracts and the keywords. Knowing that the topic of this analysis is digital transformation and business strategy, we used as a restriction criterion that the articles should somehow address these two topics and contribute in some way to answering the research questions. Seven articles were eliminated in this way. Finally, the remaining 42 articles were read in their entirety and, based on the same criteria described above, five additional articles were removed. Then, 37 articles were selected and their analysis is presented in the next sections. In Figure 1, we can see the flowchart of the search created using the tool developed by Haddaway & McGuinness (2021).

Figure 1. Research flowchart
Source: Authors' own work



Reporting and Discussing the Results

After selecting the final articles, a database was created in the NVIVO software (https://www.qsrinternational.com/), where each article was coded into several categories/subcategories. In this way, we can extrapolate some important information such as the number of publications over the years, publication sources, country of origin and research methods. To answer our research questions, the articles were subjected to content analysis to identify the key capabilities and determinants of a successful digital strategy and to summarize and clarify the relationships between the different factors from the literature.

FINDINGS

Descriptive Analysis of the Contributions in the Literature

The selected articles were published between 2001 and 2019 (Table 1). 2013 was the year with the highest number of articles (n = 8). Nevertheless, there has been a significant increase in recent years, as more than half of the selected articles were published in the last three years.

Table 1. Selected articles' publication years

Publication Years	Record Count	% of 37
2001	1	2.56%
2004	1	2.56%
2008	1	2.56%
2013	8	20.51%
2014	1	2.56%
2015	1	2.56%
2016	6	15.38%
2017	6	15.38%
2018	7	17.95%
2019	7	17.95%

Source: Authors' own work

The articles were published in 25 different publications (Table 2). It can be seen that the publication with the highest number of articles is "MIS Quarterly" (n = 7), followed by "Technology Analysis & Strategic Management" (n = 3).

Regarding the geographic location of the empirical studies (n = 35), in table 3 we can see that Europe appears in first place with 15 publications, followed by Asia (n = 6). Three of the articles comprise several regions (e.g., Europe and North America).

Table 2. Publication source

Source Titles	Record Count	% of 37
MIS Quarterly	7	18.92%
Technology Analysis Strategic Management	3	8.11%
Journal of Management Information Systems	2	5.41%
MIS Quarterly Executive	2	5.41%
Baltic Journal Of Management	1	2.70%
Electronic Markets	1	2.70%
Foundations of Management	1	2.70%
Information Management	1	2.70%
International Journal Of Electronic Commerce	1	2.70%
Internet Research Electronic Networking Applications and Policy	1	2.70%
Journal of Electronic Commerce Research	1	2.70%
Journal of Fashion Marketing And Management	1	2.70%
Journal of Information Technology	1	2.70%
Journal of Management	1	2.70%
Journal of Organizational Change Management	1	2.70%
Journal of Strategic Information Systems	1	2.70%
Journal Of Theoretical and Applied Electronic Commerce Research	1	2.70%
Management Decision	1	2.70%
Oeconomia Copernicana	1	2.70%
Psychology & Marketing	1	2.70%
Quality Access To Success	1	2.70%
Revista Eletronica de Estrategia e Negocios Reen	1	2.70%
Strategic Change Briefings in Entrepreneurial Finance	1	2.70%
Strategic Management	1	2.70%
Supply Chain Management An International Journal	1	2.70%

Source: Authors' own work

Table 3. Publication Country

Region (empirical articles)		Record Count
	Europe	15
	Asia	6
	North America	4
	Several regions	3
	Africa	1

Source: Authors' own work

The majority of the contributions found in the literature (n = 29) are empirical studies. Eight of the articles have a conceptual and theoretical nature. It is also interesting to note that qualitative approaches are predominant (n = 22). Analysis of secondary data and interviews are the most frequently used techniques for data collection. In table 4, we can see the respective distribution.

Moreover, although some articles comprise several companies from various sectors (n = 7), most empirical studies focus on particular business sectors (Table 5), banking and insurance (n = 5), business to business services (n = 3), and digital services (n = 3).

Table 4. Selected articles' methodological approaches

Article type		Record Count
	Conceptual	8
	Empirical	29
Methodological approach (empirical articles)		
	Qualitative	22
	Quantitative	7
Data collection techniques used (empirical articles)		
	Secondary data	15
	Interview	13
	Observation	5
	Survey	4

Source: Authors' own work

Table 5. Business sector under study

Business sector		Record Count
	Multiple sectors	7
	Banking and Insurance	5
	B2B Services	3
	Digital services	3
	Apparel	2
	Online retail	2
	Manufacturing industries	2
	Media	2
	Toys	2
	Retail	1
	ICT	1
	Hospitality	1
	n.a.	6

Source: Authors' own work

Two aspects of this descriptive analysis are worth highlighting. First, studies on the success factors of digitizing business strategies have attracted scholars from different continents and countries, as well as from a range of economic sectors, which provides a broad view of the topic. Moreover, most studies are very recent and the number of publications is increasing, showing that this research area is particularly active at present. Nevertheless, the existing literature is mainly qualitative in nature, often in the form of single case studies, which shows the fragmentation of contributions and thus justifies the systematic literature review presented in the next section.

Key Capabilities and Determinants of a Successful Digital Strategy

Leadership, Innovation, Organizational Structure, Culture, Customer Needs, Operations, and Digital Entrepreneurship, were the key capabilities for a successful digital strategy that emerged from the content analysis of the articles, with leadership and innovation being the most studied by the existing literature, as shown in table 6.

Table 6. Key capabilities (digital strategy)

Key capabilities	#
Leadership	7
Innovation	4
Organizational structure	3
Culture	2
Understanding customer needs	2
Operations	1
Digital Entrepreneurship	1

Source: Authors' own work

In table 7, we can see the different authors who have identified the different key capabilities for a digital strategy. The article "The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry" (Karimi & Walter, 2015), is the one where more key capabilities were identified. This is followed by the article "How are dynamic capabilities and digital marketing related? a reflection from literature" (Gutierrez-Leefmans, Nava-Rogel, & Trujillo-Leon, 2018), and the article "How DBS Bank Pursued a Digital Business Strategy" (Sia, Soh, & Weill, 2016).

From the content analysis of the articles, the identification of determinants for a successful digital strategy also emerged. As seen in Table 8, the largest number of references identified, go to, the trans-functional role of IT, and the strategic posture of the organization. These two determinants represent about 77% of the identified determinants.

In table 9, we can see the authors who were behind each identified digital strategy success determinant.

Table 7. Key capabilities (authors)

		Key Capabilities Digital Strategy				
Author	**Year**	**Leadership**	**Culture**	**Structure**	**Customer needs**	**Innovation**
Muafi; Grabara, J; Sudiyarto; Siswanti, Y	(2019)			x		
Cui, ZY; Ouyang, TH; Chen, J; Li, CX	(2019)				x	
Gutierrez-Leefmans, C; Nava-Rogel, RM; Trujillo-Leon, MA	(2018)	x		x		x
Makkonen, H; Komulainen, H	(2018)					x
Yeow, A; Soh, C; Hansen, R	(2018)	x				
Bakhtieva, E	(2017)	x				
Li, WZ; Liu, KC; Belitski, M; Ghobadian, A; O'Regan, N	(2016)	x				
El Sawy, OA; Kraemmergaard, P; Amsinck, H; Vinther, AL	(2016)	x	x			
Sia, SK; Soh, C; Weill, P	(2016)	x			x	x
Karimi, J; Walter, Z	(2015)	x	x	x		x

Source: Authors' own work

Table 8. Digital strategy determinants

Determinants of digital strategy	#
Trans-functional role of IT	7
Strategic posture	7
Strategic partnerships	3
Competitive business environment	2
Digitally satisfied employees	1
Strategy transparency	1
Relationship with customers	1

Source: Authors' own work

Leadership

Leadership is one of the emerging themes in terms of key skills for developing a successful digital strategy. The advent of digital technologies has changed the rules of the game to the point where leadership must evolve as the business evolves. Owners and senior executives must have a positive and open attitude towards technology. It is the leaders who set the strategy, adapt it to the use of technology and how the digital strategy will be achieved (Gutierrez-Leefmans et al., 2018). Leadership plays an important role in the successful adoption of digital technology (Li et al., 2016). However, in a study conducted by El Sawy et al. (2016) among more than 4800 managers, they expressed concern about whether leaders can lead their organizations in a digital environment.

Table 9. Digital strategy determinants (authors)

		Digital Strategy Determinants				
Author	**Year**	**Trans-functional role of IT**	**Strategic posture**	**Strategic partnerships**	**Competitive business environment**	**Relationship with customers**
Muafi; Grabara, J; Sudiyarto; Siswanti, Y	(2019)		x			
Cui, ZY; Ouyang, TH; Chen, J; Li, CX	(2019)					x
Gutierrez-Leefmans, C; Nava-Rogel, RM; Trujillo-Leon, MA	(2018)	x	x	x	x	
Yeow, A; Soh, C; Hansen, R	(2018)	x	x			
Beynon-Davies, P	(2018)	x				
Makkonen, H; Komulainen, H	(2018)			x		
Yi, YQ; Gu, M; Wei, ZL	(2017)		x			
Bakhtieva, E	(2017)		x			
Fosic, I; Trusic, A; Sebalj, D	(2017)	x				
Sibanda, M; Ramrathan, D	(2017)	x				
Davison, RM; Ou, CXJ	(2017)					
Sia, SK; Soh, C; Weill, P	(2016)		x			
El Sawy, OA; Kraemmergaard, P; Amsinck, H; Vinther, AL	(2016)	x				
Granados, N; Gupta, A	(2013)					
Mithas, S; Tafti, A; Mitchell, W	(2013)		x		x	
Bharadwaj, A; El Sawy, OA; Pavlou, PA; Venkatraman, N	(2013)			x		
Woodard, CJ; Ramasubbu, N; Tschang, FT; Sambamurthy, V	(2013)	x				

Source: Authors' own work

El Sawy et al. (2016) define digital leadership as doing the right thing for the strategic success of digitizing the organization and its business ecosystem. Digital leadership means thinking differently about business strategy, business models, IT function, business platforms, mindsets and capabilities, and the workplace itself. For example, Karimi & Walter (2015) report that recent studies in the field of product innovation suggest that leadership fosters dynamic capabilities in terms of radical product innovation capabilities. Top leadership not only signals the importance of innovation to the firm, but also helps innovative project teams remove the inevitable barriers to success and leverage the wisdom of top management to improve ideas. Top management leadership is critical to formulate the strategy for digital business and coordinate the necessary investment in resources (Sia et al., 2016).

The existing literature suggests that leadership and support from top management is one of the critical success factors (Li et al., 2016). However, CEOs need to be transparent, adaptable and resilient and leaders need to acquire new skills. The leadership team must be able to understand the potential and challenges of digitization, and they must share a common view that digitization is central to business growth (Sia et al., 2016). In response to the dynamic environment, top managers play a unique role in

making strategic decisions (Yi et al., 2017). However, there is still a clear need for what is meant by effective digital leadership, what entrepreneurial skills are required, and how to build and strengthen the foundations of digital leadership (El Sawy et al., 2016).

In their case study, Sia et al. (Sia et al., 2016) found that cultivating leadership for digital transformation was not limited to senior executives, but was also systematically shifted to lower levels of management to mobilize the change agenda. Top management and the implemented management structure played a key role in creating the digital mindset, which is a prerequisite for merging business strategies with technology. Similarly, El Sawy et al (2016) in their case study found that the various digitalization moves of the company under study resulted in learning effects for the entire company and were leveraged by the top management, implying a clear communication of the digital vision as a genuine commitment to the implementation of digitalization. Other studies have also found that clear communication of digital strategy by top management was critical (Yeow et al., 2018). The same was confirmed by Bakhtieva (2017), who listed the important role of internal communication and information sharing in the development of a digital strategy in both companies targeted by her research. In contrast, top management skepticism lowers employee motivation and is one of the main barriers to implementing digital strategies. The research also showed the importance of the personal attitude of top managers and managers responsible for projects or products in the development of the digital strategy.

Innovation

The multi-channel digital revolution combined with the development of digital technologies, peer-to-peer networks, virtualization, cloud computing, IoT (Internet of Things) and other developments IT are changing the rules of the game in numerous industries by disrupting business models (Pagani, 2013). Companies face the challenge of innovating to continuously stay at the forefront of technology and stay in touch with evolving customer needs. This requires developing an innovation ecosystem with external partners, including customers themselves (Sia et al., 2016). A much more complex ecosystem for growth and innovation (Pagani, 2013).

The use of innovation is critical for creating ecosystems that facilitate the reconfiguration of capabilities that would otherwise be difficult to develop (Gavetti, 2012). Digital innovation is seen as a force for renewing the old production-based business logic by integrating "digital materiality" with traditional product elements (Makkonen & Komulainen, 2018). Innovation is generally an integral part of the most advanced businesses (Gutierrez-Leefmans et al., 2018).

For companies to effectively respond to the threats and opportunities of digitization, a holistic and integrated approach is required. To do so, firms need to develop various capabilities, including innovation (Karimi & Walter, 2015). In its simplest form, digital innovation refers to the realization of new combinations of digital and physical components to produce new products (Makkonen & Komulainen, 2018). In a broader sense, digital innovation and digitisation go beyond simple changes to a technological artifact and also consider the particular socio-technological context in relation to the technology and the impact of the use of digital innovation on society.

The concept of innovation is a framing question: what is innovation and what user needs does it satisfy (Makkonen & Komulainen, 2018). The concept of digital innovation draws attention to how organizations recombine, redesign, or design new digital artifacts in response to competitor actions or market opportunities (Woodard et al., 2013).

To successfully manage innovation projects, companies need to build and maintain a culture that fosters innovation. Innovation culture is considered a critical factor in dynamic responsiveness to digital disruption. It defines or limits what an organization can and cannot do, can stimulate innovative behavior among members of an organization, and can lead an organization to accept innovation as one of its core values and foster its commitment to it (Karimi & Walter, 2015). Innovativeness involves the strategic flexibility to evolve by repurposing existing resources and introducing new resources.

The financial resources used to fund innovation projects to enable a response to digital disruption are particularly important as these projects are often seen as unlikely to generate significant profits (Karimi & Walter, 2015).

Organizational structure

There are several ways that businesses can become successful businesses. Automation of processes, education and training, improving the quality of management and redesigning the organizational structure within the company are some of the ways that the company can avoid failure (Muafi et al., 2019). Organizational structure is also referred to by Karimi & Walter (2015) as a promoter of dynamic capabilities in terms of radical product innovation capabilities. Having an organizational structure that can scale on a global scale, but at the same time is agile and allows to plan and execute quickly, is one of the necessary capabilities for companies to anticipate the needs of the market (Gutierrez-Leefmans et al., 2018).

In reality, the adaptability of companies is based on the ability to identify and exploit market opportunities based on strategic flexibility, which requires the evolution of organizational forms (Gutierrez-Leefmans et al., 2018). The organizational structure must be aligned with the business strategy implemented by the company to deliver increasing and continuous performance (Muafi et al., 2019). Organizational restructuring based on the development of operating models that are skillfully adapted to the pace and speed of change resulting from an unpredictable environment is often considered in the literature as one of the characteristics that modern organizations must have and that arise during their transformations (Grabra & Manole, 2017).

Trans-Functional Role of IT

In the last few decades, information technologies have experienced rapid growth, which has had a significant impact on the way organizations operate, forcing them to rethink the way they conceptualize their strategies (Sibanda & Ramrathan, 2017). The prevailing view of IT strategy at a functional level, aligned with but always subordinate to business strategy, needs to be replaced by an enterprise-wide digital vision that reflects the fusion of digital strategy and business strategy (El Sawy et al., 2016). El Sawy (cited, Woodard et al., 2013) defends a new perspective that he calls “the IT fusion vision”, which sees information systems as integrated and integral to the company’s product and service offering. The emergence of new business models and the transformation of entire industries through IT requires a new logic of competitive strategy that recognizes the transfunctional nature of IT and its central role in the development of products and services (Woodard et al., 2013). In contrast to the traditional view that considers IT and the business as two distinct structures that need to be aligned, digital strategy explicitly acknowledges the inclusion of IT throughout the organization and integrates it with business strategy (Yeow et al., 2018). The biggest challenge is how organizations can effectively leverage IT and

incorporate it into their strategies to fully leverage their capabilities (Sibanda & Ramrathan, 2017). IT Alignment is important because it is associated with performance.

The organizational changes required for digital leadership and digital business strategy require rethinking the functions of the corporate function of IT and the CIO. Beynon (2018) suggests improving communication between business leaders in general and technologists in developing a digital business strategy, where there is usually a clear need for convergence.

El Sawy et al. (2016) identify 3 distinctive features of the IT corporate function for digital leadership: (1) A corporate function IT, closely interwoven with business units and partners, with multiple dimensions of proximity to the business; (2) a function IT, which distributes responsibility for digital innovation across the organization; (3) a CIO who is intimately familiar with the corporate execution of IT and oversees the digitization of the entire organization.

Strategic positioning

The strategic posture of firms has been another determinant of success in implementing strategies arising from digital transformation. Research on strategic management argues that a firm's strategic position relative to its competitors at a given point in time influences its continuous decisions in research and development, marketing, innovation, and other activities (Mithas et al., 2013).

Sai et al. (2016) in their case study found that strategic posture was critical to innovation capabilities, technological partnerships, and mindset changes. Emphasis on strategic posture was critical to digital innovation. A firm's digital strategic posture, i.e., the degree to which it lags behind or leads the way in industry investment patterns, can create divergent or convergent pressures in its ongoing digital business strategy (Mithas et al., 2013). Strategic mindset is a two-way capability that leaders must develop to drive digital transformation. As digital strategy is continuously evolving and organizations need to be able to identify, understand and implement the necessary changes, a strategic mindset is essential (Yeow et al., 2018). Strategic change, through which organizations can survive and succeed by adapting the strategic guidance, resources, and capabilities needed in a fast-paced environment, has long been considered an important area of strategic management (Yi et al., 2017).

SOLUTIONS AND RECOMENDATIONS

Digital business strategies offer significant opportunities for companies to increase their competitiveness (Grover & Kohli, 2013). However, new concepts and methodologies are needed to investigate how they affect the management of competitive advantage (Woodard et al., 2013). We found in this systematic literature review that most research is based on a qualitative methodology, with the case study being the most frequently cited. It is recommended that more quantitative methods be used in future research to quantify the impact of key competencies and the determinants of digital strategies. It appears that there is a concentration of studies in the US, so a greater variety of cultural contexts is also recommended. Observations of the competitive behavior of prominent technology companies such as Google, Apple, and Microsoft, as well as companies in industries undergoing strategic change such as financial services, hospitality, and entertainment, suggest that additional insights are needed to explain and predict strategic behavior.

At a time when customer experience is at the heart of competition between firms and a strong customer experience is one of the most important management objectives (Lemon & Verhoef, 2016), there is a lack of literature on the emotions evoked by customers through digital experiences (Straker & Wrigley, 2016). Therefore, further investigation between digital transformation in organizations and customer experience is recommended.

Finally, we leave here a set of suggestions for future research that we consider useful for the topics identified above. We can see them in Table 10.

Table 10. Future research

Author	Year	Title	Future Research
Straker, K; Wrigley, C	(2016)	Emotionally engaging customers in the digital age: the case study of "burberry love"	-Future research should focus on extending the theoretical mastery of digital channels to include clients' emotional experiences and requiring professionals to publish best practices and describe important strategies and tactics with proven results.
Setia, P; Venkatesh, V; Joglekar, S	(2013)	Leveraging digital technologies: how information quality leads to localized capabilities and customer service performance	-Identify digital business strategies to coordinate global plans and local adaptations, to customize products and offerings in different cultures, to help merge local and global markets, and to influence consumer attitudes toward global and local products. -Assess the dynamics needed to build effective digital systems. For example, researchers can examine the impact of governance models on structuring information systems and appropriate IS management. -Examine how marketing outcomes are influenced by other aspects of digital design, such as IS infrastructure, the flexibility of IS assets, and IS shareability and reusability.
Karimi, J; Walter, Z	(2015)	The role of dynamic capabilities in responding to digital disruption: a factor-based study of the newspaper industry	-How to apply the concepts of crowdsourcing, collective intelligence, and open innovation to develop digital capabilities, to develop new business models, and drive digital innovations. -How to create innovative digital products, platforms, tools, and technologies to respond to digital disruptions and improve the digital ecosystem of value. -How to maintain digital platforms and key IT infrastructure capabilities as a single, coherent infrastructure to maximize synergies and provide consistent services to all consumers and non-consumers within a particular value network -How to develop dynamic capabilities to respond to disruptive innovations, coordinate and integrate a whole ecosystem of customers and companies in large-scale incremental innovations.

Source: Authors' own work

CONCLUSION

In today's business world, technology is considered as a key driver for restructuring business activities and business development strategies. In many cases, disruption through digital innovations has led to the emergence of an entirely new class of competitors in businesses (Straker & Wrigley, 2016). Digital technologies, in particular, have proven to drive economic growth and competitiveness (Ardley & McIntosh, 2019). Also, with the increasing recognition of the role of the customer in the creation and delivery of services, there is greater momentum in building customer-centric organizations (Setia, Venkatesh, & Joglekar, 2013). Digital technologies are a means for organizations to become more customer-centric.

In terms of digitalization, companies are forced to rethink the traditional concept of customer relationships as new technologies provide customers with increasingly more options (Straker & Wrigley, 2016). Below we see some statistics that highlight the importance that digital transformation has in the strategy of organizations today.

- 34% of companies have already undergone a digital transformation (SmartInsights, 2019).
- Two-thirds of all customer experience initiatives will use IT by 2022 (Gartner, 2018).
- 76% of consumers think companies should understand their expectations and needs (SalesForce, 2018).
- 90% of consumers expect companies to have an online portal for customer service (Microsoft, 2017).
- 15% of all customer service interactions will be handled exclusively by AI by 2021, a 400% increase from 2017 (Gartner, 2018).

This paper aimed to perform a systematic literature review starting from the topic" Digital transformation in business strategy". It aimed to answer the questions initially defined:

- What are the key capabilities for implementing a digital business strategy?
- What are the determinants of the success of a digital business strategy?

In terms of key capabilities for companies to successfully implement digital strategies, leadership, innovation capability, organizational structure and culture, understanding customer needs, operations and digital entrepreneurship emerged as themes. The success factors for implementing a digital strategy were also identified. First and foremost, the cross-functional role of information technologies in organizations is referred to more frequently. Organizational mindset towards digitalization and strategic partnerships are also mentioned. The competitive environment of the industry, digitally satisfied employees and relationship with customers were also mentioned. Dynamic capabilities theory is also mentioned more than once as an explanatory theory for the mechanisms of digital transformation in companies. In a bibliographic review, Gutierrez et al. (2018) identified several studies that relate dynamic capabilities theory to digital marketing or related concepts. Empirical studies also suggest that dynamic capabilities created by changing, enhancing, or adapting a firm's resources, processes, and values are positively associated with building digital platforms and that these capabilities have an impact on performance in responding to digital disruption (Karimi & Walter, 2015). These capabilities are essential to respond to disruptive technological changes, integrate digital business transformation into existing operations, and connect with customers and suppliers in response to disruptive innovations. As a result of digital transformation and digital strategies, the most frequently mentioned theme was value creation. The new value logic differentiates between products and services and groups them into "offerings" from which customers can create value for themselves (Pagani, 2013). There was also evidence of incremental innovation, digitization of products and services, co-creation, co-production and co-consumption. Better understanding of customers and improved customer service performance were also mentioned. In terms of the types of digital tools used by companies in their digital transformation, several were mentioned, including social media, e-commerce, cloud computing, Big Data and others.

REFERENCES

Bakhtieva, E. (2017). B2B digital marketing strategy: A framework for assessing digital touchpoints and increasing customer loyalty based on Austrian companies from heating, ventilation and air conditioning industry. *Oeconomia Copernicana*, *8*(3), 463–478. doi:10.24136/oc.v8i3.29

Beynon-Davies, P. (2018). Characterizing Business Models for Digital Business Through Patterns. *International Journal of Electronic Commerce*, *22*(1), 98–124. doi:10.1080/10864415.2018.1396123

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward A Next Generation Of Insights. *Management Information Systems Quarterly*, *37*(2), 471–482. doi:10.25300/MISQ/2013/37:2.3

Cui, Z. Y., Ouyang, T. H., Chen, J., & Li, C. X. (2019). From peripheral to core: A case study of a 3D printing firm on business ecosystems reconstruction. *Technology Analysis and Strategic Management*, *31*(12), 1381–1394. doi:10.1080/09537325.2019.1614554

Davison, R. M., & Ou, C. X. J. (2017). Digital work in a digitally challenged organization. *Information & Management*, *54*(1), 129–137. doi:10.1016/j.im.2016.05.005

El Sawy, O. A., Kraemmergaard, P., Amsinck, H., & Vinther, A. L. (2016). How LEGO Built the Foundations and Enterprise Capabilities for Digital Leadership. *MIS Quarterly Executive*, *15*(2), 141–166.

Fosic, I., Trusic, A., & Sebalj, D. (2017). Digital Organizational Strategy - Ticket for Competitiveness on the International Market. *Strategic Management*, *22*(3), 3–10.

Granados, N., & Gupta, A. (2013). Transparency Strategy: Competing With Information In A Digital World. *Management Information Systems Quarterly*, *37*(2), 637–641.

Gutierrez-Leefmans, C., Nava-Rogel, R. M., & Trujillo-Leon, M. A. (2018). How Are Dynamic Capabilities And Digital Marketing Related? A Reflection From Literature. *Revista Eletronica De Estrategia E Negocios-Reen, 11*(3), 265-283. doi:10.19177/reen.v11e32018265-283

Haddaway, N. R. A. U. P. C. C., & McGuinness, L. A. (2021). PRISMA2020: R package and ShinyApp for producing PRISMA 2020 compliant flow diagrams (Version 0.0.2). Zenodo. doi:10.5281/zenodo.5082518

Karimi, J., & Walter, Z. (2015). The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry. *Journal of Management Information Systems*, *32*(1), 39–81. doi:10.1080/07421222.2015.1029380

Li, W. Z., Liu, K. C., Belitski, M., Ghobadian, A., & O'Regan, N. (2016). e-Leadership through strategic alignment: An empirical study of small- and medium-sized enterprises in the digital age. *Journal of Information Technology*, *31*(2), 185–206. doi:10.1057/jit.2016.10

Makkonen, H., & Komulainen, H. (2018). Explicating the market dimension in the study of digital innovation: A management framework for digital innovation. *Technology Analysis and Strategic Management*, *30*(9), 1015–1028. doi:10.1080/09537325.2018.1433823

Mithas, S., Tafti, A., & Mitchell, W. (2013). How A Firm'S Competitive Environment And Digital Strategic Posture Influence Digital Business Strategy. *Management Information Systems Quarterly*, *37*(2), 511–536. doi:10.25300/MISQ/2013/37.2.09

Muafi, Grabara, J., Sudiyarto, & Siswanti, Y. (2019). Business strategy, organizational structure, work processes: Are the alignment? *Quality - Access to Success*, *20*, 399–404.

Setia, P., Venkatesh, V., & Joglekar, S. (2013). Leveraging Digital Technologies: How Information Quality Leads To Localized Capabilities And Customer Service Performance. *Management Information Systems Quarterly*, *37*(2), 565–U311. doi:10.25300/MISQ/2013/37.2.11

Sia, S. K., Soh, C., & Weill, P. (2016). How DBS Bank Pursued a Digital Business Strategy. *MIS Quarterly Executive*, *15*(2), 105–121.

Sibanda, M., & Ramrathan, D. (2017). Influence Of Information Technology On Organization Strategy. *Foundations of Management*, *9*(1), 191–202. doi:10.1515/fman-2017-0015

Straker, K., & Wrigley, C. (2016). Emotionally engaging customers in the digital age: The case study of "Burberry love". *Journal of Fashion Marketing and Management*, *20*(3), 276–299. doi:10.1108/JFMM-10-2015-0077

Woodard, C. J., Ramasubbu, N., Tschang, F. T., & Sambamurthy, V. (2013). Design Capital And Design Moves: The Logic Of Digital Business Strategy. *Management Information Systems Quarterly*, *37*(2), 537–564. doi:10.25300/MISQ/2013/37.2.10

Yeow, A., Soh, C., & Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *The Journal of Strategic Information Systems*, *27*(1), 43–58. doi:10.1016/j.jsis.2017.09.001

Yi, Y. Q., Gu, M., & Wei, Z. L. (2017). Bottom-up learning, strategic flexibility and strategic change. *Journal of Organizational Change Management*, *30*(2), 161–183. doi:10.1108/JOCM-12-2015-0241

ADDITIONAL READING

Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, *31*(3), 306–333. doi:10.1002mj.821

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Visions and voices on emerging challenges in digital business strategy. *Management Information Systems Quarterly*, *37*(2), 14–001. doi:10.25300/MISQ/2013/37.2.14

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, *21*(10-11), 1105–1121. doi:10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E

El Sawy, O. A., Malhotra, A., Park, Y., & Pavlou, P. A. (2010). Research commentary—seeking the configurations of digital ecodynamics: It takes three to tango. *Information Systems Research*, *21*(4), 835–848. doi:10.1287/isre.1100.0326

Gregor, S., Martin, M., Fernandez, W., Stern, S., & Vitale, M. (2006). The transformational dimension in the realization of business value from information technology. *The Journal of Strategic Information Systems*, *15*(3), 249–270. doi:10.1016/j.jsis.2006.04.001

Henderson, R. M., & Clark, K. B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, *35*(1), 9–30. doi:10.2307/2393549

Pagani, M. (2013). Digital Business Strategy And Value Creation: Framing The Dynamic Cycle Of Control Points. *Management Information Systems Quarterly*, *37*(2), 617–632. doi:10.25300/MISQ/2013/37.2.13

Pavlou, P. A., & Fygenson, M. (2006). Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *Management Information Systems Quarterly*, *30*(1), 115–143. doi:10.2307/25148720

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *Management Information Systems Quarterly*, *27*(2), 237–263. doi:10.2307/30036530

Yoo, Y. J., Henfridsson, O., & Lyytinen, K. (2010). The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research. *Information Systems Research*, *21*(4), 724–735. doi:10.1287/isre.1100.0322

KEY TERMS AND DEFINITIONS

Business Strategy: Detailed plan with the actions to be developed to achieve business success.

Digital Business Strategy: Digital business strategy is the organizational strategy formulated and executed by leveraging digital resources to create differential value.

Digital Platforms: Technological platforms that allow interaction between systems and/or between systems and users.

Digital Transformation: Digital transformation is a process of continuous change, driven by technology, companies and our entire society.

Digitalization: The use of digital technology to do anything. For example, switching invoices from paper to electronic format.

Dynamic Capabilities: Companies' ability to reconfigure internal and external competencies to deal with rapidly changing environments.

Innovation: New concept or product derived from a new idea or scientific investigation.

Leadership: Ability to inspire others, influencing behaviors and actions in a positive way.

Systematic Literature Review: Methodology that allows a systematic review of published literature on a particular area of study.

ENDNOTE

[1] Digital transformation is a process of continuous change, driven by technology, companies and our entire society, adopting disruptive technologies to increase productivity, value creation, and social welfare (Ebert & Duarte, 2018).

Chapter 10
Does Digital Transformation Impact Customer Experience?

Alireza Shabani shojaei
https://orcid.org/0000-0002-9404-3743
University of Kerala, India

ABSTRACT

Nowadays, customers are expected to digitize their operations, and they start their journey anywhere, anytime, and from any device; they use multiple communication channels to interact with a business. Providing superior customer experience is considered a consumer-based strategy for attracting and retaining customers, and the customer experience plays a crucial role in digital transformation. To move the field forward, the purpose of this chapter is to review the literature on customer experience and develop a set of fundamental premises that identify the linkage between digital transformation and customer experience. The findings of this study provide guidelines for further research and make contributions towards new knowledge of how firms and brands can provide effective customer experiences.

INTRODUCTION

In today's business world, customers are more knowledgeable and help each business and company to grow. Therefore companies need to think about customers (Law, 2009) and companies must focus on the customers' requirements and expectations to create and support long-term relationship with customers. Historically, customers are expected fair pricing and reasonable quality, but modern customers have much higher expectations and they are demanding personalized interactions, proactive service, and connected experiences across digital and online channels (Nas, 2019). In addition, many customers turn to use digital platforms; they expect brands to follow them across multiple channels to provide a frictionless experience(Lena Lich, 2020). For instance, 54% of consumers contacted brands via email for customer support in 2018 Leggett, (2018) and 83% of customers argued they want to have ability to move between channels when interacting with a brand. Nevertheless, they also expect these interactions to be smooth, fast and delightful (Lena Lich, 2020).

DOI: 10.4018/978-1-7998-9008-9.ch010

Nowadays, the business must embrace technology to deliver to a new type of "always-connected" customers. Therefore, information technology (IT) has become an integral part of businesses. IT has become more critical as companies and a top priority for companies to improve their interactions with customers, customer service and sales processes. Along with the rise of digital technologies the digital transformation opens up the possibility of predict customer behavior (Fernández-Rovira et al., 2021). Digital Transformation is "the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements (such as enhancing customer experience (CE), streamlining operations or creating new business models)" (Fitzgerald, Kruschwitz et al., 2014, p. 2). Many firms have started implementing Digital Transformation (DT) to improve their organizational processes, enhance their customer value propositions, increasing service quality, cost reduction and investment in innovation on new products and services. Digital Transformation also helps them gain a competitive advantage and improve their customer experience (Duan et al.,2012; Fitzgerald et al., 2014; Westerman and Bonnet, 2015)

For the past decade, the concept of CE has received considerable in both marketing studies and companies and creating a higher customer experience has become vital for each business. Studies predict that customer experience will be more important than the price and quality of product and service (Lobzhanidze, 2019). A positive customer experience is essential to the success of every business because a happy and satisfied customer can become a loyal customer and boost revenue (Bordeaux, 2020).

Although customer experience has received a growing amount of interest among researchers and researchers have been offered to explain the importance or otherwise of CE (Ashrafpour et al., 2021; Komulainen and Saraniemi, 2019; Rose et al., 2012; Roy, 2018; Srivastava and Kaul, 2016), there is lack of research to identify the role of Digital Transformation on customer experience.

The literature shows only few studies have developed a comprehensive approach helping managers of the companies to understand the impact of customer experience on the organization environments, considering the digital transformation (Hafsi and Assar, 2020). Moreover, from a theoretical point of view the majority of studies on CE are quantitative in nature and fragmented and tend to only partially explain the phenomenon. While some researchers studied only a few factors and ignore factors which other studies find important.

Therefore, the primary aim of this chapter is to review and critically evaluate the literature to integrate the digital transformation and customer experience concepts to show how digital transformation can improve the customer experience. Moreover, with the growing maturity of the customer experience literature, the study also considered the importance and outcomes of customer experience.

BACKGROUND

The Concept of Customer Experience

Many marketing research has been published on the customer experience concept .It is considered an important area of research and marketing scholars call the customer experience the fundamental basis for marketing management (Homburg et al., 2017; Waqas et al., 2020). Many researchers indicated that high levels of CE provide a new means of competition (Johnston and Kong, 2011), Satisfaction (Pei et al., 2020; Srivastava and Kaul, 2014), Loyalty (Srivastava and Kaul, 2016), trust (Pei et al., 2020; Ra-

jaobelina et al., 2018), re-visit intention (Ali and Omar, 2014) and intention to purchase and re-purchase have all been recognized as benefits and outcomes of a superior customer experience.

A review of literature reveals that the notion of CE is not a new concept and many researchers and academicians have focused on the experience for the last three decades. Holbrook and Hirschman (1982) were the first who researched on customer experience. Later, Pine and Gilmore (1998) are researched on experience and concerning the customer as a subject; they were studied the emergence of a new service economy named the "experience economy." For these authors, based on a person's interpretation of events, experiences are personal and unique. Schmitt (1999) developed the work of Pine and Gilmore (1998) maintained that:

We are in the middle of the revolution, a revolution that will render the principles and models of traditional marketing obsolete, a revolution that will replace traditional feature-and-benefit marketing with experiential marketing.

The concept of CE has been defined by many researchers and similar to other marketing concepts, there is no universally accepted single definition. Definitions are summarized in Table 1.

Table 1. Definitions of customer experience

Author (year)	Definition
Holbrook and Hirschman (1982)	"a steady flow of fantasies, feelings, and fun" (p.132)
Csikszentmihalyi (1990)	"the best moments usually occur when a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile. Optimal experience is thus something we make happen" (p.3)
Carbone and Haeckel (1994)	"the aggregate and cumulative customer perception created during the process of learning about, acquiring, using, maintaining, and (sometimes) disposing of a product or service" (p. 18)
Schmitt (1999)	"Experience happens on specific incidents of response to some stimulus; such as the marketing efforts on before and after purchasing. Experience contains the whole life quality. It's usually caused by direct observation or participation in the incident, whether it is true, as if a dream or fictitious"
Gentile, Spiller, and Noci (2007)	"Originating from a set of interactions between a customer and a product, a company or a part of the organization, which provokes a reaction. This experience is strictly personal and implies customer's involvement at different levels. However the concept of involvement is different from that of customer experience."
Walter, Edvardsson, and Öström (2010)	"A customer experience is defined as the customer's direct and indirect experience of the service process, the organization, and the facilities and how the customer interacts with the service firm's representatives and other customers. These in turn create the customer's cognitive, emotional and behavioral responses and leave the customer with memories about the experience"
Klaus and Maklan, (2013)	"The customer's cognitive and affective assessment of all direct and indirect encounters with the firm relating to their purchasing behavior"

The Customer experience occurs at all the three stages of consumer decision-making and consumption process, including: "pre-purchase, purchase and post-purchase" (Jain et al., 2017). The first stage – pre-purchase – includes all aspects of a customer's interaction with the brand before a final purchase decision has been made. At this point in the journey, customers are aware they need and are searching

for possible solutions. At this stage, clients get ready for consumption and anticipate the consumption process by first envisioning the experience, looking for relevant data and information about the type of experience they would want and lastly planning and budgeting and arranging for the experience (Arnould et al., 2004). The second stage – purchase – encompasses all interactions customers have with a brand while making a purchase. Businesses, particularly in retail and consumer goods, focus on this stage of the journey as it is where the financial transaction takes place (Hart, 2019). According to Hart (2019) the third and final stage – post-purchase – covers all interactions of customers with a brand after purchasing their product or service. Consumption might be happen more than one occasion. At the post-purchase stage, CE is related to the customer's experience with after-sale products/services; for instance, offline/ online customer support, installation manuals, helpdesks handling returns/refunds, etc. (Jain et al., 2017).

Digital Customer Experience

Digital transformation can bring transformative change to business; it also has potential to provide many values for a company via transforming its business models, organizational processes, products/ services, and consumer/ customer engagement. It is essential for firms to understand what is crucial for the successful realization of Digital Transformation. Digital Customer Experience can be considered as a key factor to identify and recognize how businesses fail or succeed in using digital technology. In this sense, Fitzgerald et al. (2014) stated that improving customer experience has become one of the most significant motivations for organizations to implement digital transformation.

According to Gualtrics (2021), "Digital Customer Experience" is the part of the Customer Experience journey that deals with online platforms like websites, and with digitally-mediated experiences such as social media content. It also extends to digitally-connected (online) environments. Ultimately Digital customer experience is the sum of all the experiences consumers have when they interact with a brand across digital channels.

The impact of implementation of digital transformation towards improving customer experience has been examined by many researchers (Kane et al., 2015). Digital customer experiences are fast, multi-faceted and high-stakes, far exceeding offline Customer Experience in complexity and frequency. Nowadays, customers are expected to digitize their operations. For example, according to Mulcahy (2020), 88% of customers expect firms to accelerate digital initiatives due to COVID-19. Despite the obvious advantages of digital transformation towards improving customer experience, and due to complex concept of customer experience (Koetz, 2019), the literature of marketing indicates the empirical research on the association between Digital Transformation and customer experience is scant.

Dimensions of Customer Experience

There are several studies that have described CE's dimensions. The study of literature reveals that there is still a lot of confusion on dimensions of customer experience. The review shows that some researchers have discussed the CE is involving two dimensions (Morgan-Thomas and Veloutsou, 2013; Rose et al., 2012) while some measured customer experience as three dimensions (Tafesse, 2016b). In addition, there are some researchers consider CE consisting of four (Brakus et al., 2009; Dube and Helkkula, 2015) or five or six dimensions (Fornerino et al.,2006; Gentile et al.,2007).

Morgan-Thomas and Veloutsou (2013) considered cognitive and affective dimensions as a constituent of the online customer experience. Dube and Helkkula (2015) divided customer experience into four main

areas: "Process, time, location, and outcome." Based on these four areas, the value that is experienced may include practical dimensions based on emotional dimensions (i.e. hedonic value), operations (i.e., utilitarian value), or social dimensions (i.e., the customer's social environment and the opinions and experiences of other people) (Holbrook, 2006).

Verhoef et al. (2009) describe the experience as involving "cognitive, affective, social and physical responses to the retailer" without further elaboration. Brakus et al. (2009) empirically measured the four dimensions of brand experience, namely "sensory, intellectual, affective and behavioral." Fornerino et al. (2006) worked on five dimensions of customer experience namely "sensorial-perceptual, affective and physical- behavioral and social and cognitive (facets)." Gentile et al. (2007) identified six components of customer experience, namely "sensorial, emotional, cognitive, pragmatic, lifestyle and relational."

IMPORTANCE OF CUSTOMER EXPERIENCE

Due to the developing market capacity, numerous firms are realizing and understanding that the quality of a product/service and pricing are no longer enough to build satisfaction and loyalty and CE is their best chance to stand out from competitors. (Hueffner, 2020). As time goes on, the customer experience matters more and more. Nowadays, customers are empowered, and creating higher customer experiences can support businesses to have high revenue in the long run. While lots of businesses understand that the customer experience is crucial for businesses, but it seems that many businesses are falling short of customer expectations.

Negative Customer Experience

A negative customer experience can lead companies to lose their current customers and prospective customers to a firm competitors. Bad customer experiences can have many adverse effects on a business and a negative customer experience leaves the customer feeling unhappy, disappointed, or even frustrated. Because of bad customer experience, many firms lost 24% of their annual income (Bilgihan et al., 2016). A study indicates that 32 percent of customers after only a bad experience, will change brand to another brand (Newman, 2020). In addition, researches show that 48 percent of customers who have had a bad customer experience advise other customers not to purchase products/services of a company. Also, studies indicate that 63% of the potential customers read and check for negative reviews about customer experiences. Thus unfavorable review can make customer hesitant to purchase products or services. Research conducted by Khoros (2019) shows the customers feel unhappy or angry and due to the poor experience, 65% of customers have switched to a different company and brand. In an online environment, after a bad experience 88% of consumers are less likely to use a website (Sweor, 2021).

Positive Customer Experience

As mentioned, delivering a superior CE is essential for all businesses. When customers have a great experience, they will repeat purchases of products and services, and post or write positive reviews. According to Srivastava and Kaul (2014), a good customer experience can lead customers to return to the same store and spend more money to repurchase the products/services .

According to a study, firms that earn one billion US dollars annually can expect to earn an additional 700 million US dollars within three years of investing in strategies of customer experience (Morgan, 2019). Moreover, studies show that many customers are ready to pay more for a higher CE. Similarly, if customers feel the firms are provide extra value via interactions, they are willing to pay more for the same products/services. According to Puthiyamadam and Reyes (2018), customers willing to pay up to a 16% price premium for a great customer experience. In new digital age, customers are looking for seamless experiences enabled by technology.

IMPROVEMENT OF CUSTOMER EXPERIENCE THROUGH DIGITAL TRANSFORMATION

This section addresses how digital transformation can improve the customer experience.

Meeting Customers' Expectations

Understanding customers is a big challenge and an opportunity for business and firms must understand consumer needs and expectations (Leventhal, 2008). Customer expectations and behaviors are constantly evolving as the world changes. According to Rachinger et al. (2019) "digitalization has been interpreted by businesses as a means to fulfill customers' needs more effectively". The smartphones, mobile apps, etc. not only have enabled customers to get what they want when they want it also such devices and apps, seamlessly collaborate in providing data about consumer behavior, purchasing patterns, social patterns, working out habits, etc. which brings the phenomenon of big data in consumer behavior (Bilgihan et al., 2016). In the context of big data, modern big data analytics solutions help make analytical processes faster and more efficient. It should be noted that, big data enable firms to stay ahead of their digital transformation journey, making a competitive edge over their peers. Therefore, big data and effective data analysis allows firms to identify customer expectations or purchase patterns by comprehending their thought processes and feedback beforehand (Kumar, 2021). According to Hafsi and Assar (2020), required Information for understanding customers through Digital Transformation are Social knowledge, Value proposition, Feedback, Customer feelings, etc.

Improving Interaction with Consumers

Digitalization significantly transformed provider–customer relationships by co-creation logic, long-term commitment, and greater investment in the relationship (Kamalaldin et al., 2020). According to Harvard Business Review survey, 72% of respondents agreed they expect the shift to digital to create closer relationships with customers (Eswaran, 2020). The concept of customer experience is an interaction between a customer and a firm (Garg et al., 2014)and customer experience acts "as the user's interpretation of his or her total interaction with the brand" (Ghose, 2009). In the recent years, the rise of the internet and the emergence of new digital channels (e.g., smartphones, social media, and apps) facilitated customer-to-firm interaction. Digital transformation is accelerating the opportunity for companies to engage with consumers and improve communications across different channels.

Managing Customer Touch Points

Customer touch points is a part of the customer journey and it is affected by digital transformation. It is important to understand the process of CE creation is formed of many independent touch points (Srivastava and Kaul, 2016). Providing successful experiences during their journey across all touch points is fruitful for businesses as it leads to differentiation, more revenue and customer loyalty (Rajaobelina et al., 2018). In fact, customers undergo experiences each time they 'touch' any part of a service, product across multiple channels and at various points in time (Stein and Ramaseshan, 2016). Bilgihan et al., (2016) claimed that the companies need to deliver web, mobile, and tablet touchpoints that align with core brand attributes and support business objectives.

The role of omnichannel within digital transformation were discussed. As mentioned above, omnichannel is multichannel strategies in line with Digital Transformation to sales that focus on providing seamless CE with the implementation of new technologies. In fact, the nature of omnichannel shopping behaviour sees consumers seeking out deals from different touchpoints, therefore via omnichannel companies provide customers with this information all in one place.

Facilitating the Sales Process

Nowadays, firms use technology to enhance sales conversations and interact with their customers (Graf et al., 2013; Hafsi and Assar, 2020). Sales technology refers to "firm provided technologies that can facilitate or enable the performance of sales tasks" (Hunter and Perreault, 2006). According to Pantano and Timmermans (2014), the adoption and implementation of smart technologies requires modifications in both businesses processes and selling activities. In addition, Accenture survey revealed that 84% of respondents said they preferred interacting with computer-based applications rather than human advisors due to their 24/7 availability (Sovie et al.,2017).

In recent years, the retail path to purchase a matrix of interlinking multi-channel touchpoints (Spurdle, 2020). Many industries are focusing on sales technologies to simplify their selling processes and enhance firms' productivity and to ensure long-term relationships with consumer (Ailawadi et al., 2009). Therefore, companies develop Multi-channel retail strategies to make customer's purchases more efficient. Such strategies allow companies to influence the consumer journey at every step along the path to purchase – whether that's pre-store visit, at the store, post purchase and through digital and/or physical touchpoints (Spurdle, 2020). Consequently, implementation of digital transformation substantially enhances customer experience.

OMNICHANNEL CUSTOMER EXPERIENCE

Nowadays, the habits of customers are changing and for businesses is essential to be aware and ready to meet customer expectations. In the age of technology, "Customers start their journey anywhere, anytime and from any device; and when they stop midway, they expect integration to pick up from where they left off on another device or channel" (Accenture, 2014, p. 3). Customers use multiple channels of communication and a variety of devices to interacting with a business to purchase/repurchase a product/service or to contact the firm for other purposes including inquiring, about the availability of a product, requesting information, product's use, soliciting technical advice, and facilitating feedback on the

products or services. Today's consumers can choose channels via a wide range of devices in different locations at various times of the day. Sopadjieva et al. (2017) argued that 73 percent of customers use multiple channels during their purchase.

According to Cao and Li (2015), the establishment of new marketing channels has offered customers new opportunities to transact and communicate with the company. Jarman (2019) claimed that 9 out of 10 consumers are willing to have an omnichannel experience with seamless service among communication methods. Therefore, due to the significance of integrating information and services from multiple channels and instead of managing multiple channels independently and also to reduce data mismatch and enhance the unified experience, companies promote a shift from multi-channel to an omnichannel strategy.

Multichannel marketing refers to "the practice of interacting with customers and offering buyers goods and services via two or more synchronized channels" (Rangaswamy and Van Bruggen, 2005). Omnichannel retailing or omnichannel commerce refers to "synergetic integration of customer touchpoints and communication opportunities for the purpose of creating a unified brand experience regardless of channel, platform, or stage in the selling process" (Cummins et al., 2016). The main difference between multi-channel and omni-channel reflects in the notion of service integration which helps customers to enjoy a seamless experience during their shopping journey (Verhoef et al., 2015).

Service transparency and service consistency are two main aspects of omnichannel integration that impact customer experience (Lee et al., 2019; Shen et al., 2018). Service transparency refers to "the how additional and complementary information about a retailer's services and their differences across all platforms is communicated to customers" (Lee et al., 2019). Service consistency is defined as "the coherence of information, services, and experiences among various channels" (Lee et al., 2019; Shen et al., 2018).

Previous research indicates that a number of elements critical for success in an omnichannel environment including: (1) building an omnichannel community,(2) enabling technologies, (3) ease of search processes, (4) service integration, (5) establishing switching costs, (6) aligning online, in-store and personal interactions, (7) channel integration, (8) harnessing the power of analytics, (9) embracing channel partners (10), allowing for anytime, anywhere problem-solving solutions, (11) communication synergy and (12) focus on brand (Cummins et al., 2016; Verhoef et al., 2015).

Components of Customer Omnichannel Experience

A review of the academic and practitioner literature adopt a broader view that treats the concept of customer omnichannel experience as a multidimensional construct. Shi et al. (2020) indicate "flexibility, personalization, consistency, integration, and connectivity" as the main components of customer omnichannel experience. Quach et al. (2020) review omnichannel literature and show that "flow and perceived risk" as the elements of customers' omnichannel experience. Hilken et al. (2018) consider concepts such as "cognitive and emotional fit, flow, immersion fidelity, and spatial presence components" as the main components of customer experience. Mahrous and Hassan (2017) argued the "perceived risk, consumer innovativeness, convenience seeking and shopping enjoyment" are components of customer experience.

OUTCOMES OF CUSTOMER EXPERIENCE

Customer experience has been studied in different service and product contexts: e.g., civil aviation (Chauhan and Manhas, 2014), banking (Ashrafpour et al., 2021; Rahman, 2006), travel and tourism industry (Gopalan and Narayan, 2010), mobile and telecommunication services (Chakraborty and Sengupta, 2013), luxury hotels (Mohsin and Lockyer, 2010), and modern retailing (Anuradha and Manohar, 2011). Many empirical researches have proven the CE has a significant role to determine the success of a firm (Yakhlef, 2015) and excellent customer service is a name maker .It helps grow income, maintain customer satisfaction, loyalty, and helps to improve the overall a business strategy.

A review of the academic and practitioner literature revealed that the main reasons and benefits of delivering a great CE were concerned with increasing satisfaction of customers loyalty, trust, word-of-mouth (WOM), building emotional interaction with customers and providing a competitive advantage (Godovykh and Tasci, 2020; Johnston and Kong, 2011; Martin et al., 2015; Rajaobelina et al., 2018).

Customer Trust

In the field of relationship marketing and based on the commitment–trust theory developed by Morgan and Hunt (1994), trust and commitment have been confirmed as the most important concepts. Customer trust affects every aspect of a customer's relationship with a brand and can indirectly impact to the success of a firm. Patrick (2002) noted customer trust as "thoughts, feelings, emotions, or behaviours manifested when customers feel that a provider can be relied upon to act in their best interest when they give up direct control." Trust is a strong purchase consideration for customers. A study showed that 81 percent of consumers need to be able to trust a brand to purchase from them (Edelman, 2019). Customer trust increase the likelihood that the customers will continue to be loyal to a brand.

Multiple studies have shown that customer experience has a direct effect on Customer trust (Komulainen and Saraniemi, 2019; Rose et al., 2012). Komulainen and Saraniemi (2019) argued that trust is a critical hedonic value dimension of the service experience and customers' needs to feel that the service or product is reliable and safe to use. Indeed, due to the increasing importance of electronic commerce (Brun et al., 2014), trust in the online environment has received more attention from online marketing researchers (Beldad et al., 2010). Toufaily and Pons (2017) claimed that trust represents a significant element of success in multichannel and online retail channels; therefore, to build online trust and retain customers, managers should focus on delivering a strong customer experience. Rajaobelina et al. (2018) examined the impact of mobile banking experience on trust and the findings demonstrated that the cognitive and negative affective dimensions of mobile experience impact Customer trust.

Customer Satisfaction

Customer satisfaction is one of the most examined concepts in marketing studies (Deyalage and Kulathunga, 2019). Satisfaction is a judgment of consumer that a product/service delivers a pleasurable level of consumption-related fulfillment (Oliver, 1997). Bitner and Hubbert (1994) claim that overall customer's satisfaction is "based on all encounters and experiences with that organisation." Likewise, Meyer and Schwager (2007) argued that customer experiences have a direct effect on customer satisfaction and the level satisfaction primarily depends on customer positive or negative experiences. The excellent customer experience addresses that "advocacy typically implies achieving a very high score on customer satisfac-

tion" (Frow and Payne, 2007). Meanwhile, Brakus et al. (2009) have highlighted the relationship of brand experience with brand satisfaction. Tian (2011) claimed that the quality of experience is one of the most critical factors that will result in the satisfaction of the customers. A study conducted by Shekhar Kumar, Dash, and Chandra Purwar (2013) reveals that the more positive experiences induced by brands, create more customer satisfaction. Based on these findings, it is logical to suggest that enhancing Customer experiences has a direct effect on customer satisfaction (Pentina, Amialchuk, and Taylor, 2011).

Customer Loyalty

The effect of customer experience has already been found to be positive on loyalty (Ashrafpour et al., 2021; Fornell et al., 2006; Klaus and Maklan, 2013; Roy, 2018; Srivastava and Kaul, 2016). Customers are quick to shift to competitors when they have a poor experience. However, they also reward a good customer experience with continued loyalty. Forrester's report entitled "Customer Experience Drives Revenue Growth" showed that customers with high experience are 2.7 times more likely to continue conducting business with a brand than customers who have a low-quality experience (Manning, 2016). Crosby and Johnson (2007) claimed that managing customer's experience plays a crucial role in building customer loyalty. In a similar vein, "Phil" Klaus and Maklan (2012) found that the CE has a significant impact on loyalty. Luo et al. (2011) demonstrated that enhanced online customer experience serves as a key factor leading to customer loyalty, the context of online gaming.

Word of Mouth (WOM)

Word of mouth (WOM) is defined as "informal communications directed at other consumers about the ownership, usage, or characteristics of particular goods and services and/or their sellers" (Westbrook, 1987, p. 261). Because of the influence of digital technologies, traditional WOM is evolving toward Electronic word-of-mouth (eWOM). Litvin et al. (2008) defined eWOM as "all informal communications directed at consumers through Internetbased technology related to the usage or characteristics of particular goods and services, or their sellers." Electronic word-of-mouth in the digital era encompassing online suggestions, recommendations and opinions, product/service reviews (Serra Cantallops and Salvi, 2014). Due to Electronic word-of-mouth ability to reach a large number of individuals instantly and on a global scale, therefore Electronic word-of-mouth, is argued to be more influential than Electronic word-of-mouth, (Christodoulides, Michaelidou, and Argyriou, 2012).

The relationship between customer experience and Word of Mouth has been confirmed by many studies. WOM is a crucial marketing tool for any brand .It is considered the most persuasive marketing tool (Keller and Fay, 2012). Richins (1983) believes that if customers are satisfied with their product/service and usage experiences, they are more likely to engage in positive Word of Mouth behaviour. Bilgihan et al. (2016) mentioned WOM, e-WOM as the outcomes of online customer experience. According to Nielsen's study, 83 percent of consumers say they either completely or somewhat trust the recommendations (word-of-mouth) from colleagues, family and friends about products or services (Nelsen, 2015). While a research shows that 50% of customers do not share their experiences (bad or good) through social media (CFI, 2020). However, other studies indicate that consumers share their negative experiences more than positive experiences on social media. In this case, Americans are more willing to post and write about good experiences (53%) than poor or bad experiences (35%) on social media platforms (Dorsey et al., 2020).

Customer Engagement

The notion of customer engagement, especially in digital business environments, is becoming increasingly important. According to Thakur (2019) offline environments are firm-centric, but digital business or online environments are customer-centric. Although the nations of consumer engagement and customer experience remain unconnected (Waqas et al., 2020), but marketers and researchers are exploring methods to enhance consumer engagement with different media such as social media, websites and applications (Tafesse, 2016a). The unified CE facilitates customer engagement with the brand in the long term (Bilgihan et al., 2016) and a satisfactory customer experience can improve customer engagement (Tafesse, 2016b; Triantafillidou and Siomkos, 2018; Waqas et al., 2020).

Customer Retention and Repurchasing

Customer retention has become one of the significant challenges of companies. Customer retention refers to the activities and ability of companies and organizations to keep (or retain) their customers over time and prevent them from switching to a competitor and build long-term relationships with them. Customer retention strategy is one of the most effective marketing strategies for business. The statistics show the 82% of companies agree that retention is cheaper than acquisitions, whereas increasing retention rates by just 5 percent can increase revenue by 25 percent to 95 percent (Goran, 2021).

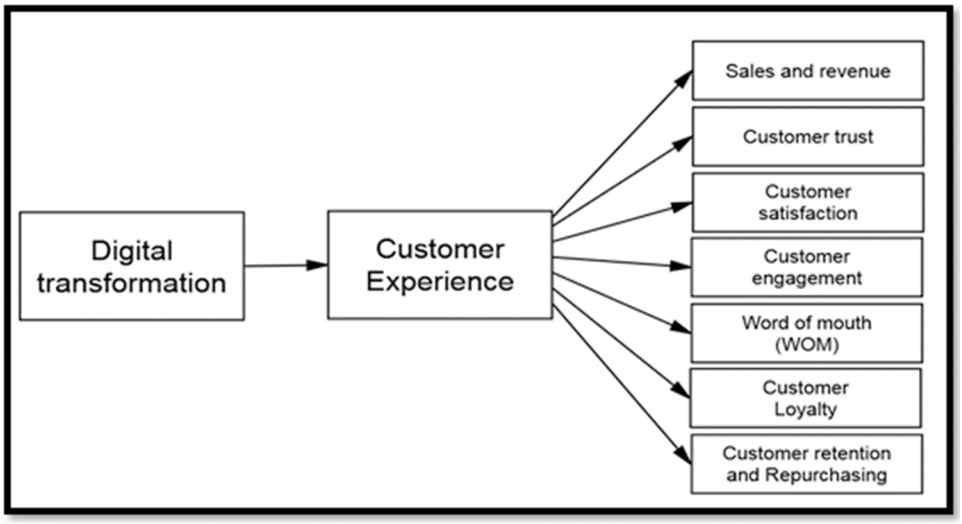
There is strong evidence of a positive relationship between customer experience and repurchasing. Rose et al. (2011) showed that re-purchase is one of the outstanding consequences of enhanced online customer experience. According to a report of Dorsey et al. (2020) the 87 percent of customers who rate and gave a 'very good' customer experience for a firm, being 'very likely' to re-purchase from the same company. In a similar study, nearly 91% of consumers are more likely and willing to repurchase after a positive and good customer service experience (Mulcahy, 2020). Likewise, Luo et al. (2011) and Chiu et al. (2012) found that positive online customer experience has a direct impact on repeat purchase.

Sales and Revenue

Excellent customer experience, directly and indirectly, impact on increase sales and save costs from various angles in a business. Studies shows that, firms with customer experience strategies drive income 4 to 8 Percent higher than the other industries (Morgan, 2019). On average, firms can earn 775 million US dollars over 3 years. Software firms stand to earn the most (1 billion US dollars over three years), while utilities stand to gain the least (476 million US dollars over three years). Similarly, Forrester's report "Customer Experience Drives Revenue Growth" showed that CE leaders achieved compound average revenue and profit growth of 17% over 5 years. The customer experience laggards achieved just 3 percent growth during the same period (Manning, 2016).

Figure 1 displays an integrated conceptual framework for the study. The framework represents direct effect of digital transformation on customer experience and outcomes of customer experience.

Figure 1. Linkage between digital transformation and customer experience



SOLUTIONS AND RECOMMENDATIONS

The present study has important management implications and brings significant insights for managers. Based on the literature, an important practical implication of this research is that companies need to shift from multi-channel to omnichannel strategy to interaction with customers through integrated synchronized channels. This study discovered several outcomes of holistic customer experiences. A well-formulated customer experiences strategy will lead to trust, Customer satisfaction, loyalty, positive WOM, engagement, and retention. Also, better customer experience is believed to create a competitive advantage and creating higher customer experiences support businesses to have high revenue in the long run.

On the theoretical front, this study highlights some specific conceptual contributions, which make significant contributions to the customer behavior literature. The review of the literature reveals that while there is a comprehensive agreement on the importance of digital transformation, the recent academic studies on customer experience are not considered the connection between digital transformation and customer experience. Thus, this study focused on identifying the evidence from current literature to show the linkage between digital transformation and customer experience; in this context, the study has provided an evidence-based approach based on statistics published on practitioner literature to a better understanding the current status of CE and how companies are developing and improving their customer experiences. Second, the current study adds a new knowledge to the understanding of customer experiences. The third contribution is the addition of the research on customer experiences by new conceptualization of customer experience, which has been given based on the theoretical perspective and evidences the linkages between digital transformation and consequences of customer experiences. Forth, the study identified outcomes of customer experience and it extends the existing knowledge into the customer experience. It can help researchers in understanding the existing state of research on CE and finding the gaps in the marketing literature.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The propositions and findings of this study can serve as a starting point for scholars seeking to further explore opportunities for customer behavior literature through customer experience. Considering the strong linkage between digital transformation and customer experience, there is a need for empirical studies to investigate the relationship between customer experiences and the digital transformation of companies. The review of academic and practitioner literature revealed that the positives customer experience has been examined by many scholars; thus, researchers could also investigate how the negative customer experience effects customer shopping behavior. From another standpoint, the multichannel environments provides different experiences for customers; Future studies are advised to empirically examine the impact of the CE of one channel on the experience of another.

CONCLUSION

Studies show that creating higher customer experiences can support businesses to have high revenue in the long run and a huge amount of potential income is lost by companies due to poor customer experiences. Many customers are using digital platforms (i.e., websites) and they expect companies to provide multiple channels to easy and fast shopping processes. On the other hand, Information Technology has become an integral part of businesses to improve their interactions with customers, customer service and sales processes. In this context, Digital Transformation has a significant role in delivering and providing a frictionless experience. DT helps to companies to use digital technologies (i.e., social media) to interacting with customers and offering products and services via multi-channels.

Given the increased access and use of devices to access the online environments along with the wide adoption of social media, the implementation of digital transformation could build unique customer experiences and enable customers to have personalized interactions anytime, anywhere across digital and online channels directly with companies. Consequently, for better understanding customer experience a conceptual framework from current marketing literature on consumer behavior was developed. In addition, building a positive customer experiences can lead to trust, Customer satisfaction, loyalty, positive WOM, engagement, retention and increase sales/revenue and save costs from various angles in a business.

Due to the importance of integrating information and services from multiple channels, omnichannel strategy and components of customer omnichannel experience were studied. Therefore, building an omnichannel community, enabling technologies, ease of search processes, service integration, etc., are critical factors for success in an omnichannel environment.

REFERENCES

Accenture. (2014). *Beyond Usability: Designing for continuous customer delight*. Retrieved September 3, 2021, from Accenture Interactive website: https://www.accenture.com/us-en/~/media/accenture/conversion-assets/dotcom/documents/global/pdf/technology_7/accenture-beyond-usability-designing-continuous-customer-delight.pdf

Ailawadi, K. L., Beauchamp, J. P., Donthu, N., Gauri, D. K., & Shankar, V. (2009). Communication and Promotion Decisions in Retailing: A Review and Directions for Future Research. *Journal of Retailing*, *85*(1), 42–55. doi:10.1016/j.jretai.2008.11.002

Ali, F., & Omar, R. (2014). Determinants of Customer Experience and Resulting Satisfaction and Revisit Intentions: PLS-SEM Approach towards Malaysian Resort Hotels. *Asia-Pacific Journal of Innovation in Hospitality and Tourism*, *3*(2), 10. doi:10.760340930-014-0010-2

Anuradha, D., & Manohar, H. L. (2011). Customer shopping experience in malls with entertainment centres in Chennai. *African Journal of Business Management*, *5*(31). Advance online publication. doi:10.5897/AJBM11.902

Arnould, E., Price, L., & Zinkhan, G. (2004). Consumers. McGraw-Hill.

Ashrafpour, N., Niky Esfahlan, H., Aali, S., & Taghizadeh, H. (2021). The prerequisites and consequences of customers' online experience regarding the moderating role of brand congruity: evidence from an Iranian bank. *Journal of Islamic Marketing*. doi:10.1108/JIMA-09-2020-0277

Beldad, A., de Jong, M., & Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior*, *26*(5), 857–869. doi:10.1016/j.chb.2010.03.013

Bilgihan, A., Kandampully, J., & Zhang, T. (2016). Towards a unified customer experience in online shopping environments. *International Journal of Quality and Service Sciences*, *8*(1), 102–119. doi:10.1108/IJQSS-07-2015-0054

Bitner, M. J., & Hubbert, A. R. (1994). Encounter satisfaction versus overall satisfaction versus quality. *Service Quality: New Directions in Theory and Practice*, *34*(2), 72–94.

Bordeaux, J. (2020). *What Is Customer Experience? (And Why It's So Important).* Retrieved September 1, 2021, from Hubspot website: https://blog.hubspot.com/service/what-is-customer-experience

Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand Experience: What is It? How is it Measured? Does it Affect Loyalty? *Journal of Marketing*, *73*(3), 52–68. doi:10.1509/jmkg.73.3.052

Brun, I., Rajaobelina, L., & Ricard, L. (2014). Online relationship quality: Scale development and initial testing. *International Journal of Bank Marketing*, *32*(1), 5–27. doi:10.1108/IJBM-02-2013-0022

Cao, L., & Li, L. (2015). The Impact of Cross-Channel Integration on Retailers' Sales Growth. *Journal of Retailing*, *91*(2), 198–216. doi:10.1016/j.jretai.2014.12.005

Carbone, L. P., & Haeckel, S. H. (1994). Engineering customer experiences. *Marketing Management*, *3*(3), 8–19.

CFI. (2020). *Contact Center Satisfaction Index (Managing the Entire Customer Experience)*. Retrieved from https://cdncom.cfigroup.com/wp-content/uploads/CFI-contact-center-satisfaction-2020.pdf

Chakraborty, S., & Sengupta, K. (2013). An exploratory study on determinants of customer satisfaction of leading mobile network providers – case of Kolkata, India. *Journal of Advances in Management Research*, *10*(2), 279–298. doi:10.1108/JAMR-11-2012-0049

Chauhan, V., & Manhas, D. (2014). Dimensional analysis of customer experience in civil aviation sector. *Journal of Service Research*, 75–101. doi:10.1201/9781315366227-4

Chiu, C.-M., Hsu, M.-H., Lai, H., & Chang, C.-M. (2012). Re-examining the influence of trust on online repeat purchase intention: The moderating role of habit and its antecedents. *Decision Support Systems*, *53*(4), 835–845. doi:10.1016/j.dss.2012.05.021

Christodoulides, G., Michaelidou, N., & Argyriou, E. (2012). Cross-national differences in e-WOM influence. *European Journal of Marketing*, *46*(11), 1689–1707. doi:10.1108/03090561211260040

Crosby, L. A., & Johnson, S. L. (2007). Experience required: Managing each customer's experience might just be the most important ingredient in building customer loyalty. *Marketing Management*, *16*(4), 20.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. Harper & Row.

Cummins, S., Peltier, J. W., & Dixon, A. (2016). Omni-channel research framework in the context of personal selling and sales management. *Journal of Research in Interactive Marketing*, *10*(1), 2–16. doi:10.1108/JRIM-12-2015-0094

Deyalage, P. A., & Kulathunga, D. (2019). Factors Affecting Online Customer Satisfaction: The Sri Lankan Perspective. *International Journal of Business and Management*, *14*(2), 99. doi:10.5539/ijbm.v14n2p99

Dorsey, M., Segall, D., & Temkin, B. (2020). *ROI of Customer Experience*. Retrieved from Qualtrics XM Institute website: https://www.qualtrics.com/xm-institute/roi-of-customer-experience-2020/

Duan, X., Deng, H., & Corbitt, B. (2012). Evaluating the critical determinants for adopting e-market in Australian small-and-medium sized enterprises. *Management Research Review*, *35*(3/4), 289–308. doi:10.1108/01409171211210172

Dube, A., & Helkkula, A. (2015). Service experiences beyond the direct use: Indirect customer use experiences of smartphone apps. *Journal of Service Management*, *26*(2), 224–248. doi:10.1108/JOSM-11-2014-0308

Edelman. (2019). *In brands we trust?* Retrieved from https://www.edelman.com/sites/g/files/aatuss191/files/2019-06/2019_edelman_trust_barometer_special_report_in_brands_we_trust.pdf

Eswaran, A. (2020). Competing in 2020: winners and losers in the digital economy. *Harvard Business Review*.

Fernández-Rovira, C., Álvarez Valdés, J., Molleví, G., & Nicolas-Sans, R. (2021). The digital transformation of business. Towards the datafication of the relationship with customers. *Technological Forecasting and Social Change, 162*(June), 120339. doi:10.1016/j.techfore.2020.120339

Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, *55*(2), 1–12.

Fornerino, M., Helme-Guizon, A., & Gotteland, D. (2006). Mesurer l'immersion dans une expérience de consommation: premiers développements. *Atti Del XXII Congresso Dell'AFM*.

Frow, P., & Payne, A. (2007). Towards the 'perfect' customer experience. *Journal of Brand Management*, *15*(2), 89–101. doi:10.1057/palgrave.bm.2550120

Garg, R., Rahman, Z., & Qureshi, M. N. (2014). Measuring customer experience in banks: Scale development and validation. *Journal of Modelling in Management*, *9*(1), 87–117. doi:10.1108/JM2-07-2012-0023

Gentile, C., Spiller, N., & Noci, G. (2007). How to Sustain the Customer Experience. *European Management Journal*, *25*(5), 395–410. doi:10.1016/j.emj.2007.08.005

Ghose, K. (2009). Internal brand equity defines customer experience. *Direct Marketing: An International Journal*, *3*(3), 177–185. doi:10.1108/17505930910985125

Godovykh, M., & Tasci, A. D. A. (2020). Customer experience in tourism: A review of definitions, components, and measurements. *Tourism Management Perspectives, 35*(May), 100694. doi:10.1016/j.tmp.2020.100694

Gopalan, R., & Narayan, B. (2010). Improving customer experience in tourism: A framework for stakeholder collaboration. *Socio-Economic Planning Sciences*, *44*(2), 100–112. doi:10.1016/j.seps.2009.11.001

Goran. (2021). *40 Amazing Customer Loyalty Statistics in 2021*. Retrieved January 9, 2021, from SmallBizGenius website: https://www.smallbizgenius.net/by-the-numbers/customer-loyalty-statistics/#gref

Graf, M., Schlegelmilch, B. B., Mudambi, S. M., & Tallman, S. (2013). Outsourcing of customer relationship management: Implications for customer satisfaction. *Journal of Strategic Marketing*, *21*(1), 68–81. doi:10.1080/0965254X.2012.734844

Gualtrics. (2021). *Digital customer experience: Everything to know in 2021*. Retrieved October 8, 2021, from Qualtrics website: https://www.qualtrics.com/uk/experience-management/customer/digital-cx/?rid=ip&prevsite=en&newsite=uk&geo=DE&geomatch=uk

Hafsi, M., & Assar, S. (2020). Does enterprise architecture support customer experience improvement? Towards a conceptualization in digital transformation context. Lecture Notes in Business Information Processing. doi:10.1007/978-3-030-49418-6_28

Hart, D. (2019). *Measuring Customer Experience: 4 CX Metrics For You To Trial*. Retrieved November 10, 2021, from https://www.thepowermba.com/en/marketing/measuring-customer-experience

Hilken, T., Heller, J., Chylinski, M., Keeling, D. I., Mahr, D., & de Ruyter, K. (2018). Making omnichannel an augmented reality: The current and future state of the art. *Journal of Research in Interactive Marketing*, *12*(4), 509–523. doi:10.1108/JRIM-01-2018-0023

Holbrook, M. B. (2006). Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay. *Journal of Business Research*, *59*(6), 714–725. doi:10.1016/j.jbusres.2006.01.008

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *The Journal of Consumer Research*, *9*(2), 132–140. doi:10.1086/208906

Homburg, C., Jozić, D., & Kuehnl, C. (2017). Customer experience management: Toward implementing an evolving marketing concept. *Journal of the Academy of Marketing Science*, *45*(3), 377–401. doi:10.100711747-015-0460-7

Hueffner, E. (2020). *What is customer experience? How to deliver great CX*. Retrieved June 10, 2021, from Zendesk blog website: https://www.zendesk.com/blog/why-companies-should-invest-in-the-customer-experience/

Hunter, G. K., & Perreault, W. D. Jr. (2006). Sales Technology Orientation, Information Effectiveness, and Sales Performance. *Journal of Personal Selling & Sales Management*, *26*(2), 95–113. doi:10.2753/PSS0885-3134260201

Jain, R., Aagja, J., & Bagdare, S. (2017). Customer experience – a review and research agenda. *Journal of Service Theory and Practice*, *27*(3), 642–662. doi:10.1108/JSTP-03-2015-0064

Jarman, P. (2019). Delivering an Excellent Omni-channel Experience. *CX Today*. Retrieved from https://www.cxtoday.com/contact-centre/delivering-an-excellent-omni-channel-experience/

Johnston, R., & Kong, X. (2011). The customer experience: A road-map for improvement. *Managing Service Quality*, *21*(1), 5–24. doi:10.1108/09604521111100225

Kamalaldin, A., Linde, L., Sjödin, D., & Parida, V. (2020). Transforming provider-customer relationships in digital servitization: A relational view on digitalization. *Industrial Marketing Management, 89*(November), 306–325. doi:10.1016/j.indmarman.2020.02.004

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, not technology, drives digital transformation. *MIT Sloan Management Review and Deloitte University Press*, *14*, 1–25.

Keller, E., & Fay, B. (2012). Word-of-Mouth Advocacy. *Journal of Advertising Research*, *52*(4), 459–464. doi:10.2501/JAR-52-4-459-464

Khoros. (2019). *Getting to know your customers*. Retrieved from https://khoros.com/resources/forrester-report-getting-to-know-your-customers

Klaus, P., & Maklan, S. (2012). EXQ: A multiple-item scale for assessing service experience. *Journal of Service Management*, *23*(1), 5–33. https://doi.org/10.1108/09564231211208952

Klaus, P., & Maklan, S. (2013). Towards a Better Measure of Customer Experience. *International Journal of Market Research*, *55*(2), 227–246. doi:10.2501/IJMR-2013-021

Koetz, C. (2019). Managing the customer experience: A beauty retailer deploys all tactics. *The Journal of Business Strategy*, *40*(1), 10–17. doi:10.1108/JBS-09-2017-0139

Komulainen, H., & Saraniemi, S. (2019). Customer centricity in mobile banking: A customer experience perspective. *International Journal of Bank Marketing*, *37*(5), 1082–1102. doi:10.1108/IJBM-11-2017-0245

Kumar, V. (2021). *Digital transformation: implementing big data analytics*. Retrieved October 9, 2021, from Analytics Insight website: https://www.analyticsinsight.net/digital-transformation-implementing-big-data-analytics/

Law, A. K. Y. (2009). *CRM adoption and its impact on organisational performance*. University of Nottingham.

Lee, Z. W. Y., Chan, T. K. H., Chong, A. Y.-L., & Thadani, D. R. (2019). Customer engagement through omnichannel retailing: The effects of channel integration quality. *Industrial Marketing Management*, *77*, 90–101. doi:10.1016/j.indmarman.2018.12.004

Leggett, K. (2018). *2018 Customer Service Trends: How Operations Become Faster, Cheaper — And Yet, More Human.* Retrieved October 8, 2021, from Forrester website: https://www.forrester.com/report/2018-Customer-Service-Trends-How-Operations-Become-Faster-Cheaper-And-Yet-More-Human/RES142291

Lena Lich, A. (2020). *What Makes a Great Digital Customer Experience?* Retrieved October 8, 2021, from Bright IT GmbH website: https://www.bright.global/en/blog/what-makes-a-great-digital-customer-experience

Leventhal, L. (2008). The role of understanding customer expectations in aged care. *International Journal of Health Care Quality Assurance*, *21*(1), 50–59. doi:10.1108/09526860810841156 PMID:18437938

Lobzhanidze, G. (2019). *Customer Experience Vs. Product: What's More Important?* Retrieved September 8, 2021, from Qminder website: https://www.c.com/customer-experience-vs-product/

Luo, M. M., Chen, J.-S., Ching, R. K. H., & Liu, C.-C. (2011). An examination of the effects of virtual experiential marketing on online customer intentions and loyalty. *Service Industries Journal*, *31*(13), 2163–2191. doi:10.1080/02642069.2010.503885

Mahrous, A. A., & Hassan, S. S. (2017). Achieving Superior Customer Experience: An Investigation of Multichannel Choices in the Travel and Tourism Industry of an Emerging Market. *Journal of Travel Research*, *56*(8), 1049–1064. doi:10.1177/0047287516677166

Manning, H. (2016). Customer Experience Drives Revenue Growth. *Forrester*. Retrieved from https://lumwp.azureedge.net/cdn/wp-content/uploads/2019/12/16-06-21-customer_experience_drives_revenue_growth_2016

Martin, J., Mortimer, G., & Andrews, L. (2015). Re-examining online customer experience to include purchase frequency and perceived risk. *Journal of Retailing and Consumer Services*, *25*, 81–95. doi:10.1016/j.jretconser.2015.03.008

Meyer, C., & Schwager, A. (2007). Understanding Customer Experience. Harvard.

Mohsin, A., & Lockyer, T. (2010). Customer perceptions of service quality in luxury hotels in New Delhi, India: An exploratory study. *International Journal of Contemporary Hospitality Management*, *22*(2), 160–173. doi:10.1108/09596111011018160

Morgan, B. (2019). *50 Stats That Prove The Value Of Customer Experience*. Retrieved from forbes website: https://www.forbes.com/sites/blakemorgan/2019/09/24/50-stats-that-prove-the-value-of-customer-experience/?sh=cd7bee24ef22

Morgan, R. M., & Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing*, *58*(3), 20–38. doi:10.1177/002224299405800302

Morgan-Thomas, A., & Veloutsou, C. (2013). Beyond technology acceptance: Brand relationships and online brand experience. *Journal of Business Research*, *66*(1), 21–27. doi:10.1016/j.jbusres.2011.07.019

Mulcahy, S. (2020). *State of the Connected Customer*. Retrieved from https://c1.sfdcstatic.com/content/dam/web/en_us/www/documents/research/salesforce-state-of-the-connected-customer-4th-ed.pdf

Nas, D. (2019). *How technology is changing customer expectations*. Retrieved November 10, 2021, from The Startup website: https://medium.com/swlh/how-technology-is-changing-customer-expectations-fef52fd709c5

Nelsen. (2015). *Digital formats are among the most trusted advertising sources despite slow growth*. Retrieved October 10, 2021, from Nelsen website: https://www.nielsen.com/us/en/insights/article/2015/digital-formats-are-among-the-most-trusted-advertising-sources-despite-slow-growth/

Newman, D. (2020). *4 Actionable Customer Experience Statistics For 2020*. Retrieved from Forbes website: https://www.forbes.com/sites/danielnewman/2020/06/23/4-actionable-customer-experience-statistics-for-2020/?sh=595492541a84

Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. McGraw-Hill.

Pantano, E., & Timmermans, H. (2014). What is smart for retailing? *Procedia Environmental Sciences*, *22*, 101–107. doi:10.1016/j.proenv.2014.11.010

Patrick, A. S. (2002). Building trustworthy software agents. *IEEE Internet Computing*, *6*(6), 46–53. doi:10.1109/MIC.2002.1067736

Pei, X.-L., Guo, J.-N., Wu, T.-J., Zhou, W.-X., & Yeh, S.-P. (2020). Does the Effect of Customer Experience on Customer Satisfaction Create a Sustainable Competitive Advantage? A Comparative Study of Different Shopping Situations. *Sustainability*, *12*(18), 7436. doi:10.3390u12187436

Pentina, I., Amialchuk, A., & Taylor, D. G. (2011). Exploring effects of online shopping experiences on browser satisfaction and e-tail performance. *International Journal of Retail & Distribution Management*, *39*(10), 742–758. doi:10.1108/09590551111162248

Pine, B. J., & Gilmore, J. H. (1998, July). Welcome to the experience economy. *Harvard Business Review,* 97–105.

Puthiyamadam, T., & Reyes, J. (2018). Experience is everything: Here's how to get it right. *PwC*. doi:10.1057/9780230554719_13

Quach, S., Barari, M., Moudrý, D. V., & Quach, K. (2020). Service integration in omnichannel retailing and its impact on customer experience. *Journal of Retailing and Consumer Services*, 102267. doi:10.1016/j.jretconser.2020.102267

Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*, *30*(8), 1143–1160. https://doi.org/10.1108/JMTM-01-2018-0020

Rahman, Z. (2006). Customer experience management— A case study of an Indian bank. *Journal of Database Marketing & Customer Strategy Management*, *13*(3), 203–221. https://doi.org/10.1057/palgrave.dbm.3240298

Rajaobelina, L., Brun, I., Prom Tep, S., & Arcand, M. (2018). Towards a better understanding of mobile banking: The impact of customer experience on trust and commitment. *Journal of Financial Services Marketing*, *23*(3–4), 141–152. https://doi.org/10.1057/s41264-018-0051-z

Rangaswamy, A., & Van Bruggen, G. H. (2005). Opportunities and challenges in multichannel marketing: An introduction to the special issue. *Journal of Interactive Marketing*, *19*(2), 5–11. https://doi.org/10.1002/dir.20037

Richins, M. L. (1983). Negative Word-of-Mouth by Dissatisfied Consumers: A Pilot Study. *Journal of Marketing*, *47*(1), 68–78. https://doi.org/10.1177/002224298304700107

Rose, S., Clark, M., Samouel, P., & Hair, N. (2012). Online Customer Experience in e-Retailing: An empirical model of Antecedents and Outcomes. *Journal of Retailing*, *88*(2), 308–322. https://doi.org/10.1016/j.jretai.2012.03.001

Rose, S., Hair, N., & Clark, M. (2011). Online Customer Experience: A Review of the Business-to-Consumer Online Purchase Context. *International Journal of Management Reviews*, *13*(1), 24–39. https://doi.org/10.1111/j.1468-2370.2010.00280.x

Roy, S. (2018). Effects of customer experience across service types, customer types and time. *Journal of Services Marketing*, *32*(4), 400–413. https://doi.org/10.1108/JSM-11-2016-0406

Schmitt, B. (1999). Experiential Marketing. *Journal of Marketing Management*, *15*(1–3), 53–67. https://doi.org/10.1362/026725799784870496

Serra Cantallops, A., & Salvi, F. (2014). New consumer behavior: A review of research on eWOM and hotels. *International Journal of Hospitality Management*, *36*, 41–51. https://doi.org/10.1016/j.ijhm.2013.08.007

Shekhar Kumar, R., Dash, S., & Chandra Purwar, P. (2013). The nature and antecedents of brand equity and its dimensions. *Marketing Intelligence & Planning*, *31*(2), 141–159. https://doi.org/10.1108/02634501311312044

Shen, X.-L., Li, Y.-J., Sun, Y., & Wang, N. (2018). Channel integration quality, perceived fluency and omnichannel service usage: The moderating roles of internal and external usage experience. *Decision Support Systems*, *109*, 61–73. https://doi.org/10.1016/j.dss.2018.01.006

Shi, S., Wang, Y., Chen, X., & Zhang, Q. (2020). Conceptualization of omnichannel customer experience and its impact on shopping intention: A mixed-method approach. *International Journal of Information Management*, *50*, 325–336. https://doi.org/10.1016/j.ijinfomgt.2019.09.001

Sopadjieva, E., Utpal, M. D., & Benjamin, B. (2017). *A Study of 46,000 Shoppers Shows That Omnichannel Retailing Works.* Retrieved March 9, 2021, from Harvard Business Review website: https://hbr.org/2017/01/a-study-of-46000-shoppers-shows-that-omnichannel-retailing-works

Sovie, D., Curran, J., Schoelwer, M., & Björnsjö, A. (2017). *Dynamic digital consumers: Ever-changing expectations and technology intrigue*. Academic Press.

Spurdle, A. (2020). *3 steps to effective multi-channel marketing for retailers*. Retrieved July 10, 2021, from Americas HQ website: https://www.tagww.com/ams/article/3-steps-to-effective-multi-channel-marketing-for-retailers/

Srivastava, M., & Kaul, D. (2014). Social interaction, convenience and customer satisfaction: The mediating effect of customer experience. *Journal of Retailing and Consumer Services*, *21*(6), 1028–1037. https://doi.org/10.1016/j.jretconser.2014.04.007

Srivastava, M., & Kaul, D. (2016). Exploring the link between customer experience-loyalty-consumer spend. *Journal of Retailing and Consumer Services*, *31*, 277–286. https://doi.org/10.1016/j.jretconser.2016.04.009

Stein, A., & Ramaseshan, B. (2016). Towards the identification of customer experience touch point elements. *Journal of Retailing and Consumer Services*, *30*, 8–19. https://doi.org/10.1016/j.jretconser.2015.12.001

Sweor. (2021). *27 Eye-Opening Website Statistics: Is Your Website Costing You Clients?* Retrieved from https://www.sweor.com/firstimpressions

Tafesse, W. (2016a). An experiential model of consumer engagement in social media. *Journal of Product and Brand Management*, *25*(5), 424–434. https://doi.org/10.1108/JPBM-05-2015-0879

Tafesse, W. (2016b). Conceptualization of Brand Experience in an Event Marketing Context. *Journal of Promotion Management*, *22*(1), 34–48. https://doi.org/10.1080/10496491.2015.1107007

Thakur, R. (2019). The moderating role of customer engagement experiences in customer satisfaction–loyalty relationship. *European Journal of Marketing*, *53*(7), 1278–1310. https://doi.org/10.1108/EJM-11-2017-0895

Tian, H. (2011). *Volumetric heat capacity enhancement in ultrathin fluorocarbon polymers for capacitive thermal management*. University of Illinois at Urbana-Champaign. Retrieved from http://hdl.handle.net/2142/24118

Toufaily, E., & Pons, F. (2017). Impact of customers' assessment of website attributes on e-relationship in the securities brokerage industry: A multichannel perspective. *Journal of Retailing and Consumer Services*, *34*, 58–69. https://doi.org/10.1016/j.jretconser.2016.09.011

Triantafillidou, A., & Siomkos, G. (2018). The impact of Facebook experience on consumers' behavioral Brand engagement. *Journal of Research in Interactive Marketing*, *12*(2), 164–192. https://doi.org/10.1108/JRIM-03-2017-0016

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2015). From Multi-Channel Retailing to Omni-Channel Retailing. *Journal of Retailing*, *91*(2), 174–181. https://doi.org/10.1016/j.jretai.2015.02.005

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies. *Journal of Retailing*, *85*(1), 31–41. https://doi.org/10.1016/j.jretai.2008.11.001

Walter, U., Edvardsson, B., & Öström, Å. (2010). Drivers of customers' service experiences: A study in the restaurant industry. *Managing Service Quality*, *20*(3), 236–258. https://doi.org/10.1108/09604521011041961

Waqas, M., Hamzah, Z. L. B., & Salleh, N. A. M. (2020). Customer experience: a systematic literature review and consumer culture theory-based conceptualisation. *Management Review Quarterly*. doi:10.1007/s11301-020-00182-w

Westbrook, R. A. (1987). Product/Consumption-Based Affective Responses and Postpurchase Processes. *JMR, Journal of Marketing Research*, *24*(3), 258–270. https://doi.org/10.1177/002224378702400302

Westerman, G., & Bonnet, D. (2015). Revamping your business through digital transformation. *MIT Sloan Management Review*, *56*(3), 10.

Yakhlef, A. (2015). Customer experience within retail environments. *Marketing Theory*, *15*(4), 545–564. https://doi.org/10.1177/1470593115569016

ADDITIONAL READING

Amin, M. (2016). Internet banking service quality and its implication on e-customer satisfaction and e-customer loyalty. *International Journal of Bank Marketing*, *34*(3), 280–306. doi:10.1108/IJBM-10-2014-0139

Ashrafpour, N., Niky Esfahlan, H., Aali, S., & Taghizadeh, H. (2021). The prerequisites and consequences of customers' online experience regarding the moderating role of brand congruity: evidence from an Iranian bank. *Journal of Islamic Marketing*. doi:10.1108/JIMA-09-2020-0277

Cummins, S., Peltier, J. W., & Dixon, A. (2016). Omni-channel research framework in the context of personal selling and sales management. *Journal of Research in Interactive Marketing*, *10*(1), 2–16. doi:10.1108/JRIM-12-2015-0094

Garg, R., Rahman, Z., & Kumar, I. (2011). Customer experience: A critical literature review and research agenda. *International Journal of Services Sciences*, *4*(2), 146. doi:10.1504/IJSSCI.2011.045556

Pandey, S., & Chawla, D. (2018). Online customer experience (OCE) in clothing e-retail. *International Journal of Retail & Distribution Management*, *46*(3), 323–346. doi:10.1108/IJRDM-01-2017-0005

Rose, S., Hair, N., & Clark, M. (2011). Online Customer Experience: A Review of the Business-to-Consumer Online Purchase Context. *International Journal of Management Reviews*, *13*(1), 24–39. doi:10.1111/j.1468-2370.2010.00280.x

Shen, X.-L., Li, Y.-J., Sun, Y., & Wang, N. (2018). Channel integration quality, perceived fluency and omnichannel service usage: The moderating roles of internal and external usage experience. *Decision Support Systems*, *109*, 61–73. doi:10.1016/j.dss.2018.01.006

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2015). From Multi-Channel Retailing to Omni-Channel Retailing. *Journal of Retailing*, *91*(2), 174–181. doi:10.1016/j.jretai.2015.02.005

Waqas, M., Hamzah, Z. L. B., & Salleh, N. A. M. (2020). Customer experience: A systematic literature review and consumer culture theory-based conceptualisation. *Management Review Quarterly*. Advance online publication. doi:10.100711301-020-00182-w

KEY TERMS AND DEFINITIONS

Customer Experience: Customer experience is the sum of all the cognitive and affective assessment and interactions that a customer has with a brand at every point of their buying journey.

Digital Transformation: Digital transformation is the adoption and implementation of computer-based technologies by a company and integration of such technologies into all areas of a business.

Multichannel Marketing: Multichannel marketing is the implementation of a unified strategy to focuses on communicating with customers services via two or more synchronized channels.

Omnichannel Marketing: Omnichannel marketing is the integration of customer touchpoints and communication opportunities to deliver a more consistent and customized customer experience across all channels and devices.

Chapter 11
Customer Value, Brand Experience, and User Experience on Customer Satisfaction and Loyalty in Digital Streaming Services

Syafrizal Helmi Situmorang
https://orcid.org/0000-0002-3988-5622
Universitas Sumatera Utara, Indonesia

Wisnu Agus Harmawan
Universitas Sumatera Utara, Indonesia

ABSTRACT

The COVID-19 pandemic has limited people's access and mobility, forcing consumers to prefer home video streaming services over going to the cinema. This condition causes a decline in the performance of the cinema film industry but brings blessings to the digital streaming service industry. The growth of the streaming business jumped sharply, and as a result, the competition became increasingly fierce. This chapter analyzes the effect of brand experience, customer value, and user experience on customer satisfaction and loyalty in the millennial generation. Data analysis used Smart PLS-SEM to test the direct, indirect, and total effect of the relationship between variables. The findings of this study indicate that although satisfied with customer service, they are still not loyal. This is due to the ease with which customers switch services, cheap services, and the desire to seek new experiences from the content provided by streaming services.

DOI: 10.4018/978-1-7998-9008-9.ch011

INTRODUCTION

COVID-19 has quickly changed the behavior and activities of our daily lives. The consequences of the impact of COVID-19 have forced us to limit everyday physical and social activities (Haleem et al., 2020). The pandemic has increased anxiety about health and safety, and to prevent transmission of COVID-19, we have to stay away from the crowds. One of the affected sectors caused by COVID-19 is the entertainment industry, including movies or cinema (Sari, 2020). The film industry is a sector that the pandemic has hardest hit because COVID-19's disruptive effect has already wreaked havoc on the production schedules of many of Hollywood's studios. The MPA Report (2020) shows that the global pandemic has caused a reduction in the number of productions at various film studios, resulting in a slowdown in the growth of the entertainment and cinema industries. A significant decrease in income occurred globally as a result. Industrial film revenues decreased from $42.3 billion in 2019 to $12 billion in 2020. Hall and Pasquini (2020) state that the pandemic has expedited the shift of cinema production, distribution, and consumption that has already begun. Since COVID-19, there has been a change in consumer behavior by watching streaming video-on-demand (SVoD). In Indonesia, two major cinema chains, namely XXI and CGV, had to close to prevent and reduce the spread of the pandemic. About 90% of film studio revenues come from cinema ticket sales. The Studio must be innovative in finding new sources of income to maintain its financial stability by creating new business models through streaming platforms. Parson (2020) states that streaming services and video on demand become the only means of entertainment in a self-isolating world. However, it will not be easy for media and entertainment companies to make a business shift from cinema films to streaming services. Companies must pay attention to many things, such as providing a new viewing experience at home that can replace the cinema experience, providing service and value at a price that consumers can pay. Consumer behavior and work habits have altered due to the pandemic, particularly the desire for internet speed and efficiency. For this reason, businesses must adapt to provide a more personalized experience, ease, and security of transaction processing and provide meaningful benefits. Today, the concept of customer experience is a new source of competitive advantage for companies because when customers are happy, they will share positive experiences with friends, family, and followers on social media. The impact will increase the loyalty of existing customers, attract new customers and cut advertising costs. Unfortunately, many companies are so focused on getting new customers that they forget to provide an unforgettable experience to their existing customers. The competition between Netflix and Disney + Hotstar is described and analyzed in this study based on the perceived value customers receive and customer satisfaction and loyalty. In addition, this study also analyzes the direct and indirect effects of customer value, user experience, and brand experience variables on customer satisfaction and loyalty.

BACKGROUND

The impossibility of going to the cinema has forced consumers to watch movies, series, sports, and other entertainment at home (Granados, 2020). People divert activities to meet their entertainment needs through home entertainment and streaming services. Consumers prefer home streaming videos compared to going to theaters. A survey conducted by Morning Consult and The Hollywood Reporter (2020) showed that streaming film and TV became increasingly popular during a pandemic. The Coronavirus pandemic is the main reason they subscribe. Pandemic has provided fortune streaming business

to Netflix, increasing more than double the number of new customers, and even Disney+ experiences a surge of 22 million customers (Gontovnikas, 2020). According to Ofcom (2020), since the pandemic, the time spent on streaming services such as Netflix, Amazon Prime Video, and Disney + increased 31% compared to the previous year. This change, due to the time spent watching a subscription streaming service, has almost doubled from before. Research from Marketsandresearch.biz (2021) estimates the streaming size of global cloud videos will grow at the 10.2% CAGR for the next five years.

In Indonesia, Market Streaming Services, Video, and Video On Demand (VOD) began to grow and expand. Restrictions on social interactions triggered the public to seek their entertainment. Based on a survey conducted by Daily social and Populix regarding the type of application that the Indonesian people often use to get enjoyment during the pandemic, 966 respondents chose 79% social media applications, 67% video streaming applications, 63% game applications, 44% music streaming application, and Other 3% (Nabila, 2020). The resulting survey shows that the video streaming application is an alternative in fulfilling the entertainment needs of the community during the COVID-19 pandemic. Pandemic Covid-19 has made digital streaming services more popular and competitive. Competition for streaming services has intensified after Disney+ Hotstar arrived in the Indonesian market in September 2020. Through Disney, Marvel, and Star Wars original content, Disney+ Hotstar has succeeded in dominating the subscription video service market in Indonesia, surpassing the number of subscribers of other streaming such as Netflix, HBO, VIU, Iflix, GoPlay, HOOQ dan Vidio (Lidwina, 2020). To attract more customers, Disney+ Hotstar has a business partnership with Telkomsel, while Netflix collaborates with Gopay to make it easier for consumers to subscribe. To increase local content and market reach, digital streaming providers collaborate with local content producers and creators and provide old Indonesian film content (Yusra, 2019). Arkenberg et al. (2021) explain that competition is increasingly fierce, the environment and the landscape are more dynamic than before because consumers will have more options for discovering information and finding value. This situation will trigger a war in digital streaming services.

According to Cagan (2018), a strong technology companies know that they need to ensure consistent innovation, which means they must continue to create new values for their customers and businesses. The most prominent value of digital streaming services is undoubtedly the content. Various digital streaming services offer subscribers exclusive content and new experiences. Disney+ Hotstar offer an exclusive collection from Disney studios such as Star Wars, Pixar, Marvel, The Simpsons, and many more. The entire collection will attract Disney fans to engage through the streaming platform (Alphanso, 2020). Netflix produces and provides exclusive and original content with famous actors and actresses and quality story trips to attract new customers and retain their customers. (Samson, 2020). Rezwan (2020) states when customers decide to subscribe to a streaming service, they want high-quality content, great stories, beautiful direction, and amazing shows. This paper will compare content favorites between Netflix and Disney+ Hotstar.

Weinstein (2012) states that value is a strategic driver to distinguish businesses from competitors in customers' minds. A streaming service business such a Netflix and Disney+Hotstar has modified its business strategy to allow users to stream their favorite materials from the comfort of their own home. Netflix's general business structure and revenue have improved due to its platform's advancement to streaming technology (Pereira, 2021). The increasing number of subscribers of streaming video services will be a challenge for companies. Viewers have greater control over their entertainment than ever before. The problem is how companies can attract and retain customers when they have many choices and easily switch services to competitors? So, apart from providing engaging viewing content, companies should

also provide additional value and memorable experiences to retain their subscribers. Capallone (2017) pinpoints when customers are satisfied, it will trigger a purchase then retention, which ultimately leads to customer loyalty. Making customers loyal can be a long-term advantage for the company. Netflix and Disney + Hotstar both continue to try to make customers satisfied with the services provided. This paper will analyze the effect of customer value on customer satisfaction and loyalty. Is the value offered by digital streaming services able to increase customer satisfaction and loyalty?

Companies that can provide a memorable customer experience and meet customer expectations will be able to survive and win. Situmorang (2020) states that value is something worth and reason customers to buy. Pine and Gilmore (2020) explain that the economy is changing. People don't just want goods and services anymore, and they want experiences designed to please them. Customers are less willing to spend time, attention, and money on mere interest and kindness. The more valuable the experience, the more personal and memorable it is for them. So, business success will depend on how the company can provide an experience that drives customer satisfaction and loyalty. Van Belleghem (2021) explained that Netflix has a demonstrated track record of offering excellent customer service. Netflix has attempted to deliver a far better movie viewing experience than the typical video rentals. Netflix goes beyond excellent customer service and introduces "joy" to fundamentally redefine the experience. The impression a person gets from engaging with a product's interface is known as user experience (UX). UX will prevent users from spending less time selecting and more time enjoying viewing. It is necessary to measure UX to understand and verify that the service website is appropriately created and adapted to meet the needs of its subscribers. Chen et al. (2018) explained user experience refers to the internal and subjective feelings someone has while using a product or service. The concept of Customer Experience has occupied a central place even in academic debates and has become a research priority (Forlani et al. 2018; Kranzbühler et al., 2018). A study by Roto et al. (2021) showed the rapidly growing number of publications in the experience area, which indicates an increasing scholarly interest in experience research. Their research findings demonstrate the importance of experiential research to advance further knowledge of experience. This paper will analyze the brand and user experience of Netflix and Disney+ Hotstar and its relation to customer satisfaction and loyalty.

Market segmentation of video streaming services especially targeting young (millenials) people who are used to using digital. It is essential to know more about millenials' consumer preferences such as entertainment choices, content types, or satisfaction with digital streaming services. Bozkurt (2020) explains that customers will consider the service's cost, the choice of the content offered, and the convenience of viewing time. For this reason, research is needed to understand customer behavior on digital streaming services that connect viewers, TV, and online streaming, especially among Indonesian millennials.

METHODS

This study aims to analyze the impact of Customer Value, Brand Experience, and User Experience on Customer Satisfaction and Loyalty of Netflix and Disney+Hotstar digital streaming services in Medan City among the millennial generation. There are five variables to be studied: Customer Value, Brand Experience, and User Experience acting as independent variables, Customer Satisfaction as the mediating variable, and Customer Loyalty as the dependent variable. In this study, the population is the millennial generation in Medan, Indonesia. Data were collected from 385 respondents consisting of 170 Netflix

subscribers and 215 Disney+ Hotstar subscribers. The sampling technique uses non-probability sampling with the criteria of having used each digital streaming service for at least one month.

Customer value is measured using indicators such as social value, functional (quality) and price value (Sweeney & Soutar, 2001). Brand experience is measured using indicators such as sensory, affective, behavioral, and intellectual (Brakus, Schmitt, & Zarantonello, 2009). User experience is measured using indicators such as functional, usefulness, informational, physical characteristics, sensory/Perceptual, cognitive, psychological, and social (Robert, 2014). Customer satisfaction is measured using indicators such as product and service features, attributions, and perceptions of equity or fairness (Zeithaml, Bitner, & Gremler, 2017). Customer loyalty is measured using indicators such as repurchase, share of wallet, recommendation, and retention (Reicheld, Osenton, 2003; Kotler & Keller, 2016).

Data was collected by distributing questionnaires with measurements of each study's variables. Respondents are asked to score how much they agree with statements that describe a questioner's topic using a Likert scale of one to five. Before data collection, validity and reliability tests were conducted on questionnaire statements on 30 Netflix subscribers and 30 Disney+Hotstar subscribers outside the research sample. The collected data were analyzed using descriptive statistics. Descriptive analysis is needed to describe indications or situations from the characteristics of individuals, groups, communities, or organizations (Babin and Zikmund, 2016; Situmorang, 2017). Path analysis is used to estimate causality between variables that have been previously determined based on theory. Furthermore, the path analysis test is used to determine whether the customer satisfaction variable is an intermediate variable whose function is to mediate the relationship between the independent variable and the dependent variable. The analytical model used is Structural Equation Modeling (SEM). Data processing technique were conducted through partial least square-structural equation model (PLS-SEM) by using Smart PLS 3.0 program. PLS SEM analysis consists of two sub-models, namely testing the measurement model (outer model) and structural model (inner model).

RESULT AND DISCUSSION

Respondent Profile

The respondent's profile table shows that the number of female customers (72%) exceeds that of male customers (28%). These results indicate that women are more likely to use streaming service than men. This study was dominated by respondents aged 17-20 (54%) with a high school education level and aged 21-25 (42%) with an undergraduate education level. The dominance of Gen Z provides growth opportunities for Disney+ Hotstar because its entertainment content is more family-friendly and focused on the youth segment compared to Netflix. These results also show that the subscribers of these digital streaming services are well educated. Based on work, subscribers are dominated by undergraduate students who have more free time due to studying from home than those who work. Therefore, students are freer to use digital streaming services. According to digital media trends, watching TV and movies at home is a favorite during the pandemic (Westcott, et al., 2021). Based on the length of the subscription period, 147 new subscribers (38%) mostly came from new Disney+ Hotstar customers because they have only been operating since September 2020. Meanwhile, Netflix has been serving in Indonesia since 2016. The success of attracting new Disney+ Hotstar subscribers is due to collaborating with Telkomsel's internet data package.

The content and genres of films offered by Netflix and Disney+ Hotstar are very diverse. Based on the type of content they like the most, Netflix subscribers are more likely to prefer the action and drama genres. Netflix offers an action-adventure range such as Hollywood films, Asian films, or Netflix original films that can bring viewers to feel new experiences and suspense displayed. Meanwhile, drama genre content on Netflix is deemed capable of touching its customers' feelings. Disney+ Hotstar customers also prefer the Marvel universe superhero action genres such as The Avengers, The Amazing Spider-Man, The Iron Man, Thor, Captain America, and other Marvel superheroes. To attract more local markets, Disney+ will broadcast a new series that tells the story of a local superhero from Indonesia. Disney+ Hotstar subscribers prefer movies and animations, while Netflix subscribers prefer films and series. One of the advantages of Netflix is that Netflix Original Series is always popular because it is full of creativity and can provide unique and new sensations for series movie lovers.

Descriptive Statistics

Customer Value

Value has many different meanings. To some people, value means price, benefit, worth of something or willingness to pay for a better product or more convenience (Mahajan, 2020). According to Kumar and Reinart (2016), the most crucial responsibility for marketers is to create and communicate value to customers to increase their satisfaction, loyalty, and profitability. Value is defined as an overall evaluation of an offering's utility based on perceptions of what is received and delivered. *Social value* is the utility obtained from the ability of services to increase social status. Netflix got an average social value of 3.89 and Disney 3.16. *Price Value* is the utility obtained from the service according to the price paid by the customer. Even though the Disney+ Hotstar package is cheaper than Netflix, Netflix content is considered to provide more value (4,24) than Disney+Hotstar (3,41). Functional Value (Quality) is the utility obtained from the perceived quality and expected performance to have consistent quality standards and follow customer expectations (Sweeney & Soutar, 2001). Netflix got an average quality value (4.43) and Disney (3,48). Overall, Netflix has a higher average value (4,19) compared to Disney+ Hotstar (3,35), which is reasonable because Netflix currently dominates the market compared to Disney. Netflix provides more value because it displays original programs produced from various countries, and these programs are not available on other digital streaming services. In addition, Netflix's original series highlights unique and out-of-the-box story concepts and ideas by keeping up with emerging trends. Disney+Hotstar tries to adapt Netflix's successful steps in working on many original series, namely by adapting Marvel superheroes, usually films, into series such as Wanda Vision, Falcon, The Winter Soldier, Loki, And What If. Disney's original series strategy is expected to increase the emotional value. Dreyer et al. (2017) explain that the advantage of Disney's content marketing strategy is to build stories (storytelling) that can attract an emotional component to consumers of all ages. Nostalgia is the driving force behind Disney's annual revenue. Consumers who experienced the power of Disney in their childhood want to be reminded of that feeling.

Table 1. Respondent profile

		Netflix	Disney+Hotstar	
Category		**Frequency**	**Frequency**	**Total**
Gender	Male	42	67	109
	Female	128	148	276
	Total	170	215	385
Age	17-20	26	184	210
	21-25	138	23	161
	26-30	6	8	14
	Total	170	215	385
Education	Senior High School	93	181	274
	Undergraduate	74	31	105
	Post Graduate	3	3	6
	Total	170	215	385
Profession	Job Seeker	8	3	11
	Civil Servant	13	5	18
	Student	122	177	299
	Employee	8	8	16
	Entrepreneur	11	22	33
	Others	8	0	8
	Total	170	215	385
Subscription time	≤ 1 Month	22	125	147
	1-6 Month	51	69	120
	6-12 Month	38	21	59
	1 Year	59	0	59
	Total	170	215	385
Genre	Action	42	70	112
	Comedy	29	51	80
	Drama	42	25	67
	Horror/thriller	19	18	37
	Romance	30	50	80
	Other	8	1	9
	Total	170	215	385
Favorite Content	Animation	7	38	45
	Documenter	5	2	7
	Film	80	151	231
	Random	1	1	2
	Serial	77	22	99
	TV show	0	1	1
	Total	170	215	385

Brand Experience

According to Brakus et al. (2009), brand experience allows for a better understanding of the complete of experiences elicited by brand-related stimuli. Brand experience is measured using four dimensions as Sensory, Affective, Behavioral, and Intellectual. Khan and Rahman (2015) state that Brand experience is becoming increasingly relevant in the marketing literature because marketers see it as a key approach for establishing long-term consumer-brand relationships. Sensory is how a brand can make a strong impression on customers' senses, attractive in a sensory way, and how brand appeals to their senses. Netflix (4.32) performed better than Disney+Hotstar (3.31) in sensory experience. Netflix can provide a pleasant sensory experience compared to Disney+. Affective is how a brand induces feelings and sentiments, how strong customers' emotions are, and how emotional a brand is. Netflix (3.87) provides a better affective experience than Disney (3.12). Netflix is perceived as capable of presenting more emotional shows than Disney. Affectively, Netflix is better able to touch the emotions of its subscribers because its genres are more varied than Disney's, and its content is more able to touch the feelings of its subscribers. Behavioral is how the brand engages in physical actions and behaviors when customers use the brand, how the brand results in bodily experiences, and how action-oriented the brand is. Netflix (3,70) have higher behavioral experience average value compared to Disney+ (2,99). Intellectual is how customers engage in much thinking when they discover a brand. Does the brand make them think? In addition, how brands stimulate their curiosity and problem-solving. Disney has not been able to outperform Netflix in terms of Intellectual experience. Original series content presented by Netflix, especially adaptations of famous novels, makes viewers want to see the visualization and adaptation of the novel to the screen. In terms of customer behavior, Netflix is more likely to trigger binge-watching potential because it has more variety and content than Disney+Hotstar. On the intellectual dimension in solving customer problems, Netflix is superior to Disney+Hotstar because it can better meet entertainment needs with more entertaining content and various genres.

It is estimated that competition in providing memorable shows will be increasingly sharp because Disney is known as a very skilled company at making storytelling that can touch its customers' emotions. Jones (2018) explained that to understand Disney customers' needs, wants, and expectations, Disney has three principles in providing an experience to its customers: providing emotional experiences, creating personalized interactions, and investing in developing services that provide memorable experiences. Disney offers journeys that will take us into a very detailed spectrum such as Mulan's fantastic journey as a Chinese fighter or Aladdin's journey with the light genie. Schnoor (2020) explains that another advantage of Disney is that its childhood consumers who grew up with Disney characters will always have emotional memories with Disney. This is the power for Disney to reach customers emotionally. Disney will continue to study how audiences react to its films and television series. Disney has always accommodated the demands and wants of its growing fan base by understanding its consumers.

User Experience (UX)

User Experience (UX) is the perception and response resulting from customer interactions in using digital streaming systems and services. UX can show the system's ease of use, efficiency, and information perceived by the user by observing how the user interacts with services. Filippi & Barahtin (2018) describe UX is essential in product development because of the increasing functional complexity and interfaces of services, the development of new interaction paradigms, the availability of technology and

innovative devices. UX is measured using six dimensions: functional, Usefulness, Informational, Perceptual, Psychological, and Social (Robert, 2014). *Functional* refers to the quality of services offered, such as reliability, compatibility, accessibility, and availability. *Usefulness* refers to how the service is easy to learn and use. *Informational* refers to available information about the product, such as recommendations of movies, TV shows, supported devices, and help centers. *Perceptual* refers to the product's impression on the sense organs, impacting the user's perception, such as visuals. *Psychological* refers to the emotions that users feel when interacting with the product. *Social* is about connecting users with others through products.

Based on Table two, Netflix has a higher average user experience on functional, usefulness, informational, perceptual, psychological, and social dimensions than Disney+ Hotstar. Hallinan and Striphas (2016) state that Netflix can track user activity (start, stop, rewind, fast forward, pause, log the time of viewing, device, and user's location) even, whether the user watched a program from beginning to end. In addition, The Netflix recommendation system has an algorithm to fulfill the tagline "connecting people to the movies they love" and has business value (Gomez-Uribe and Hunt, 2015). Netflix has more than 1650 exclusive content, while Disney+Hotstar has 282. Based on the cultural influence obtained from each content, Netflix is superior because it has enough local content from each country to influence its subscribers. For example, the audience will be affected by the cast's style of dress, language, and habits if they often watch Korean dramas. Netflix subscribers also want to learn Spanish after watching the Money Heist series. Another advantage, Netflix has many excellent features such as profile, continue, my list, downloads, and recommendations to simplify and maximize the application experience. Disney+Hotstar emphasizes local culture more as part of its content strategy, such as Raya and The Last Dragon, which highlight Southeast Asian culture, or Aladdin, which features Arab culture.

Customer Satisfaction and Loyalty

The concept of customer satisfaction is designed to measure customer satisfaction in using services based on customer experience. *Features* are how satisfying the elements and service attributes of the brand used are. Attribution is the conformity of the customer's perceived expectations and service outcomes; for example, the service is better or worse than expected. Perception of Equity and Fairness of the service received as being treated fairly and equally like other customers and paying a fair price for the service. Based on Table 2, Netflix provides higher customer satisfaction (4,27) in the dimensions of service features, attributions, perception of equity & fairness than Disney+ Hotstar (3,28). In terms of features, Netflix is considered superior to Disney+Hotstar because it provides more service features to satisfy its customers. As a newcomer, Disney+Hotstar is currently more focused on attracting as many subscribers as possible by promoting its featured content while increasing its local content to compete with Netflix. Although Netflix subscriptions are more expensive than Disney+Hotstar, Netflix has more new content and shows than Disney+Hotstar. So, in terms of Attribution and Perception of equity & fairness, Netflix is considered better than to Disney+Hotstar. Lee et al. (2016) state that customer satisfaction is a critical aspect of business performance, and it is heavily influenced by service provider conduct. Customers should be treated as assets, and their requirements, preferences, and purchasing habits should all be considered. The results of the PWC survey (2020) show that the experience of watching videos will affect customer satisfaction and encourage customers to stay subscribed.

Loyalty is the company's ability to retain existing customers (retention), the willingness of customers to spend more money on the same brand than competing brands (share of wallet), and willing to recom-

mend the brand they use to others (recommendation). Netflix subscribers have higher loyalty values (3,96) on the dimensions of repurchase, share of wallet, retention, and recommendation than Disney+ Hotstar (3,12). Loyalty is the company's ability to retain existing customers (retention), the willingness of customers to spend more money on the same brand than competing brands (share of wallet), and willing to recommend the brand they use to others (recommendation). These results suggest that Netflix is currently more capable of building loyal customers than Disney+Hotstar. In order to retain its customers, the company must continuously promote and present the latest content. However, Disney+Hotstar still lags in terms of release quantity compared to Netflix. Therefore, Disney+Hotstar subscribers are reluctant to spend more for a subscription if it costs more than other services such as Netflix. Based on recommendations, Netflix customers will recommend the brand more than Disney+Hotstar customers because it is clear from the extensive content catalog and flagship features that Netflix is superior to Disney+Hotstar.

Table 2. Descriptive statistics

Customer Value	*Social value*	*Price Value*	*Functional (Quality)*	**Mean**			
Netflix	3.89	4.24	4.43	4.19			
Disney+ Hotstar	3.16	3.41	3.48	3.35			
Brand Experience	*Sensory*	*Affective*	*Behavioral*	*Intellectual*	*Mean*		
Netflix	4.32	3.87	3.70	3.16	3.76		
Disney+ Hotstar	3.31	3.12	2.99	2.81	3.06		
Satisfaction	*Service Features*	*Attributions*	*Perceptions of Equity or Fairness*	*Others*	Mean		
Netflix	4.43	4.21	4.24	4.19	4.27		
Disney+ Hotstar	3.39	3.19	3.29	3.25	3.28		
Loyalty	*Repurchase*	*Share of Wallet*	*Retention*	*Recommend*	Mean		
Netflix	4.29	3.62	3.63	4.32	3.96		
Disney+ Hotstar	3.25	2.85	3.11	3.29	3.12		
User Experience	*Functional*	*Usefulness*	*Informational*	*Perceptual*	*Psychological*	*Social*	*Mean*
Netflix	4.49	4.61	4.18	4.64	4.12	4.43	4.41
Disney+ Hotstar	3.46	3.45	3.28	3.46	3.28	3.33	3.38

Source: Results of Research, 2021 (Processed Data), Scale 1-5.

PLS SEM

Evaluation Measurement Model (Outer Model)

The accuracy of testing a hypothesis about the relationship between research variables is very dependent on the quality of the data used in the test. Testing research hypotheses will not hit the target if the data used is unreliable and does not accurately describe the concept being measured. Therefore, it is necessary

to test the validity and reliability of the instrument. A validity test is used to test the extent to which the accuracy or truth of an instrument is a measuring instrument for research variables. The reliability test is used to measure the consistency of the measuring instrument in measuring a concept or the consistency of respondents in answering the question items in the research questionnaire. The criterion that is evaluated is the reliability of internal consistency. According to Hair et al. (2017), the first thing to do before testing the hypothesis is to evaluate the model in PLS by designing a measurement model (outer model). The outer model consists of a validity test (convergent and discriminant) and a reliability test (Cronbach's alpha and composite reliability).

Table 3. Cronbach's alpha, rho_A, composite reliability and AVE

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Brand Experience (BX)	0.868	0.869	0.899	0.559
Customer Loyalty (CL)	0.871	0.876	0.906	0.659
Customer Satisfaction (CS)	0.847	0.849	0.891	0.622
Customer Value (CV)	0.812	0.814	0.870	0.573
User Experience (UX)	0.918	0.918	0.931	0.551

Source: Results of Research, 2021 (Processed Data).

Table 4. Fornell Larcker criterion

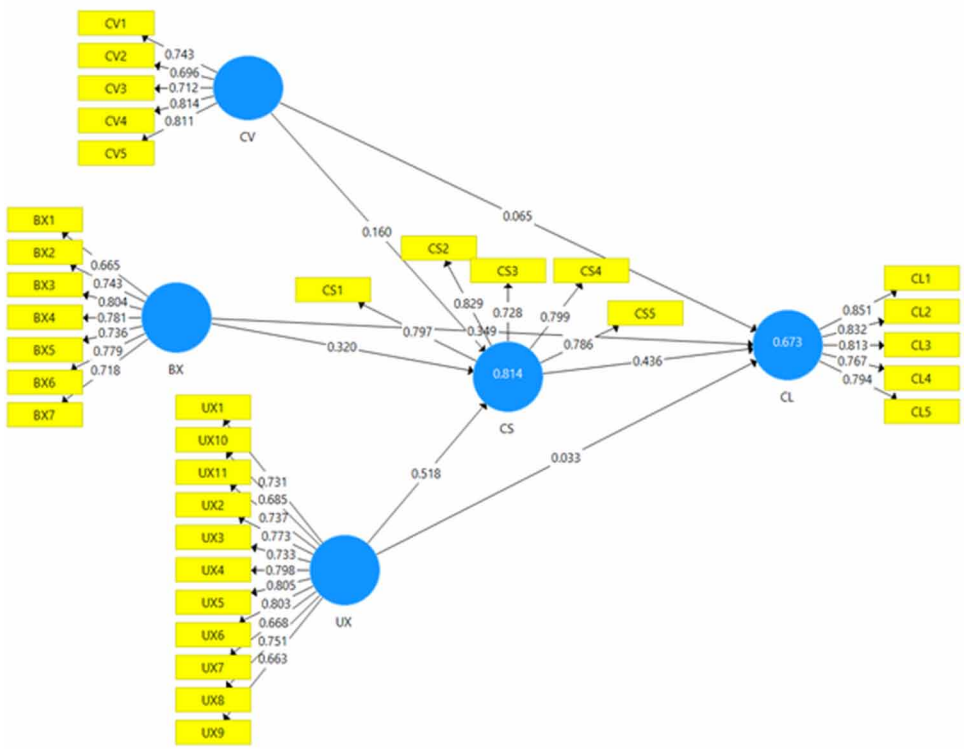
	BX	CL	CS	CV	UX
Brand Experience (BX)	0.748				
Customer Loyalty (CL)	0.756	0.812			
Customer Satisfaction (CS)	0.778	0.786	0.789		
Customer Value (CV)	0.701	0.672	0.774	0.757	
User Experience (UX)	0.669	0.687	0.852	0.753	0.742

Source: Results of Research, 2021 (Processed Data).

The Fornell-Larcker criterion is a more conservative version for determining discriminant validity by comparing the AVE roots for each construct with the correlation between the constructs in the model. The model has sufficient discriminant validity if the AVE root for each construct is greater than the correlation between the other constructs in the model.

The composite reliability scale ranges from 0 to 1, with higher values indicating greater reliability. The rule of thumb used for convergent validity is outer loading > 0.7, communality > 0.5 and Average Variance Extracted (AVE) > 0.5. but if the loading score is between 0.5 – 0.7, researchers may use this indicator as long as the AVE and Communality scores of the indicator are > 0.5. (Chin, 1998). However, indicators with extremely low outer loadings (below 0.40) should always be removed off the scale (Hair, Ringle, & Sarstedt, 2011). The results of the smart PLS show that there are five indicators, namely BX1, CV2, UX7, 9, 10, which are between 0.6-0.7, i.e.,> 0.5. in comparison, the rest are in values between 0.70 and 0.90. According to Nunally & Bernstein (1994) the value can be considered satisfactory.

Figure 1. Evaluation measurement model



Evaluation Structural Model (Outer Model)

The structural model in PLS is evaluated using R square. The path coefficient value (β) or t-values for each path is used to test the significance between constructs in the structural model. The value of R square is used to measure the level of variation of changes in the independent variable to the dependent variable. The better the research design model, the higher the R square result. R Square value for satisfaction of 0.814 means that the variation of the endogenous variable (customer satisfaction) changes that can be explained by exogenous variable (Customer Value, Brand Expereince and User Experience variable) is 81,4%, while the rest (18,6%) is explained by other variables outside the proposed model. R Square value for customer loyalty of 0.673 means that the variation of the customer loyalty variable changes that can be explained by Customer Satisfaction, Customer Value, Brand Experience and User Experience variable is 67.3%, while the rest (22,7%) is explained by other variables outside the proposed model.

Table 5. R square and R square adjusted

		R Square	R Square Adjusted
Customer Loyalty (CL)		0.673	0.670
Customer Satisfaction (CS)		0.814	0.812

Source: Results of Research, 2021 (Processed Data).

Table 6. Path coefficient direct effect, indrect effect and total effect

Direct Effect	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values	Hypothesis
BX -> CL	0.349	0.349	0.054	6.503	**0.000**	**Accepted**
BX -> CS	0.320	0.323	0.045	7.126	**0.000**	**Accepted**
CS -> CL	0.436	0.437	0.074	5.879	**0.000**	**Accepted**
CV -> CL	0.065	0.064	0.052	1.255	**0.209**	**Rejected**
CV -> CS	0.160	0.157	0.052	3.083	**0.002**	**Accepted**
UX -> CL	0.033	0.034	0.055	0.596	**0.551**	**Rejected**
UX -> CS	0.518	0.517	0.039	13.238	**0.000**	**Accepted**
Indirect Effect						
BX -> CS -> CL	0.139	0.141	0.031	4.548	**0.000**	**Accepted**
UX -> CS -> CL	0.226	0.226	0.042	5.327	**0.000**	**Accepted**
CV -> CS -> CL	0.070	0.069	0.026	2.685	**0.007**	**Accepted**
Total Effect						
BX -> CL	0.139	0.141	0.031	4.548	**0.000**	**Accepted**
CV -> CL	0.070	0.069	0.026	2.685	**0.007**	**Accepted**
UX -> CL	0.226	0.226	0.042	5.327	**0.000**	**Accepted**

Source: Results of Research, 2021 (Processed Data).

Direct Effect

One indicator of success for business continuity is providing a positive customer experience. Experience is a customer's overall perception of their experience with a business or brand. Experience occurs when consumers interact with a brand and start using its services. The consumption experience is multidimensional and includes multiple hedonic dimensions, such as feelings, fantasies, and pleasures (Holbrook and Hirschman 1982). Verhoef et al. (2009) explained that customer experience summits all elements of a holistic customer experience. Customers will judge their experience by comparing their expectations with their perceptions. If the experience gained can exceed expectations, then they will be satisfied and loyal. The results of direct effect testing show that brand experience has a positive and significant effect on customer satisfaction and loyalty. The results of this research are in line with Chinomona (2013), Sand et al. (2017), Situmorang et al. (2019, 2020), which state that brand experience has positive impacts on customer satisfaction and customer loyalty.

Value is a customer's overall evaluation of what the customer receives compared to what the customer gives or pays. So, value is a tradeoff between all the benefits and sacrifices that refer to a mix of brand attributes. According to Kotler & Keller (2016), customer value is the difference between the prospective customer's evaluation of an offer's benefits and costs and the perceived alternative. The results of direct effect testing show that customer value has a positive and significant effect on customer satisfaction but has not significant effect on customer loyalty. The results of this study are in line with research conducted by Suhardi et al. (2020) and Lee et al. (2016), which state that customer value has a positive and significant effect on customer satisfaction. The findings of this study indicate that the value given

to customers has not been able to meet customer expectations, so even though customers are satisfied, it does not guarantee that customers will not switch to other digital streaming brands. This result also shows that the digital streaming subscription business competition is getting tighter and crowded.

User Experience (UX) is a broad term that encompasses all aspects of a user's contact with a product. The development of digitalization makes the discussion of UX even more critical. UX can be product information, reviews, prices, availability, recipes, event times, locations, or application information that helps users make decisions. Roth (2017) UX is a set of principles, rules, and workflows for critically thinking about the design and usage of an interactive product. For companies, UX provides better communication and results about customer behavior. Kingsnorth (2016) states that UX research and observations can deliver more human guidance for digital product creation. The results of direct effect testing show that user experience has a positive and significant effect on customer satisfaction but has not significant effect on customer loyalty. The results of this study are in line with research conducted by Amalina & Jumhur (2018) which states that user experience has a positive and significant effect on customer satisfaction. In terms of scope, objects, or elements examined, UX ideas can differ. Badran & Al-Haddad (2018) take a different approach by identifying the dimensions of user experience such as utility, usability, aesthetics, identification, and value in predicting customer satisfaction. Their research results show that user experience has a significant impact on customer satisfaction. Martins and Riyanto (2020) found that User Experience consisting of attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty had a positive and significant effect on customer satisfaction on Netflix application users.

Customer satisfaction is an essential variable in maintaining market share. The main goals and objectives of marketing are to create, support, and increase customer loyalty for their brand. The results of direct effect testing show that customer satisfaction has a positive and significant effect on customer loyalty. Wirtz & Lovelock (2016) state that customers will be pretty satisfied as long as the perceived performance is within the tolerance zone, above an adequate level of service. When the perceived performance approaches or exceeds the desired level, the customer will be delighted. The findings of this study agree with those of Situmorang et al. (2019, 2020), who discovered that contentment has a favorable and significant impact on loyalty. When consumers find things that exceed their quality, value, and expectations, they will be more satisfied and loyal.

Indirect Effect and Total Effect

According to Preacher and Hayes (2008), incorporating several mediators into one model allows researchers to determine the magnitude of the specific indirect effects in terms of the presence of other mediators. Path coefficient indirect shows that customer satisfaction represents a mediating variable between brand experience and customer loyalty. The results of this study are in line with the research of Moreira et al. (2017), which states that customer experience significantly influences loyalty through the mediation of satisfaction. The concept of the relationship between experience and satisfaction has gained popularity among researchers because it provides different marketing repertoires. The consumer experience is involved emotionally, mentally, socially, spiritually, and physically in the consumption of a product or service.

Path Coefficient Indirect shows that customer satisfaction represents a mediating variable between user experience and customer loyalty. This result is different from the direct effect, which shows that user experience and customer value do not significantly affect customer loyalty. This research implies

that the importance of the role of the mediating variable of customer satisfaction in increasing customer loyalty. This result is also in line with Soni (2021), who supports serial mediation between website functionality, flow, customer satisfaction, and loyalty. However, the pathway between brand diversity and loyalty is more strongly mediated by customer satisfaction. In order to increase the positive impact of the informativeness of apps on loyalty, Netflix and Disney must provide accurate, detailed, and relevant information on their websites. The Pandey and Chawla (2018) study found that website navigation and search dimensions had no impact on satisfaction and loyalty. This is because respondents are used to browsing online purchasing websites. Customer satisfaction has an essential role in building loyalty (Situmorang et al., 2019). In the online context, growing competition forces online marketers to recognize the importance of understanding the value that customers expect (Situmorang, 2020) and developing good relationships that will ultimately help change them to become loyal customers (Wang et al., 2011, Scarpi, 2012). The results of the total effect research show that customer experience, user experience and customer value has a positive and significant effect on customer loyalty. Total effect is the sum of the direct and indirect effects.

SOLUTIONS AND RECOMMENDATIONS

Netflix is a service pioneer in the streaming video industry, so its business model strategy is a blueprint for its competitors. Although Netflix's price is more premium than Disney's, the research results show that Netflix has a higher average value of research variables and dimensions. Plothe & Buck (2019) explain that the successful deployment of Netflix represents the full incorporation of the integration of distribution capabilities into the film and television production scene marks a fundamental shift in the industry. The industry composition and the economic geography of both content production and distribution. The exclusivity of Netflix content provides new sensations and experiences to subscribers, thus becoming Netflix's competitive advantage. No wonder Disney sees Netflix as their competitor and chooses to withdraw its movie library collection and remove its content from Netflix, ending the partnership agreement and offering its streaming service. Competition for video streaming services in Indonesia is getting tighter after Disney, Marvel, and Star Wars content enters the domestic market. Nevertheless, because some of the content offered by Disney has been watched in cinemas, it makes the Disney viewing experience less exciting than Netflix. The competition will continue because Disney plans to present a new series that has never appeared in cinema (original) and is part of the Marvel Universe or Star Wars series. In addition, Disney also collaborates with local filmmakers to present local Indonesian films.

Competition in the digital streaming industry will be fiercer. Providing quality viewing (content) will create clear differentiation for competitors, increase popularity, and attract new customers while retaining existing customers. Not surprisingly, streaming platforms in major studios will compete for exclusive content broadcasting rights, individual copyrights through adaptations of famous novels, or other strategies to develop quality content. In addition, streaming service companies are also starting to provide various types of alternative content such as podcasts, online classes (cooking, sports, and tutorials), games, or virtual reality shows. There are about 11 streaming service players in Indonesia with different broadcast genres. In Indonesia, the digital streaming market is expected to grow and develop. The competition from this platform will be even tighter in presenting the spectacle. A war of marketing strategy, partnership support, and quality original content will attract more users. The monthly duration of membership packages from streaming services and the distinct content choices and inexpensive costs

will make it easier for customers to transition between streaming services and test new experiences. According to the conclusions of this survey, businesses are challenged to increase customer loyalty. This study also indicates that customer value and user experience have not significantly affected customer loyalty, meaning that companies need to pay more attention to the benefit and experiences offered to their customers.

Customer experience has become a top focus for marketing professionals and scholars because that can generate revenue and growth (wittel et al., 2019). This study tries to distinguish brand experience to measure customer experience in interacting with brands (offline) and user experience to measure customer experience in using applications (online). However, there is difficulty distinguishing measurements between brand and user experience, given the importance of the customer experience variable in marketing. In addition, the measurement of user experience also has many dimensions, as described above. It is hoped that the results of this research can be used to improve customer experience in the developing digital industry in indonesia. Lemon and verhoef (2016) state that understanding the customer experience and the customer journey over time is vital for companies. Digitization enables customers to interact across multiple channels and media touchpoints, making the customer experience more social. This change requires companies to create and provide positive customer experiences and value according to their expectations. Netflix or disney+ must constantly understand the importance of customers' behavior when watching at home. Customers will spend more time watching if they have a positive experience. Customers are in a flow state, where they only feel like they have spent a short amount of time watching netflix or disney+ shows, despite having spent several hours doing so. This condition ensures that the customer has the best possible (optimal) experience.

FUTURE RESEARCH DIRECTIONS

The study's limitation is that it only looks at the competition between Netflix and Disney+Hotstar. Disney+Hotstar services had just entered the Indonesian market when this research was conducted, so Disney+Hotstar had not yet offered much new content to customers. The growth and development of this industry are expected to be researched more broadly and comprehensively by adding other digital streaming services such as Amazon Prime Video, Hooq Iflix, or Viu, which are more focused on displaying original Asian and Indonesian content. Other researchers can involve more varied respondents, urban millennials, and the middle to lower economic segment because the price and range of streaming services are getting cheaper and more accessible for consumers to reach. Focusing on the consumer behavior of Generation Z and Children is a strategic step because these two groups are digitally connected and are potential customers of the future. To enter the children's market, Netflix is testing a new feature called Kids Clips, which is designed to provide short video content in the hope that it will be easier for children to find interesting new content to watch. Even to strengthen its position Netflix wants to spread its wings into the video game market without additional subscription fees. Understanding the digital behavior of Generation Z and Children is strategic.

The development of digital business is increasing very fast. The emergence of digital operating models has changed various business competitions. Humans and computers are increasingly connected. Business operating models will increasingly rely on and be driven by data, networks, and software based on Artificial Intelligence (AI), machine learning, and algorithms. The development of digital (virtual) spaces such as the metaverse will revolutionize the way businesses work and the behavior of employees and

consumers. By using AI and Algorithms, companies can make predictions and use data to improve the accuracy of digital operating models in helping users find, choose alternative services, and recommend services that may be preferred. Thus, digital experience research and measurement, marketing AI, will become increasingly important and require more valid and reliable concepts and measurements. Other researchers need to investigate new variables such as digital customer engagement, digital experience value, digital consumer-brand relationship, and digital conformity theory to increase customer satisfaction and loyalty.

CONCLUSION

The direct effect test shows that brand experience positively impacts customer satisfaction and loyalty. Customer value and user experience have a positive and significant effect on customer satisfaction but have no significant effect on customer loyalty. The indirect effect test shows that customer satisfaction represents a mediating variable between brand experience, customer value, user experience, and customer loyalty. The total effect analysis shows that customer experience, user experience, and customer value positively and significantly affect customer loyalty.

The development of the streaming service business has changed consumer behavior, primarily affecting people who visit the cinema. These considerations will be compared with the ease of service, ranging from practicality, the number of costs that must be incurred, to the variety of content offered by streaming service providers. Streaming service competition shows that companies must prioritize the experience obtained by customers through the development of digital streaming features and applications to support consumer satisfaction in enjoying the available content. Value is also an essential aspect of any platform to make a difference in the eyes of consumers. Supplying memorable experience will create repurchase intention and recommendation to attract new subscribers. So, business must get customer attention and offering memorable experience.

REFERENCES

Adgate, B. (2021). *The Impact COVID-19 Had On The Entertainment Industry In 2020.* www.forbes.com/sites/bradadgate/2021/04/13/the-impact-covid-19-had-on-the-entertainment-industry-in-2020/?sh=52bee519250f

Ahmad, A., Rahman, O., & Khan, M. N. (2017). Exploring the role of website quality and hedonism in the formation of e-satisfaction and e-loyalty: Evidence from internet users in India. *Journal of Research in Interactive Marketing*, *11*(3), 246–267. doi:10.1108/JRIM-04-2017-0022

Alphanso Tech. (2020). *Disney+ OTT Platform | Explore to Know its Business Model and Much More!* https://www.alphansotech.com/explained-disney-ott-platform-explore-to-know-its-business-model-and-much-more

Amalina, N., & Jumhur, H. M. (2018). The Influence of User Experience towards User Satisfaction of E-Government Service: A Case Study of GAMPIL Application. *International Journal of Scientific and Research Publications*, *8*(3), 254–259. doi:10.29322/IJSRP.8.3.2018.p7538

Babin, B. J., & Zikmund, W. G. (2016). *Exploring Marketing Research* (11th ed.). Cengage Learning.

Badran, O., & Al-Haddad, S. (2018). The Impact Of Software User Experience On Customer Satisfaction. Journal of Management Information and Decision Sciences, 21(1).

Baser, U. I., Cintamur, G. I., & Arslan, M. F. (2015). Examining The Effect of Brand Experience on Customer Satisfaction, Brand Trust, adn Brand Loyalty. *İ.İ.B. Dergisi*, *37*(2), 101–128. doi:10.14780/iibd.51125

Bilgihan, A. (2016). Gen y customer loyalty in online shopping: An integrated model of trust, user experience and branding. *Computers in Human Behavior*, *61*, 103–113. doi:10.1016/j.chb.2016.03.014

Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand Experience: What Is It? How Is It Measured? Does It Affect Loyalty? *Journal of Marketing*, *73*(3), 52–68. doi:10.1509/jmkg.73.3.052

Cagan, M. (2018). *INSPIRED: How to Create Tech Product Customers Love* (2nd ed.). Wiley.

Capallone, M. (2017). *Marketing and Customer Loyalty The Extra Step Approach*. Springer International Publishing. doi:10.1007/978-3-319-51991-3

Cha, S., & Lee, S. (2021). The Effects of User Experience Factors on Satisfaction and Repurchase Intention at Online Food Market. *The Journal of Industrial Distribution & Business*, *12*(4), 7–13. doi:10.13106/jidb.2021.vol12.no4.7

Chen, Y., You, F., Jianmin, W., & Schroeter, R. (2018). Measuring User Experience in Situ. *Use Emotion Data to Assess User Experience.*, *607*, 547–558. doi:10.1007/978-3-319-60492-3_52

Chin, W. W. (1998). The Partial Least Squares Approach To Structural Equation Modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–358). Lawrence Erlbaum.

Chinomona, R. (2013). The Influence Of Brand Experience On Brand Satisfaction, Trust And Attachment In South Africa. International Business & Economics Research Journal, 21(10).

Dreyer, J. J., Keane, G., & Windahl, S. L. (2017). *Beyond the Castle: A Guide to Discovering Your Happily Ever After*. Zondervan.

Filippi, S., & Barattin, D. (2018). User experience (UX) evaluation based on Interaction-Related mental models. *Advances in Intelligent Systems and Computing*, *607*, 635–645. doi:10.1007/978-3-319-60492-3_60

Forlani, F., Buratti, A., & Pencarelli, T. (2018). Experiential Perspective in Management Literature: A Systematic Review. In T. Pencarelli & F. Forlani (Eds.), *The Experience Logic as a New Perspective for Marketing Management* (pp. 15–42). Springer. doi:10.1007/978-3-319-77550-0_2

Gligor, D., Bozkurt, S., Gölgeci, I., & Maloni, M. J. (2020). Does supply chain agility create customer value and satisfaction for loyal B2B business and B2C end-customers? *International Journal of Physical Distribution & Logistics Management*, *50*(7–8), 721–743. doi:10.1108/IJPDLM-01-2020-0004

Gomez-Uribe, C. A., & Hunt, N. (2015). The netflix recommender system: Algorithms, business value, and innovation. *ACM Transactions on Management Information Systems*, *6*(4), 1–19. Advance online publication. doi:10.1145/2843948

Gontovnikas, M. (2020). *The (Surprisingly Complex) Impact of COVID-19 on Streaming Media*. https://auth0.com/blog/the-impact-of-covid-19-on-streaming-media/

Granados, N. (2020). *How Will Theaters And Streaming Services Coexist After The Pandemic?* https://www.forbes.com/sites/nelsongranados/2021/02/22/how-will-theaters-and-streaming-services-coexist-after-the-pandemic/?sh=716087db5106\

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. doi:10.2753/MTP1069-6679190202

Haleem, A., Javaid, M., & Vaishya, R. (2020). Effects of COVID-19 pandemic in daily life. *Current Medicine Research and Practice*, *10*(2), 78–79. doi:10.1016/j.cmrp.2020.03.011 PMID:32292804

Hall, S. B., & Pasquini, S. (2020). *Can there be a fairy-tale ending for Hollywood after COVID-19?* https://www.weforum.org/agenda/2020/07/impact-coronavirus-covid-19-hollywood-global-film-industry-movie-theatres/

Hallinan, B., & Striphas, T. (2016). Recommended for you: The Netflix Prize and the production of algorithmic culture. *New Media & Society*, *18*(1), 117–137. doi:10.1177/1461444814538646

Jenner, M. (2018). *Netfix and the Re-invention of Television*. Palgrave Macmillan. doi:10.1007/978-3-319-94316-9

Jones, B. (2018). *3 Principles Disney Uses to Enhance Customer Experience*. https://hbr.org/sponsored/2018/02/3-principles-disney-uses-to-enhance-customer-experience

Khan, I., & Rahman, Z. (2015). A review and future directions of brand experience research. *International Strategic Management Review*, *3*(1–2), 1–14. doi:10.1016/j.ism.2015.09.003

Kingsnorth, S. (2016). *Digital Marketing Strategy: An Integrated Approach to Online Marketing*. Kogan Page Limited.

Kotler, P., & Keller, K. L. (2016). *Marketing Management* (S. Ukil, Ed.). Pearson Education Limited.

Kranzbühler, A. M., Kleijnen, M. H. P., Morgan, R. E., & Teerling, M. (2018). The Multilevel Nature of Customer Experience Research: An Integrative Review and Research Agenda. *International Journal of Management Reviews*, *20*(2), 433–456. doi:10.1111/ijmr.12140

Kumar, V., & Reinartz, W. (2016). Creating enduring customer value. *Journal of Marketing*, *80*(6), 36–68. doi:10.1509/jm.15.0414

Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience Throughout the Customer Journey. *Journal of Marketing*, *80*(6), 69–96. doi:10.1509/jm.15.0420

Lidwina, A. (2020). *Video Streaming Competition in Indonesia*. https://katadata.co.id/ariayudhistira/infografik/5f3c7825c56e5/persaingan-streaming-video-di-indonesia

Mahajan, G. (2020). What Is Customer Value and How Can You Create It? Journal of Creating Value, 6(1), 119–121. doi:10.1177/2394964320903557

Marketsandresearch. (2021). *Global Cloud Video Streaming Market 2021*. https://www.marketsandresearch.biz/report/203422/global-cloud-video-streaming-market-2021-by-company-regions-type-and-application-forecast-to-2026

Martins, M. A. J., & Riyanto, S. A. (2020). The Effect of User Experience on Customer Satisfaction on Netflix Streaming Services in Indonesia. *International Journal of Innovative Science and Research Technology, 5*(7).

Moreira, A. C., da Silva, P. M. F., & Ferreira Moutinho, V. M. (2017). The Effects of Brand Experiences on Quality, Satisfaction and Loyalty: An Empirical Study in the Telecommunications Multiple-play Service Market. *Innovar (Universidad Nacional de Colombia)*, *27*(64), 23–38. doi:10.15446/innovar.v27n64.62366

Morningconsult and The Hollywood Reporter. (2020). *National Tracking Poll*. https://morningconsult.com/wpcontent/uploads/2020/03/2003101_crosstabs_HOLLYWOOD_Adults_v1_AUTO.pdf

Nabila, M. (2020). *Menengok Sederet Aplikasi Hiburan Terpopuler Selama Pandemi* [Take a Look at the Most Popular Entertainment Apps During the Pandemic]. https://dailysocial.id/post/menengok-sederet-aplikasi-hiburan-terpopuler-selama-pandemi

Ofcom. (2020). *Annual study of the nation's media habits*. https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/brits-spend-a-third-of-2020-watching-tv-and-video

Osenton, T. (2003). *Customer Share Marketing: How The World's Great From Customer Loyalty*. Prentice Hall.

Pandey, S., & Chawla, D. (2018). Online customer experience (OCE) in clothing e-retail: Exploring OCE dimensions and their impact on satisfaction and loyalty – Does gender matter? *International Journal of Retail & Distribution Management*, *46*(3), 323–346. doi:10.1108/IJRDM-01-2017-0005

Parsons, B. (2020). *Coronavirus: COVID-19's impact on the film industry*. https://theboar.org/2020/03/coronavirus-covid-19s-impact-on-the-film-industry/

Pereira, D. (2021). *Netflix Business Model*. https://businessmodelanalyst.com/netflix-business-model/

Pine, J. B. II, & Gilmore, J. H. (2020). *The Experience Economy: Competing for Customer, Time, Attention and Money*. Harvard Business Review Press.

Plothe, T., & Buck, M. A. (2019). *Netflix at the Nexus Content, Practice, and Production in the Age of Streaming Television*. Peter Lang Publishing, Inc., doi:10.3726/b14725

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models. *Behavior Research Methods*, *40*(3), 879–891. doi:10.3758/BRM.40.3.879 PMID:18697684

Reichheld, F. F. (2011). *The Ultimate Question 2.0 (How Net Promoter Companies Thrive in a Customer-Driven World)*. HBR Press.

Robert, J.-M. (2014). Defining and Structuring the Dimensions of User Experience with Interactive Products. LNAI, 8532.

Roth, R. (2017). User Interface and User Experience (UI/UX) Design. *Geographic Information Science & Technology Body of Knowledge, 2017*(Q2). doi:10.22224/gistbok/2017.2.5

Roto, V., Bragge, J., Lu, Y., & Pacauskas, D. (2021). Mapping experience research across disciplines: Who, where, when. *Quality and User Experience*, *6*(1), 7. Advance online publication. doi:10.100741233-021-00047-4

Samson, R. (2020). *The business strategy of Netflix*. https://www.profolus.com/topics/the-business-strategy-of-netflix/

Sand, F. V., Frison, A. K., Zotz, P., Riener, A., & Holl, K. (2017). *User Experience is Brand Experience The Psychology Behind Successful Digital Products and Services*. Springer. doi:10.1007/978-3-030-29868-5

Sari, R. P. (2020). *Prevent Corona, CGV in Jakarta Temporarily Closed Starting March 23, 2020*. https://www.kompas.com/hype/read/2020/03/21/160619066/cegah-corona-cgv-di-jakarta-tutup-sementara-mulai-23-maret-2020

Scarpi, D. (2012). Work and Fun on the Internet: The Effects of Utilitarianism and Hedonism Online. *Journal of Interactive Marketing*, *26*(1), 53–67. doi:10.1016/j.intmar.2011.08.001

Schnoor, A. (2020). *The Secret of Disney's Brand: How the company has become a marketing empire*. https://bettermarketing.pub/the-secret-of-disneys-brand-a1e4432cf6fd

Situmorang, S. H., Rini, E. S., &Lubis, A. N. (2019). Brand Experience Analysis – How It Relates to Brand Personality, Value, Satisfaction, and Loyalty in TV Brands? *International Journal of Civil Engineering and Technology*, *10*, 852–866.

Situmorang, S. H. (2020). Middle Class Millennial Experiences in the Digital Market. In *Handbook of Research on Innovation and Development of E-Commerce and E-Business in ASEAN*. IGI Global. doi:10.4018/978-1-7998-4984-1

Soni, P. (2021). Web-store image dimensions and online retail customer loyalty: Investigating mediators and moderators. *American Journal of Business*, *36*(1), 20–34. doi:10.1108/AJB-08-2020-0133

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, *77*(2), 203–220. doi:10.1016/S0022-4359(01)00041-0

The Motion Picture Association. (2020). *Theme Report 2020*. https://www.motionpictures.org/wp-content/uploads/2021/03/MPA-2020-THEME-Report.pdf

Wang, Y. S., Wu, S. C., Lin, H. H., & Wang, Y. Y. (2011). The relationship of service failure severity, service recovery justice and perceived switching costs with customer loyalty in the context of e-tailing. *International Journal of Information Management*, *31*(4), 350–359. doi:10.1016/j.ijinfomgt.2010.09.001

Westcott, K., Arbanas, J., Downs, K., Arkenberg, C., & Jarvis, D. (2021). *Digital media trends, 15th edition: Courting the consumer in a world of choice.* https://www2.deloitte.com/us/en/insights/industry/technology/digital-media-trends-consumption-habits-survey/summary.html

Wirtz, J., & Lovelock, C. (2016). *Service Marketing: People, Technology, Strategy* (K. Samsudin, Ed., 8th ed.). World Scientific Publishing Co. Inc. doi:10.1142/y0001

Witell, L., Kowalkowski, C., Perks, H., Raddats, C., Schwabe, M., Benedettini, O., & Burton, J. (2020). Characterizing customer experience management in business markets. *Journal of Business Research*, *116*, 420–430. doi:10.1016/j.jbusres.2019.08.050

Yu, D. (2021). *Disney+ Hotstar pulls in 2.5m subscribers in Indonesia, surpassing Netflix*. https://www.techinasia.com/disney-hotstar-achieves-25m-subscribers-indonesia-surpass-netflix

Yusra, Y. (2019). *"Video Streaming" Platform Competition in Indonesia.* https://dailysocial.id/post/persaingan-platform-video-streaming-di-indonesia

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2017). *Services Marketing Integrating Customer Focus Across the Firm* (7th ed.). McGraw-Hill Education.

ADDITIONAL READING

Cho, C. Y. (2020). Competition Among Video Streaming Services. Congressional Research Service, 18. Retrieved from https://crsreports.congress.gov

Coleman, D. (2018). *Building Brand Experiences: A practical guide to retaining brand relevance*. Kogan Page Limited.

Dietzel, J. (2020). *Touch: building your brand in the experience economy*. Marshall Cavendish Business.

Lobato, R., & Lotz, A. (2021). Beyond Streaming Wars: Rethinking Competition in Video Services. *Media Industries Journal*, *8*(1). Advance online publication. doi:10.3998/mij.1338

Spilker, H. S., & Colbjørnsen, T. (2020). The dimensions of streaming: Toward a typology of an evolving concept. *Media Culture & Society*, *42*(7–8), 1210–1225. doi:10.1177/0163443720904587

Wayne, M. L. (2018). Netflix, Amazon, and branded television content in subscription video on-demand portals. *Media Culture & Society*, *40*(5), 725–741. doi:10.1177/0163443717736118

KEY TERMS AND DEFINITIONS

Brand Experience: Is the sensation, feeling, cognition, and behavioral response that customers feel when interacting with a streaming service brand.

Customer Loyalty: Is the commitment and willingness of customers to persist in not switching to other brands, being willing to make repeat purchases consistently, and actively recommending the brand of streaming service used to friends or family.

Customer Satisfaction: Is a customer evaluation in the form of feeling happy or disappointed with the performance of streaming services in meeting customer needs and expectations.

Customer Value: Is the benefits customers get from streaming services compared to the effort expended to enjoy the services.

Streaming Services Business: Is a company that provides services using media in the form of audio and video content to user devices via the internet.

User Experience: Is the consumer experience when interacting with streaming service applications to provide convenience for users. This experience can be seen from the ease of using streaming services to maximize all aspects ranging from features, design, and content that can help users achieve their goals when interacting with streaming service applications.

Chapter 12
The Effects of Use of Restaurant Management Systems Perceived by the Personnel According to Their Demographic Characteristics

Emel Memis Kocaman
https://orcid.org/0000-0003-4577-3421
Tokat Gaziosmanpasa University, Turkey

Büşra Meltem Türkmen
Istanbul Medipol University, Turkey

ABSTRACT

Restaurant management systems (RMSs) developed to increase business efficiency and service quality in operation and management processes in restaurants were discussed in this study. This research reveals the current impact of RMSs in restaurants processes from the perspectives of staff working in restaurants. The purpose of this study was to assess the restaurant staff's perspective on restaurant management systems (RMS) based on their demographic characteristics. Research data were collected by conducting face-to-face and online surveys to a total of 385 staff working in restaurants in different cities of Turkey. ANOVA test and independent-sample t-test were used in the analysis of research data. A significant difference was found between the education level of the restaurant staff and the components of operation management, sales increase, and production/service standard of the RMSs perspective scale ($p<0.05$). Sector employees with higher general education and/or vocational training have a more positive view of RMSs' contributions to the business.

DOI: 10.4018/978-1-7998-9008-9.ch012

INTRODUCTION

Today, the service industry is seen as one of the most important industries in terms of both developing and developed countries. On the other hand, restaurants are one of the biggest components of the service industry (Cavusoglu, 2019). Although restaurant businesses are mostly food and beverage businesses that have effects on the economy, society, and the environment, they are places that can offer food and drinks from different cultures, where customers can have a delicious lunch or dinner, and buy fast and quality service (Yüksel & Yüksel, 2003; McConnell Freeman, 2011). Since both products and services are produced in restaurants, the management and operation process has a very complex structure. This complex process increases the work stress and workload of managers and restaurant staff and also leads to possible malfunctions, mistakes, or financial losses (Memis Kocaman & Kocaman, 2014). Due to the manual execution of the whole process in traditional restaurant management, the time the customer spends in the enterprise increases in the process, consisting of pre-order, during the order, preparation of the order, service, additional requests, and payment of the bill. At the same time, this situation causes an increase in the workload for the restaurant staff and a slowdown in the speed of service (Saeed et al., 2016; Kumar & Varun, 2020). In addition, it reduces the time that the chef and manager/managers of the restaurant will devote to works other than operation monitoring and control. Again, it is difficult and time-consuming for senior managers to keep track of accounts, stock levels, and business sales as these are made manually. Furthermore, because regular and strict control cannot be performed, flexible and error-prone control is realized (Memis Kocaman & Kocaman, 2019). For this reason, it is thought that the management of the restaurants which continue to be operated using traditional methods is insufficient. Therefore, the goal of minimizing all human factor-based losses, fulfilling customer requests and demands quickly and accurately, and the desire to make a difference among the rivals in a competitive environment has led to the search for effective and efficient systems (Rajesh et al., 2015).

Today, with the rapid development of technology, restaurants' desire to use information systems effectively has become a necessity rather than an option (Laudon & Laudon, 2014). For this reason, it has become more important for businesses to use systems suitable for their internal performance and management to meet consumer demands and needs, survive in a competitive environment, and be successful in the sector (Al-Mamary et al., 2014). Various Restaurant Management Systems (RMSs) have been developed by many different individuals/companies by using the developing information technologies to meet these needs of restaurants. Although these systems have different features with respect to their hardware and software, they all provide to facilitate and systematize the work and processes related to operation and management in restaurants. RMSs are used for management processes, material requests and needs of restaurants to create appropriate invoicing reports, to carry out data flow completely and regularly, to meet demands of customers on time, to minimize waste and loss. With the developments in information technologies, RMSs are getting richer with more comprehensive and functional features day by day. These improvements include examples such as Personal Digital Assistant (PDA), Point-of-Sale (POS), Radio Frequency Identification (RFID), Near Field Communication (NFC) sensors, Wireless Fidelity (WI-FI), cloud technology, big data, Internet of Things (IoT) systems (Tripp & Vaszary, 2006; Cheong et al.,2010; Adeoye & Elegunde, 2012; Saeed et. al., 2016). This system is very beneficial in terms of facilitating the effectual performing of the management process from planning to assessment, increasing customer satisfaction and competitiveness, providing fast and accurate data flow, increasing profitability, and providing fast production and service (Memis Kocaman & Kocaman, 2014; Jakhete & Mankar, 2015).

As it can be seen, the efficient use of RMS in enterprises decreases the time that managers spend on coordination and control. Through this system, detailed reports, discounts, sales according to payment type, and business turnover can be obtained for the cash account. It is very easy for managers to follow the whole process from anywhere (especially important for chain businesses), and to check, spot, and intervene early on possible errors/mistakes and to perform these operations on a computer. Therefore, the existence of such a system allows middle and senior managers to devote more time to other management activities (Jakhete & Mankar, 2015; Memis Kocaman & Kocaman, 2019). In other words, RMSs used today have been developed for managers in a structure that helps improve the performance of the business, the productivity of the personnel and inventory control, performs accounting records, stock control, menu planning, pricing, procurement/supplier tracking, and provides statistical reports and graphics. However, the personnel who will use the management systems developed for this purpose should receive adequate training and ensure the continuity of this training. To solve the systemic problems that may arise due to the busyness of the restaurant, the necessary controls should be carried out at appropriately predetermined intervals, and a proper budget should be allocated for these controls (Leifer, 2003; Ge et al., 2003; Cheong et al., 2010; Burns et al., 2013; Echtler & Wimmer, 2014; Memis Kocaman & Kocaman, 2019).

RMS is designed to facilitate the workflow of staff working in restaurants and to provide the best service for customers (Liyanage et al., 2018). This research was planned to examine whether this technology, developed for restaurants, can reach its intended purpose in operations, and to determine the effects of restaurant management system (RMS) use from the perspective of restaurant personnel. Within the scope of this purpose, the viewpoints of restaurant staff on restaurant management systems were examined through their demographic characteristics, and the effect of RMS use was evaluated.

BACKGROUND

When we look at the historical development of RMS, the first and simplest examples that come to mind are a system that allows monitoring the occupancy status of the tables in different rooms of a restaurant (Auger, 1967) and an automation system where the waiter enters customers' orders into a console in the restaurant and the total invoice calculated (Wolf, 1967). The earliest years when the POS (point-of-sale) systems were used were in the 1970s, during which the POS system started to be used in food and beverage businesses and in retail sales points. The transition to the POS systems were considered a development from the cash registers, which had a mechanism where the customer places his order at the first entrance to the restaurant and the order is simultaneously sent to the kitchen via a printer (Williams & Simmonds, 2010). Thanks to this system, the orders received from customers are transferred to the main computer and sent to the relevant units such as the kitchen, accounting, safe and warehouse. The POS systems provides convenience in many business activities by automating features such as adjusting seating arrangements, issuing accounts, and providing end-of-day reports (Arango et al., 2011; Profeta et al., 2012).

In 1985, John Dorr developed a system for restaurant management and control aimed at reducing the time spent in taking orders and transferring them between departments. This system provided all the information flow that was carried out manually in the traditional restaurant management, starting from the moment the order was taken from the customer on a piece of portable equipment by the service personnel, and even enabled the accounting transactions and the deducting of the ordered products from

the stock (Dorr, 1985). On the other hand, Tripp and Vaszary (2006) developed an even more improved restaurant management system in which the customer can insert her/his order on a screen on the table at the restaurant.

In their study, Xu et al., (2009) mentioned that RMS was developed in the restaurant industry to control the density of orders, to create appropriate invoicing reports, to reduce customer waiting time, to increase the efficiency of the workflow and to reduce the margin of error. A modern wireless device called a Personal Digital Assistant (PDA) has been adapted to RMS, eliminating traditional methods of taking orders using pen and paper (Kukulska-Hulme et al., 2009). As seen in these two examples, such a restaurant management system can contribute to speeding up the service flow in restaurants and minimizing human-induced errors.

Today, restaurants that move their desktop systems to mobile devices provide easy service and become more accessible to the customers. These businesses use advanced hardware and software systems that provide management processes and workflow with devices called hand terminals which are designed to receive customers' orders electronically and send them to the necessary units (Vico et al., 2011). Earls (2017) mentioned that orders are placed through the RMS systems called My Business Hub in some restaurants that offer fast service. Tablet computers used with this system can be carried anywhere in the restaurant, customers may place their orders, and is transmitted to the kitchen. Again, thanks to this RMS, customers are provided with the opportunity to make payments with their bank cards over the system and shorten the time spent for payment (Davis et al., 2018: p. 362).

Ying & QiuWen (2011) examined multimedia order systems in catering establishments based on the errors such as manpower waste, missing or repetitive products caused by the management of traditional catering establishments' daily operations being based on manual management. They think that it would be more beneficial to use efficient information technology to prevent disruptions and increase productivity in businesses. Multimedia ordering systems are thought to be a very important part of RMSs and it is stated that the implementation of this system will be positive for the dissemination and application of advanced science and technology in the national economy, as well as the economic benefits it will provide to food and beverage businesses.

In a study to identify innovative services implemented in restaurant businesses, Sahilli Birdir & Yıldız Kale (2015) found that restaurant enterprises mostly innovate in areas such as "food," "order delivery time," "service innovations," "customers wait time," "account processing time," and "order receipt time." Since these are areas of innovation for issues that may be solved with an effective use of the RMS, it is argued that the RMS use allows businesses to make a difference both in innovation and in competitive environments. Karaca & Güçlü Nergis (2019) examined the use of information systems in the kitchen of a five-star hotel in their study. In the study, it was determined that effective communication between restaurant and kitchen is provided through the information system, faster services are provided to customers, the cost of food and beverages offered can be made clear, internal control is provided more easily, the products needed are taken and stocked in sufficient quantities, thus minimizing the casualties.

In his research, Zhu (2014), proposed a software model that can be used by more than one person. In this model, the existing application is integrated into the conversion platform, transforming a single-user database into a database that can be accessed by multiple users with the database conversion function. Each user's transaction and data access are then isolated at the database layer by the user filtering function. Subsequently, the original system, combined with the certification and configuration functions in the SaaSconversion platform, is converted to support a cloud-based multi-user Software as a Service model [SaaS] system for source code updates. Finally, its usefulness was analysed by applying function

and performance tests to the SaaS system. As a result of this study, it was found that the system used can have a lower manual workload, a shorter life cycle, and higher utilization of server resources.

Tran et al., (2017) examined each feature of the POS systems used in restaurants in their studies and aimed to determine the most beneficial transactions in the daily operation of existing quality restaurants using the POS systems. In the data obtained as a result of the study, it was found that the POS system is beneficial to the restaurants for providing a digital menu and allowing the customer to learn more about the menu items. In addition, it was evaluated that it is possible to inform customers about the content of the meals on the menu and to provide detailed information about the products prepared, and thanks to this, customers feel themselves valuable. While the POS system also contributes to inventory and waste management, it can be used to organize the menu more efficiently in the process. It is also stated as an important feature that it can automatically warn the restaurant staff about the product, order, management and service.

Harpanahalli et al., (2020) presented a Radio Frequency Identification (RFID) based restaurant management system, using open source technology concepts such as Python and Raspberry Pi as a solution to the problems caused by cashiers in their research. Considering the self-service system, the proposed system aims to develop a digital, contactless, and secure restaurant environment that will enable customers to "Select, Scan and Eat" the food they want without any hassle. Identification of foodstuffs with payment allows the whole process to be controlled on electronic devices, using technology where each food item is marked using adhesive RFID tags. In the study, it is thought that this system will provide important progress in controlling the automatic management and reducing the workforce in a restaurant environment.

Riofrío –Valdivieso et al., (2019) thought that incorporating wireless technologies such as RFID and WI-FI into the restaurant industry would facilitate the operation. The authors mentioned that these systems can reduce delays in certain processes such as order taking and service, with mobile applications. It is suggested that their RMS, named "Quick Waiter", can create a solution for disruptions and errors. In the study, an RFID module was integrated using Arduino, which allows users to directly pay the requested amount using an RFID card. At the end of the research, it was determined that there was a significant reduction in the time required to register and pay an order compared to traditional methods.

METHODOLOGY

Research Model

Regarding RMS, which is seen as the element of developing technology in restaurants, this study was carried out to determine the effects perceived by the personnel while using these systems. In the study conducted specifically for restaurant personnel, perspectives about the effects of RMSs on the operational process were examined by considering the demographic variables of the sector employees.

Restaurant is a place where the requests and needs of the customers are met in a complete, fast, and satisfactory manner in order to please their customers (Sangaran & Jeetesh, 2015). Accordingly, there is an intense work tempo of the staff in the restaurants. In order to reach restaurant personnel that would like to be included in the research, firstly, the restaurant managers serving in many cities of Turkey were contacted both face-to-face and digital and were informed about the purpose of the study. Some of the business managers contacted did not accept to participate in the study due to the intensity of workload.

A face-to-face or online structured questionnaire was applied to business managers and employees of these businesses who agreed to participate in the research. In this volunteer-based study, research data were collected from personnel with time and opportunity. Therefore, the personnel participating in the research were selected by the random sampling method among the people who were working in the restaurants allowed by the business managers and who voluntarily agreed to participate in the research. Incomplete questionnaires were excluded from the evaluation, and the research was completed with data obtained from 385 individuals.

The difference between the demographic variables of the restaurant staff and their perspectives on RMS use was analysed. In this context, research questions have been developed as follows:

- Is there a significant difference between the age of the restaurant staff and their perspective on RMS use?
- Is there a significant difference between the gender of restaurant staff and their perspective on RMS use?
- Is there a significant difference between the educational background of restaurant staff and their perspectives on the use of RMS?
- Is there a significant difference between the vocational training status of restaurant staff and their perspective on RMS use?
- Is there a significant difference between the restaurant staff's status in the workplace and their perspectives on the use of RMS?
- Is there a significant difference between the restaurant staff's working time in the sector and their perspectives on using RMS?

Participants

Employees in restaurants whose managers agreed to participate to the study were included in the sample group on a voluntary basis. In Table 1, participants' age, gender, education level, status in the workplace, and working time in the food and beverage businesses are presented.

29.4% of the participants are 25 years old, and under, 27.0% of them are between 26-30 years old. Only 19.0% of the participants are in the age group of 41 years and older. 64.7% of respondents are male and 35.3% are female. 46.2% of the employees are higher education graduates, 42.1% are high school graduates or equivalent. 11.2% of them are primary/secondary school graduates. According to their status in the business, 24.4% of the participants are waiters, and 22.6% are business managers. Barmens (1.6%) and cashiers (1.2%) %) consisted of the smallest percentage of participants in terms of their status in the business. 31.8% of the restaurant employees stated that they worked in the sector for 3 years or less, and 30.6% stated that they worked in the sector for 4-6 years. It was determined that only 17.9% worked in the sector for 11 years or more (Table 1).

In Table 2, the professional training status of the restaurant personnel participating in the research and the distribution of the vocational training received are given.

As seen in Table 2, 66.2% of the participants answered "yes" and 33.8% answered "no" to the question "Have you received vocational training related to the sector?" 42.8% of those who received vocational training related to the sector stated that they attended a certificate course, and 38.8% stated that they received training in a vocational high school. On the other hand, 21.2% of those studying at the university level have an associate degree, and 23.1% have a bachelor's degree (Table 2).

Table 1. Descriptive characteristics of the participants

Variables		n	%
Age (Year)	≤ 25	113	29.4
	26-30	104	27.0
	31-35	55	14.2
	36-40	40	10.4
	41 ≥	73	19.0
Gender	Female	136	35.3
	Male	249	64.7
Education status	Primary/Secondary School graduate	43	11.2
	High school or equivalent graduate	162	42.1
	Higher education graduates	178	46.2
	Other*	2	0.5
Status	Manager	87	22.6
	Executive chef	31	8.1
	Chef cook	32	8.3
	Assistant cook	43	11.2
	Restaurant chef	40	10.4
	Waiter/Waitress	94	24.4
	Busboy/Busgirl	20	5.2
	Barmen	6	1.6
	Owner	10	2.6
	Cashier	5	1.2
	Other personnel**	17	4.4
Total working time in the F&B industry	≤ 3 years	122	31.8
	4-6 years	118	30.6
	7-10 years	76	19.7
	≥ 11 years	69	17.9

*:No degree
**:More than one mission

Table 2. The status of receiving vocational training related to the sector and the trainings received

Variables		n	%
Receiving vocational training related to the sector	No	130	33.8
	Yes	255	66.2
Trainings received (n=255)*	Certificate course	109	42.8
	In-service training	54	21.2
	Vocational high school	99	38.8
	University associate degree program (2 years)	54	21.2
	University undergraduate program (4 years)	59	23.1

*: More than one answer is marked. Row percentage is taken.

Measures

A 3-part questionnaire was prepared to reveal the effects of RMS use from the restaurant staff's perspective. The first part of the questionnaire consists of 5 closed-ended questions about the demographic characteristics of the restaurant staff (gender, age, education level, status in the business, and working time). In the second part, there are 2 closed-ended statements about the status of receiving vocational training in the sector and determining the training received. In the last part, the perspective scale for the use of RMS is used (Memis Kocaman, 2021). The scale consists of a total of five components: *operations management* (α=0.825), *difficulty of using the system* (α=0.821), *sales increase* (α=0.792), *production/service standard* (α =0.723), *and technical costs* (α=0.635). The perspective scale for the use of RMS explains 63.708% of the total variance (Memis Kocaman, 2021). A 5-point Likert scale (1=strongly disagree, 2=disagree, 3=partially agree, 4=agree, and 5=strongly agree) was used to evaluate the views of the participants.

Data Analysis

Data analysis was performed using Statistical Package for the Social Sciences [SPSS] 21 program. The effects of RMS use were examined according to the perspective of the restaurant personnel within the scope of the analysis of this study. In this examination, first of all, the demographic characteristics of the participants, their vocational training related to the sector, and the frequency of their trainings were determined. Descriptive statistics (arithmetic means) were used according to the expressions in the scale of perspectives on the effects of RMS use.

Tests were conducted to determine whether the scale data used in the study had a normal distribution (Kolmogorov-Smirnov test) and homogeneity (Levene). As a result of the analysis, it was determined that the data were normally distributed. Hence, the independent sample t-test was used to compare two groups, and the one-way ANOVA test was used to compare more than two groups as a result of the Kolmogorov-Smirnov and Levene's tests suggesting the use of parametric tests. The Tukey's test was used to determine the difference between groups (Pallant, 2005).

RESULTS AND DISCUSSION

In Table 3, the frequency and percentage distributions of the expressions regarding the viewpoints of restaurant employees participating in the research about the use of RMS in food and beverage businesses are given.

When the data in Table 3 was examined, it was found that the statements with the highest level of participation are "It provides detailed up-to-date information to the business management, enabling decisions to be taken faster and more effectively" ($\bar{x}$=4.53±0.67), "The speed of service increases in the business" ($\bar{x}$=4.40±0.86), "It facilitates stock tracking" ($\bar{x}$=4.38±0.73), "It provides accurate and complete transmission and tracking of information between departments" ($\bar{x}$=4.37±0.75) and "Fast selling and more profitable products can be determined" ($\bar{x}$=4.31±0.83). As shown in Table 3, the highest average scores, and therefore the most positive opinions about the use of RMS, are concentrated in the statements in the operation management component of the scale. Again, the mean scores of the expressions related to the sales increase and production/service standard components, which include the advantages

of using RMS, are high. In the study conducted by Rızaoğlu & Hançer (2005), it was mentioned that automation systems in food and beverage businesses have an efficient use in management, customer, and production services. Menu planning and analysis, sales forecasting and analysis, employee productivity, sales and order control, stock control and tracking, faster reporting of income and expenses, production control, and accounting processes are mentioned among the purposes of use in these areas. In this way, it is predicted that there will be an increase in customer satisfaction in parallel with the increase in personnel and business performance. Ultimately, increasing customer satisfaction will also benefit the prolongation of the business' existence in the sector, as it will gain a stronger place in the competitive environment. It is seen that the evaluations in the study of Rızaoğlu & Hançer (2005) coincide with the statements with high average scores in the perspective scale for the use of RMS.

Table 3. Descriptive statistics of perspectives about the use of RMS in food and beverage businesses

Items for RMS perspectives	$\overline{X}$	SD
Operations management (+)		
It facilitates stock tracking.	4.38	0.73
It provides accurate and complete transmission and tracking of information between departments.	4.37	0.75
It provides detailed up-to-date information to the business management,enabling decisions to be taken faster and more effectively.	4.53	0.67
Insufficient/unwanted stock build-up is prevented.	4.24	0.84
Fast selling and more profitable products can be determined.	4.31	0.83
It is possible to reach statistical information in a short time and accurately.	4.30	0.83
Difficulty of using the system (-)		
Its use is complex and time consuming.	3.12	1.28
Difficulty of its use causes delays in business.	2.96	1.38
It has a negative effect on employment as jobs are carried out with fewer employees	3.38	1.23
Changing menus or other situations cause difficulties because the system requires changing the database.	3.55	1.22
Sales increase (+)		
Customer satisfaction increases	4.24	0.94
The profit of the business increases.	4.07	1.02
The speed of service increases in the business.	4.40	0.86
It enables the business to open branches.	3.93	1.06
Production/service standard (+)		
It allows everyone to do the same job with the same standards.	3.88	1.04
It allows the service in the branches of the company to be of the same standard.	3.94	0.99
It facilitates the provision of auto control in the business.	4.27	0.79
It provides important contributions to the institutionalization efforts of the business.	4.17	0.93
The point where a fault or mistake occurs in the business can be detected and intervened immediately.	4.17	0.90
Technical costs (-)		
Employees and managers of the company should be trained about the use of the system.	4.30	0.88
It requires employment of qualified personnel.	4.07	0.88
The installation costs of the system to the enterprise are high.	4.12	0.86

+: Positive effects of using RMS, -: Negative effects of using RMS

In the study conducted by Öztürk (2006), the effects of electronic orders in restaurants on business performance were examined. As a result of the research, it has been determined that the electronic order taking system has positive contributions to the restaurant management, other parts of the business, the satisfaction of employees and customers, the acceleration of the process, the effectiveness of control and supervision, financial performance, and cost advantage. In this study, it has been determined that RMS has positive effects on the coordination and workflow between all units.

In the study by Şimşek (2010) it was stated that the most effective benefit of the RMS in food and beverage businesses is that it increases account control and reliability in businesses. In this way, it plays a positive role in the quick and effective decision-making of the relevant department managers. The study of Bharadi et al. (2013) stated that with automation systems, it is possible to carry out activities faster and easier than they are, to store information and documents correctly and without errors, and to reuse them when desired. In addition, it has been mentioned that there is an increase in productivity by contributing to the individual performance of employees and managers. When the studies in the literature are examined, it is seen that there are similar findings with highly rated expressions on the scale of perspective for RMS use. Therefore, it is possible to mention that restaurant management systems benefit from faster and more efficient decisions for staff working in food and beverage enterprises, to provide greater customer satisfaction by increasing the speed of service, to save time by facilitating stock tracking, to transmit cross-departmental information without errors and deficiencies, and to detect products that sell faster and more profitably.

The expressions with the lowest level by the restaurant employees determined as a result of the analysis are "Difficulty of its use causes delays in business" ($\bar{x}$=2.96±1.38), "Its use is complex and time consuming" ($\bar{x}$=3.12±1.28), "It has a negative effect on employment as jobs are carried out with fewer employees" ($\bar{x}$=3.38±1.23), and "Changing menus or other situations cause difficulties because the system requires changing the database" ($\bar{x}$=3.55±1.22). As seen in Table 3, the lowest mean scores are in the expressions of the difficulty of using the system component, including the negative effects of RMS use.

According to a study conducted by the McKinsey Institute in 2017, it is estimated that 400-800 million people worldwide will lose their jobs by 2030 due to the increase in the use of automation systems in businesses (Manyika et al., 2017). As a result of the analyses made by PwCanalysis (2017) in 29 OECD countries, it is stated that there will be a shortage of employment towards the end of the 2020s and the middle of the 2030s where automation systems are used. However, it has been determined that these studies are not similar to the result, which has a low average score in the scale expressions, " It has a negative effect on employment as jobs are carried out with fewer employees" ($\bar{x}$=3.38±1.23). The reason for this may be the prediction that the loss of employment due to automation will be less in restaurants than in other sectors, as it is a labour-intensive sector.

In Table 4, the results of the independent sample t-test and one-way analysis of variance (ANOVA) tests performed to examine the scores of the components of the perspective scale for the use of RMS in terms of demographic variables are presented.

When Table 4 was examined, it was determined that there was no statistically significant difference in terms of RMS usage scores between groups whose age, gender, and working time were different in the sector ($p>0.05$). According to these results, it has been determined that there is no significant difference regarding the following questions: "Is there a significant difference between the age of the restaurant staff and the perspectives on the use of the restaurant management system?", "Is there a significant difference between the gender of the restaurant staff and their perspectives on the use of the restaurant management

system?" and "Is there a significant difference between the working hours of restaurant staff and their perspectives on the use of the restaurant management system?". The results were similar in the study of innovation management practices in boutique hotel businesses by Ayaz & Türkmen (2018). The study stated that there was no significant difference in terms of gender, age, and sector experience variables of boutique hotel managers.

Table 4. Comparison of scores according to the demographical characteristics of the participants

Variables	Operations management (+)	Difficulty of using the system (-)	Sales increase (+)	Production/service standard (+)	Technical costs (-)
Age (Year)	×	×	×	×	×
Gender	×	×	×	×	×
Education Status	F=3.065 p=0.048*	×	F=3.567 p=0.029*	F=4.598 p=0.011*	×
Vocational training	t=-2.800 p=0.005*	×	t=-2.804 p=0.005*	t=-2.752 p=0.006*	t=-2.603 p=0.010*
Status	×	F=2.555 p=0.010*	×	×	×
Working Time	×	×	×	×	×

*p<0.05

There is a statistically significant difference between the groups with different education levels in terms of the component of operation management (p<0.05). In the "Operations Management" component, the average score of those who graduated from higher education ($\bar{x}$=4.43±0.55) is the highest, and the average decreases as the education level decreases from high school or equivalent school graduate ($\bar{x}$=4.29±0.59) to primary/secondary school graduate ($\bar{x}$=4.28±0.55) as determined. In terms of the "Sales Increase" component, the mean scores of primary/secondary school graduates ($\bar{x}$=4.27±0.69) and higher education graduates ($\bar{x}$=4.24±0.72) are higher than those of high school and equivalent school graduates ($\bar{x}$=4.04±4.04; p<0.05). For the "Production/Service Standard" component, the average of points for those who have higher education degrees ($\bar{x}$=4.19±0.57) were higher than those who graduated from high school or equivalent ($\bar{x}$=3.98±0.70) and primary/secondary school graduates ($\bar{x}$=4.05±0.66; p<0.05) (Table 4).

There is no statistically significant difference in the components of "Difficulty of Using the System" and "Technical Costs" of the perspective scale on the use of RMS between the groups with different education levels (p>0.05). Therefore, it was found that higher education graduates had more positive opinions in the components of the scale covering the advantages of using RMS. Only primary school graduate staff at the lower level of sales growth have a high level of positive opinion, as do higher education graduate staff. In the components of the scale, which includes the disadvantages of using RMS, there is no difference according to the education level of the personnel.

In a study examining the use of information systems in the kitchen of a five-star hotel by Karaca & Güçlü Nergis (2019), it was determined that the effective communication between restaurant and kitchen, faster services provided to customers through the information system, the cost of food and beverages

offered being made clear, internal control being provided more easily, and the products needed being taken and stocked in sufficient quantities resulted in the minimizing of the casualties.

It is seen that the answers of the personnel who received vocational training in the sector ($\bar{x}$=4.41±0.55) to the statements related to the "Operation Management" sub-dimension were more positive than those who did not receive vocational training ($\bar{x}$=4.24±0.59; p<0.05). In the "Sales Increase" component, the mean score of those who have received vocational training ($\bar{x}$=4.24±0.73) is higher than those who have not received vocational training ($\bar{x}$=4.01±0.80; p<0.05). In the "Production/Service Standard" component, it has been found that those who have received vocational training ($\bar{x}$=4.15±0.62) have a more positive opinion score than those who have not received vocational training ($\bar{x}$=3.96±0.66; p<0.05; Table 4). When the mean scores of the "Technical Costs" component of the scale is compared, those who have received vocational training ($\bar{x}$=4.23±0.63) were found to have a higher mean score than those who have not received vocational training ($\bar{x}$=4.04±0.71; p<0.05; Table 4). Within the framework of these results, it is possible to say that restaurant staff who receive vocational training for the sector have more positive viewpoints in their perspectives on RMS use than those who have not received vocational training, excluding technical costs. The cost that the use of RMS brings/will bring to the business is inevitable, and according to the results of this research, the personnel who have received vocational training are better aware of this. It was determined that there was no statistically significant difference only in the "Difficulty of Using the System" component between the groups with different levels of vocational training related to the sector (p>0.05).

There is a statistically significant difference between the groups with different status only in the component of "The Difficulty of Using the System" for the perspectives on the use of RMS (p<0.05) According to this, while the average score of the restaurant personnel who are the chefs ($\bar{x}$=3.86±0.77) is the highest, the average score of the personnel who are the business manager ($\bar{x}$=2.97±1.07) and the restaurant chef ($\bar{x}$=3.06±1.11) is the smallest (Table 4). Within the framework of this result, it can be mentioned that chefs have more difficulties in using RMS, they believe that the system is complicated, and they think that the difficulty in using it also affects the workflow. There is no significant difference between the groups of personnel working in food and beverage businesses with different statuses in terms of "operation management, sales increase, production/service standard, and technical costs" components (p>0.05) (Table 4).

Analysed within the framework of the research, the question "Is there a signif*icant difference between the status of restaurant staff and their perspectives on the use of the restaurant management system?" did not have a s*ignificant difference except for one component (difficulty of using the system, p<0.05).

The proposed study by Rai et al. (2014) found that the RMS demo model would attract more customers and also contribute to the efficiency of maintaining the restaurant's ordering and billing divisions. With RMS, a system has been designed where customers can now create their own orders without having to wait for the staff to serve them during peak hours. Within the framework of the results obtained in the study, it is possible to mention that with the implementation of RMS in restaurants, the restaurant efficiency will increase, labour costs will decrease, and a suitable environment will be provided for customers to have a unique dining experience by providing better quality service. In the study of Rai et al. (2014), it is seen that the results obtained from the restaurant management system model are similar, in line with the components of "Operations Management, Production/Service Standard, Sales Increase," which covers the benefit that the use of RMS mentioned throughout the research can provide to businesses.

SOLUTIONS AND RECOMMENDATIONS

Today, customers expect high standard and fast service from businesses. In addition, competition between businesses makes it necessary for businesses to renew themselves, meet customer expectations at the maximum level, and increase product and service standards. Traditional restaurant management is insufficient to provide all these. This inadequacy situation led to the development of RMSs, the first examples of which emerged in the late 1960s, and their widespread use in the industry. Today, RMSs have been developed and offer many professional management opportunities (Memis Kocaman & Kocaman, 2019). This research was conducted to evaluate the view of restaurant staff on the effects of RMS use and determine whether there was a significant difference in the demographic characteristics of the staff.

The highest staff score averages on the RMS usage perspective scale are in the statements in the operation management component. The lowest scoring averages of the personnel are also in the component of difficulty of using the system. Among the five sub-dimensions of the scale, operations management, sales increase and production/service standard sub-dimensions include the advantages of using the system, so it can be said that the staff generally have the opinion that the use of RMS has positive effects. The technical costs component of the scale consists of statements containing the disadvantages of the system, but the average score of the personnel is also high in this component. Therefore, the advantages of RMS are widely believed, although the technical costs are generally accepted as disadvantages. The difficulty of using the system component in the perspective scale is through the other components containing possible disadvantages; that is, in the sense that the lowest average scores are seen in these statements. Therefore, the difficulty of using RMS is not a disadvantage that is widely accepted by staff.

No significant difference was found between the components of the perspective scale on RMS use and the gender, age, and length of time staff worked in the sector ($p>0.05$). Both highly general education personnel (higher education graduates) and vocationally trained personnel for the sector have a more positive view of the advantages of RMS use (operation management, sales increase, and production/service standard components) ($p<0.05$). As a disadvantage of RMS use, the score of the personnel who have received vocational training is higher if the technical costs of the scale are lower ($p<0.05$). When the perspectives of restaurant staff in terms of their status in the enterprise were examined, only a significant difference in the component of "difficulty of using the system" was detected ($p<0.05$).

As a result of the data obtained from this research, it is possible to realize customer requests and needs in restaurants by providing a quality service on time, as well as to mention the need for an efficient RMS to maintain the presence of the enterprise in the sector and to make a difference between it and its rivals in a competitive environment. RMS is essential for achieving optimum service and maximum profit at minimum cost. However, for RMS use to achieve an efficient result, it is crucial to take the necessary care for personnel training and ensure the continuity of training. Personnel training is required to use the system effectively, prevent any errors on the system and incomplete data entry. RMS is an easy and effective technology to use with its new hardware in parallel with the technology and the presence of up-to-date software. However, depending on their hardware and software, it is inevitable to create additional expenses for restaurants. In order to correct possible defects and errors in software and hardware, the system will create additional expenses for the operation. Due to this situation, the technical costs it will bring to restaurants can be expressed as the disadvantage of this system.

FUTURE RESEARCH DIRECTIONS

In light of the data and experiences obtained from the research, the following suggestions can be put forward;

- The perspectives of the 385 restaurant staff who were examined within the scope of the research were evaluated, and the number of samples can be increased in future studies.
- This research, which is covered throughout Turkey, can be reanalysed by identifying specific cities or repeated in different countries.
- According to the software and hardware specifications of the RMS used, a comparison can be made in terms of the benefit provided in restaurants.

CONCLUSION

RMSs are hardware and software systems used for ensuring complete and regular execution of management processes, material needs, and data flow in restaurants; they are used to create proper invoicing reports, meet customer demands on time, and minimize waste and loss. For food and beverage businesses, a well-chosen RMS program can reduce the time for complex tasks that many people would have to do simultaneously, minimizing the margin for error. Besides, they can facilitate the effective execution of the management process from planning to evaluation, improve customer satisfaction and competitiveness, yield fast and accurate data flow, increase profitability, and provide fast production and service.

In traditional restaurant management, services and products are often produced and served at the same time, which causes disruptions in the operation or management process, affecting managers, personnel, and customers. For businesses that aim to offer high-quality products at a high standard, trying to control this process manually can lead to long-term problems. Here, RMSs gives businesses the opportunity to offer better services in a systematic and controlled way, with a minimum margin of error.

The importance of this research lies in investigating RMSs, which are used ever more in restaurants with the advances in information technologies and determining the positive and negative effects perceived by the personnel while using these systems. For food and beverage businesses, RMSs are crucial for achieving minimum costs, optimum services, and maximum profits. Still, for efficient results, even with an RMS, it is key to pay attention to personnel training and the continuity of such training. Personnel training is required to prevent any errors or incomplete data entry, and for effective use of the system.

In conclusion, with the rapid advances in technology, we believe that utilizing information and technology more efficiently in food and beverage businesses can be achieved through RMSs. With these systems, businesses can make a difference in their competitive environment and grow with efficient use of human resources, better standards for services/practices, and more effective management.

REFERENCES

Adeoye, A. O., & Elegunde, A. F. (2012). Impacts of external business environment on organisational performance in the food and beverage industry in Nigeria. *British Journal of Arts and Social Sciences*, *6*(2), 194–201.

Al-Mamary, Y. H., Shamsuddin, A., & Aziati, N. (2014). The role of different types of information systems in business organizations: A review. *International Journal of Research*, *1*(7), 333–339.

Arango, C. A., Huynh, K. P., & Sabetti, L. (2011). *How do you pay? The role of incentives at the Point-of-Sale.* Bank of Canada Working Paper. European Central Bank.

Auger, U. G. (1967). *Method and apparatus for coordinating restaurant operation* (U.S. Patent No. 3,310,797. Washington). U.S. Patent and Trademark Office.

Ayaz, N., & Türkmen, B. M. (2018). Yenilik yönetimi uygulamaları üzerine butik otel işletmelerinde bir araştırma. *Journal of Recreation and Tourism Research*, *5*(2), 24–32.

Bharadi, V. A., Ranjan, V., Masiwal, N., & Verma, N. (2013). e-Restaurant: Online restaurant management system for android. *IJACSA*.

Burns, J. W., Berenschot, C. E., Calabrese, G., Kasper, C. D., & Lovell, R. (2013). *Restaurant management system and method* (U.S. Patent No. 8,620,753. Washington). U.S. Patent and Trademark Office.

Cavusoglu, M. (2019). An analysis of technology applications in the restaurant industry. *Journal of Hospitality and Tourism Technology*, *10*(1), 45–72. doi:10.1108/JHTT-12-2017-0141

Cheong, S. N., Chiew, W. W., & Yap, W. J. (2010). Design and development of multi-touchable e-restaurant management system. In *2010 International Conference on Science and Social Research*. IEEE. 10.1109/CSSR.2010.5773867

Davis, B., Lockwood, A., Alcott, P., & Pantelidis, I. (2018). *Food and beverage management*. Routledge. doi:10.4324/9781315563374

Dorr, J. A. (1985). *Restaurant management information and control method and apparatus* (U.S. Patent No. 4,530,067). U.S. Patent and Trademark Office.

Earls, E. (2017). *The future of Epos: Convenience is king.* https://www.thecaterer.com/news/in-depth/the-future-of-epos-convenience-is-king

Echtler, F., & Wimmer, R. (2014). The interactive dining table, or pass the weather widget, please. *Proceedings of the Ninth ACM International Conference on Interactive Tabletops and Surfaces*. 10.1145/2669485.2669525

Ge, L., Yang, C., & Ge, R. (2003). *Electronic restaurant service management system* (U.S. Patent Application No. 10/104,187). U.S. Patent and Trademark Office.

Harpanahalli, J., Bhingradia, K., Jain, P., & Koti, J. (2020). Smart restaurant system using RFID technology. In *2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC)*. IEEE. 10.1109/ICCMC48092.2020.ICCMC-000162

Jakhete, M. D., & Mankar, P. C. (2015). Implementation of smart restaurant with e-menu card. *International Journal of Computers and Applications*, *119*(21), 23–27. doi:10.5120/21361-4374

Karaca, E., & Güçlü Nergiz, H. (2019). *Beş yıldızlı bir otel mutfağının bilişim sistemi kullanımının incelenmesi* [Conference Presentation]. Presented at the 4. Uluslararası Gastronomi Turizmi Araştırmaları Kongresi, Nevşehir, Turkey.

Kukulska-Hulme, A., Sharples, M., Milrad, M., Arnedillo-Sánchez, I., & Vavoula, G. (2009). Innovation in mobile learning: A European perspective. *International Journal of Mobile and Blended Learning*, *1*(1), 13–35. doi:10.4018/jmbl.2009010102

Kumar, B. N., & Varun, B. S. (2020). Table booking and restaurant management system using android application (Opss). *International Journal of Engineering Applied Sciences and Technology*, *4*(12), 373–378. doi:10.33564/IJEAST.2020.v04i12.065

Laudon, K. C., & Laudon, J. P. (2014). *Yönetim bilişim sistemleri* (U. Yozgat, Trans.). Nobel Akademik Yayıncılık. (Original work published 2012)

Leifer, R. (2003). *Restaurant management system* (U.S. Patent Application No. 10/195,336). U.S. Patent and Trademark Office.

Liyanage, V., Ekanayake, A., Premasiri, H., Munasinghe, P., & Thelijjagoda, S. (2018). *Foody-smart restaurant management and ordering system. In 2018 IEEE Region 10 Humanitarian Technology Conference (R10-HTC)*. IEEE.

Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R., & Sanghvi, S. (2017). *What the future of work will mean for jobs, skills, and wages: Jobs lost, jobs gained.* McKinskey Global Institute. https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages

McConnell Freeman, E. (2011). *Restaurant industry sustainability: Barriers and solutions to sustainable practice indicators* [Unpublished master degree thesis]. Arizona State University.

Memis Kocaman, E. (2021). Operational effects of using restaurant management system: An assessment according to business features. *International Journal of Gastronomy and Food Science*, *25*, 1–8.

Memis Kocaman, E., & Kocaman, M. (2014). Yiyecek ve içecek işletmelerinde otomasyon sistemleri kullanımının yönetim sürecine etkileri. *Standard*, *53*(625), 28–33.

Memis Kocaman, E., & Kocaman, M. (2019). Restaurant management system (RMS) and digital conversion: A descriptive study for the new era. In *Global Trends, Practices, and Challenges in Contemporary Tourism and Hospitality Management*. IGI Global. doi:10.4018/978-1-5225-8494-0.ch004

Öztürk, A. (2006). *Restoran işletmelerinde siparişlerin elektronik ortamda alınmasının işletme performansı üzerine etkileri ve Afyonkarahisar Özdilek A.Ş.'de bir uygulama* [Yayımlanmamış yüksek lisans tezi]. Afyon Kocatepe Üniversitesi.

Pallant, J. (2005). *SPSS Survival manual: A step by step guide to data analysis using SPSS*. Allen and Unwin Inc.

Profeta, A., Balling, R., & Roosen, J. (2012). The relevance of origin information at the point of sale. *Food Quality and Preference*, *26*(1), 1–11. doi:10.1016/j.foodqual.2012.03.001

PwCanalysis. (2017). *Will robots really steal our jobs?* PwC. https://www.pwc.co.uk/economics

Rai, V., Shinde, S., Mhatre, B., & Mahadik, P. (2014). Restaurant management system. *International Journal of Research in Information Technology*, *2*(3), 284–288.

Rajesh, M., Satya Prabha, G., & Vara Prasad Rao, P. V. (2015). e-Restaurant: Online restaurant management system for android. *International Journal & Magazine of Engineering, Technology*, *Management and Research*, *2*, 574–579.

Riofrío-Valdivieso, A., Quinga-Socasi, F., Bustamante-Orellana, C., & Andrade-Chamorro, E. (2019). RFID and wireless based system for restaurant industry. In *The International Conference on Advances in Emerging Trends and Technologies*. Springer.

Rızaoğlu, B., & Hançer, M. (2005). *Menü ve yönetim*. Detay Yayıncılık.

Saeed, H., Shouman, A., Elfar, M., Shabka, M., Majumdar, S., & Horng-Lung, C. (2016). Near-field communication sensors and cloud-based smart restaurant management system. In *2016 IEEE 3rd World Forum on Internet of Things (WF-IoT)*. IEEE. 10.1109/WF-IoT.2016.7845440

Sahilli Birdir, S., & Yıldız Kale, E. (2015). Restoran işletmelerinde yenilik uygulamaları: Mersin ve Adana örneği. *Seyahat ve Otel İşletmeciliği Dergisi*, *11*(3), 57–72.

Sangaran, G., & Jeetesh, K. (2015). The effects of job satisfaction towards employee turnover in the hotel industry: A case study of hotels in Kuala Lumpur City Center. *Journal of Tourism & Hospitality (Los Angeles, Calif.)*, *4*(1), 1–5.

Şimşek, G. (2010). Otomasyon uygulamaları. In M. Sarıışık, Ş. Çavuş & K. Karamustafa (Eds.), Profesyonel restoran yönetimi ve ilkeler uygulamalar ve örnek olaylar (pp. 299-312). Detay Yayıncılık.

Tran, J., Hol, A., Nguyen, Q. V., & Simoff, S. (2017). Fine dining restaurant framework development and surver. *Proceedings of the 14th International Joint Conference on e-Business and Telecommunications*. 10.5220/0006417800830090

Tripp, T., & Vaszary, M. (2006). *Restaurant management using network with customer-operated computing devices* (U.S. Patent Application No. 11/024,105). U.S. Patent and Trademark Office.

Vico, D. G., Woerndl, W., & Bader, R. (2011). A study on proactive delivery of restaurant recommendations for android smartphones. ACM RecSys workshop on personalization in mobile applications.

Williams, W., & Simmonds, D. M. (2010). A case study in the design of a restaurant management system. *Proceedings of International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS)*.

Wolf, J. D. (1967). *Business order control system and apparatus* (U.S. Patent No. 3,304,416). U.S. Patent and Trademark Office.

Xu, H., Tang, B., & Song, W. (2009). Wireless food ordering system based on web services. In *Proceedings of Second International Conference on Intelligent Computation Technology and Automation*. IEEE.

Ying & QiuWen, Z. (2011). Research on the multimedia order system in catering services. *Advanced Materials Research, 217*, 1141-1146.

Yüksel, A., & Yüksel, F. (2003). Measurement of tourist satisfaction with restaurant services: A segment-based approach. *Journal of Vacation Marketing*, *9*(1), 52–68. doi:10.1177/135676670200900104

Zhu, Y. (2014). A platform for changing legacy application to multi-tenant model. *International Journal of Multimedia and Ubiquitous Engineering*, *9*(8), 407–418. doi:10.14257/ijmue.2014.9.8.38

ADDITIONAL READING

Avyazova, R. K., & Blinova, E. A. (2018). Introduction of information system for optimization of restaurant management system. Proceedings of young scientists and specialists of the Samara University, Russia, (2), 103-107.

Bellamy, R., Swart, C., Kellogg, W. A., Richards, J., & Brezin, J. (2001). Designing an e-grocery application for a palm computer: Usability and interface issues. *IEEE Personal Communications*, *8*(4), 60–64. doi:10.1109/98.944005

Chen, C., & Guan, Y. (2008). Experience design of the theme restaurant make the dining be a memorable experience. In *2008 9th International Conference on Computer-Aided Industrial Design and Conceptual Design.* IEEE.

Jingga, F., & Limantara, N. (2014). Pembangunan model restaurant management system. ComTech: Computer. *Mathematics and Engineering Applications*, *5*(2), 973–982.

Majumdar, S. (2018). Leveraging cloud computing and sensor-based devices in the operation and management of smart systems. Handbook of smart cities: Software services and cyber infrastructure, 55-80. doi:10.1007/978-3-319-97271-8_3

Murphy, K. S., & Murrmann, S. (2009). The research design used to develop a high-performance management system construct for US restaurant managers. *International Journal of Hospitality Management*, *28*(4), 547–555. doi:10.1016/j.ijhm.2009.03.003

Ravekar, U., & Singh, S. (2019). Data centric smart restaurant management system. *International Research Journal of Engineering and Technology*, *6*(7), 1425–1427.

Renaldi, F., Wati, D. F., Maulidin, A. J., & Bon, A. T. (2020). Increasing customer satisfaction index through integrated restaurant operational system. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 1956-1965.

Xiang, Y., Zhou, W., & Chowdhury, M. U. (2004, August). Toward pervasive computing in restaurant. *Proceedings of the First International Conference on E-Business and Telecommunication Networks*, (1), 312-317.

KEY TERMS AND DEFINITIONS

Digital Menu: These are applications where information of the name, price, content, picture, etc. of the food and beverages to be sold in food and beverage businesses is presented to the customer with hardware and software products of information technologies.

Food and Beverage Businesses: These are businesses that produce goods and services for people to fulfill their eating and drinking needs outside their homes.

Internet of Things: It defines advanced technologies that can be read, located, and recognized independently of communication tools, controlled by information detection devices, and perform interaction via the Internet from human to human, human to machine, or machine to machine.

Menu Planning: This refers to determining the food and beverages that such businesses will offer to their customers, considering factors like the purposes and possibilities of the business, the preferences and expectations of the customers, nutritional ingredients, prices, seasonal conditions, market characteristics, etc.

Personal Digital Assistant (PDA): These are small, mobile, and handheld wireless devices that are used in restaurants to facilitate taking orders, reduce waiting times for customers, increase efficiency, and reduce the margin of error.

Point-of-Sales (POS) System: These are information technologies that are used when paying for goods/services received by customers. Today, with new modules and applications, these devices have better features for facilitating service/management processes in restaurants.

Restaurant Management System: These are software and hardware tools that are developed with information and communication technologies and that allow the execution and monitoring of the traditional business functions of restaurants in the digital environment.

Stock Control: This refers to the regular controls of input products (raw, semi-finished, or finished materials) in the warehouses of food and beverage businesses.

Chapter 13
Digital Transformation and Reimagined Brand Messages for Travelers in the Pandemic:
Empirical Investigation on Twitter Data From Cruise Brands

Jiyoon An
Broadwell College of Business and Economics, Fayetteville State University, USA

ABSTRACT

In the pre-pandemic era, price competition dominates digital brand messages in the tourism industry for "call to action"; however, in the pandemic era, the focus of digital brand messages is to provide aspiration for potential travelers. For example, the cruise industry used to focus on providing information on deals in the communication, but today it appears to maintain attention, interest, and desire for cruise which has not been continued due to pandemic. In the pre-pandemic era, loyalty can be measured by action-level purchase data, but today it can be measured by attitudinal data including reactions to the social media messages. This chapter used text mining methods to examine how various brands adopts different messages strategies with various sentiments and topics. These empirical findings will provide theoretical and managerial implications for digital communication strategies for more reactions and digital brand management for greater loyalty.

INTRODUCTION

A brand message is designed to build, maintain, and strengthen brand equity to the target audience as a managed activity (Nandan 2005). Marketing scholars conceptualize brand equity with four elements: brand awareness, brand loyalty, perceived quality of brand, and brand associations (Yoo and Donthu 2001). Major players (Disney, Norwegian, Royal Caribbean, Princess, and Carnival) in the cruise industry are well-recognized and loved by consumers. During the pandemic, cruise brands have not been operated in

DOI: 10.4018/978-1-7998-9008-9.ch013

a regular capacity. Although the cruise brands seem to possess high level of brand awareness and loyalty, the other elements of brand equity, including service quality and positive associations with the brands, have been troubled since the Diamond Princess incident in 2020 because the pandemic has raised the concerns of health and safety in perceived service quality of cruise brands, damaging their operational and financial performances (Forbes 2021). Whereas the industry has recorded a recovery in the market size of $23.8 billion in 2021, which still is the half of the market size in 2019 (Cruise market watch 2021).

Brand messages in the cruise industry have been conventionally used as a vehicle to grow the market size. This comes from the nature of the cruise industry because brand messages including availability of discount and seasonality would help demand-supply management as their market offering is a time-sensitive service with limited supply, but demand is flexible as a function of brand messages (Ayvaz-Cavdaroglu et al. 2019). In the pandemic, cruise brands face a growing need to address service quality concerns in terms of health and safety and are eager to establish brand associations when cruise ships are not able to operate because of pandemic-related restrictions (The Wall Street Journal 2021). Against this backdrop, social media marketing has become a center of cruise brands' efforts, which adopts a new view on a brand's messages for crisis management, sentiment management, and brand engagement metrics. In this new paradigm, the objective of brand messages has been reimagined from greater revenue and sales to more unique and positive associations with enhanced service quality and future purchase intention.

This paper is designed to examine this transition focusing on how cruise brand messages have evolved for travelers during the pandemic with empirical investigation with Twitter data. In the next section to introduce conceptual background, theories on negative events in marketing and crisis management will be discussed to enhance our understanding of reimagined brand messages for digital transformation and crisis management. Then, the methods part will include data collection and analysis as well as discussion to advance the theoretical understanding with empirical examination. Finally, implications and future research will be provided to improve theories and practices to help reimagine brand strategies with digital transformation and crisis management.

BACKGROUND

As the central premise of marketing is value creation and exchange in the market, marketing scholars have examined the negative events which disrupt the market interactions. Khamitov and his colleagues have conceptualized negative events in marketing into three terms: Brand transgression (BT), service failure and recovery (SFR), and product-harm failure (PHF) (Khamitov et al. 2019). Understanding cruise brands in the pandemic may be informed by the theories on product-harm failure where the market offering is found to be harmful or defective to the mass rather than an individual consumer. For example, although only passengers and crew members have been directly affected by the Diamond Princess incident in 2020, this event made stakeholders recognize cruise brands' potential harms in public health and safety, influencing their attitudes and behaviors at the group level. As PHF includes dynamics of stakeholder groups, the focus of PHF research examines how stock performances would be affected at the group level with archival data, unlike BT and SFR with emphases on lab experiments and individual-level analyses. This methodical preference has led to a lack of the impact of process-variables (e.g., emotions) on consumers' attitudes or behavioral metrics. In addition, PHF's research tradition may have neglected the nature of relationship evolution between a brand and a consumer.

As a product harm is a brand's violation of morality, moral foundation theory can be useful to understand emotions regarding a Covid 19-initiatiated product harm. Graham and his colleagues posit five pillars of the moral foundation to assess a morality-relating incident: care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, and purity/degradation (Graham et al. 2009). First, the care/harm dimension is a care to a friend, but a harm to a foe. Second, the fairness/cheating dimension is an interest in procedural and distributive justice to promote fairness and prevent cheating. Third, the loyalty/betrayal dimension is a belief to value patriotism, in-group favoritism, and sacrifice for a greater group cause. Fourth, authority/subversion is a legitimate practice to implement leadership and followship to maintain a moral order. Fifth, the purity/degradation dimension is a tendency to avoid contamination and chase purity. A product harm caused by the pandemic may cause a harm to your family (vs. stranger), bring a more harm to those who employed in a cruise brand (over a tech brand), demand a consumer's sacrifice for frontline employees' health, engage as part of brand community during the pandemic, and make the core brand equity intact by modifying a business model from a physical to a virtual space. Therefore, a product harm incident and its subsequent interactions between a consumer and a brand are worthy of being researched.

Particularly, the use of social media data will be relevant because it entails real-time responses from multiple stakeholder groups' voices at the individual level. In Twitter, text data gained from an individual can provide a background to conduct sentiment analysis, which allows us to see how a process variable (emotion) is related to behavioral metrics (e.g., favorite tweet or retweet). Also, emotions from judgments based on moral foundation may indicate which dimension has been affected and how effective communication would address those challenges. In the next section, digital transformation and crisis management will be given as a research context and twitter data will be examined with hierarchical clustering and sentiment analysis.

MAIN FOCUS OF THE CHAPTER

Reimagined Brand Messages for Digital Transformation and Crisis Management

Brand message strategies have evolved with digital transformation and the pandemic. A latest report from CNBC has reported one third of advertising budget has been spent on social media marketing in 2020 (CNBC 2021). This growing use of social media as a vehicle to convey brand messages has provided an opportunity for the scholarly community at the intersection of digital transformation and crisis management.

In the tourism industry, hospitality and airline brands have focused on positive emotions and feedback to assess the potential crisis in their service offerings from the eyes of consumers (Alei et al. 2017). Beyond the service-intensive tourism industry, scholars have paid attention to the evolution of brand messages surrounding a product brand with a negative incident (e.g., Maggi, Nestle's instant noodle brand with Facebook data Mishra and Sharma 2019). They found three effects in their analyses: the mitigation effect of negative emotions on Maggi's violation of Food Safety regulations for lead and monosodium glutamate, positive emotions on Maggi's reassurance on the risk, and rising interests on a Maggi's competitor brand, Yippee. These findings are explained by brand equity literature which emphasizes on

a brand as a set of positive, strong, and unique associations to defend their assets against threats and its malleable nature to evolve with the circumstances in an individual's mind.

This research is instructive, but it lacks comprehensive understanding of market competition by considering a competitor brand. In addition, according to attribution theory (Srivastava and Gosain 2020), this research examined a specific negative incident which occurred due to a brand's internal cause for a relatively short period of time with a negative outcome with low severity. This is different from a chance of contracting the Covid-19 viral disease with a cruise brand because the nature of the negative incident occurs by external cause for a relatively long period of time with a negative outcome with high severity.

Another challenge of this existing research is a lack of theoretical foundations of the role of emotions in brand messages. The existing research merely assessed polarity of emotions according to brand messages without theoretical framework to examine dynamics of emotions and brand messages. Most of emotion researches have driven by a lab-controlled experiment focusing on discrete emotion from a given stimuli, which is different from Twitter data as it is from multi-stimuli dynamic contents with a mingle of various emotions. Although there is no dominant theory to examine emotions in a field study (e.g., twitter data), it is important to review existing theories rooted in the traditional lab experiment investigating a discrete emotion.

Cognitive appraisal theory aims to examine emotions sourced from interactions with a brand, which focuses on an individual's subjective assessment of the situation. This theory emphasizes the judgments on the outcome and procedure justice and attribution to the brand failures and their relating emotions (Bagozzi et al. 1999; Smith & Bolton 2002). This theoretical background is different from social media contexts because social media as a media channel includes audience with reaction-oriented tendency from emotions rather than what CAT posits with conscious audience with emotional and cognitive appraisal with high elaboration.

The other existing theory which may be helpful to interpret emotions across brand messages with social media is affect-as-information theory (Clore et al., 2001). This theory focuses on unconscious instant emotion with audience with low elaboration, which may explain how an instant feeling from the glimpse of a headline message may affect information processing. According to this theory, the perceived emotion would serve as a frame to interpret the subsequent brand messages by adapting their information processing to seek for information validating the existing feeling (Lerner et al. 2007). Clearly, existing theoretical lenses neglect dynamic nature of emotions from brand messages in social media, but empirical examination on brand messages on a crisis may help discover a novel theory to understand a complex phenomenon driven by the pandemic crisis.

The Covid-19 pandemic entails multiple dimensions which gives various entry points for cognitive appraisal for emotions. For example, it can serve as a point of conflicts to divide people towards measures against the public health threat (e.g., pro-vaccine vs. anti-vaccine), a crisis to disrupt the traditional supply chain system (e.g., shortage of logistics infrastructure and labor), and a catastrophe to cost millions of lives under financial and health insecurities (e.g., Spike in unemployment benefit claims in the United States), affecting high arousal emotions (e.g., anxiety) among people.

Against this backdrop, scholars have examined whether a high arousal emotion affects interactions in social media. Berger (2011) suggests that the role of high arousal emotions in transmitting messages. The author argues that high arousal emotions coming from times of conflict, crisis, and catastrophe increase the speed and number of transmitting messages. This study may explain how negative incidents affect consumer judgments and decision and why negative incidents should be responded with careful management of emotions. Wheaton and his colleagues have examined emotions are contagious in a

conscious or unconscious manner as listening and speaking in social media helps you share emotions like audience in a big show or a funeral (Wheaton et al. 2021).

As social media is a place to share emotions regarding the pandemic and brands, investigating cruise brand messages in social media for travelers in the pandemic can be meaningful to advance our understanding of reimagining brand strategies in the intersection of digital transformation, crisis management, and market dynamics.

Methods

The rise of digital transformation enables brand messages to be more interactive and dynamic across various stakeholders. Twitter, a message platform, has been used in academia to explore the relationships among digital transformation, crisis management, and market dynamics. Nadeau and his colleagues have addressed their research question of "how are changes in consumer attitude towards a brand and its communicated personality affected by different crisis types? (p.1032)?" They selected four brands with different crisis types and brand personalities and investigated the attitudinal changes between a consumer, a problematic action, and brand personality (Nadeau et al. 2020). This research is instructive by using Twitter data for a source of sentiment analysis, but it did not capture market dynamics in a specific industry caused by Covid 19, a negative incident with external cause for a relatively long period of time with a highly severe negative outcome. Therefore, this research will conduct an empirical examination to answer the question of "how an externally caused, highly severe negative incident made brand messages reimagined?" with Twitter data.

To answer this question, sentiment analysis was applied as part of text analysis. At the first step, a bag-of-words method, a preprocessing method, was used to preprocess text data to explore emotions in text data. This technique allows "the frequency of occurrence of words in a collection of documents (p. 54)" from unstructured to structured data (Siering et al. 2018). Then, lexicon-based text analysis for sentiment analysis was conducted. National Research Council Canada's NRC method was used because it drives from a strong theory of categorizing emotions (Plutchik 1980) with empirical evidence and allows more than 50% lexicon to be cross listed in different emotion categories to open a room for contextually aware interpretation (Mohammad and Turney 2013). This text mining methods helped to examine how various brands adopt different message strategies with various sentiments.

Data

The Diamond Princess incident in 2020 was the beginning of cruise brand's industry-wide crisis. To answer the research question, two waves of twitter data have been gathered from official Twitter accounts of cruise brands: @CruiseNorwegian, @CarnivalCruise, @RoyalCaribbean, @DisneyCruise, and @PrincessCruises. As a result, Wave 1 (2828 tweets, April 15-23, 2021) and Wave 2 (6779 tweets, May 3-11, 2021) were collected to understand the evolution of brand messages. Data collected from two different time frames can be important because it may show changes in emotions with brand messages and how reimagined brand messages to appeal to the audience as living with the risk of contracting Covid 19 has become a part of life beyond the affected cruise industry. The success of brand messages to reach out to the audience was measured in the number of favorite Tweets and retweets.

Analysis

Figure 1 shows the descriptive analysis of data. In Figure 1, Panel A shows data collected at Wave 1, but Panel B shows data collected at Wave 2. The number of tweets is how many tweets includes the official cruise brand handles (@CruiseNorwegian, @CarnivalCruise, @RoyalCaribbean, @DisneyCruise, and @PrincessCruises), the number of favorite tweets is how many tweets including the official cruise brand handles were favorite by various users, and the number of retweet is how many tweets including the official cruise brand handles were retweeted to share with other users. In other words, the number of tweets measures the inbound and outbound activity levels of official cruise brands, the number of favorite tweets assesses users liking, and the number of retweets shows positive word of mouth from the users. Overall, all the metrics improved from Wave 1 and Wave 2. Disney and Norwegian brands appear performing better than the other three brands. These quantitative measures explain what happened over the time of the crisis, but it does not deliver how brand messages were imagined.

After emotions being classified into 10 subgroups of emotions, hierarchical clustering was applied because it uses categorical and continuous data to identify inter-group and intra-group differences and similarity (See Figure 2). Unlike partitioned k-means clustering, hierarchical modeling does not have a pre-defined number of clusters and investigate clusters by using Euclidean distances across all the data points, which is appropriate for dimension reduction to focus on similarities and differences (Wajrock et al. 2008). Dimension 1 explains approximately 80% of variance of the data, which appears to be the number of participants in brand messages. Dimension 2 explains approximately 13% of variance of the data, which appears to be assessed success of tweets virality (e.g., retweets count). Four clusters are located in the two dimensional frames to explain total 93% of variance between- and in- group differences. Cluster 1 includes Disney, Norwegian, Princess, and Carnival cruise at the Wave 1 and Princess and Carnival cruise at the Wave 2. Cluster 2 entails Disney cruise at the Wave 2, but Cluster 3 shows Norwegian cruise at the Wave 2. Cluster 4 includes Royal cruises at the Wave 1 and Wave 2. Disney and Carnival cruise have shown the largest amount of changes during the Wave 1 and Wave 2, because their Twitter messages at the Wave 2 were classified in a different cluster from the ones at the Wave 1. Unlike Disney and Carnival cruise brands, other cruise brands, such as Princess, Carnival, and Royal, remained in the same cluster across the Wave 1 and Wave 2. As shown in Figure 1, Disney cruise has achieved 10 times more retweets at Wave 2 than Wave 1, but Norwegian cruise has accomplished 16 times more favorite tweets at Wave 2 than Wave 1. Carnival and Princess cruise has shown approximately 4 times more retweets at Wave 2 than Wave 1, but Royal cruise has only shown twice more retweets at Wave 2 than Wave 1, but a half of favorite tweets at Wave 2 compared to the one at Wave 1. In other words, the results of hierarchical clustering indicate the patterns of cruise brands' Twitter engagements, but it lacks the qualitative aspects of brand messages and their engagements in the brand community. The next section will examine sentiment analysis with visualization. At the macro industry level, Figure 2 has examined reimagined brand messages across two different time frames. In the next session, at the micro level, five brands are individually analyzed to understand the dynamics of an individual actor in the cruise industry.

Figure 1. Descriptive analysis of data

Figure 1 entails descriptive analyses for data collected at Wave 1 and Wave 2. The descriptive analysis shows the number of tweet, favorite tweet, and retweet, respectively.

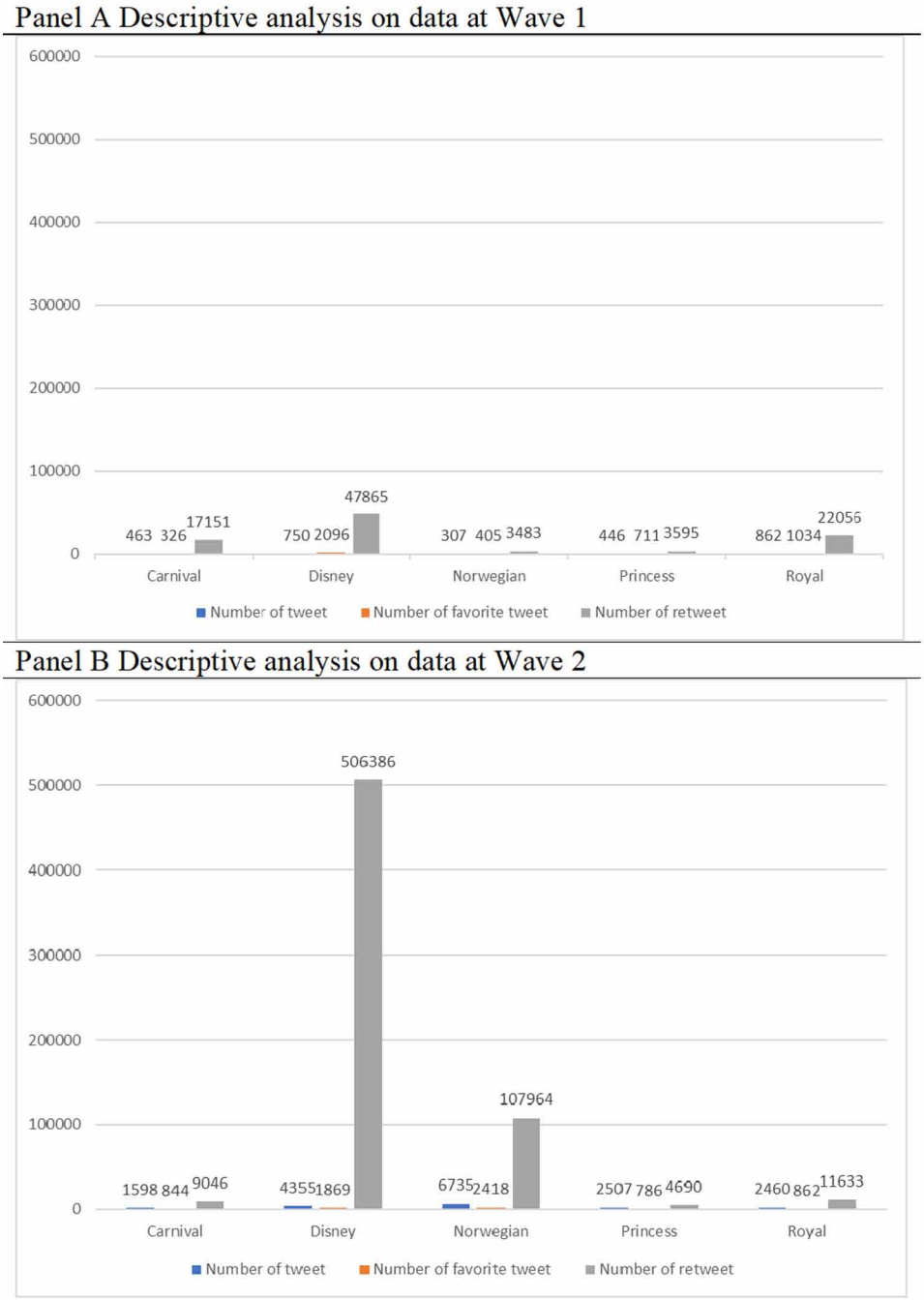


Figure 2. Output of hierarchical clustering

Figure 2 is a cluster plot to show two major dimensions to describe four clusters. 80% of variance of the cluster analysis is explained by the first dimension, and 13% of variance of the cluster analysis is explained by the second dimension. This method is helpful for reducing dimensions to explain similarities and differences across data points.

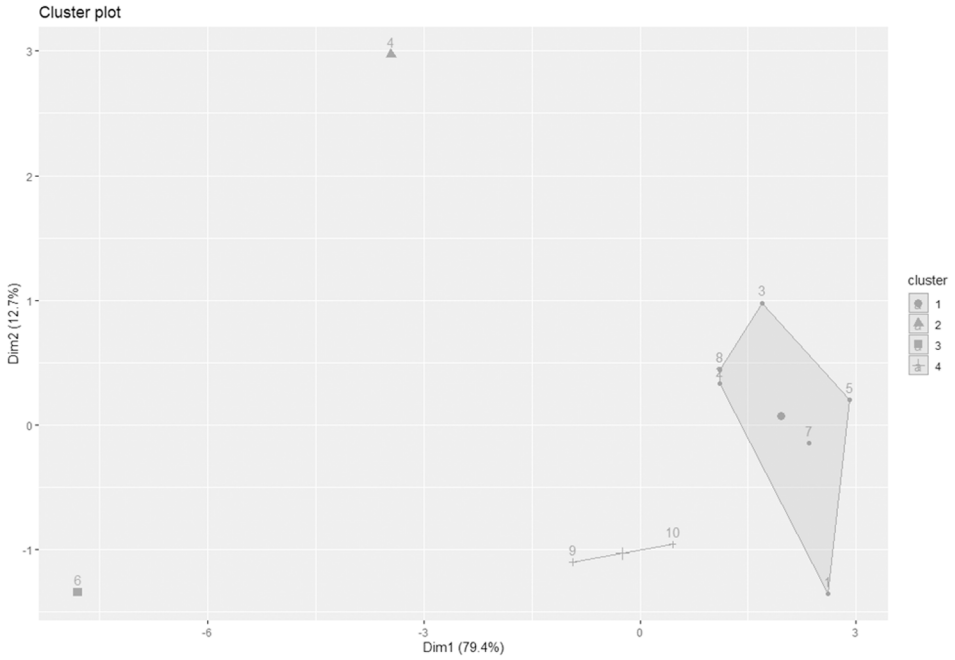
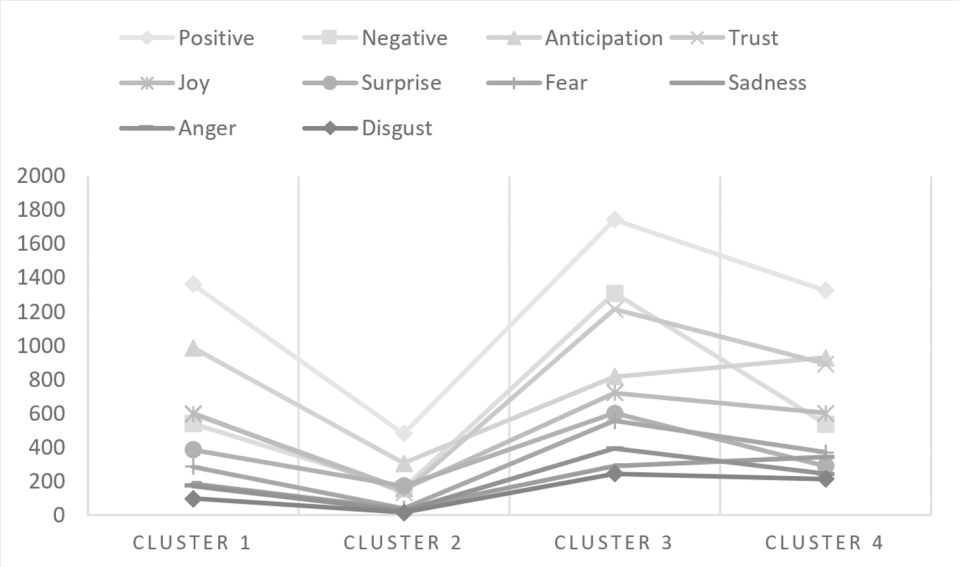


Figure 3 indicates emotions from Cluster 1, Cluster 2, Cluster 3, and Cluster 4, which indicates some emotions are shown more frequently than others. Positive emotion was the strongest emotion, yet disgust was the weakest emotion across clusters. Marketing scholars suggest controlling disgust is extremely important because it indicates a consumer's judgment of a brand's moral violation, damaging a consumer-brand relationship (Amar et al., 2018; Winterich et al., 2014). As the mere exposure to the concept of disgust may increase a consumer's accessibility to disgust, to address an externally caused negative incident, a brand practitioner's limited use of disgust would be a wise approach, which is consistent with the empirical findings.

To interpret the findings, it is important to note that the NRC method allows words to be embedded to the multiple emotion categories rather than a single category, to help interpreters understand the contextual nature of emotions. Among words ranked in the most frequently occurring emotions in each cluster, a commonly shared word will receive more attention for analysis to show how and why those emotions emerged in a brand's communication strategy in the different times of crisis at the emotional cluster level. Figure 4's Panel A shows Cluster 1's emotion profiles and most frequently mentioned words in top 3 emotion categories. Positive, anticipation, and trust emotions are the top 3 emotion categories. "Share", "Happy", and "Hope" appear to be shared words among the emotion categories. Figure 4's Panel B entails Disney cruise at Wave 2 (Cluster 2)'s emotion profiles and most frequently mentioned words. Across the top 3 emotion categories (positive, anticipation, and surprise categories of emotions), "magical" and "hope" are most frequently appeared terms across the emotions. Norwegian cruise at the Wave 2 (Cluster 3) is shown in Figure 4's Panel C. Positive, negative, and trust emotions are shown as

the top 3 emotion categories. No shared words have emerged among three categories, yet most words in positive and trust emotions are shared against words for negative categories. Figure 4's Panel D shows Royal cruises at the Wave 1 and Wave 2 (Cluster 4)'s emotion profiles and most frequently mentioned words in top 3 emotion categories. "Continue" and "Feeling" are shared words among the top 3 emotion categories including positive, anticipation, and trust.

Figure 3. Emotions from cluster 1, cluster 2, cluster 3, and cluster 4
Figure 3 indicates 10 various emotions across four clusters to summarize outputs of the sentiment analysis. Across the all the clusters, a positive emotion is most frequent expressed sentiment, but a disgust emotion is least frequently expressed sentiment.



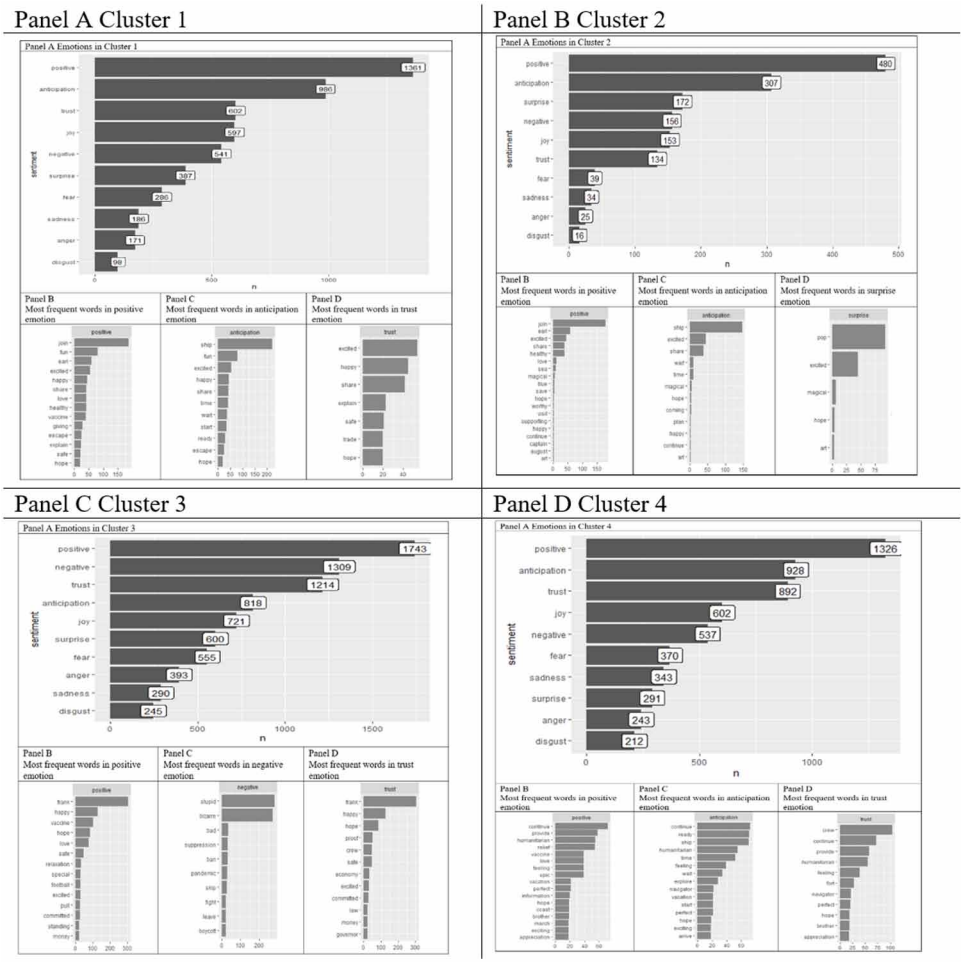
SOLUTIONS AND RECOMMENDATIONS

This paper attempts to examine the question of question "how did a highly serious negative incident, caused externally, make brand messages reinvented?" by conducting empirical examinations with Twitter data. For managers, the findings from the analytics are threefold. First, practitioners may use emotional appeal to reimagine brand messages against an externally caused negative incident. Specifically, this research identified hope was one of the most frequently shared words in Cluster 1 and Cluster 2 to help brand messages reimagined during the time of crisis. Scholars have given attention to hope for continuing a feeling of yearning and converting impossibility to possibility. An externally caused pandemic has created product failure and discontinuation of service, cruise brand communities shared emotions of hope (MacInnis and de Mello 2005). Hope has been an important emotion to understanding a consumer-brand relationship in the healthcare market, which consistently deals with a long-lasting severe crisis (Kemp et al. 2017). For a brand with strong, unique, and favorable associations like Disney cruise at Wave 2, the hope is seen as magical as the following quotes.

What To Expect On The Magic At Sea Staycation Cruise (14 retweets at Wave 2).

Figure 4. Sentiment analysis

Figure 4 includes four panels to explain four clusters with frequently expressed emotions and top 3 emotions and their associated words. This quantification approach is helpful to understand how each cluster is similar and different.



Lovely sunset this evening as @DisneyCruise #Disneymagic sits alongside in #Southampton very magical moment (7 tweets at Wave 2).

The Disney cruise's word "magic" is important to understand a consumer-brand relationship because magic lies in a consumer's belief on Disney's transformative experience which can be emotionally attached than rationally attached. According to James and his colleagues, "magical thinking allows participants to construct a space of uncertainty and ambiguity that transforms impossibilities into possibilities, thus sustaining their hope in the pursuit of goals (p.632, St. James et al. 2011)." Thus, magical thinking is one of the important coping mechanisms, which helps hope stronger. Marketing scholars have researched the relationship between magic and marketing communication. Magic is a fantasy and entails a process and a dialog for transformation. Those who believe in magic possess their own imaginative narratives and negotiate meanings from marketer-initiated brand messages (Miles 2013). As magic owns the nature to open to interpretations, the use of magic as a brand's theme like Disney is a powerful vehicle to cope the pandemic for effective consumer engagement.

Second, managers may recognize the use of negative emotion, which has been neglected in the traditional brand messages. this research noticed the role of negative emotion as an engagement vehicle for interactive brand messages in social media. Negative emotions may bring more engagements when people view an event from a competitive angle based on different beliefs (e.g., Covid-19 vaccination). For example, this research was able to classify three groups to hold various negative emotions in Cluster 3 (Norwegian cruise's Wave 2): evaluation, prevention, and avoidance. The evaluation group includes "stupid", "bizarre", and "bad", which shows far-from ideal deviations from the norms the user believes in. The prevention group includes "suppression" and "ban", which encourage Norwegian cruise's activism in the political landscape (e.g., be against voter suppression or proof-of-vaccine ban). The avoidance group entails "leave" and "boycott" relating to the Norwegian cruise's political standing. This sharp division based on their belief systems would increase the audience's political discussion intent and participation in political entertainment (Landreville and LaMarre 2011).

Attention to negative emotion is important because it occurs when a consumer uses a smartphone over a personal computer and when the messages are for someone close (vs. distanced) to them (Melumad et al. 2019). As social media is used more with a smartphone over a personal computer and often involves frequent message exchanges among close community members, it would be important to monitor what are the sources of negative emotions and how sharing community evolves as stronger negative feelings, such as regret and disappointment, may rise from the situation, which may damage brand equity (Jayasimha & Srivastava 2017). Particularly, messages using prevention and avoidance words can be problematic when they are seen as boycott messages. Business scholars have shown negative effects on brand performances: low stock performances and ungrounded influence on modifying brand's policy (Makarem & Jae 2016). Although negative emotions may engage a portion of consumers, managers should manage the nature of dialogues with negative emotions, addressing potential detrimental consequences.

Third, managers may leverage the power of storytelling by using a story plot as an engagement mechanism. This research discovered story plot mechanisms are helpful to generate strong consumer engagement represented by the number of favorite tweets and retweets. Plots are defined as "the temporal sequence of events affecting a character and results from the interplay of chronology and causality as the two components of narrative structure (p. 184, Laurence and Valentina 2019)", which may include hope with chronological change and opposing emotions with different belief systems. Unlike other clusters, Cluster 4 does not have a momentum for story plot mechanisms to reimagine their brand messages with a continued feeling as a shared word among top emotion categories. For Cluster 4, there was no hope or magical thinking to save the brand. None of the brand's advocates can have a chance to defend the brands against opponents and threats.

FUTURE RESEARCH DIRECTIONS

In the pre-pandemic era, price competition dominates digital brand messages in the tourism industry for "call to action"; however, in the pandemic era, the focus of digital brand messages is to provide aspiration for potential travelers (Wall Street Journal 2021). Whereas the pre-pandemic era's cruise brand messages used to focus on providing information on deals in the communication, but today, during the pandemic, the first three steps of AIDA Model (Attention-Interest-Desire-Action) appear to be more important in the interactive social media communication platforms to wait for their desire for cruise realized in the era of post-pandemic.

Scholars examining crisis management suggest a brand message strategy may adopt to where the crisis is situated: pre-crisis, crisis, and post-crisis phase (Coombs & Laufer 2018). As the interaction between a brand and a crisis would make damages, assessing risks relating to the potential damages and developing contingency crisis plans and service scripts are central tasks in the pre-crisis phase. In the crisis phase, identifying damages and affected stakeholders are essential, which include apiologies and compensation to maintain brand equity. Sentiment analysis can be a barometer to measure real-time sentiment across various stakeholders and implement effective communications, creating damage-mitigating dialogues. Lastly, in the post-crisis phase, organizational learning should be built as part of organizational memory and system to iterate the crisis management cycle to be more situationally aware of potential risks and damages associated with a potential crisis.

In the phase of crisis, sentiment analysis is an easy-to-use vehicle to make initiatives surrounding digital transformation, crisis management, and brand communication strategies possible. I found that hope and opposing emotions can be a vehicle for consumer engagements during a long-standing externally caused crisis with severe harm, Covid 19. This finding is meaningful because the traditional brand communications for crisis management focused on rational contents-based strategies (e.g., information provision, remediation, and rectification) rather than emotional intelligence strategies (Chen 2018). Identifying hope and opposing emotions to fight against negative incidents will provide a new vehicle to kindle awareness, interest, and desire/longing of cruise experience.

In the post-crisis phase, scholars suggest that understanding the unique impacts of a crisis is helpful for organizational learning, and using a lens of social exchange theory is helpful to make sense of various stakeholders' reactions and motivations (Cortez and Johnston 2020). They argue four elements to conduct the post-crisis review using social exchange theory: digital transformation, decision-making processes, leadership, and emotions and stress. First, digital transformation allows to examine flows of value creation and value exchange in a digitized manner, which helps identify innovations and changes from the crisis, underlying motives, and market reactions. This lens also covers complex supply chain to the rise of e-commerce competitors, gives a good survey of market dynamics. Second, examining decision making processes after crisis helps observe whether the decision-making processes are centralized, who are decision makers to determine reporting frequencies and coverages. For example, the pandemic gathered marketing resources to social media over the traditional mass media, and invited internal digital strategy teams over outsourcing to investigate market trends and respond rapidly by implementing changes in the supply chain management system and ad sets across social media channels. Also, leadership keeps revisiting resource allocations to maintain brand equity to determine what product should be promoted during the supply chain disruption and recovery while maintaining brand equity. Emotions and stresses across the entire organization should be closely monitored to provide supports to mitigate risks for potential crisis, returning to the pre-crisis phase.

The temporal perspective of crisis management provides a brand-level insights, whereas alignment squared model gives a lens to examine how a market consisting of multiple brands evolves with the crisis at the operationalized intendencies across market actors. This model entails four elements: customers, value propositions, value propositions, and value demonstration. The following questions are answered by using this model "How is revenue affected by the crisis (i.e., which changes do you notice or predict in terms of the value propositions that customers buy)? Similarly, how does the value demonstration provided to customers change in light of the coronavirus crisis? Finally, what im-pact do the first two changes have on a firm's capabilities? (Ritter and Pedersen 2020, p. 217)" This set of questions guide us

to understand the crisis and innovation better, which may inspire what brand content should be a focus of receiving attention, and interest, and desire as a new normal after a crisis.

In addition to managerial implications, future researchers may invite controlled lab experiments to explore the casualty of hope on consumer judgments as a remedy for the crisis. Specifically, manipulation of consumer-brand relationships can be interesting to find a moderating condition for the effect of hope on consumer choice. Hope is a positive emotion which appears to be useful to maintain marketing effectiveness measures against a crisis, but future researchers may examine what boundary conditions are for a specific positive emotion. Also, this crisis may come from Diamond Princess incident in 2020. Valentini and her colleagues have disagreed on where is the departure and destination of the negative emotions and how we can measure the carryover effects from the negative emotions (Valentini et al. 2020). Traditionally, the carryover effect research has been examined in the context of marketer-driven advertising and brand competitions (Breuer et al. 2011; Breuer & Brettel 2012), it would be worthy of getting attention from future scholars on how to expand the wisdom from the traditional empirical examination to advance our understanding of dynamics between user-generated contents and brand messages.

In the literature on negative incidents and consumer-brand relationships, type of brand relationship (e.g., communal vs. exchange) and brand personality are reported as a moderator which might affect the effectiveness of emotion-driven brand strategies. In addition, it would be interesting to explore how other industries implement reimagined brand strategies during the pandemic. For example, L'Oréal, a beauty product company, emphasizes virtual trials instead of in-person trials, and pushes forward to online shopping over in-person Sephora visits. Still, it is not clear what emotions are included to deliver the contents to handle the ongoing crisis and reimagine a consumer-brand relationship. The advance of understanding the intersection of digital transformation, crisis management, and brand message strategies will give more practical insights to business managers and policy makers to be equipped with more tools with persuasive emotions in the short term and automate content strategies with greater marketing effectiveness in the long term.

CONCLUSION

This research suggests actionable knowledges by addressing the question of "how an externally caused, highly severe negative incident made brand messages reimagined?" At the brand level, hierarchical clustering was applied to reduce dimensions of rich text data. At the tweet level, sentiment analysis was used to examine various emotions and most frequently used words associated with their consumer engagement on Twitter.

During the pandemic, caring emotions about pains without a cruise trip were displayed, bonding and loyal emotions as part of a cruise brand community were maintained while dreaming of the next trip, and debates on mandatory vaccinations for elevated life were one of the strong discussion topics to bring positive and negative emotions. The conversations on Twitter were a great gateway to access real-time responses from multiple stakeholder groups' voices at the individual level. Especially, the emotions and its behavioral metrics (e.g., favorite tweet or retweet) were helpful to understand alluded moral foundations from various stakeholder groups.

Therefore, this research explored the intersection of digital transformation and crisis management. Empirical findings of reimagined brand messages include that using emotions in a brand's communication is an effective way of handling an externally caused, highly severe negative incident. Researchers

may investigate how industries affected by the Covid 19 crisis reimagine their brand communication by utilizing more diverse data sources in addition to text data. Practitioners can develop a strategic communication plan for various negative incidents to weaken a potential damage by strengthening the essence of brand equity.

REFERENCES

Alaei, A. R., Becken, S., & Stantic, B. (2019). Sentiment analysis in tourism: Capitalizing on big data. *Journal of Travel Research*, *58*(2), 175–191. doi:10.1177/0047287517747753

Amar, M., Ariely, D., Carmon, Z., & Yang, H. (2018). How counterfeits infect genuine products: The role of moral disgust. *Journal of Consumer Psychology*, *28*(2), 329–343. doi:10.1002/jcpy.1036

Ayvaz-Cavdaroglu, N., Gauri, D. K., & Webster, S. (2019). Empirical evidence of revenue management in the cruise line industry. *Journal of Travel Research*, *58*(1), 104–120. doi:10.1177/0047287517737178

Bagozzi, R. P., Gopinath, M., & Nyer, P. U. (1999). The role of emotions in marketing. *Journal of the Academy of Marketing Science*, *27*(2), 184–206. doi:10.1177/0092070399272005

Berger, J. (2011). Arousal increases social transmission of information. *Psychological Science*, *22*(7), 891–893. doi:10.1177/0956797611413294 PMID:21690315

Breuer, R., & Brettel, M. (2012). Short-and long-term effects of online advertising: Differences between new and existing customers. *Journal of Interactive Marketing*, *26*(3), 155–166. doi:10.1016/j.intmar.2011.12.001

Breuer, R., Brettel, M., & Engelen, A. (2011). Incorporating long-term effects in determining the effectiveness of different types of online advertising. *Marketing Letters*, *22*(4), 327–340. doi:10.100711002-011-9136-3

Cheng. (2018). How social media is changing crisis communication strategies: Evidence from the updated literature. *Journal of Contingencies and Crisis Management*, *26*(1), 58-68.

Clore, G. L., Gasper, K., & Garvin, E. (2001). Affect as information. In J. P. Forgas (Ed.), *Handbook of affect and social cognition* (pp. 121–144). Lawrence Erlbaum.

CNBC. (2021). *Digital ad spend grew 12% in 2020 despite hit from pandemic*. https://www.cnbc.com/2021/04/07/digital-ad-spend-grew-12percent-in-2020-despite-hit-from-pandemic.html

Coombs, W. T., & Laufer, D. (2018). Global crisis management–current research and future directions. *Journal of International Management*, *24*(3), 199–203. doi:10.1016/j.intman.2017.12.003

Cortez, R. M., & Johnston, W. J. (2020). The Coronavirus crisis in B2B settings: Crisis uniqueness and managerial implications based on social exchange theory. *Industrial Marketing Management*, *88*, 125–135. doi:10.1016/j.indmarman.2020.05.004

Cruise Market Watch. (2021). *2021 Worldwide Cruise Line Market Share*. https://cruisemarketwatch.com/market-share/

Dessart, L., & Pitardi, V. (2019). How stories generate consumer engagement: An exploratory study. *Journal of Business Research*, *104*, 183–195. doi:10.1016/j.jbusres.2019.06.045

Forbes. (2021). *CDC Rejects Cruise Industry Push To Resume Sailing, Sending Stocks Tumbling*. https://www.forbes.com/sites/nicholasreimann/2021/03/24/cdc-rejects-cruise-industry-push-to-resume-sailing-sending-stocks-tumbling/?sh=6bee93ce4eb1

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology*, *96*(5), 1029–1046. doi:10.1037/a0015141 PMID:19379034

Jayasimha, K. R., & Srivastava, H. S. (2017). Consumer advocacy: Examining the feeling and doing following a failed service encounter. *Journal of Retailing and Consumer Services*, *34*, 201–208. doi:10.1016/j.jretconser.2016.09.016

Kemp, E., Bui, M., Krishen, A., Homer, P. M., & LaTour, M. S. (2017). Understanding the power of hope and empathy in healthcare marketing. *Journal of Consumer Marketing*, *34*(2), 85–95. doi:10.1108/JCM-04-2016-1765

Khamitov, M., Grégoire, Y., & Suri, A. (2020). A systematic review of brand transgression, service failure recovery and product-harm crisis: Integration and guiding insights. *Journal of the Academy of Marketing Science*, *48*(3), 519–542. doi:10.100711747-019-00679-1

Landreville, K. D., & LaMarre, H. L. (2011). Working through political entertainment: How negative emotion and narrative engagement encourage political discussion intent in young Americans. *Communication Quarterly*, *59*(2), 200–220. doi:10.1080/01463373.2011.563441

Laurence, D., & Valentina, P. (2019). How stories generate consumer engagement: An exploratory study. *Journal of Business Research*, *104*, 183–195. doi:10.1016/j.jbusres.2019.06.045

Lerner, J. S., Han, S., & Keltner, D. (2007). Feelings and consumer decision making: Extending the appraisal-tendency framework. *Journal of Consumer Psychology*, *17*(3), 181–187. doi:10.1016/S1057-7408(07)70027-X

MacInnis, D. J., & De Mello, G. E. (2005). The concept of hope and its relevance to product evaluation and choice. *Journal of Marketing*, *69*(1), 1–14. doi:10.1509/jmkg.69.1.1.55513

Makarem, S. C., & Jae, H. (2016). Consumer boycott behavior: An exploratory analysis of twitter feeds. *The Journal of Consumer Affairs*, *50*(1), 193–223. doi:10.1111/joca.12080

Melumad, S., Inman, J. J., & Pham, M. T. (2019). Selectively emotional: How smartphone use changes user-generated content. *JMR, Journal of Marketing Research*, *56*(2), 259–275. doi:10.1177/0022243718815429

Miles, C. (2013). Persuasion, marketing communication, and the metaphor of magic. *European Journal of Marketing*, *47*(11/12), 2002–2019. doi:10.1108/EJM-11-2011-0632

Mishra, M. S., & Sharma, R. W. (2019). Brand crisis-sentiment analysis of user-generated comments about@ Maggi on Facebook. *Corporate Reputation Review*, *22*(2), 48–60. doi:10.105741299-018-0057-4

Nadeau, J., Rutter, R., & Lettice, F. (2020). Social media responses and brand personality in product and moral harm crises: Why waste a good crisis? *Journal of Marketing Management*, *36*(11-12), 1031–1054. doi:10.1080/0267257X.2020.1764080

Nandan, S. (2005). An exploration of the brand identity–brand image linkage: A communications perspective. *Journal of Brand Management*, *12*(4), 264–278. doi:10.1057/palgrave.bm.2540222

Plutchik, R. (1980). A general psychoevolutionary theory of emotion. In *Theories of Emotion* (pp. 3–33). Academic Press. doi:10.1016/B978-0-12-558701-3.50007-7

Ritter, T., & Pedersen, C. L. (2020). Analyzing the impact of the coronavirus crisis on business models. *Industrial Marketing Management*, *88*, 214–224. doi:10.1016/j.indmarman.2020.05.014

Smith, A. K., & Bolton, R. N. (2002). The effect of customers' emotional responses to service failures on their recovery effort evaluations and satisfaction judgments. *Journal of the Academy of Marketing Science*, *30*(1), 5–23. doi:10.1177/03079450094298

Srivastava, M., & Gosain, A. (2020). Impact of service failure attributions on dissatisfaction: Revisiting attribution theory. *Journal of Management Research*, *20*(2), 99–112.

St. James, Y., Handelman, J. M., & Taylor, S. F. (2011). Magical thinking and consumer coping. *The Journal of Consumer Research*, *38*(4), 632–649. doi:10.1086/660163

The Wall Street Journal. (2021), *Travel and Tourism Brands Boost Marketing and TailorMessages*. https://www.wsj.com/articles/travel-and-tourism-brands-boost-marketing-and-tailor-messages-11618830000

Wajrock, S., Antille, N., Rytz, A., Pineau, N., & Hager, C. (2008). Partitioning methods outperform hierarchical methods for clustering consumers in preference mapping. *Food Quality and Preference*, *19*(7), 662–669. doi:10.1016/j.foodqual.2008.06.002

Wheaton, M. G., Prikhidko, A., & Messner, G. R. (2021). Is fear of COVID-19 contagious? The effects of emotion contagion and social media use on anxiety in response to the coronavirus pandemic. *Frontiers in Psychology*, *11*, 3594. doi:10.3389/fpsyg.2020.567379 PMID:33469434

Winterich, K. P., Mittal, V., & Morales, A. C. (2014). Protect thyself: How affective selfprotection increases self-interested, unethical behavior. *Organizational Behavior and Human Decision Processes*, *125*(2), 151–161. doi:10.1016/j.obhdp.2014.07.004

Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, *52*(1), 1–14. doi:10.1016/S0148-2963(99)00098-3

ADDITIONAL READING

Chung, W., & Zeng, D. (2020). Dissecting emotion and user influence in social media communities: An interaction modeling approach. *Information & Management*, *57*(1), 103108. doi:10.1016/j.im.2018.09.008

Coombs, W. T. (2014). *Ongoing crisis communication: Planning, managing, and responding*. Sage Publications.

Dhaoui, C., Webster, C. M., & Tan, L. P. (2017). Social media sentiment analysis: Lexicon versus machine learning. *Journal of Consumer Marketing*, *34*(6), 480–488. doi:10.1108/JCM-03-2017-2141

Heinonen, K., & Strandvik, T. (2020). Reframing service innovation: COVID-19 as a catalyst for imposed service innovation. *Journal of Service Management*, *32*(1), 101–112. doi:10.1108/JOSM-05-2020-0161

Lachlan, K. A., Spence, P. R., Lin, X., & Del Greco, M. (2014). Screaming into the wind: Examining the volume and content of tweets associated with Hurricane Sandy. *Communication Studies*, *65*(5), 500–518. doi:10.1080/10510974.2014.956941

Li, F., Larimo, J., & Leonidou, L. C. (2021). Social media marketing strategy: Definition, conceptualization, taxonomy, validation, and future agenda. *Journal of the Academy of Marketing Science*, *49*(1), 51–70. doi:10.100711747-020-00733-3

McGraw, A. P., Williams, L. E., & Warren, C. (2014). The rise and fall of humor: Psychological distance modulates humorous responses to tragedy. *Social Psychological & Personality Science*, *5*(5), 566–572. doi:10.1177/1948550613515006

Smith, A. K., & Bolton, R. N. (2002). The effect of customers' emotional responses to service failures on their recovery effort evaluations and satisfaction judgments. *Journal of the Academy of Marketing Science*, *30*(1), 5–23. doi:10.1177/03079450094298

Valentini, S., Orsingher, C., & Polyakova, A. (2020). Customers' emotions in service failure and recovery: A meta-analysis. *Marketing Letters*, *31*(2), 199–216. doi:10.100711002-020-09517-9

KEY TERMS AND DEFINITIONS

Brand: A set of unique, strong, and favorable associations in one's mind.

Brand Transgression: A brand's moral violation to against a consumer's expectations.

Crisis Management: Managerial processes to identify crisis issues and implement plans to cope with a negative event.

Emotion: A mental state about feelings.

Hierarchical Clustering: Euclidean distance-based grouping techniques on data points to identify within-group similarities and between-group differences.

Product Harm: A product's defect and danger to a consumer.

Sentiment Analysis: A method to extract emotion information from text data.

Service Failure: A disruption of service does not meet a consumer's expectations.

Chapter 14
The Causes and Their Influencers in the Age of Digital Business:
The Instagrammers' Influence in Shaping the Attitudes for and Against the Animal Products

Edar S. Añaña
https://orcid.org/0000-0002-8298-9208
Universidade Federal de Pelotas, Brazil

ABSTRACT

This study evaluates the effect of Instrammers' recommendations pro and against the consumption of animal foods, on the attitude towards the animals' welfare, in light of respondents' involvement with the so-called healthy eating. The research uses a sample of 144 respondents, whose data were analyzed by structural equation modeling performed with the Smart-PLS-2.0. The sample was collected through online questionnaires, containing videos of four different influencers in favor and against the consumption of animal foods, to which the respondents were randomly assigned to. The result pointed out that influencer credibility, in this case, is best organized as a second-order construct, which in addition to the three factors suggested by Ohanian also incorporates the influencer's interactivity with the consumer. The result confirmed that both the involvement with the healthy eating cause, and the Instagrammers' credibility contribute directly or indirectly to the quality of information posted and to the attitude towards animal welfare.

DOI: 10.4018/978-1-7998-9008-9.ch014

INTRODUCTION

The marketing literature only recently has seen the rise of the term influencer. According to Chopra, Avhad, & Jaju (2021), influencer marketing is the action of an external person to influence consumers' buying choices. As per The Word of Mouth Marketing Association (WOMMA), influencer marketing is when a marketer identifies, seeks out, and engages with influencers in support of a business objective, and an influencer is a person who has a greater than average reach or impacts through word of mouth in a relevant marketplace (Fay et al., 2009). According to Silva et al. (2020), companies are adopting diversified strategies to engage consumers, such as geomarketing, multilevel marketing, and guerrilla marketing, among others, but none of these tactics has proven to be as efficient as marketing recommendations, known as word of mouth: "Nothing can be more compelling than receiving input from people who comment, naturally or almost naturally, on their personal experiences with particular products" (Silva et al., 2020, p. 158). Influencer marketing consists in identifying key communities and opinion leaders who are likely to talk about products and have the ability to influence the opinions of others (Morton, 2020).

Influencer marketing is a marketing strategy that uses the influence of key individuals or opinion leaders to drive consumers' brand awareness and/or their purchasing decisions (Lou & Yuan, 2019). However, for a sustainable strategy, marketers must focus on identifying the right influencers and using them to drive brand engagement by identifying the target audience for whom the communication would be relevant (Chopra et al., 2021).

Opinion leaders can influence others' behaviors due to their appeal or connection with their audience, as well as their specialized knowledge and/or authority on a given topic (Torres et al., 2019). The endorsement of celebrities is not a new subject, but its understanding still requires new studies, especially regarding microcelebrities.

According to Erdogan (1999), the proportion of advertisements that used celebrities as endorsers was one in six in 1979, one in five in 1988, and one in four in 1997. However, we must observe that consumers today are more aware and informed, and better empowered than before to distinguish between a genuine recommendation and a simple endorsement (Chopra et al., 2021), and for this reason, it is important to note that not all celebrities are "natural influencers".

In contrast to traditional marketing campaigns in which celebrities are featured to demonstrate the superiority and uniqueness of the brand, successful influence marketing campaigns require influencers who demonstrate familiarity and authenticity and maintain visual congruence with their followers (Vrontis et al., 2021). And contrary to traditional celebrities or public figures who are well-known via traditional media, social media influencers are "regular people" who become "online celebrities" by creating and posting content on social media (Lou & Yuan, 2019). For that reason, brands that use influencers without studying the fit between the influencer and the brand story are more likely to be considered inauthentic.

According to Silva et al. (2020), clothing is the category most endorsed by the digital fitness influencers, food (supplements and healthy, natural and/or organic foods without sugar, gluten, fat, oil and lactose) the second, and esthetic and cosmetics the third most endorsed category. Even though Instagram is one of the most influential networks nowadays (Y. Gupta et al., 2020; Nugraha et al., 2018), still exists a lack of academic research about this social platform, probably because Instagram is a relatively new phenomenon, which only in the last few years won capillarity (Djafarova & Rushworth, 2017).

But in addition to Instagram, other social networks such as YouTube have also sparked the interest of researchers. Some works, such as that of Corrêa, Soares, Christino, Gosling, & Gonçalves (2020), for example, have examined the influence of Youtubers on the intention to use the brands they recom-

mend and identified that involvement with those influencers explains engagement with the brand, in the cognitive, affective, and behavioral aspects. In other words, they found that respondents more engaged with the recommender, want to learn more about the recommended content. The videos presented by a favorite Youtuber trigger the cognitive processing of the followers, who become more likely to recommend the video to others to evaluate it as well. However, contrary to what was expected, only the good feeling (affection) arousal towards a Youtuber does not assure a higher intention to use the products or services recommended. Yet one must acknowledge that in the digital age, likes and comments are the thermometers used to gauge relationships built and maintained from an interaction that cannot be disregarded by marketers when developing communication strategies and online promotion (Silva et al., 2020).

This chapter examines the impact of exposure to recommendations posted by digital influencers, on shaping the opinion of food consumers, using influence marketing for and against the consumption of animal products, regardless of what "healthy food" means to each respondent. The study aims to evaluate the relationships between consumers' involvement with healthy eating and Instagrammers' recommendations (for and against the consumption of animal food), and their impacts on the attitude towards the animals' welfare among consumers of different dietary practices. This research does not discuss the healthfulness of carnivore or vegetarian diets, given that it is more rhetorical than a health-related matter (Wilson et al., 2004). According to these authors, this discussion is a contradictory issue, an "ideological dilemma", once both types of diet (vegetarianism or meat consumption) can promote health or cause disease. The relationship to health is an assumption that carnivores assume to be true, and that the non-carnivore ones try to persuade that it is just an illusion (a false consciousness).

The study is experimental in nature and uses as stimuli four videos produced by two important digital influencers and two journalists who formally counter-argue the positions of one and the other. The influencers are Anita, a famous Brazilian singer that abhors the consumption of animal products, and Camila Telles, who advocates for the cause of agribusiness and the consumption of all agricultural products, including those of animal origin, once assuring animal rights. In addition to the influencers, two journalistic editorials against the positions defended by those influencers were included in the set of stimuli that respondents should receive randomly.

THEORETICAL BACKGROUND

The use of celebrities as brand endorsers is an old phenomenon, dating back at least to the late 19th century when Queen Victoria's image was associated with Cadbury Cocoa chocolate (Erdogan, 1999). For ages celebrity endorsement in advertising is prevalent and research has shown a significant relationship between the endorser and buying behavior, but in the last few years, it is observed that in digital marketing micro-influencers such as bloggers and 'Instafamous' personalities have increased massively (Y. Gupta et al., 2020).

Influence Marketing

Influence marketing is about change from marketing "at" consumers to marketing "with" people (Fay et al., 2009). But influence marketing can also be defined as a marketing strategy where public and private entities advertise their products and services to a target audience from a media or social media outlet (Barreiro et al., 2019). Literature has suggested that both, brand attitudes and purchase intentions, are

influenced by the digital influencer's attractiveness (which includes both likeability and familiarity) and by the congruence between the digital influencer and the brand (Torres et al., 2019). Social media influencers share some characteristics, such as that they are perceived as successful, talented, attractive, authentic, trustworthy, and close to their followers, who admire them, associate with them, and aspire to be like them (Morton, 2020).

As per Djafarova & Rushworth (2017), people involved with social networks aspire to share the lifestyles of certain celebrities, copying their fashion and makeup styles, types of posts, or choices of restaurants and holiday destinations. According to Erdogan (1999), celebrity endorsement strategy can be an effective competitive weapon in mature and saturated markets to differentiate products from competitors since there is a heavy advertising clutter and almost no room for actual products.

Silva et al. (2020) investigated the posts of digital influencers that endorsed some brand or product to observe posting characteristics and the forms of the engagement generated by them, and Fay et al. (2009) identified five broad categories of influencers based on varying degrees of formal/institutional roles to less formal influencers. Among those categories, they mention the cultural elite, including celebrities, designers, artists and musicians that influence consumers by the social, traditional, and the new media. As per those authors, these influencers are designated as trendsetters, fashionists, tastemakers, creators, starters, etc...

Morton (2020) found that consumers consider influencers to be normal people (rather than celebrities) who are followed by others, that their popularity comes from sharing content, and that they collaborate with brands. Nowadays, Instagram is capable of turning a housewife into a successful fashion designer, or a banker into a photographer (Y. Gupta et al., 2020). As per Y. Gupta et al. (2020), Instagram assists 80% of its users in buying decisions, "thus, it can be concluded that the instafamous celebrities play an important role in influencing the online buyers, so if the company is not promoting on Instagram they are missing out huge opportunity" (p.12). The influencers' endorsement is a mediation process that promotes a reconfiguration of advertising consumption. An endorsement is placed in the personal platform of the endorsers, in the most natural way possible, as if it were part of their daily life (Silva et al., 2020), accessible to all followers who can instantly interact with the post.

Several works have evaluated the influence of Instagrammers on the purchase decisions of their followers, in different product categories and contexts, most of them using de scale proposed by Ohanian (1990) with slight adjustments. This is the case, for example, of R. Gupta, Kishor, & Verma (2017), that combined the expertise, trustworthiness, and attractiveness constructs (as suggested by Ohanian, 1990) along with two new constructs - popularity and relevance of the celebrity for the product endorsed.

Mammadli (2021) investigated the effect of endorsement on the purchase intention, as well as the mediating effect of trust (an attitude) in that relationship. And Amelina & Zhu (2016) investigated the effect of Instagrammers' trustworthiness, expertise, and attractiveness, on brand attitude and merchandise attractiveness. Torres et al. (2019) evaluated the influencers' attractiveness by a set of six variables (I like, physically attractive, knowledgeable, always on the web, good reputation, and makes me feel comfortable) adapted from previous works. Other authors, like Xiao, Wang, & Chan-Olmsted (2018) have used more complex models in which, besides the three original dimensions (trustworthiness, expertise, and attractiveness), other factors such as interactivity, social advocacy, and homophily also contribute to the credibility of the information transmitted by the influencers. With this in mind, the following hypothesis can be formulated:

H1 – The influencers' credibility to recommend topics related to the consumption of animal products depends on their expertise, likability, and trustworthiness, as well as the intensity of interactions between respondent and influencer.
H2 – The influencers' credibility impacts consumers' Attitude Towards Animal Welfare both directly (H2a) and indirectly, by reinforcing the credibility of the information as a whole (H2b).

Consumer Involvement

Consumer involvement with a product category was defined by Zaichkowsky (1985) as a person's perceived relevance of the object based on inherent needs, values, and interests. As stated by that author the involvement is a complex construct that requires a 20-item inventory to measure it. A decade later, the same author revised the original work, in the light of some critics and contributions from other authors, who advocated, among other things, that involvement contained affective and cognitive components (Zaichkowsky, 1994). In her review, this author suggested a more parsimonious 10-item version of the scale, although keeping the original definition for understanding that her previous definitions were extensive enough to cover the affective and the cognitive components.

When the theme is involvement in healthy eating, it is important to consider that this concept can express different meanings. According to Bisogni et al. (2012), depending on the cultural background and the dietary habits developed since childhood, people may associate healthy eating with the consumption of fruits, vegetables, meat, safe or functional foods, among other categories. They may also classify foods by the nutrients they offer (fiber, vitamins, fats, carbohydrates, etc.), as well as by how the food is produced (natural, processed, homemade, organic, etc.). But ultimately, they will end up "categorizing the food according to their definitions of healthfulness, often using dichotomous categories of 'good food' and 'bad food'" (Bisogni et al., 2012, p. 289).

For this work respondents were questioned about their involvement with "healthy food" through adjectives like important, relevant, meaningful, needed, involving (Zaichkowsky, 1994), independently of their concepts about the subject. Considering that in consumption decisions, consumers more involved with the consumption category tend to be more careful in doing the decision (Zaichkowsky, 1985) it is expected that:

H3 - Involvement with the consumption/non-consumption of healthy foods strengthens the credibility attributed by respondents to influencers.
H4 - Involvement with the consumption/non-consumption of healthy foods strengthens the credibility of the information as a whole.
H5 - Involvement with the consumption/non-consumption of healthy foods strengthens the Attitude Towards Animal Welfare.

Xiao et al. (2018) found that information perceived credibility correlates with attitudes toward the video and the announced brand, a result that is consistent with Greer (2003), who found that the perceived credibility of information transmitted online influences people's attitudes toward the stories they read. In the same vein, Chu & Kamal (2008) found that readers were more likely to have a positive attitude toward the brand when they were reading a high-quality blog written by a credible blogger, and for those reasons, we expect that:

H6 – The credibility conveyed by the information contained in the videos presented to respondents influences their Attitude towards Animal Welfare.

METHODS

The experimental plan follows the same logic espoused by Lu, Mihalik, Heere, Meng, & Fairchild (2019) to evaluate the media impact on consumer attitude, with a random selection of stimuli. After adhering to the proposal, the respondents were randomly addressed to one of the four possible scenarios: (a) a video in which Anita vehemently condemns the dairy and baby beef consumption; (b) an editorial counter-arguing Anita's position and defending the agribusiness merits, formally transmitted by a journalist; (c) a video in which Camila Telles exalts the merits of large-scale production and defends the responsible consumption of animal products; and (d) an editorial formally criticizing the agribusiness and its impacts, formally presented by another journalist.

The main objective of this work is to analyze the role of influencers in shaping the attitude towards animal welfare, based on respondents' involvement with healthy eating and influencer' recommendations. For this reason, all the respondents were asked to express their opinion about the consumption of animal products in a scale (Cembalo et al., 2016) before watching one of the four videos, about three minutes long. The credibility of influencers was assessed by the scale proposed by Ohanian (1990), and the involvement with healthy eating products by Zaichkowsky (1994) scale. The interactivity with every influencer was measured by four items adapted from McMillan & Hwang (2002), as done by Xiao et al. (2018), and the quality of the information provided by the videos, by the five items proposed by Xiao et al. (2018): believable, reliable, credible, trustworthy, and accurate.

The Ohanian scale (1990) was chosen because it is an instrument that can be adapted to a variety of situations, "including experimental studies of source credibility, in which the scale can be used to assess the effectiveness of experimental manipulation" (Ohanian, 1990, p. 49). Furthermore, several studies have used that instrument in its original configuration (Gaur, Tiwari, & Bathula, 2012; Y. Gupta et al., 2020; Jin, Muqaddam, & Ryu, 2019; Nugraha et al., 2018; van der Veen & Song, 2010) or with some adaptations (R. Gupta et al., 2017; Lou & Yuan, 2019; Mammadli, 2021; Senecal & Nantel, 2004), as done here.

After evaluating the reliability and validity of scales, they were reduced into manifest variables by the averages of every construct to test and to compare the attitudes of the respondents of different eating habits. This work analyzed a sample of 144 respondents chosen by convenience via an electronic questionnaire that was set available online for 15 days in June 2021. The questionnaire adherence was encouraged through the social networks of the author and colleagues, who were also involved in disseminating the survey. As shown in Table 1, the sample was largely female (66%) and carnivorous (82.6%), without any significant difference in eating habits amid the genders ($\chi^2 = 0.490$; DF = 1; Sig = 0.484).

To avoid possible biases of preference the respondents were assigned randomly to one of the four scenarios, independent of their habitual diet. After answering some preliminary questions about gender, age, eating habits, and social media attendance, respondents were asked to answer the questions related to the Animal Welfarism Attitudes Scale (Cembalo et al., 2016) and to see a short video recorded by the influencer s/he was appointed to, before passing to the next section. The questionnaire and the videos were available at the LimeSurvey platform, hosted by an academic site.

Table 1. Eating habit and sex

Eating Habits			Female	Male	Total
Eating Habit	Carnivorous	Count	77	42	119
		%	64,7%	35,3%	100,0%
	Non-Carnivorous	Count	18	7	25
		%	72,0%	28,0%	100,0%
Total		Count	95	49	144
		%	66,0%	34,0%	100,0%

The videos presented to respondents were available on Youtube, by Anita, Giancarlo Eidler (a vegetarian influencer), Camila Telles (an influencer aligned to the agribusiness interests), and Carmen Cestari (a journalist expert in rural business). The videos posted by the first two influencers hardly condemned the meat-eating and the consumption of products that involve animals in their development; and the last ones defended the consumption of all products derived from modern agriculture, including meat and other products, as long as the animal rights are preserved. As shown in Table 2, the assignment of influencers was independent from the diet type preferred by respondents ($\chi^2 = 1.098$; DF = 3; Sig = 0.777).

Table 2. Eating habit and influencer seen

Diet Type	Anita (singer)	Carmen Cestari	Camila Telles	Giancarlo Eidler	Total
Carnivorous	28	37	24	30	119
Non-Carnivorous	4	7	6	8	25
Total	32	44	30	38	144

RESULTS

Data were treated by Structural Equation Modeling with Smart-PLS-2.0 (Ringle et al., 2005) to evaluate the measurement model and to test the research hypotheses. Whereas the scale proposed by Ohanian (1990) behaved differently in contexts where it had been used before, two measurement models were estimated for comparison. The first model estimated the factors of influencers' credibility and interactivity as first-order constructs; and for the second one, those factors were agglutinated in a second-order model, as per Xiao et al. (2018). Once the first model failed to comply with discriminant validity, the second-order model was adopted as a better choice to represent the influencers' credibility, as will be discussed in the next section.

Three of the eight variables related to the Animal Welfarism Attitudes Scale – AWF (Cembalo et al., 2016) (AWFP1, AWFP6, and AWFP8) did not show adequate levels of significance ($t > 1.96$) and needed to be excluded from the model. All the remaining factors showed low cross-loadings, satisfactory levels of reliability (C.R. > 0.7) and Average Variance Extracted (AVE > 0.5), as shown in Table 3, attesting to the model convergent validity (Hair et al., 2019).

Table 3. Measurement model reliability

Factors	AVE	Composite Reliability	R Square	Cronbach's Alpha
AWF	0.767	0.943	0.795	0.925
Expertise	0.909	0.980	0.824	0.975
Influencer Credibility	0.805	0.985	0.458	0.984
Information Credibility	0.967	0.993	0.717	0.991
Interactivity	0.860	0.961	0.820	0.946
Involvement	0.971	0.994	-	0.992
Likability	0.940	0.984	0.909	0.979
Trustworthiness	0.919	0.983	0.953	0.978

The discriminant validity of the model was assessed by the criteria proposed by Fornell & Larcker (1981), for whom the discriminant validity does exist when the square root of factors' AVEs exceeds factors' correlations with all other factors. As shown in Table 4, the square roots of factors' AVEs (in the main diagonal) are higher than the corresponding correlations with all other factors, except for those of the second-order factor (Influencer Credibility) and its members, something that was within expectations. Once it is a second-order factor, the lower-order components must exhibit discriminant validity among each other and to all other constructs in the model, "except for their own higher-order component of which they are a part of" (Sarstedt, Hair, Cheah, Becker, & Ringle, 2019, p. 200). Therefore, we can assume that discriminant validity is present across the first- and the second-order factors. For ease of interpretation, the correlations referring to the factors forming second-order construct are in italics in the table.

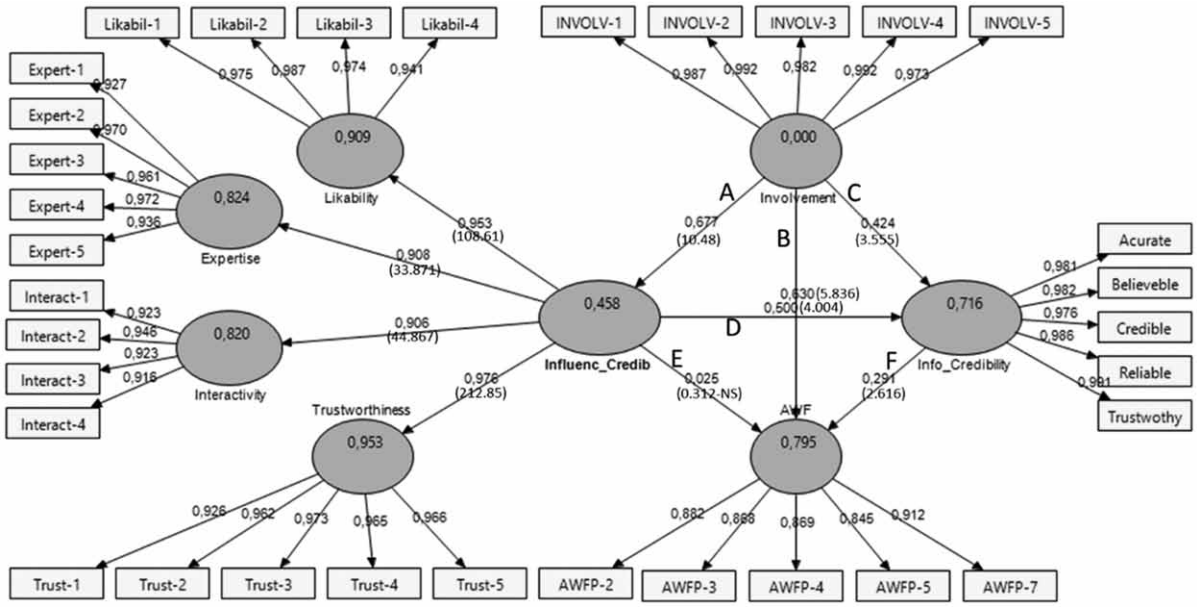
The significance of the structural relationships was assessed by Bootstrapping (500 samples), and the result confirmed statistical significance ($t > 1.96$) in nine of ten tested relationships. Figure 1 presents outer and inner models, with standardized loadings and the corresponding t-scores in parentheses. For ease of description, the structural relationships were labeled with capital letters from A to F. As shown in Figure 1, except for the Hypothesis H2a (relationship "E"), which was not confirmed, other influences were all significant ($t > 1.96$) as expected.

Table 4. Measurement model discriminant validity

Factors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AWF (1)	**0.876**	-	-	-	-	-	-	-
Expertise (2)	0.555	**0.953**	-	-	-	-	-	-
Influencer Credibility (3)	0.680	*0.908*	**0.897**	-	-	-	-	-
Information Credibility (4)	0.791	0.701	0.787	**0.983**	-	-	-	-
Interactivity (5)	0.691	0.788	*0.906*	0.785	**0.927**	-	-	-
Involvement (6)	0.869	0.548	0.677	0.762	0.671	**0.985**	-	-
Likability (7)	0.628	0.814	*0.953*	0.713	0.793	0.634	**0.970**	-
Trustworthiness (8)	0.664	0.857	*0.976*	0.753	0.830	0.665	0.941	**0.959**

Results confirmed that involvement with healthy eating improves by 67.7% the influencer's credibility (confirming H3), raises 63% in the AWF (confirming H5), and transfers 42.4% of its own to the videos' credibility (confirming H4). Results also confirmed that the influencer's credibility improves 50% of the credibility of information present in the videos (confirming H2b), and the last one contributes 29.1% of its importance to the Animal Welfare Attitude (confirming H6).

Figure 1. Complete model tested



The hypothesis H1, that influencers' credibility also depends on the quality and intensity of interaction they maintain with followers, besides the factors originally proposed by Ohanian (1990), was fully confirmed. As shown in Figure 1 and Table 5, the t-scores presented by the four relationships far exceed the minimum required of 1.96, for the original factors (expertise, likability, and trustworthiness) and interactivity, introduced in the construct for this work.

Once the hypothesis H2a was not supported when estimating the model for the full sample, we sought to confirm whether the non-significance of that relationship was also present within the segments, due to the possibility of carnivorous and non-carnivorous differ on their beliefs regarding the AWF. Due to the fragmentation of the sample, it was necessary to consolidate the minority groups (e.g. vegetarians, vegans, flexitarians, egg-lacto-vegetarians, etc.) into a sole group of non-carnivorous (n=25), to be compared to the meat-eaters group (n=119).

After identifying the groups and splitting the data, the model was replicated with both subsamples to compare the strengths of the inner model relationships across the groups. The significance of differences was tested by the *t*-scores estimated by the relationships mean loadings, resulting from the model Bootstrapping. The *t*-scores were calculated according to the formula proposed by Sarstedt, Henseler, & Ringle (2011), in which $Path_{sample1;\,2}$ denotes the original parameter estimated for a path relationship

in group one (two), m(n) represents the number of observations in group one (two), and S.E.[2] represents the standard error of coefficients in group one (two) obtained from the bootstrapping procedure.

$$t = \frac{Path_{sample1} - Path_{sample2}}{\left[\sqrt{\frac{(m-1)^2}{(m+n-2)} * SE^2_{sample1} + \frac{(n-1)^2}{(m+n-2)} * SE^2_{sample2}}\right] * \left[\sqrt{\frac{1}{m} + \frac{1}{n}}\right]}$$

Table 5. Structural relationships

Tested Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/SE)
Influencer Credibility → Likability	0.953	0.954	0.009	108.6
Influencer Credibility → Expertise	0.908	0.910	0.027	33.87
Influencer Credibility → Interactivity	0.906	0.905	0.020	44.87
Influencer Credibility → Trustworthiness	0.976	0.976	0.005	212.9
Involvement → Influencer Credibility (A)	0.677	0.673	0.065	10.48
Involvement → AWF (B)	0.630	0.619	0.108	5.836
Involvement → Information Credibility (C)	0.424	0.408	0.119	3.555
Influencer Credibility → Information Credibility (D)	0.500	0.517	0.125	4.004
Influencer Credibility → AWF (E)	*0.025*	*0.046*	*0.080*	*0.312*
Information Credibility → AWF (F)	0.291	0.286	0.111	2.616
Influencer Credibility → AWF (Carnivorous)	*0.056*	*0.057*	*0.084*	*0.673*
Influencer Credibility → AWF (Non-carnivorous)	-0.081	-0.083	0.032	2.488

As seen in the last two rows of Table 5, the influencer's messages do not influence the AWF within the meat-eaters, but they do influence that attitude amongst the other group. For this reason, we must rewrite the conclusion stated above, to acknowledge that H2a is partially supported, once the hypothesized relationship was true at least for a segment of respondents (the non-carnivorous ones).

Table 6 summarizes the comparisons between models estimated for carnivorous and for the non-carnivorous ones. For simplicity of reading, relationships in which the estimated original parameter differs significantly between the groups are shown in bold. The results confirmed the existence of significant differences in two of the five relationships tested.

The impact of respondents' involvement with healthy eating on influencer credibility (A) is relatively similar between carnivorous and non-carnivorous, but the same involvement produces a significantly stronger impact on AWF (B) among non-carnivorous. And the same is true for influencers' credibility, whose impact on the quality of information posted in the video (D), is also significantly more pronounced among the non-carnivorous. The impacts of involvement on the credibility of information conveyed by the video (C), and of the latter on shaping pro-animal welfare attitude (E) show higher parameters among the carnivorous, but the difference does not reach significance ($p<0.05$).

Table 6. Comparison of the inner model relationships between the two groups

N	Structural Relationships	Carnivorous		Non-Carnivorous		*t* Statistics
		Sample Mean (M)	Standard Deviation (STDEV)	Sample Mean (M)	Standard Deviation (STDEV)	
A	Involvement →Influencer Credibility	0,664	0,072	0,688	0,070	-0,25
B	Involvement → AWF	0,563	0,101	0,958	0,025	**-2,99**
C	Involvement → Info. Credibility	0,456	0,101	0,211	0,099	1,82
D	Influencer Credibility →Info. Credibility	0,462	0,100	0,724	0,099	**-1,98**
E	Info. Credibility → AWF	0,325	0,099	0,094	0,039	1,78

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The main limitation of the present research refers to the size and characteristics of the sample. As it is a small sample collected by convenience, it was not possible to evaluate possible differences between some groups of non-carnivorous, something that would be quite desirable. Agglutination of different kinds of non-carnivorous into a single category was a necessary alternative, but it greatly reduced the scope of analysis. Since the paper deals with animal welfare as a whole, there might be divergent attitudes among those who eat beef and poultry, from those who do not eat meat but do eat eggs and dairy products, from those who refuse all types of animal foods, for example.

Another limitation refers to the possible lack of identification between respondents and the influencers they were assigned to see. As the study sought to know the effect of the involvement with the healthy eating cause in the other constructs, passing by the recommendation every respondent had received from the influencer, the authors considered it convenient to assign them randomly. If the choice of influencer was left to the respondents, it would be more or less obvious that people identified with "healthy eating" would tend to choose posts of influencers that support the non-meat cause, once vegetarians frequently associate their choice to health. Nevertheless, we have to admit that healthy eating is not a unique quality of vegetarians, once health encompasses people, meat animals, and the environment in general, the trinity of individual, animals, and nature (Wilson et al., 2004). Another aspect that may have skewed the result, is the fact that adherence to the questionnaire was encouraged through various social networks (not restricted to Instagram), a strategy that may have attracted respondents not familiar with that platform. Perhaps not all respondents would have been included in the sample if the questionnaire access contained a filter question restricting access to only those users of Instagram.

Further studies are needed to confirm (or refute) the present findings with influencers of different degrees of coverage (number of followers), and reliability, to verify possible differences in their power of influence. It is also important to investigate the influence of such elements (the involvement and credibility of influencers) on consumption decisions other than that of healthy food, to verify these findings' consistency.

CONCLUSION

This research analyzed the influence of consumers' involvement with the animal cause, in conjunction with the recommendation of sympathetic and opposed Instagrammers, in shaping the attitude towards animal welfare. The result identified four factors constituting the Instagrammers' credibility (expertise, interactivity, likability, and trustworthiness) and found that this construct behaves better if treated as a sole second-order factor than when treated as a set of first-order factors, as suggested by previous work (R. Gupta et al., 2017; Ohanian, 1990; Xiao et al., 2018). The measurement model, composed of 33 variables that were adapted from previous works, showed acceptable levels of convergent and discriminant validity, and all the first-order endogenous variables had R^2 indexes > 0.7.

As hypothesized, the structural model tested the influence of the involvement with healthy eating on the credibility of Instagrammers, the quality of the information posted by them, and the reinforcement of the Pro-Animal Welfare Attitude (AWF). The result confirmed that consumers more involved with the healthy eating cause, tend to attribute more credibility to the Instagrammers and the communication pieces posted by them, but the opposite is not true (as will be seen later on).

The Instagrammers' credibility improves the perceived quality of the information they post in their videos, but alone does not lead to engagement with the healthy eating cause, and in the case of carnivorous it does not even reinforce the AWF (as seen in Table 5). This result is per Mammadli (2021), that investigated the effect of endorsement on purchase intention and the mediating effect of trust (an attitude) and found that social media influencers impact purchase intention, especially because of their expertise and attractiveness. The result is also in line with the findings reported by Torres et al. (2019), who found that fans of a digital influencer tend to find him/her congruent with any brand, showing that there is a bias related to affection. For these authors, although fans' assessments of the congruence follow a more cognitive route, the affective evaluation also impacts this cognitive evaluation.

Conversely to what was hypothesized, the study also tested possible influences of Instagrammers' credibility and quality of information on the engagement with the cause. The result did not identify a significant influence of Instagrammers' credibility on the engagement, but the quality of the information posted does influence the engagement with the cause of healthy eating. Thus, since the credibility of Instagrammers directly and decisively influences the quality of information, and given that the latter influences both the involvement with the cause and the AWF, authors must conclude that Instagrammers' credibility does favor greater involvement with the cause, and does reinforce the Attitude Towards Animal Welfare, as long as they manage to produce accurate, believable, credible, reliable and trustworthy information. Otherwise, their credibility is unlikely to produce effective impacts on the consumer's behavior.

The result confirmed that Instagrammers' influence on the involvement with the cause, and the AWF is circumstantial because, depending on the respondents' beliefs and eating habits, the impact occurs by one by or another pathway, or even does not happen at all. This result is compatible with the findings of Amelina & Zhu (2016), that investigated three characteristics of the Instagrammers (trustworthiness, expertise, and attractiveness) and their effects on brand attitude and merchandise attractiveness in Indonesia, and found that some factors forming the credibility of the Instagrammers influence the attitude towards the brand, and others influence the branded merchandise attractiveness, and vice versa.

REFERENCES

Amelina, D., & Zhu, Y.-Q. (2016). Investigating effectiveness of source credibility elements on social commerce endorsement: The case of Instagram in Indonesia. *PACIS Proceedings, 232*. https://aisel.aisnet.org/pacis2016%0Ahttp://aisel.aisnet.org/pacis2016/232

Barreiro, T., Dinis, G., & Breda, Z. (2019). Marketing de influência e influenciadores digitais: Aplicação do conceito pelas DMO em Portugal. *Marketing & Tourism Review*, *4*(1). Advance online publication. doi:10.29149/mtr.v4i1.5702

Bisogni, C. A., Jastran, M., Seligson, M., & Thompson, A. (2012). How People Interpret Healthy Eating: Contributions of Qualitative Research. *Journal of Nutrition Education and Behavior*, *44*(4), 282–301. doi:10.1016/j.jneb.2011.11.009 PMID:22732708

Cembalo, L., Caracciolo, F., Lombardi, A., Del Giudice, T., Grunert, K. G., & Cicia, G. (2016). Determinants of Individual Attitudes Toward Animal Welfare-Friendly Food Products. *Journal of Agricultural & Environmental Ethics*, *29*(2), 237–254. doi:10.100710806-015-9598-z

Chopra, A., Avhad, V., & Jaju, S. (2021). Influencer Marketing: An Exploratory Study to Identify Antecedents of Consumer Behavior of Millennial. *Business Perspectives and Research*, *9*(1), 77–91. doi:10.1177/2278533720923486

Chu, S.-C., & Kamal, S. (2008). The Effect of Perceived Blogger Credibility and Argument Quality on Message Elaboration and Brand Attitudes. *Journal of Interactive Advertising*, *8*(2), 26–37. doi:10.1080/15252019.2008.10722140

Corrêa, S. C. H., Soares, J. L., Christino, J. M. M., Gosling, M. de S., & Gonçalves, C. A. (2020). The influence of YouTubers on followers' use intention. *Journal of Research in Interactive Marketing*, *14*(2), 173–194. doi:10.1108/JRIM-09-2019-0154

Djafarova, E., & Rushworth, C. (2017). Exploring the credibility of online celebrities' Instagram profiles in influencing the purchase decisions of young female users. *Computers in Human Behavior*, *68*, 1–7. doi:10.1016/j.chb.2016.11.009

Erdogan, B. Z. (1999). Celebrity Endorsement: A Literature Review. *Journal of Marketing Management*, *15*(4), 291–314. doi:10.1362/026725799784870379

Fay, B., Cakim, I., Carpenter, S., Hershberger, S., O'Driscoll, S., Rabasca, E., Selvas, F., & Suckernek, W. (2009). *Influencer Handbook The Who, What, When, Where, How, and Why of Influencer Marketing*. Word of Mouth Marketing Association. http://painepublishing.com/wp-content/uploads/2015/06/Influencer-Handbook-v4-2.pdf

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Gaur, S. S., Tiwari, S. P., & Bathula, H. (2012). Ohanian's celebrity endorsers' credibility scale: Evaluation and validation in the context of an emerging economy. *International Journal of Indian Culture and Business Management*, *5*(2), 152. doi:10.1504/IJICBM.2012.045642

Greer, J. D. (2003). Evaluating the Credibility of Online Information: A Test of Source and Advertising Influence. *Mass Communication & Society*, *6*(1), 11–28. doi:10.1207/S15327825MCS0601_3

Gupta, R., Kishor, N., & Verma, D. (2017). Construction and validation of a five-dimensional celebrity endorsement scale: Introducing the pater model. *British Journal of Marketing Studies*, *4*, 15–35. www.ea-journals.org

Gupta, Y., Agarwal, S., & Singh, P. B. (2020). To Study the Impact of Instafamous Celebrities on Consumer Buying Behavior. *Academy of Marketing Studies Journal*, *24*(1), 1528–2678.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. doi:10.1108/EBR-11-2018-0203

Jin, S. V., Muqaddam, A., & Ryu, E. (2019). Instafamous and social media influencer marketing. *Marketing Intelligence & Planning*, *37*(5), 567–579. doi:10.1108/MIP-09-2018-0375

Lou, C., & Yuan, S. (2019). Influencer Marketing: How Message Value and Credibility Affect Consumer Trust of Branded Content on Social Media. *Journal of Interactive Advertising*, *19*(1), 58–73. doi:10.1080/15252019.2018.1533501

Lu, Q., Mihalik, B. J., Heere, B., Meng, F., & Fairchild, A. (2019). Media effect on resident attitudes toward an Olympic bid. *Tourism Management Perspectives*, *29*, 66–75. doi:10.1016/j.tmp.2018.10.009

Mammadli, G. (2021). The Role Of Brand Trust in The Impact Of Social Media Influencers On Purchase Intention. SSRN *Electronic Journal*. doi:10.2139/ssrn.3834011

McMillan, S. J., & Hwang, J.-S. (2002). Measures of Perceived Interactivity: An Exploration of the Role of Direction of Communication, User Control, and Time in Shaping Perceptions of Interactivity. *Journal of Advertising*, *31*(3), 29–42. doi:10.1080/00913367.2002.10673674

Morton, F. (2020). Influencer marketing: An exploratory study on the motivations of young adults to follow social media influencers. *Journal of Digital and Social Media Marketing*, *8*(2), 156–165.

Muhammad, F. M. (2018). Instagram Effects as Social Media toward Adolescence and Young Adult Users. *Uses and Gratification Approach.*, *165*(January), 204–206. doi:10.2991/iccsr-18.2018.44

Nugraha, R., Kusumawardani, K. A., & Octavianie, V. (2018). The influence of celebrity endorsement in instagram towards customer behavior and purchase intention in healthy food diet business. *Journal of Management Studies*, *3*(2), 1–24.

Ohanian, R. (1990). Construction and Validation of a Scale to Measure Celebrity Endorsers' Perceived Expertise, Trustworthiness, and Attractiveness. *Journal of Advertising*, *19*(3), 39–52. doi:10.1080/00913367.1990.10673191

Ringle, C. M., Wende, S., & Will, A. (2005). *Smart PLS 2* (2.0). PLS. http://www.smartpls.com

Sarstedt, M., Hair, J. F. Jr, Cheah, J. H., Becker, J. M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal*, *27*(3), 197–211. doi:10.1016/j.ausmj.2019.05.003

Sarstedt, M., Henseler, J., & Ringle, C. M. (2011). Multigroup Analysis in Partial Least Squares (PLS) Path Modeling: Alternative Methods and Empirical Results. doi:10.1108/S1474-7979(2011)0000022012

Senecal, S., & Nantel, J. (2004). The influence of online product recommendations on consumers' online choices. *Journal of Retailing*, *80*(2), 159–169. doi:10.1016/j.jretai.2004.04.001

Silva, M. J. de B., Farias, S. A., de, & Grigg, M. K. (2020). Online Engagement and the Role of Digital Influencers in Product Endorsement on Instagram. *Journal of Relationship Marketing*, *19*(2), 133–163. doi:10.1080/15332667.2019.1664872

Torres, P., Augusto, M., & Matos, M. (2019). Antecedents and outcomes of digital influencer endorsement: An exploratory study. *Psychology and Marketing*, *36*(12), 1267–1276. doi:10.1002/mar.21274

van der Veen, R., & Song, H. (2010). Exploratory Study of the Measurement Scales for the Perceived Image and Advertising Effectiveness of Celebrity Endorsers in a Tourism Context. *Journal of Travel & Tourism Marketing*, *27*(5), 460–473. doi:10.1080/10548408.2010.499059

Vrontis, D., Makrides, A., Christofi, M., & Thrassou, A. (2021). Social media influencer marketing: A systematic review, integrative framework and future research agenda. *International Journal of Consumer Studies*, *45*(4), 617–644. doi:10.1111/ijcs.12647

Wilson, M. S., Weatherall, A., & Butler, C. (2004). A Rhetorical Approach to Discussions about Health and Vegetarianism. *Journal of Health Psychology*, *9*(4), 567–581. doi:10.1177/1359105304044040 PMID:15231057

Xiao, M., Wang, R., & Chan-Olmsted, S. (2018). Factors affecting YouTube influencer marketing credibility: A heuristic-systematic model. *Journal of Media Business Studies*, *15*(3), 188–213. doi:10.1080/16522354.2018.1501146

Zaichkowsky, J. L. (1985). Measuring the Involvement Construct. *The Journal of Consumer Research*, *12*(3), 341. doi:10.1086/208520

Zaichkowsky, J. L. (1994). The Personal Involvement Inventory: Reduction, Revision, and Application to Advertising. *Journal of Advertising*, *23*(4), 59–70. doi:10.1080/00913367.1943.10673459

ADDITIONAL READING

Acikgoz, F., & Burnaz, S. (2021). The influence of 'influencer marketing' on YouTube influencers. *International Journal of Internet Marketing and Advertising*, *15*(2), 201. doi:10.1504/IJIMA.2021.114331

Jaitly, R. C., & Gautam, O. (2021). Impact of social media influencers on customer engagement and brand perception. *International Journal of Internet Marketing and Advertising*, *15*(2), 220–242. doi:10.1504/IJIMA.2021.114336

Koot, C., Mors, E., Ellemers, N., & Daamen, D. L. (2016). Facilitation of attitude formation through communication: How perceived source expertise enhances the ability to achieve cognitive closure about complex environmental topics. *Journal of Applied Social Psychology*, *46*(11), 627–640. doi:10.1111/jasp.12391

Kusumasondjaja, S., & Tjiptono, F. (2019). Endorsement and visual complexity in food advertising on Instagram. *Internet Research*, *29*(4), 659–687. doi:10.1108/IntR-11-2017-0459

Pilař, L., Stanislavská, L. K., Kvasnička, R., Hartman, R., & Tichá, I. (2021). Healthy Food on Instagram Social Network: Vegan, Homemade and Clean Eating. *Nutrients*, *13*(6), 1991. doi:10.3390/nu13061991 PMID:34207910

Thakker, S., & Pabalkar, V. (2021). A study on the impact of influencer marketing on the buying behaviour of consumers across different generations. *International Journal of Modern Agriculture.*, *10*(2), 453–464.

Vasconcelos, C., Costa, R. L., Dias, A. L., Pereira, L., & Santos, J. P. (2021). Online influencers: Healthy food or fake news. *International Journal of Internet Marketing and Advertising*, *15*(2), 149. doi:10.1504/IJIMA.2021.114334

KEY TERMS AND DEFINITIONS

Animal Welfare: A utilitarian attitude towards the well-being of nonhuman animals. Respect for the welfare of animals is often based on the belief that animals are also sentient, so humans should consider their well-being and prevent them from suffering, especially those destined for slaughter.

Carnivorous: People who eat meat regularly.

Influencer: Someone who affects or changes the way that other people behave.

Instagrammer: Someone who regularly shares images or other things such as video or text, on the social media service Instagram.

Involvement: The act or process of taking part in an act or in a pleading of some cause.

Non-Carnivorous: People who refuse to eat meat regularly. For the purpose of this paper the expression "non-carnivorous" covers various types of diet (e.g. vegetarians, vegans, flexitarians, etc.).

Recommendation: A suggestion that something is good or suitable for particular purpose.

Word-of-Mouth: Suggestion given or done by people talking about something or telling people about something.

Chapter 15
Social Media Usage in Small and Medium-Sized Enterprises (SMEs) in Developing Countries

Sikandar Ali Qalati
https://orcid.org/0000-0001-7235-6098
School of Finance and Economics, Jiangsu University, China

Dragana Ostic
School of Finance and Economics, Jiangsu University, China

Mingyue Fan
School of Management, Jiangsu University, China

ABSTRACT

Small and medium-sized enterprises (SMEs) can use social media (SM) for communicating information with stakeholders with minimal cost. The ability to access and share information influences the SMEs' performance, but there is little scholarship on the association between the adoptions and usage of SM from a SMEs perspective. In this context, the present chapter discusses the concept, definition, and importance of SM use in SMEs operating in developing countries. In addition, this chapter also insights into the benefits, characteristics, and challenges of SM use in the SME context. Furthermore, this chapter aims to identify the technological, organizational, environmental, and personal factors influencing social media use and its impact on SMEs. This chapter also offers theoretical and practical implications and insights for future scholars.

INTRODUCTION

Increasing globalization, digitization, and constant advancement in technologies have led to a high level of competition. Additionally, the development of new technologies has generated both opportunities and challenges for the small and medium enterprises (SMEs) across the globe because their lack of resources

DOI: 10.4018/978-1-7998-9008-9.ch015

represents a barriers to innovation adoption. Besides, in order to be sustainable and competitive in the market, given the increasing level of globalization, SMEs needs to get help from technologies such as social media (SM). Nowadays, the concept of SM is top of the agenda for many business executives. Owners, consultants, and policymakers try to identify ways to make profitable use of applications such as Facebook, YouTube, WhatsApp, WeChat, TikTok, Instagram, and Twitter. Nonetheless, despite this interest, there seems to be a very limited understanding of the term what SM exactly means (Kaplan & Haenlein, 2010). SM recently has established its dominance as multifunctional tools, and many corporate colossuses, institutes, organizations, or even individuals organize and execute their strategies, promote and disseminate their businesses grounded on SM. Therefore, this study aims to improve the overall understanding of the SMEs decision-makers regarding the factors influencing them to adopt and use SM, and its impact on overall performance of SMEs.

THE CONCEPT OF SOCIAL MEDIA

Definition of Social Media

Despite the lack of a universal definition of SM in existing literature, there have been several attempts (Al Rahbi, 2017). In these attempts' SM has been defined from different contexts, including marketing, technical, social, and communication. There are several definitions of SM for various applications and purposes, such as

1. SM is "a hybrid in that it springs from mixed technology and media origins that enable instantaneous, real-time communications, and utilizes multi-media formats and numerous delivery platforms with global reach capabilities" (Mangold & Faulds, 2009, p. 748).
2. SM is "collaborative online applications and technologies that enable participation, connectivity user-generated content, sharing of information and collaboration amongst a community of users" (Henderson & Bowley, 2010, p. 239).
3. SM is "a group of internet-based applications that build on the ideological and technological foundation of Web 2.0, and that allow the creation and exchange of User Generated Content"(Kaplan & Haenlein, p. 61).

The definition mentioned above of the term SM can be summarized by dividing SM into social media and media. Social refers to the activities carried out among individuals, and media refers to the internet-based technologies and tools used to perform such activities. Besides, some scholars also argue that SM's concept cannot be understood without understanding Web 2.0 and User Generated Content (Kang, 2016; Kaplan & Haenlein, 2010).

Web 2.0

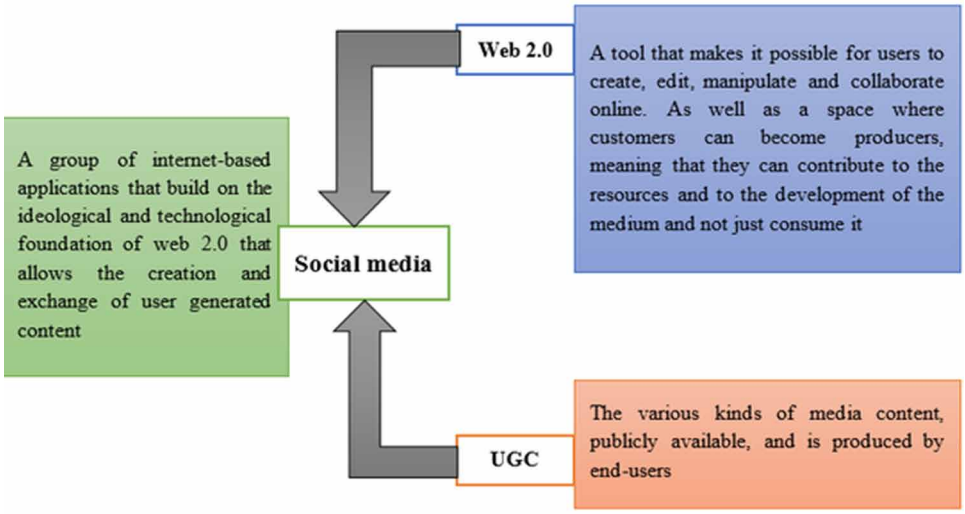
This term is used to define a shift in how web 2.0 improve the web (Cormode & Krishnamurthy, 2008). Andersen (2007) defined it as the second phase in web technology evolution, characterizing it as a social phenomenon as it results in a more connected web where everyone is allowed to create, exchange and edit content.

Cormode and Krishnamurthy (2008) argued that social networks are websites that incorporate a strong social component. It involves user-profiles and encourages user-generated content in text, video, and photo postings and comments, and tags. Thus, Twitter, Facebook, YouTube, MySpace, wikis, and blogs are illustrated as prototypical examples of Web 2.0 (Barassi & Treré, 2012). The development of Web 2.0 has led to the facilitation of communication and has enhanced creativity, information sharing, and collaboration amongst users. Notably, Web 2.0 technologies have seen unbelievable progress, which has led to the advancement of new technologies such as SM, grounded on the ideological and technological foundation of web 2.0.

User Generated Content (UGC)

Besides web 2.0, SM is also connected with UGC, which illustrates the major difference between web 1.0 and 2.0. UGC refers to the capability provided by Web 2.0 technologies whereby end-users are enabled with various forms of media content, such as video, audio, images and comments. UGC, also called consumer-generated content, refers to various kinds of publicly available media content produced by end-users. All media technologies included podcasting, digital video, wikis, question-answer databases, and mobile phone photography (Key & Dietmar, 2010). Taking a step ahead enables web 2.0 users to create and share information rather than only using published content, as was the case with web 1.0 technologies (Hvass & Munar, 2012). Therefore, it is argued that SM definition is largely connected with and based on both terms (web 2.0 and UGC). Furthermore, Olvera-Lobo and Castillo-Rodríguez (2018) also stated that SM is one of the maximum web 2.0 exponents, enabling not only information sharing but also dialogue with users. Moreover, this will permit users to interact. Figure 1 shows the definition of SM derived from web 2.0 and UGS.

Figure 1. SM definition derived from web 2.0 and UGC



IMPORTANCE OF SOCIAL MEDIA USAGE IN LARGE ORGANIZATIONS IN DEVELOPED COUNTRIES

In recent years, there is growing interest among the organization of all sizes (i.e., small, medium, and large) to use social media to reach a large number of potential customers. There is a growing penetration rate of social media usage among SMEs in developing countries relative to developed economies. Of 39 countries (17 developed and 22 developing) internet penetration rate – as measured by internet use or smartphone ownership–remains high in North America and much of Europe, as well as in part of the Asia-Pacific. According to Poushter, Bishop, and Chwe (2018) study of the 39 countries surveyed social media use among 17 advanced countries remains flat with a median of 87% in 2017, similar to the 86% in 2015 or 2016. While, among the 19 developing countries in 2013 and 2014 authors observed a median of 42% across the countries whereas in 2017 a median of 64%.

Most of the organizations in developed nations (the US and Switzerland) are influenced by top management support, motivation, interaction, and monitoring other posts to adopt social media applications (Milwood, Marchiori, & Zach, 2013). In addition, social media usage offers information and knowledge benefits, and also increases the organizations' performance in the UK (Nisar, Prabhakar, & Strakova, 2019). Garrido-Moreno and Lockett (2016) study reported that social media offers several benefits including improved image, customer proximity, and gaining customer knowledge.

IMPORTANCE OF SOCIAL MEDIA USAGE IN SMES IN DEVELOPING COUNTRIES

Benefits of Social Media for SMEs

SM is becoming an integral part of everyday life for sharing and communicating information. It is usually casual to utilize and therefore offers businesses a relatively rapid and low-cost method of connecting with customers (Fischer & Reuber, 2011). The increasing growth of SM platforms raises several questions about how these platforms might be beneficial in SMEs' context. Many studies have been conducted to highlight the number of SM adoption benefits. For example, McCann and Barlow (2015) study identified better communication with customers, increased brand awareness, better communication and marketing of products and services, better ability to exhibit firm expertise, gain more business contacts, better market research, better customer feedback, reduced communication costs, increased sales, better customer services, and increased customer satisfaction are the benefits of SM adoption in the Scottish SME's.

Furthermore, increased knowledge, traffic on the firm website and Facebook page, increased number of clients, and the increase in sales volume are the benefits of using the Facebook page (Nobre & Silva, 2014). Also, improved communication, quick access to information and knowledge, improved collaboration, reduced cost, and positive influence on organization culture are some of the additional benefits of SM adoption and use for SMEs. SM improve the overall performance (i.e., financial and non-financial) of SME in the form of reach to large audience, increase in profits, decrease in marketing costs and improvement in relationships with stakeholders (Odoom, Anning-Dorson, & Acheampong, 2017).

Characteristics of Social Media Usage for SMEs

Mayfield (2008) stated that SM is best understood as a group of online platforms (blogs, wikis, podcasts, forums, content communities, microblogging), which share five main characteristics. These are: (i) participation (SM promotes contribution and feedback from everyone interested); (ii) openness (most of the SM platforms are open to participation and feedback, enabling the voting, sharing of information, and comments); (iii) conversation (SM platforms offer a two-way interaction which is better than content disseminated via the traditional forms of marketing); (iv) community (SM platforms also enable communities to share their common interest, such as political issues, pictures of friendship and love, etc.) and (v) connectedness (SM platforms succeed in their connectedness, making use of links to other sites, people and resources). Milla and Dos-Santos (2019) recently listed seven characteristics of SM (i) participation; (ii) openness; (iii) speaking; (iv) groups; (v) being connected and forming an online culture; (vi) Generation of content in media; and (vii) formation of new action groups.

In general, from the adoption perspective, Jiao, Yang, and Xu (2013) collected data from a sample of 624 customers in Ningbo, China, and identified five characteristics of SM; information openness, participation, interaction, sharing, and connectedness. Filipov (2020) recently evidenced the awareness, information sharing, education, persuasion, changing/preserving attitude, and changing/preserving behavior as characteristics of SM in the context of SME located in Kazakhstan a developing country.

Challenges of Social Media for SMEs

The existing literature also indicates several challenges and barriers towards SM adoption in SMEs in developing countries. As an example, Bakri (2017) studied SMEs operating in the Gulf Cooperation Council (GCC) areas (UAE, Saudi Arabia, Kuwait, Qatar, Bahrain, and Oman) and reported that 90% of SME owners in GCC countries are not using SM; due to due to a lack of technical skills and to integrate SM tools into their businesses. Similarly, El-Gohary (2012) found that the lack of technical and knowledge skills and substantial implementation cost are significant barriers to SM adoption. Besides, Meske and Stieglitz (2013) highlighted that insufficient support from employees, lack of resources, poor effectiveness and efficiency, and culture issues are the major challenges related to SM adoption and its implementation in SMEs.

Furthermore, lack of trust, workplace acceptance and support, and lack of active participation are some of the challenges in SM adoption listed by Panahi, Watson, & Partridge (2014), whereas, He, Wang, Chen, and Zha (2017) study findings stated that SM adopters face challenges related to managing and maintaining their SM accounts after adoption. Besides, the primary reason for discontinuing SM use was that aged owners felt too frustrated to keep up with SM's constant advancement like Facebook. Given the speed of advanced technology, adoption practices have outpaced current academic research (Kietzmann, Silvestre, McCarthy, & Pitt, 2012). Thus, there is a deficit in our understanding of the challenges surrounding the SM adoption processes, particularly concerning the implementation and implications for the firm and customer linkages within the context of SMEs operating in developing countries (Durkin, McGowan, & McKeown, 2013).

DIGITAL TRANSFORMATION AND SMES

Undoubtedly, SMEs around the world are accountable for over 90% of businesses and have substantial contributions to GDP in developing countries. However, SMEs are suffering from inadequate resources (i.e., human, capital, and financial) and capabilities to meet the current market standard, satisfy customer demand, and sustain their operations. In addition, the current pandemics has significantly affected their performance. In addition, constant advancement of technology and digitization, has changed the nature of competition and market structure (Ulas, 2019). In this context, SMEs require digital transformation, which can be gained through using SM applications (i.e., Facebook, WhatsApp, Twitter, Instagram, YouTube, etc.). Several studies have evidenced that digital transformation derived from SM tools has altered the way of doing business. SM enable SMEs to compete with bigger organizations, reach a large number of customers, increase their sales volumes, decrease their marketing cost (e.g., traditional advertising), and improve the relationship with customers and other stakeholders (Castagna et al., 2020; Pelletier & Cloutier, 2019; Sikandar Ali Qalati, Ostic, Shuibin, & Mingyue, 2021). Thus, this study aims to increase the overall understanding of SMEs decision-makers in developing countries. Which could be the factors to influence the SM use?, And how can effective use of SM can improve the overall performance?.

Technological-Organizational-Environmental (TOE) Theory

The TOE theoretical framework was constructed by Tornatzky, Fleischer, and Chakrabarti (1990) to measure conditions that impact an organizations' decision towards innovation adoption at the organizational level. There is an increasing interest in the existing literature for the use of the TOE theory, given the fact that the diffusion of innovation (DOI) theory fails to include environmental concerns (Ahmad Syed, Abu Bakar Abdul, & Ahmad, 2019) and to determine how elements falling under TOE dimensions impacts implementation, post-implementation, performance of applications and information technology systems (Pateli, Mylonas, & Spyrou, 2020). The scholars argued that the TOE theory could better explain intra-firm innovation diffusion (Wang, Wang, & Yang, 2010) and describe how TOE determinants may impact the adoption of innovation. This model has previously been utilized in many innovation adoption studies comprising Asian, American and European contexts as well as emerging and emerging countries in SMEs' perspectives.

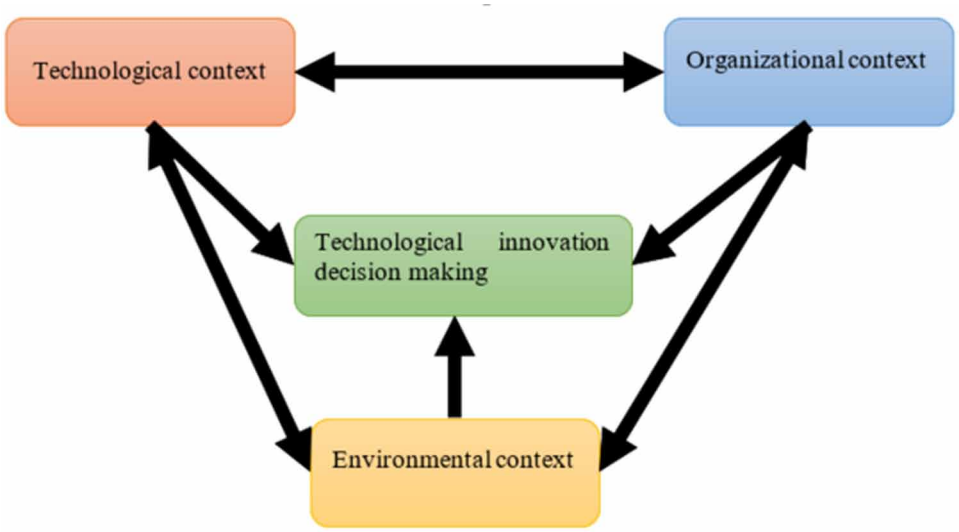
Furthermore, Wong, Leong, Hew, Tan, and Ooi (2020) argued that the existing work based on TAM and UTAUT theories, have ignored the organizational and environmental affects on technology adoptions. Thus, it is mandatory to include both human and non-human factors together into a single model, as it offers superior strength over the traditional models TAM and UTAUT (Awa, Uko, & Ukoha, 2017). Besides, Abed (2020) proclaimed that little work has been devoted to SMEs to date related to SM adoption and stated that the TOE model has strong theoretical and empirical support regarding innovation adoption. The empirical findings from existing literature evidenced that TOE is more valuable to comprehend the innovation adoption, especially SM in SMEs (Sikander Ali Qalati, Yuan, Khan, & Anwar, 2021).

Diffusion of Innovation (DOI) Theory

The pioneer of the DOI theory is Rogers (1962), who conceived the first model of diffusion and defined DOI as "the process by which an innovation is communicated through certain channels over time among the members of a social system"(p. 62). There are four essential DOI elements: innovation, commu-

nication channel, time, and social system. Also, it seeks to explain how, why and at what speed SME should adopt and use new technology (Avery et al., 2010). Furthermore, the DOI theory has become a commonly applied theory for understanding how and at what rate innovation is adopted in different settings (Archibald & Clark, 2014).

Figure 2. TOE Framework (Tornatzky et al., 1990)



According to Rogers (1995) there are five characteristics of innovation: relative advantage, compatibility, complexity, trialability, and observability, which can moderate the adoption rate of new technology innovation. Archibald and Clark (2014) posited that the DOI theory promotes understanding of SM tools like Twitter and offers some directions for developing strategies to increase its use. Odoom et al. (2017) stated that the DOI theory espouses the process through which an innovation spread within SMEs or among individuals over time can result in its adoption and use for several objectives. Figure 3 reflects the five attributes of the DOI theory.

FACTORS INFLUENCING SOCIAL MEDIA USAGE BY SMES IN DEVELOPING COUNTRIES

Technological Factors

There is no universally accepted definition of a technological context. AlSharji, Ahmad Syed, and Abu Bakar Abdul (2018) stated that a technological context describes any innovation or technology that is known to be potentially useful, available or being used by the firms but not being used. Most of SMEs decide on what technology to adopt and use based on its perceived benefits relative to drawbacks (Beier & Früh, 2020). According to Irhas, Dyah, and Yuni (2020), the proposition of a technological context focuses on both internal and external technology improves the technical knowledge required to apply

SM. There are many technological factors such as relative advantage, complexity, trialability, compatibility, perceived usefulness, interactivity, structural assurance, etc. Most of the studies investigated the individual factor's influence on SM adoption.

Figure 3. Characteristics of the DOI theory

Relative Advantage

Maduku, Mpinganjira, and Duh (2016) defined relative advantage as "the anticipated benefits that SMEs can derive from adopting and using the mobile marketing platform" (p. 713). Ghobakhloo, Arias-Aranda, and Benitez-Amado (2011) argued that the decision-makers of SMEs are highly likely to adopt new technology if they perceive that its benefits far outweigh the risks of its adoption. Several researchers proposed that relative advantage has a significant influence on innovation adoption (Mamun Abdullah, 2018). For instance, Ghobakhloo et al. (2011) evidenced that the relative advantage of e-commerce adoption is a significant discriminator between adopters and non-adopter in SMEs located in Iran. Similarly, Ainin, Parveen, Moghavvemi, Jaafar Noor, and Mohd Shuib Nor (2015) found the positive and significant influence of relative advantage on SM Facebook adoption among Malaysian SMEs. At the same time, however Ahmad Syed et al. (2019) results show the insignificant influence of relative advantage on SM adoption in UAE SMEs.

Cost-Effectiveness

Regardless of the characteristics of the DOI theory, the cost of innovation adoption is considered a critical factor in IT-based technologies acceptance (Ghobakhloo et al., 2011; Maduku et al., 2016). Rahayu and Day (2015) verified that cost influenced e-commerce adoption in SMEs located in Indonesia. The authors also stated that the less expensive the cost of innovation adoption, the more likely it will be adopted and implemented in the firms. Tajudeen, Jaafar, and Ainin (2018) conceptualized cost as the perceived cost-effectiveness in the context of SMEs. Several authors have found cost-effectiveness to be a significant factor in innovation adoption (Ahani, Rahim, & Nilashi, 2017; Chong, Chan, & Ooi, 2012). Therefore, Tajudeen et al. (2018) argued that, in the context of SM, an organization could involve in timely and direct end-customer contact at relatively low cost, and a great level of efficiency can be accomplished when compared with the traditional form of communication.

Compatibility

Compatibility is defined as "to what extent innovation is appropriate with technology infrastructure, value, work practices, and culture that already exists in the organization" (Rahayu & Day, 2015, p. 145). Innovation will be easily adopted in the firm if it is tuned in with the prevailing value of that firm, can meet the needs of the firm, and accords with organizational culture. Several scholars have explored the influence of compatibility on innovation adoption and evidenced both positive and negative results. Ghobakhloo et al. (2011) highlighted the positive effects of compatibility on the adoption of e-commerce in the SMEs in Iran, while, Ainin et al. (2015) highlighted the positive influence of compatibility on the adoption of SM in the context of SMEs operating in Malaysia. However, Chatterjee and Kumar Kar (2020) recently evidenced the positive but insignificant effects of compatibility on SM marketing activities in the context of SMEs operating in India.

Interactivity

According to Blattberg and Deighton (1991), interactivity is the facility for organizations as well as individuals to communicate directly with one another regardless of distance and time. Despite the above, Ariel and Avidar (2015) argued that there had been a continuing debate over the definition and measurement of interactivity. However, there is general agreement that interactivity is an essential element of the communication process and serves as a relational maintenance strategy that contributes to relational outcomes. Several scholars have used interactivity to investigate its effect on SM adoption. For example, Ainin et al. (2015) stated that SM, like Facebook, is an interactive media, which enables two-way communication regardless of the unidirectional transmission of information.

Visibility

Kazmer and Haythornthwaite (2001) defined visibility as the means, methods, and opportunities for presentation. In terms of SM, it refers to how frequently SM users discuss a firm and its related concern. Zhao, Liu, and Deng (2013) stated that SM technologies enable individuals to effortlessly and easily see others' information, which leads to making people knowledgeable. The authors also reveal the importance of using SM in the context of internal communication among organizations. This study argued

that SMEs adopt SM to show their existence online and reveal the information about an organization's current and upcoming product and the same that they are following the current trends of the market. Very few studies are devoted to investigating the influence of visibility on SM adoption. For instance, Cesaroni and Consoli (2015) argue that the adoption of SM and its usage can provide organizations with higher visibility, interactivity, and cost-effectiveness.

Organizational Factors

Organizational context refers to the "organizations' internal structures and processes that may facilitate or constrain the adoption of new information technology" (Beier & Früh, 2020, p. 4). It includes all the characteristics of the firm and its resources, such as turnover, employee readiness, managerial structure, staff, their network, and relationships (AlSharji et al., 2018). Previous studies employed several proxies for testing organizational context. This study used two proxies (i.e., top management support and entrepreneurial orientation) to represent the organizational context.

Top Management Support

There are several organizational attributes such as employees, size, turnover, managerial structure, and related issues. The existing literature grounded on innovation largely focuses on top management as the main factor for varying the firms' norms, values, and culture; this allows other internal stakeholders to adapt to the new technology. SM provides not only advantages but also disadvantages, which hinder top management's choice to adopt SM. Some of the negative sides of SM adoption include the employees' waste of time and negative posts of dissatisfied customers, affecting the company reputation (Ahmad, Bakar, & Ahmad, 2018).

Entrepreneurial Orientation

Tajudeen et al. (2018) referred to entrepreneurial orientation as practices, methods, and decision-making styles that executives employ to act entrepreneurially. Considering the innovativeness characteristics, enterprises with higher EO are expected to be more likely to adopt new technology such as SM (Dutot & Bergeron, 2016). Particularly, entrepreneurial orientation elements such as proactivity, risk-taking, and innovativeness enable firms to adopt new or innovative technology. However, adopting innovative technologies is not risk-free; hence, it enhances uncertainty (Zahra, 2018). SM is a two-way communication technology, which requires managers and employees to act entrepreneurially (Tajudeen, Jaafar, & Sulaiman, 2017) while being ready for uncertain outcomes. However, the literature on the entrepreneurial orientation and SM adoption link is limited.

Environmental Factors

Attention towards the environment is critical because it affects the extent of mindful attention directed to a given environmental incident and may influence the likelihood that any external event will make on to the organizations' firm strategic agenda. The environmental context refers to external influences such as supplier/customer pressure, competitor pressure, and external support, influencing innovation adoption (Rahayu & Day, 2015). It refers to an arena in which the organization operates and conducts its business.

Competitive Pressure

Competitive pressure occurs when competitors perceive pressure that forces the company to adopt new technologies to survive (Hsu, Ray, & Li-Hsieh, 2014). Soto-Acosta, Popa, and Palacios-Marqués (2016) proclaimed that competitive pressure largely influence when an organization realizes that an innovation adoption might lead to "competitive advantage", which ultimately results in better organizational performance. A pressure driven by rivals is called competitor pressure and if driven by a customer is called customer pressure. Furthermore, Al Rahbi (2017) argued that competitive pressure is usually considered as an incentive for firms within the same industry to adopt innovation. Much of IT-related studies acknowledge that competitive pressure plays a key role in adoption pressure. In the context of SMEs, several studies have found the significant influence of competitive pressure on the different technologies adoption (Maduku et al., 2016; Pool, Arabzad, Asadi, & Ansari, 2015; Valdebenito & Quelopana, 2019).

Competitive Intensity

Auh and Menguc (2005) stated that competitive intensity usually arises in a situation where contestants are copious and when there are rare opportunities for development in the market. Khan, Xuehe, Atlas, and Khan (2019) argued that, currently, SMEs are competing in a more dynamic business environment than before due to globalization and rapid digitization. Yang and Yang (2019) recently witnessed the impact of competitive intensity on organization performance. Purnama and Subroto (2016) study was based on a sample of 130 Indonesian SMEs (developing countries) and evidenced a statistically significant but negative effect of competitive intensity on firm's performance.

Customer Pressure

Customer pressure is another critical factor that impacts innovation adoption. Previous studies directed to ICT-related adoption verified that SMEs' decisions to innovation adoption are influenced by pressure levied by customers (Ghobakhloo et al., 2011; Rahayu & Day, 2015). Maduku et al. (2016) evidenced that satisfying the different expectations and needs of customers by providing e-commerce services, which enables better interactive communication with customers, is a critical driver of innovation adoption in SMEs. Furthermore, SMEs are adopting innovations because they believe that their customers expect them to do this (Abed, 2020).

Personal Factors

CEOs / Owner Personality Trait

CEOs play pivotal roles in primary adoption decisions in organizations and almost the whole spectrum of the adoption process (Beatty, Shim, & Jones, 2001). Social medial adoption for CEOs has been researched in many perspectives, starting with personality traits: conscientiousness, openness, and extraversion have been the most vital in driving SM use (Mandal, McQueen, Dillon, & Rastrick, 2017). Obschonka, Fisch, and Boyd (2017) investigated the effect of different personalities using SM. Similarly, Tata, Martinez, Garcia, Oesch, and Brusoni (2017) explored the differences between CEOs and the general populace on SM.

Out of the Big Five personality traits, researchers have found that:

- Agreeableness makes CEOs more likely to adopt social media, due to their flexibility and tolerant nature.
- Conscientious CEOs found to be more careful considering means where the utilization of social media would permit them to be more useful and improve performance.
- Neurotic CEOs were found as fearful, which prone to negative emotions and negative reactions to work-related stimuli and are not likely to open themselves to new experiences.
- CEOs with Openness characteristic seek more information, and have the desire to learn new things. Research shows that they are more likely to become innovators and early adopters to social media tools.
- Extravert CEOs were more social and talkative. In addition, were found to have a positive attitude toward adaption to social media, due to the higher use of the internet, social media applications.

CEOs / Owner Experience

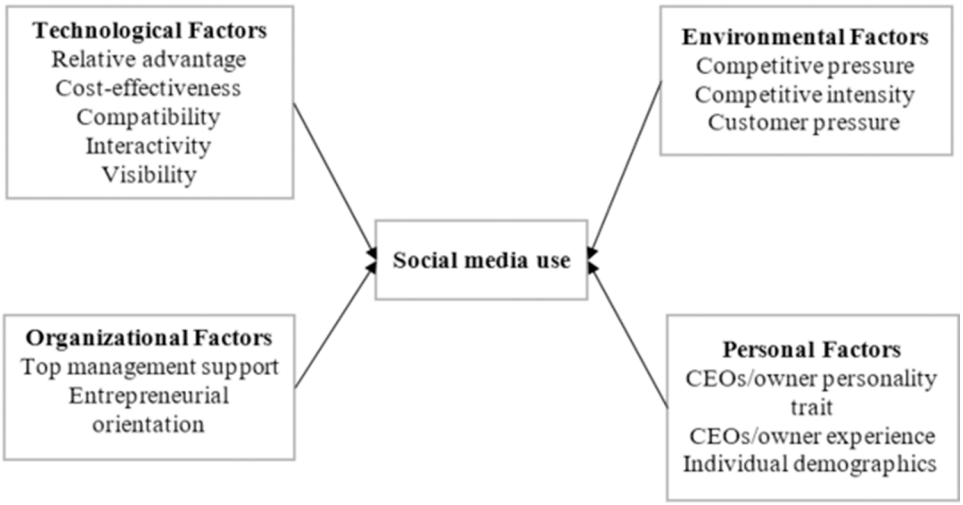
CEOs' professional experience, such as the length in the previous occupation and career track within organizations, could be important for adoption of SM. The managerial experience they gained during earlier involvement in a specific business function, makes them perceive and interpret any situation based on their functional training (Barker III & Mueller, 2002). Top executives with work experience in engineering/technology recognized better technological alliance opportunities than those with other kinds of experience (Tyler & Steensma, 1998).

Individual Demographics

Individual demographics can show us the level of SM adoption. Age, for instance, is one of the indicators. Those between 18-29 are among the earliest SM adopters, following the age group of 30-49 years old. Usage of SM by older adults has as well increased in recent years. Previously, studies stated that women have been more avid users of social media than men, therefore when it comes to SM adoption, we can argue that females can easily adopt social media application. Community is also another demographic indicator of SM adoption. Those living in urban areas are more inclined to use SM, due to network accessibility, and speed of the internet, than of those living in suburban and rural areas. Considering the income gap, some research (https://www.pewresearch.org) show a big difference in SM usage of those with high income relative to low incomes, assuming that M adoption is going to be higher with the group of people in the high-income household, than of those in low-income households.

Figure 4 shows the factors influencing social media use by SMEs operating in developing countries. In particular, technological (i.e., relative advantage, cost-effectiveness, compatibility, interactivity, and visibility), organizational (i.e., top management support and entrepreneurial orientation), environmental (i.e., competitive pressure, competitive intensity, and customer pressure), and personal (CEOs/owner personality trait, experience, and individual demographics) factors influence social media adoption and its use for SMEs operating in developing countries.

Figure 4. Technological, organizational, environmental, and personal factors influencing social media use



WHAT ARE THE OUTCOMES OF SOCIAL MEDIA USAGE?

SM outcomes or consequences to SMEs might be measured through either financial or non-financial matrices (Durkin et al., 2013). Some authors have used a content analysis approach to investigate SM adoption outcomes in SMEs located in East Asia, Ireland, and UAE. They found that SM adoption enhances their relationships with stakeholders, improve collaborations, increases their sales, leads, and e-commerce activities. Ahmad, et al. (2018) stated that SM helps SMEs in branding, advertising, promotions, leveraging community networks, information sharing, building customer relationships, social interactions, and social media impacts. Most profoundly, the effect of SM includes, increase relationship with customers, increase brand awareness, loyalty, reputation, cost reductions, revenue generation, attracting new customers, etc.

Ainin et al. (2015) evidenced that Facebook usage has a dominant influence on SMEs' financial and non-financial performance in terms of cost reduction to reach a customer and other marketing activities, enhances information accessibility and increase relationships with customers. However, Ahmad Syed et al. (2019) found an insignificant link between SM adoption and business performance among UAE's SME and conclude that SMEs are not benefiting from SM adoption because SM adoption is an experimental process, it requires time to produce results, and subjective measures can be one of the reasons to get appropriate results.

Despite the above, several other studies evidenced that SM adoption leads to SMEs' performance. For instance, Eid, Abdelmoety, and Agag (2019) stated that apart from understanding customer preferences, brand awareness, international business contacts, and competition, it led to export performance. Likewise, Tajvidi and Karami (2021) recently witnessed the firm performance as a strong result of SM adoption. Accordingly, Gavino Monica, Williams Denise, Jacobson, and Smith (2019) observed that it increases the revenue of SMEs.

Table 1 shows the literature review regarding the outcomes of SM usage in the context of SMEs operating in both developed and developing countries. It reflects that social media adoption and its us-

age has significant impacts on SME performance. For example, increase in sales, improve knowledge creation, innovation, business processes, services, and relationships with customers, as well as the cost of marketing activities and communications with stakeholders.

Table 1. Outcomes of SM adoption in SMEs

Authors	Title	Sample size	Analysis techniques	Outcomes
Durkin et al. (2013)	• Exploring social media adoption in small to medium-sized enterprises in Ireland	8 SMEs (Ireland)	Thematic analysis	• Increase sales, e-commerce, leads, improve relationships with customers
Ainin et al. (2015)	• Factors influencing the use of social media by SMEs and its performance outcomes	259 SMEs (Malaysia)	PLS	• Non-financial performance • Financial performance
Alarcón María del, Rialp, and Rialp (2015)"	• The Effect of Social Media Adoption on Exporting Firms' Performance"	undefined	SEM	• Increase export performance
Toker et al. (2016)	• Social media adoption: A process-based approach	310 SMEs (Turkey)		• Social media commitment
Wang, Pauleen, and Zhang (2016)	• How social media applications affect B2B communication and improve business performance in SMEs	5 SMEs (East Asia)	Thematic analysis	• Increase SMEs business performance in the context of marketing, innovation, and collaboration
Dutot and Bergeron (2016)	• From strategic orientation to social media orientation: Improving SMEs' performance on social media	50 SMEs (257 respondents)	PLS-SEM	• Increase performance
Odoom et al. (2017)	• Antecedents of social media usage and performance benefits in small- and medium-sized enterprises (SMEs)	210 SMEs (Ghana)	SEM	• Performance benefits
Pérez-González, Trigueros-Preciado, Popa (2017)	• Social Media Technologies' Use for the Competitive Information and Knowledge Sharing, and Its Effects on Industrial SMEs' Innovation	111 SMEs (Spain)	SEM	• Increase innovation
Tajvidi and Karami (2021)	• The effect of social media on firm performance	384 SMEs (UK)	SEM	• Increase firm performance
Ahmad, et al. (2018)	• Reflections of entrepreneurs of small and medium-sized enterprises concerning the adoption of social media and its impact on performance outcomes: Evidence from the UAE	7 SMEs (UAE)	Thematic analysis	• Benefits of social media
Papa, Santoro, Tirabeni, and Monge (2018)	• Social media as a tool for facilitating knowledge creation and innovation in small and medium enterprises	96 SMEs (Italy)	OLS regression	• Improve knowledge creation processes (socialization, externalization, and combination)
Eid et al. (2019)	• Antecedents and consequences of social media marketing use: an empirical study of the UK exporting B2B SMEs	277 SMEs (UK)	SEM	• Export performance. • Understanding customer preference, brand awareness, international business contact understanding competition.
Ahmad Syed et al. (2019)"	• Social media adoption and its impact on firm performance: the case of the UAE"	144 SMEs (UAE)	PLS-SEM	• Business performance (insignificant)
Gavino Monica et al. (2019)	• Latino entrepreneurs and social media adoption: personal and business social network platforms	633 SMEs (USA)	PLS	• Revenue
Olanrewaju, Hossain, Whiteside, and Mercieca (2020)"	• Social media and entrepreneurship research: A literature review"	160 papers	Review paper	• Enhancing entrepreneurial business process, performance, driving firm innovation, value co-creation
Rienda, Ruiz-Fernández, and Carey (2020)	• Analyzing trademark and social media in the fashion industry: tools that impact performance and internationalization for SMEs	122 SMEs (UK and Ireland)	PLS	• Increase firm performance
Sikander Ali Qalati et al. (2021)	• A mediated model on the adoption of social media and SMEs' performance in developing countries	423 SMEs (Pakistan)	PLS-SEM	• Improve SME performance

IMPLICATIONS

Theoretical Implication

This is chapter contributes to the scant literature devoted to SM adoption by SMEs in developing countries. The study's findings are relating to developing countries, like Pakistan or Nigeria, where little literature is available. This study draws on TOE and DOI theories and extended the TOE framework by adding personal factors (CEOs/owners' personality traits, experience, and individual demographics) to identify the fundamental influencing factor for SM adoption and their impacts on SME performance. Very few studies have investigated factors influencing SM adoption and SME performance in developing countries (Sikander Ali Qalati et al., 2021). When companies adopt SM, they need to comprehensively study multiple factors that can significantly influence SM adoption by SMEs operating in developing countries. Therefore, this study was conducted to present the integrated model with an in-depth understanding of factors.

Practical Implication

These research can also have practical implications for SMEs' representatives (i.e., owner and manager).

First of all, the present research provides a comprehensive understanding of factors, letting owners and managers cognize the actual consequence of SM usage. This chapter expedites their understanding of how the effective administration of digital transformation through SM tools usage can increase overall SMEs' performance (financially and non-financially) in developing countries. Because SM has enabled both firms and customers to have two-way communication, it has given more power to customers to share information, new idea for the products and allows them comments on services. Besides, SMEs can share their messages and positive images with customers. In other aspects, SM adoption and its usage have helped SMEs to reach potential business and target audiences for future alliances.

Second, SMEs owners and managers with substantial support to the businesses can overcome the technical learning barriers to SMEs business and increase the technology adoption rate. SMEs adoption and its usage decision not only enhances the performance by offering several benefits such as cost-effectiveness and relative advantage, but also enable SMEs to communicate with customers and other partners in real-time, sharing information and building relationship with them, but also increasing their cooperation. In addition, enable them to learn from their customers, tailor their specific needs, and dynamics (Dirgiatmo, Abdullah, & Ali, 2019).

Finally, the present research suggests that SMEs' digital transformation processes must follow the SM strategy (such as SMEs providing SM guidelines and arranging training, workshops, case studies, simulations, etc.) to enable SMEs and their employees to effectively and successfully use SM. The significance of such procedures and guidelines is mandatory in SMEs operating in developing countries. Based on the findings of Ahmad, et al. (2018), Ndiege (2019), and Sikander Ali Qalati et al. (2021), it can be stated that nearly half of the SMEs are using minimal SM tools, which can result from the lack of technical skills (i.e., to implement SM usage and track changes in the trends) and know-how regarding the use and operation of SM tools (Handayani & Er, 2019). Therefore, it is suggested that government must play a key role in organizing training, workshops related to implementation of SM in their SMEs. Customers expect a great level of interactivity, responsive actions, and two–way communication from the SMEs, implying that SME must recruit a dedicated team or improve the capabilities of the existing

employees. This can be improved if the government plays a key role since SMEs in developing countries are already suffering from insufficient funds and inadequate skills, thus requiring the government to organize general training for SMEs on a large scale and assist them accordingly in the implementation of technology adoption. Free seminars should be organized in different phases so that each SME can participate and avail of its benefits.

FUTURE RESEARCH DIRECTIONS

This research work is not free from limitations, which pinpoint avenues for future research. Instead of the twelfth factors discussed, there may be other predecessors such as employees' skills and their willingness to adopt and implement SM adoption, institutional pressure, customer satisfaction, and trust, government policies, and regulation related to marketing activities conducted on SM platforms. Consequently, the use of only limited factors and associated elements (e.g., visibility, cost-effectiveness, relative advantage, interactivity, and compatibility) may be a limitation.

This study was conducted from the developing country's perspective, especially SMEs located in Pakistan; thereby, analysis from the different developing countries (i.e., Bangladesh, China, India, and the Middle East region) and cultures about SM usage, as well as regulation regarding online businesses, would be interesting research and addition to the present chapter. Moreover, future studies could also investigate the comparative analysis in SMEs and distinct sectors that have been slightly studied in developing countries. Besides, future scholars could also study how managers and executives use SM to manage customers' knowledge. This study also suggests that future scholars could assess SM usage association and its impacts on SMEs' performance in an emerging economy and investigate any deviation in results between different timeframes. Furthermore, this chapter suggests future studies to explore the intervening and causal role of social media applications (e.g., Facebook) between the TOEP constructs and SME performance irrespective of developed or developing countries.

CONCLUSION

This study aims to improve understanding of how digital transformation can improve the overall performance of SMEs using SM applications. In addition, the study investigated the factors (technological, organizational, environmental, and personal) influencing the adoption and usage of SM and SME performance in developing countries, especially Pakistan. The findings from existing literature stated that SM has a significant effect on SME performance, as it increases sales volume and number of customers, improving the relationship with stakeholders (i.e., customers, suppliers, employees), and decreasing marketing costs.

This research suggests that SM allows SMEs operating in developing countries to connect effectively with customers, business partners, and other stakeholders on a more personal level because SM facilitates direct mentions and immediate replies. Most importantly, this work highlights how SM adoption allows SMEs to build brand awareness and loyalty, improve customer relationships, and provide several benefits, including cost-effectiveness, relative advantage, visibility, and interactivity, so that they can adjust with limited resources. Ultimately, the proposed constructs provide a more detailed understanding of SM adoption for decision-makers in SMEs.

The present study also highlights that SM adoption and its use in SMEs significantly influence SMEs' performance in terms of cost reduction for customer service and overall marketing activities. In today's world, SMEs can advertise their products and reach a large audience by adopting SM tools like Facebook, Twitter, WhatsApp, TikTok, and Instagram, which have reduced the cost of advertising and preserved many resources' efforts SMEs put in traditional form of marketing. Furthermore, SM adoption enables SMEs to build direct contact with potential and upcoming customers, share information and ask for ideas. Furthermore, SM adoption and its practical use will improve information accessibility; SMEs can get information about customers' needs, tastes, and wants by direct conversation or viewing their conversation on SM channels. Apart from the above, SMEs can efficiently deliver information to the general public promptly.

REFERENCES

Abed, S. S. (2020). Social commerce adoption using TOE framework: An empirical investigation of Saudi Arabian SMEs. *International Journal of Information Management*, *53*, 102118. doi:10.1016/j.ijinfomgt.2020.102118

Ahani, A., Rahim, N. Z. A., & Nilashi, M. (2017). Forecasting social CRM adoption in SMEs: A combined SEM-neural network method. *Computers in Human Behavior*, *75*, 560–578. doi:10.1016/j.chb.2017.05.032

Ahmad, S. Z., Ahmad, N., & Abu Bakar, A. R. (2018). Reflections of entrepreneurs of small and medium-sized enterprises concerning the adoption of social media and its impact on performance outcomes: Evidence from the UAE. *Telematics and Informatics*, *35*(1), 6–17. doi:10.1016/j.tele.2017.09.006

Ahmad, S. Z., Bakar, A. R. A., & Ahmad, N. (2018). Social media adoption and its impact on firm performance: The case of the UAE. *International Journal of Entrepreneurial Behaviour & Research*, *25*(1), 84–111. doi:10.1108/IJEBR-08-2017-0299

Ahmad Syed, Z., Abu Bakar Abdul, R., & Ahmad, N. (2019). Social media adoption and its impact on firm performance: The case of the UAE. *International Journal of Entrepreneurial Behaviour & Research*, *25*(1), 84–111. doi:10.1108/IJEBR-08-2017-0299

Ainin, S., Parveen, F., Moghavvemi, S., Jaafar Noor, I., & Mohd Shuib Nor, L. (2015). Factors influencing the use of social media by SMEs and its performance outcomes. *Industrial Management & Data Systems*, *115*(3), 570–588. doi:10.1108/IMDS-07-2014-0205

Al Rahbi, H. S. A. (2017). *Factors influencing social media adoption in small and medium enterprises (SMEs)*. Brunel University London.

Alarcón María del. C., Rialp, A., & Rialp, J. (2015). The Effect of Social Media Adoption on Exporting Firms' Performance. In Entrepreneurship in International Marketing (Vol. 25, pp. 161–186). Emerald Group Publishing Limited.

AlSharji, A., Ahmad Syed, Z., & Abu Bakar Abdul, R. (2018). Understanding social media adoption in SMEs: Empirical evidence from the United Arab Emirates. *Journal of Entrepreneurship in Emerging Economies*, *10*(2), 302–328. doi:10.1108/JEEE-08-2017-0058

Andersen, P. (2007). *What is Web 2.0? Ideas, technologies and implications for education* (Vol. 1). JISC Bristol.

Archibald, M. M., & Clark, A. M. (2014). Twitter and nursing research: How diffusion of innovation theory can help uptake. *Journal of Advanced Nursing*, *70*(3), e3–e5. doi:10.1111/jan.12343 PMID:24450876

Ariel, Y., & Avidar, R. (2015). Information, Interactivity, and Social Media. *Atlantic Journal of Communication*, *23*(1), 19–30. doi:10.1080/15456870.2015.972404

Auh, S., & Menguc, B. (2005). Balancing exploration and exploitation: The moderating role of competitive intensity. *Journal of Business Research*, *58*(12), 1652–1661. doi:10.1016/j.jbusres.2004.11.007

Avery, E., Lariscy, R., Amador, E., Ickowitz, T., Primm, C., & Taylor, A. (2010). Diffusion of Social Media Among Public Relations Practitioners in Health Departments Across Various Community Population Sizes. *Journal of Public Relations Research*, *22*(3), 336–358. doi:10.1080/10627261003614427

Awa, H. O., Uko, J. P., & Ukoha, O. (2017). An empirical study of some critical adoption factors of ERP software. *International Journal of Human-Computer Interaction*, *33*(8), 609–622. doi:10.1080/10447318.2016.1265828

Bakri, A. A. A. (2017). The impact of social media adoption on competitive advantage in the small and medium enterprises. *International Journal of Business Innovation and Research*, *13*(2), 255–269. doi:10.1504/IJBIR.2017.083542

Barassi, V., & Treré, E. (2012). Does Web 3.0 come after Web 2.0? Deconstructing theoretical assumptions through practice. *New Media & Society*, *14*(8), 1269–1285. doi:10.1177/1461444812445878

Barker, V. L. III, & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. *Management Science*, *48*(6), 782–801. doi:10.1287/mnsc.48.6.782.187

Beatty, R. C., Shim, J. P., & Jones, M. C. (2001). Factors influencing corporate web site adoption: A time-based assessment. *Information & Management*, *38*(6), 337–354. doi:10.1016/S0378-7206(00)00064-1

Beier, M., & Früh, S. (2020). Technological, Organizational, and Environmental Factors Influencing Social Media Adoption by Hospitals in Switzerland: Cross-Sectional Study. *Journal of Medical Internet Research*, *22*(3), e16995. doi:10.2196/16995 PMID:32149718

Blattberg, R. C., & Deighton, J. (1991). Interactive marketing: Exploiting the age of addressability. *Sloan Management Review*, *33*(1), 5–15.

Castagna, F., Centobelli, P., Cerchione, R., Esposito, E., Oropallo, E., & Passaro, R. (2020). Customer Knowledge Management in SMEs Facing Digital Transformation. *Sustainability*, *12*(9), 3899. https://www.mdpi.com/2071-1050/12/9/3899. doi:10.3390u12093899

Cesaroni, F. M., & Consoli, D. (2015). Are small businesses really able to take advantage of social media? *Electronic Journal of Knowledge Management*, *13*(4), 257.

Chatterjee, S., & Kumar Kar, A. (2020). Why do small and medium enterprises use social media marketing and what is the impact: Empirical insights from India. *International Journal of Information Management*, *53*, 102103. doi:10.1016/j.ijinfomgt.2020.102103

Chong, A. Y.-L., Chan, F. T. S., & Ooi, K.-B. (2012). Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia. *Decision Support Systems*, *53*(1), 34–43. doi:10.1016/j.dss.2011.12.001

Cormode, G., & Krishnamurthy, B. (2008). Key differences between Web 1.0 and Web 2.0. *First Monday*, *13*(3). Advance online publication. doi:10.5210/fm.v13i6.2125

Dirgiatmo, Y., Abdullah, Z., & Ali, R. H. R. M. (2019). The role of entrepreneurial orientation in intervening the relationship between social media usage and performance enhancement of exporter SMEs in Indonesia. *International Journal of Trade and Global Markets*, *12*(2), 97–129. doi:10.1504/IJTGM.2019.100332

Durkin, M., McGowan, P., & McKeown, N. (2013). Exploring social media adoption in small to medium-sized enterprises in Ireland. *Journal of Small Business and Enterprise Development*, *20*(4), 716–734. doi:10.1108/JSBED-08-2012-0094

Dutot, V., & Bergeron, F. (2016). From strategic orientation to social media orientation: Improving SMEs' performance on social media. *Journal of Small Business and Enterprise Development*, *23*(4), 1165–1190. doi:10.1108/JSBED-11-2015-0160

Eid, R., Abdelmoety, Z., & Agag, G. (2019). Antecedents and consequences of social media marketing use: An empirical study of the UK exporting B2B SMEs. *Journal of Business and Industrial Marketing*, *35*(2), 284–305. doi:10.1108/JBIM-04-2018-0121

El-Gohary, H. (2012). Factors affecting E-Marketing adoption and implementation in tourism firms: An empirical investigation of Egyptian small tourism organisations. *Tourism Management*, *33*(5), 1256–1269. doi:10.1016/j.tourman.2011.10.013

Filipov, M. (2020). Social media marketing for small and medium-sized enterprises in Kazakhstan. *Central Asian Journal of Innovations on Tourism Management and Finance*, *1*(4), 1–14.

Fischer, E., & Reuber, A. R. (2011). Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior? *Journal of Business Venturing*, *26*(1), 1–18. doi:10.1016/j.jbusvent.2010.09.002

Garrido-Moreno, A., & Lockett, N. (2016). Social media use in European hotels: Benefits and main challenges. *Tourism & Management Studies*, *12*(1), 172–179. doi:10.18089/tms.2016.12118

Gavino Monica, C., Williams Denise, E., Jacobson, D., & Smith, I. (2019). Latino entrepreneurs and social media adoption: Personal and business social network platforms. *Management Research Review*, *42*(4), 469–494. doi:10.1108/MRR-02-2018-0095

Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, *111*(8), 1238–1269. doi:10.1108/02635571111170785

Handayani, S. F., & Er, M. (2019). Antecedent and Business Process Management Non-Technical Capabilities in Social Media Implementation for Micro, Small and Medium Enterprises: A Conceptual Model. *Procedia Computer Science*, *161*, 1114–1121. doi:10.1016/j.procs.2019.11.223

He, W., Wang, F.-K., Chen, Y., & Zha, S. (2017). An exploratory investigation of social media adoption by small businesses. *Information Technology Management*, *18*(2), 149–160. doi:10.100710799-015-0243-3

Henderson, A., & Bowley, R. (2010). Authentic dialogue? The role of "friendship" in a social media recruitment campaign. *Journal of Communication Management (London)*, *14*(3), 237–257. doi:10.1108/13632541011064517

Hsu, P.-F., Ray, S., & Li-Hsieh, Y.-Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management, 34*(4), 474-488. doi:j.ijinfomgt.2014.04.006

Hvass, K. A., & Munar, A. M. (2012). The takeoff of social media in tourism. *Journal of Vacation Marketing*, *18*(2), 93–103. doi:10.1177/1356766711435978

Irhas, E. M., Dyah, S., & Yuni, I. (2020). Social Media Adoption in SMEs Impacted by COVID-19: The TOE Model. *The Journal of Asian Finance, Economics, and Business*, *7*(11), 915–925. doi:10.13106/jafeb.2020.vol7.no11.915

Jiao, Y., Yang, J., & Xu, S. (2013). *A study of the impact of social media characteristics on customer adoption intention of social media.* Paper presented at the International Academic Workshop on Social Science (IAW-SC-13). 10.2991/iaw-sc.2013.252

Kang, I. (2016). Web 2.0, UGC, and citizen journalism: Revisiting South Korea's OhmyNews model in the age of social media. *Telematics and Informatics*, *33*(2), 546–556. doi:10.1016/j.tele.2015.07.007

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, *53*(1), 59–68. doi:10.1016/j.bushor.2009.09.003

Kazmer, M. M., & Haythornthwaite, C. (2001). Juggling Multiple Social Worlds: Distance Students Online and Offline. *The American Behavioral Scientist*, *45*(3), 510–529. doi:10.1177/00027640121957196

Key, P., & Dietmar, G. W. (Eds.). (2010). *Handbook of Research on Mobile Marketing Management*. IGI Global.

Khan, K. U., Xuehe, Z., Atlas, F., & Khan, F. (2019). The impact of dominant logic and competitive intensity on SMEs performance: A case from China. *Journal of Innovation & Knowledge*, *4*(1), 1–11. doi:10.1016/j.jik.2018.10.001

Kietzmann, J. H., Silvestre, B. S., McCarthy, I. P., & Pitt, L. F. (2012). Unpacking the social media phenomenon: Towards a research agenda. *Journal of Public Affairs*, *12*(2), 109–119. doi:10.1002/pa.1412

Maduku, D. K., Mpinganjira, M., & Duh, H. (2016). Understanding mobile marketing adoption intention by South African SMEs: A multi-perspective framework. *International Journal of Information Management*, *36*(5), 711–723. doi:10.1016/j.ijinfomgt.2016.04.018

Mamun Abdullah, A. (2018). Diffusion of innovation among Malaysian manufacturing SMEs. *European Journal of Innovation Management*, *21*(1), 113–141. doi:10.1108/EJIM-02-2017-0017

Mandal, D., McQueen, R. J., Dillon, S., & Rastrick, K. (2017). The influence of small enterprise owner personality traits on Facebook use. *Small Enterprise Research*, *24*(2), 120–131. doi:10.1080/13215906.2017.1338194

Mangold, W. G., & Faulds, D. J. (2009). Social media: The new hybrid element of the promotion mix. *Business Horizons*, *52*(4), 357–365. doi:10.1016/j.bushor.2009.03.002

Mayfield, A. (2008). *what is social media?* Academic Press.

McCann, M., & Barlow, A. (2015). Use and measurement of social media for SMEs. *Journal of Small Business and Enterprise Development*, *22*(2), 273–287. doi:10.1108/JSBED-08-2012-0096

Meske, C., & Stieglitz, S. (2013). *Adoption and Use of Social Media in Small and Medium-Sized Enterprises.* Paper presented at the Practice-Driven Research on Enterprise Transformation, Berlin, Germany.

Milla, A. C., & Dos-Santos, L. J. M. (2019). Social media preferences, interrelations between the social media characteristics and culture: A view of Arab nations. *Asian Social Science*, *15*(6), 71–77. doi:10.5539/ass.v15n6p71

Milwood, P., Marchiori, E., & Zach, F. (2013). A Comparison of Social Media Adoption and Use in Different Countries: The Case of the United States and Switzerland. *Journal of Travel & Tourism Marketing*, *30*(1-2), 165–168. doi:10.1080/10548408.2013.751287

Ndiege, J. R. A. (2019). Social media technology for the strategic positioning of small and medium-sized enterprises: Empirical evidence from Kenya. *The Electronic Journal on Information Systems in Developing Countries*, *85*(2), e12069. doi:10.1002/isd2.12069

Nisar, T. M., Prabhakar, G., & Strakova, L. (2019). Social media information benefits, knowledge management and smart organizations. *Journal of Business Research*, *94*, 264–272. doi:10.1016/j.jbusres.2018.05.005

Nobre, H., & Silva, D. (2014). Social Network Marketing Strategy and SME Strategy Benefits. *Journal of Transnational Management*, *19*(2), 138–151. doi:10.1080/15475778.2014.904658

Obschonka, M., Fisch, C., & Boyd, R. (2017). Using digital footprints in entrepreneurship research: A Twitter-based personality analysis of superstar entrepreneurs and managers. *Journal of Business Venturing Insights*, *8*, 13–23. doi:10.1016/j.jbvi.2017.05.005

Odoom, R., Anning-Dorson, T., & Acheampong, G. (2017). Antecedents of social media usage and performance benefits in small- and medium-sized enterprises (SMEs). *Journal of Enterprise Information Management*, *30*(3), 383–399. doi:10.1108/JEIM-04-2016-0088

Olanrewaju, A.-S. T., Hossain, M. A., Whiteside, N., & Mercieca, P. (2020). Social media and entrepreneurship research: A literature review. *International Journal of Information Management*, *50*, 90–110. doi:10.1016/j.ijinfomgt.2019.05.011

Olvera-Lobo, M. D., & Castillo-Rodríguez, C. (2018). Dissemination of Spanish SME information through web 2.0 tools. *Journal of Transnational Management*, *23*(4), 178–197. doi:10.1080/15475778.2018.1509422

Panahi, S., Watson, J., & Partridge, H. (2014). Social media and physicians: Exploring the benefits and challenges. *Health Informatics Journal*, *22*(2), 99–112. doi:10.1177/1460458214540907 PMID:25038200

Papa, A., Santoro, G., Tirabeni, L., & Monge, F. (2018). Social media as tool for facilitating knowledge creation and innovation in small and medium enterprises. *Baltic Journal of Management*, *13*(3), 329–344. doi:10.1108/BJM-04-2017-0125

Pateli, A., Mylonas, N., & Spyrou, A. (2020). Organizational adoption of social media in the hospitality industry: An integrated approach based on DIT and TOE frameworks. *Sustainability*, *12*(17), 7132. doi:10.3390u12177132

Pelletier, C., & Cloutier, L. M. (2019). Conceptualising digital transformation in SMEs: An ecosystemic perspective. *Journal of Small Business and Enterprise Development*, *26*(6/7), 855–876. doi:10.1108/JSBED-05-2019-0144

Pérez-González, D., Trigueros-Preciado, S., & Popa, S. (2017). Social Media Technologies' Use for the Competitive Information and Knowledge Sharing, and Its Effects on Industrial SMEs' Innovation. *Information Systems Management*, *34*(3), 291–301. doi:10.1080/10580530.2017.1330007

Pool, J. K., Arabzad, S. M., Asadi, A., & Ansari, M. R. (2015). RFID acceptance in SMEs using TOE framework: An empirical investigation on Iranian SMEs. *International Journal of Logistics Systems and Management*, *21*(3), 335–347. doi:10.1504/IJLSM.2015.069731

Poushter, J., Bishop, C., & Chwe, H. (2018). *Social media use continues to rise in developing countries but plateaus across developed ones.* Pew Research Center.

Purnama, C., & Subroto, W. T. (2016). Competition intensity, uncertainty environmental on the use of information technology and its impact on business performance small and medium enterprises (SMEs). *International Review of Management and Marketing*, *6*(4).

Qalati, S. A., Ostic, D., Shuibin, G., & Mingyue, F. (2021). A mediated–moderated model for social media adoption and small and medium-sized enterprise performance in emerging countries. *Managerial and Decision Economics*. doi:10.1002/mde.3422

Qalati, S. A., Yuan, L. W., Khan, M. A. S., & Anwar, F. (2021). A mediated model on the adoption of social media and SMEs' performance in developing countries. *Technology in Society*, *64*, 101513. doi:10.1016/j.techsoc.2020.101513

Rahayu, R., & Day, J. (2015). Determinant factors of e-commerce adoption by SMEs in developing country: Evidence from Indonesia. *Procedia: Social and Behavioral Sciences*, *195*, 142–150. doi:10.1016/j.sbspro.2015.06.423

Rienda, L., Ruiz-Fernández, L., & Carey, L. (2020). Analysing trademark and social media in the fashion industry: Tools that impact performance and internationalization for SMEs. *Journal of Fashion Marketing and Management*, *25*(1), 117–132. doi:10.1108/JFMM-03-2020-0035

Rogers, E. (1995). *Diffusion of Innovations*. Free Press.

Rogers, E. M. (1962). Diffusion of innovations. New York: Free Press.

Soto-Acosta, P., Popa, S., & Palacios-Marqués, D. (2016). E-business, organizational innovation and firm performance in manufacturing SMEs: An empirical study in Spain. *Technological and Economic Development of Economy*, *22*(6), 885–904. doi:10.3846/20294913.2015.1074126

Tajudeen, F. P., Jaafar, N. I., & Ainin, S. (2018). Understanding the impact of social media usage among organizations. *Information & Management*, *55*(3), 308–321. doi:10.1016/j.im.2017.08.004

Tajudeen, F. P., Jaafar, N. I., & Sulaiman, A. (2017). Role of social media on information accessibility. *Pacific Asia Journal of the Association for Information Systems, 8*(4).

Tajvidi, R., & Karami, A. (2021). The effect of social media on firm performance. *Computers in Human Behavior*, *115*, 105174. doi:10.1016/j.chb.2017.09.026

Tata, A., Martinez, D. L., Garcia, D., Oesch, A., & Brusoni, S. (2017). The psycholinguistics of entrepreneurship. *Journal of Business Venturing Insights*, *7*, 38–44. doi:10.1016/j.jbvi.2017.02.001

Toker, A., Seraj, M., Kuscu, A., Yavuz, R., Koch, S., & Bisson, C. (2016). Social media adoption: A process-based approach. *Journal of Organizational Computing and Electronic Commerce*, *26*(4), 344–363. doi:10.1080/10919392.2016.1228361

Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). *Processes of technological innovation*. Lexington books.

Tyler, B. B., & Steensma, H. K. (1998). The effects of executives' experiences and perceptions on their assessment of potential technological alliances. *Strategic Management Journal*, *19*(10), 939–965. doi:10.1002/(SICI)1097-0266(199810)19:10<939::AID-SMJ978>3.0.CO;2-Z

Ulas, D. (2019). Digital Transformation Process and SMEs. *Procedia Computer Science*, *158*, 662–671. doi:10.1016/j.procs.2019.09.101

Valdebenito, J., & Quelopana, A. (2019). *Conceptual Model for Software as a Service (SaaS) Enterprise Resource Planning (ERP) Systems Adoption in Small and Medium Sized Enterprises (SMEs) Using the Technology-Organization-Environment (T-O-E) Framework.* Paper presented at the Information Technology and Systems, Cham.

Wang, W. Y. C., Pauleen, D. J., & Zhang, T. (2016). How social media applications affect B2B communication and improve business performance in SMEs. *Industrial Marketing Management*, *54*, 4–14. doi:10.1016/j.indmarman.2015.12.004

Wang, Y.-M., Wang, Y.-S., & Yang, Y.-F. (2010). Understanding the determinants of RFID adoption in the manufacturing industry. *Technological Forecasting and Social Change*, *77*(5), 803–815. doi:10.1016/j.techfore.2010.03.006

Wong, L.-W., Leong, L.-Y., Hew, J.-J., Tan, G. W.-H., & Ooi, K.-B. (2020). Time to seize the digital evolution: Adoption of blockchain in operations and supply chain management among Malaysian SMEs. *International Journal of Information Management*, *52*, 101997. doi:10.1016/j.ijinfomgt.2019.08.005

Yang, H., & Yang, J. (2019). The effects of transformational leadership, competitive intensity and technological innovation on performance. *Technology Analysis and Strategic Management*, *31*(3), 292–305. doi:10.1080/09537325.2018.1498475

Zahra, S. A. (2018). Entrepreneurial risk taking in family firms: The wellspring of the regenerative capability. *Family Business Review*, *31*(2), 216–226. doi:10.1177/0894486518776871

Zhao, X., Liu, J. S., & Deng, K. (2013). Assumptions behind intercoder reliability indices. *Annals of the International Communication Association*, *36*(1), 419–480. doi:10.1080/23808985.2013.11679142

Zhu, K., Kraemer, K., & Xu, S. (2003). Electronic business adoption by European firms: A cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, *12*(4), 251–268. doi:10.1057/palgrave.ejis.3000475

Chapter 16
The Role of Websites in Business Internationalization:
A Closer Look at Objectives and Strategies

Belem Barbosa
https://orcid.org/0000-0002-4057-360X
University of Porto, Portugal

Claudia Amaral Santos
https://orcid.org/0000-0003-2630-294X
University of Aveiro, Portugal

Chaitra Katti
Sikkim Manipal University, India

Sandra Filipe
https://orcid.org/0000-0003-4159-758X
University of Aveiro, Portugal

ABSTRACT

This chapter aims to contribute to a better understanding of the role of websites in business internationalization by exploring how website overall objectives and their coherence with website strategies support website internationalization effectiveness. It provides empirical evidence on the experiences of Portuguese companies shared by 20 managers of large companies and SMEs of various activity sectors. Results show the importance of a clear website strategy (e.g., clear objectives and coherent tactics) for an effective role in internationalization. Findings also confirm that, while many managers are skeptic about the effectiveness of websites as an internationalization touchpoint, namely due to sector characteristics (e.g., type of customers, type of products/services), the website is perceived as an essential tool for reaching, attracting, and involving international customers, supporting other communication instruments such as participating in international fairs and sales force.

DOI: 10.4018/978-1-7998-9008-9.ch016

INTRODUCTION

The global pandemic disrupted many businesses and our daily life worldwide. According to Altman & Bastian (2020), people flow suffered an unprecedented decline. In addition, trade and capital flows were also hit hard. Consequently, digital information flow and international data flow soared. Thus, digital channels have become the main lifeline to connect businesses and the world. In this context, the majority of countries are striving towards internationalization of home companies and businesses.

The key factor for internationalization lies in the power of digital channels. In fact, prior to lockdowns, 90% of business decision makers already believed that digital commerce was or would become their company's most important sales channel within one to three years, and 87% agreed that digital was the future of their company (Forrester Consulting, 2020). Thus, given this promising opportunity for internationalization and the dramatic change in the digital world, it becomes necessary for practitioners and researchers to study the effectiveness of digital touchpoints, such as websites, in international markets.

The importance of websites as an international touchpoint is undeniable. Being widely associated with market globalization, a website is recognized as the most valuable digital asset of any company (Chaffey & Smith, 2017), since it offers the opportunity to create an information hub and an outlet store available to any prospective client with internet access. Without surprise, the role of websites in business internationalization attracts a lot of attention from practitioners, and research on the topic has become increasingly popular.

Despite the interesting insights in extant literature regarding companies' adoption of websites (e.g., Oliveira & Martins, 2011; Ramayah et al., 2016; Simmons, Armstrong & Durkin, 2008, 2011), managers' predisposition for e-commerce (e.g., Al-Bakri & Katsioloudes, 2015; Houghton & Winklhofer, 2004; Ocloo et al., 2020; Nasution et al., 2021; Sin & Sin, 2020; Sumiyana & Susilo, 2021; Walker et al., 2016; Xuhua et al., 2019) and the expected impacts of websites on internationalization, especially exports (e.g., Hagsten & Kotnic, 2017; Jean & Kim, 2020; Rivera-Trigueros & Olvera-Lobo, 2021), research on the topic is still sparce in exploring the role of industry specific websites and its customer-centric strategy, and the effects in the company's internationalization efforts. This chapter aims to fill this gap.

To better understand the role of websites in business internationalization, the chapter has two objectives:

1. Explore how website overall objectives (e.g., sell, inform, build relationships, foster brand image) contribute to website internationalization effectiveness (e.g., reaching international prospects, exporting).
2. Understand how website strategy (e.g., target audience, content and optimization) contribute to website internationalization effectiveness (e.g., reaching international prospects, exporting).

Building on recent scientific outputs, this research provides empirical evidence on Portuguese companies' experiences shared by 20 managers of large companies and SMEs of various activity sectors. Overall, the chapter offers both theoretical and empirical contributions to managers and practitioners in general, by highlighting important determinants of website effectiveness for business internationalization.

BACKGROUND

Internationalization is a complex process involving the expansion of companies' operations to foreign markets. Jean and Kim (2020) argue that the effect of internet capabilities, including platform and web capabilities, enhance internationalization with some major functions such as product showcasing, communication services, and export market capabilities. In fact, according to Jurado et al. (2021), websites represent one of the fundamental tools in online business strategies. As a result, the website has become a primary digital touchpoint for any business. However, how effective is a website in business internationalization?

Previous studies delved into this topic. Sinkovics and Penz (2005) consider internet as the effective channel for SMEs to send targeted messages, with website empowerment playing a successful role in internationalization strategies. Other researchers (Cermak & Smutny, 2018; Shneor, 2012; Singh & Baack, 2004, Singh & Boughton, 2005; Singh et al., 2009) highlighted the importance of website localization in international markets, and focused on important characteristics of a website such as quality, information, and interactivity in the company's international presence (Jurado et al., 2021). Additional research underlined the competitive advantage of B2B e-commerce market (Bala & Feng, 2019; Hamad et al., 2018; Xuhua et al., 2019).

Chakraborty et al. (2002), in their seminal quantitative approach to this topic, identified eight factors related to B2B website effectiveness, with informativeness on product or company, organization of the website content, transaction-related interactivity such as real-time communication or interactive decision aids, and personalization features involving collaborative filtering or customization, playing a significant role as strong predictors of B2B website effectiveness, whereas non-transaction-related interactivity, privacy/security, accessibility, and entertainment showcased no direct relationship with B2B website effectiveness. Detailing informativeness, studies at the time already indicated that websites were being explored as part of companies' communication strategies, with managers attributing strong emphasis to the information a website could convey.

B2B specificities, namely when compared to the B2C model, were further explored by Löbler (2013) based on the service-dominant network and the network paradigm, featuring actors, resources and services. More recently, and also based on the service-dominant logic, deLeon & Chatterjee (2017) delved into the profound changes that are taking place in the seller-customer interactions, with customers being increasingly knowledgeable and receptive to a hybrid goods-service approach, where quality resources and value-creation on the side of the customer are important factors both in the B2B and B2C relationship models.

Despite extant literature's contributions supporting the adoption of websites, studies are still scarce in the context of business internationalization, albeit with some exceptions (Jurado et al., 2021). This study aims to consider the overall effectiveness of websites in business internationalization by extending the current literature (Jean & Kim 2020; Jurado et al., 2021), applied only to limited markets such as wine, olive and exports, and including other international markets by conducting an exploratory qualitative analysis based on a diversified sample of SMEs and larger companies.

Website Adoption as an Essential Marketing Tool

Websites may have potential to supplement and replace a physical presence in foreign markets, helping in contacting, communicating and informing customers of other countries (Pajares et al., 2015). Gemino

et al. (2006) define website adoption as the establishment of a company's website to share business information, maintain business relationships, and conduct business transactions through telecommunications networks. Thus, website adoption becomes an important company's establishment (Gemino et al., 2006), serving as an essential marketing tool (Martin & Matlay, 2003) and a key driver of marketing strategies (Martin & Matlay, 2003; Varadarajan &Yadav, 2002).

Some studies link website content quantity and quality to company's results (Zhu et al., 2004), others highlight its competitive advantage to respond effectively to market opportunities (Pajares et al., 2015), and still others underline the importance of small businesses and the opportunities presented by website adoption globally (Raymond, 2001), reinforcing the relevance of understanding the key issues that determine website adoption.

Table 1 below summarizes the most important aspects highlighted by literature on the use of websites in internationalization strategies.

Table 1. Use of website in internationalization strategies

Major Findings	Authors
Public relations and promotions	Gemino et al., 2006; Louw & Nieuwenhuizen, 2019.
Sales channel	Harto, 2019.
Business transactions	Gemino et al., 2006; Ramayah et al., 2016; Warlina et al., 2019.
Exports, operations and business internationalization	Gregory et al., 2007; Jean & Kim, 2020; Jurado et al., (2021); Kim & Stoel, 2004; Qurratu'Aini & Hapsari (2019).
Interaction and customer service	Durkin, et al., 2013; Loureiro, 2015; Pajares et al., 2015.
Customer relationship	Gemino et al., 2006; Laroche et al., 2013.
Information and interactive features	Noort et al., 2012; Saban & Rau, 2005; Voorveld et al., 2009; Zhu et al., 2004.

As can be observed, extant literature points out several internationalization domains which may be leveraged by websites. Overall, scholars have illustrated websites as communication tools that facilitate an organization's ability to promote and easily modify the company's messages in order to overcome apprehensions and promote interest in a wide range of people.

Website Overall Objectives

Web Traffic, Sales, and Visits

An online presence is necessary to boost business revenue (Ramayah et al., 2016). Web entrepreneurs consider internet as a sales channel and seek to capitalize experiences, create value and differentiate themselves to enhance customer satisfaction and commercial performance. Literature offers some contributions on website capability for exports and international operations (Jean & Kim, 2020; Qurratu'Aini & Hapsari, 2019; Kim & Stoel, 2004). In addition, research elaborates on the importance of web traffic for online performance (Ghandour, 2015; Kim & Stoel, 2004) and observes on the importance of website design (Warlina et al., 2019), visual appeal, information and interactivity (Heinze & Hu, 2006; Ye et al., 2019), all characteristics that generate traffic and encourage transactions (Warlina et al., 2019), allow-

ing for better brand performance (Ye et al., 2019). Thus, websites have become a privileged channel for SMEs to internationalize, namely by attaining a high volume of website traffic (Pajares et al., 2015).

Website popularity encourages a large number of visits and increases sales (Harto, 2019), enabling the organization to listen, talk and interact with customers (Durkin et al., 2013). Website popularity lies in optimizing content, meeting customer needs and facilitating interaction (Butkiewicz, Madhyastha, & Sekar, 2011). Some studies indicate that the number of visits to a company's corporate website is positively related to the quality of information and interaction on the website (Chiu et al., 2005, Loureiro, 2015, Ye et al., 2019). Szymanski and Hise (2000) highlighted that the variety of information available in virtual environments is positively related to the levels of satisfaction of users. As suggested by Heinze & Hu (2006), a high level of information, strong interactivity, and a wide range of services on the website are the most important elements of perceived usefulness and ease of use. Jurado et al. (2021), for example, confirmed that a high-quality website, internationalization, organic certification, and market orientation in the sale of bottled wine are responsible for 26.61% of visits to the corporate website. In fact, according to Demangeot and Broderick (2016), receiving a visit is a critical opportunity for companies to capture, secure, commit and induce customers to act.

Brand Image and Interactivity

Consumers increasingly consider brand websites as the most important medium to seek and find information (Noort et al., 2012). In this regard, research mostly showed a positive relationship between interactivity and affective responses, such as attitudes towards the website and the online retailer (Voorveld et al., 2009). Voorveld et al., (2009) designate brand websites as business to consumer websites, prioritizing persuasion by informing consumers of interactive possibilities, since interactive features provide information about the brand, organization, and products.

Website Role as a Facilitator of Companies' Internationalization

Information and Product Related Services

Previous studies (Gregory et al., 2007) have underlined that a company's website can foster different export marketing strategies and capabilities. In fact, a website's information and communication power attracts different types of user segments, providing distinctive functionalities such as information, interactivity, and transactional methods to enhance processes (Saban & Rau, 2005). A functionality offered by a corporate website is expected to improve the export marketing capabilities of the company (Jean & Kim, 2020). For example, a company's website may offer product catalogs showcasing product information and improving marketing communication (Zhu et al., 2004).

Support and operations

A website can also offer customer feedback and dialogue functions, which help companies to understand customer preferences and optimize product development (Zhu et al., 2004). Corporate websites are key factors to strengthen relationships with consumers (Laroche et al., 2013). The impression that corporate websites cause on users depends on the information they provide and their quality, connectivity, and interactivity, which are useful to reinforce the connection with consumers and increase the popularity

of the website (Chiu et al., 2005). For some users, websites are the first and only contact they have with an organization, so a high-quality website is a good motivation to visit and recommend the company (Loureiro, 2015).

Website localization

Conceptually, website localization was defined as the process of customizing a website for a specific cultural group so that it seems natural or 'local' to members of that particular culture (Singh et al., 2009). Shneor (2012) considered culture as an important element in the international business environment and stressed the importance of website localization. Website localization supports cultural adaptation by modifying content and language and thereby fostering the internationalization of SMEs, overcoming linguistic and cultural barriers of internet users of different socio-cultural and linguistic contexts, and thus improving SME competitiveness in a globalized environment (Cermak & Smutny, 2018).

A website design which is congruent with a national culture will foster consumer online purchasing (Gong, 2009). Consumers' motivations and intentions to shop at e-retailers from the perspective of their personal-level cultural orientations are highly important (Ryu & Fortenberry, 2017). Other authors have highlighted the impact of localization on SMEs business, demonstrating that localization makes the buying experience easier, influences the purchasing behavior of customers and contributes to trust and personal assurance with local merchants (Chhibber & Chadha, 2020).Website localization, which is of paramount importance for achieving successful website international outreach, has led several authors to propose frameworks for analyzing the overall quality of this aspect (Cermak & Smutny, 2018; Singh et al., 2009).

Some studies (Chhibber & Chadha, 2020; Clavijo-Olmos, 2018) highlight different languages and translations on website of SMEs as an important tool to create a friendly environment, generate engagement, develop a strong brand strategy and increase competitiveness.

Internationalization of Websites and E-Commerce

For SMEs, e-commerce is a fundamental strategy to enter global markets. The adoption of e-commerce enables SMEs to pursue a global strategy and target a broader customer base (Beck et al., 2005) and take advantage of significant cost savings associated with implementing such a technology (Raymond et al.,2005).

According to Xuhua et al., (2019), who studied the Ghanaian market for B2B e-commerce adoption, e-commerce allows SMEs to achieve an increase in market share and improve sales, customer satisfaction, and business efficiency when accessing new markets. These findings are in agreement with Hamad et al., (2018), who found that adopting B2B e-commerce helps SMEs to increase sales and enhance business efficiency. Other authors reinforce the importance of e-commerce namely in helping SMEs to achieve significant gains by improving operational efficiency, increasing sales and revenue, enhancing customer/supplier relationships, and strengthening their competitive position with large organizations in the global markets (Elbeltagi et al., 2016; Mohtaramzadeh et al., 2018).

METHOD

With the help of current literature review, this study extends on adding more evidences on the role of websites in internationalization, using a qualitative method encompassing semi-structured interviews conducted in the last quarter of 2018 to managers of Portuguese companies with international experience or intending to expand internationally.

Qualitative studies are widely applied in social sciences, providing flexibility to obtain in-depth viewpoints and opinions on topics (Bryman, 2016). Based on the research objectives, this study adopted a purposive sampling. The sample comprised managers of Portuguese companies that have a website and international customers. The participants were recruited with the help of two of the researchers' personal and professional networks. Following the recommended practices in conducting qualitative studies in social sciences, the recruitment intended to guarantee sample diversity (Bryman, 2016) and, for that reason, the invitations to participate were addressed to managers in different sectors (e.g., B2B and B2C, industry and services), with various profiles (e.g., age, education) and performing different roles (e.g., CEO, sales manager, account manager) in both small and large size companies. A total of 20 managers of diverse companies accepted to participate in the study. The sociodemographic and professional characteristics of managers who were interviewed and data on the companies comprising the sample are presented in Table 2.

The interview outline developed for this study was organized in two sections. The first one collected information on the interviewees' profiles, on the characteristics and objectives of their companies' websites, and on their companies' internationalization process. Then, the interview outline included a series of questions regarding the relationship between website strategy and business internationalization (e.g., "In your opinion, does the website provide internationalization opportunities to your company?"; "What advantages for your business would you like to obtain from your website that you haven't had yet?").

Interviews were conducted face-to-face and lasted between 20 and 100 minutes. The recommended ethical principles for social sciences according to Bryman (2016) were applied. The participation was anonymous, confidential, and voluntary. The participants were provided with full information of the study, including its scope and objectives, ethical procedures, data collection, methods of analysis, and dissemination of results. Before the interview, participants provided their informed consent to participate in the study and accepted that the interview was audio-recorded to enable further transcription. Subsequently, the interviews were transcribed in full and the data were qualitatively analyzed based on thematic content analysis. Categories and subcategories for thematic content analysis to assess aspects relevant for website effectiveness and website strategies for internationalization were previously identified and codified. They are presented in Table 3.

RESULTS

To specifically address the research questions, the next two sections explore data on website objectives and website strategy in internationalization purposes, according to data retrieved from interviews.

Table 2. Characteristics of company managers and companies comprising the sample

Participant	Age	Education	Position	Type of commerce	Category	Sector	# Workers	Sales M€
C1	50-59	BA Engineering	Chief Sales Officer	B2B	Industry	Metal Industry	101-500	11-19
C2	30-39	BA Design	Chief Product Officer	B2B	Industry	Industrial Products and Services	101-500	11-19
C3	30-39	BA Marketing	Chief Executive Officer	B2C	Services	Tourism and Hospitality	01/out	0 - 1
C4	30-39	BA Marketing	Chief Marketing Officer	B2B	Industry	Construction and Construction Materials	51 - 100	01-09
C5	40-49	BA Engineering	Chief Executive Officer	B2B	Industry	Construction and Decorative Materials	51 - 100	01-09
C6	50-59	PG Business Sciences	Chief Executive Officer	B2B	Services	Communication and Consultancy	nov/50	0 - 1
C7	40-49	BA Communication Technologies	Chief Executive Officer	B2B	Services	Communication and Consultancy	51 - 100	01-09
C8	40-49	BA Industrial Engineering	Chief Executive Officer	B2B	Services	Communication and Consultancy	01/out	0 - 1
C9	30-39	BA Chemical Engineering	Chief Executive Officer	B2B	Industry	Food and Beverages	01/out	0 - 1
C10	40-49	PG Marketing	Chief Marketing Officer	B2B	Industry	Metal Industry	101-500	20 - 99
C11	40-49	BA Marketing	Chief Executive Officer	B2B	Industry +Services	Computer Products and Services	101-500	20 - 99
C12	50 59	BA Electronic Engineering	Chief Executive Officer	B2B & B2C	Industry	Construction and Construction materials	nov/50	0 - 1
C13	40-49	BA Marketing	Chief Executive Officer	B2B & B2C	Industry +Services	Retail (miscellaneous)	01/out	0 - 1
C14	30-39	BA Marketing	Chief Marketing Officer	B2B	Industry +Services	Technology	nov/50	n.a.
C15	22-29	BA Communication Technologies	Chief Executive Officer	B2C	Services	Technology	nov/50	0 - 1
C16	22-29	PG Marketing	Account Manager	B2B	Industry	Construction and Decorative Materials	nov/50	01-09
C17	22-29	BA Marketing	Marketing Assistant	B2B	Industry	Construction and Decorative Materials	101-500	10-19
C18	22-29	PG Marketing	Marketing Assistant	B2B	Industry	Construction and Construction Materials	101-500	20- 99
C19	50-59	PG International Relations	Chief Sales Officer	B2B	Industry	Industrial Products and Services	51 - 100	01-09
C20	30-39	BA Marketing	Marketing Assistant	B2B	Industry	Food and Beverages	101-500	n.a.

Source: Authors

Notes: Education: BA – Bachelor degree; PG – Masters' and Post-Graduation degree. M€ - Million Euro; n.a. – Information not made available for this study.

Table 3. Categories and sub-categories considered for data codification

Categories	Subcategories
Website objectives	Inform Sell, build brand awareness Foster brand image Reach new customers Increase loyalty
Website role	Generate lead Qualify leads Support commercial team Complement face-to-face communication tools Provide information services to customers Increase efficiency
Determinants of website success in internationalization	Website characteristics Sector and customer characteristics
Main internationalization challenges	Identify valid prospects Find relevant intermediaries Costs associated with internationalization Costs of face-to-face internationalization actions Schedule initial meetings with potential customers Brand globalization

Website Objectives

The participants in this study pointed out several types of objectives associated with the website, which clearly affected the role of the website in the internationalization process, and in the overall business activity. Guided by participants' spontaneous narratives, website objectives are explored in detail and grouped in the following topics: providing detailed information about products and services; fostering brand image and building brand awareness; reaching new customers; and, selling/increasing sales.

Providing Detailed Information About Products and Services

Many participants said that the main objective of their company's website was to inform customers and prospects about the company's offers (e.g., C2, C4, C9, C12, C14, C16, C20). Those websites were described as catalogue-type, i.e., their main feature was to present detailed information on all products offered by the company. This type of objective was particularly relevant for companies whose offerings were either complex or innovative. In the case of product innovation, participants noted that the website was essential to "get the product known, to demystify some products" (C12) and to "showcase the new products, as we are continuously innovating" (C20). In companies offering complex products and services, namely in some B2B sectors, the density of the information provided in the website was high, and included full detail on products' technical features, certifications, and user manuals, to name a few. As explained by the participants, this approach was especially relevant for international customers, who had more limited opportunities to deal directly with the company's staff and offers.

… we, in our website, have the pdfs of our catalogs, our price lists, all our products are there, we have technical leaflets with all details and characteristics of the product. (…) [This] is fundamental to new

foreign customers (...) Here in Portugal anybody can come to visit our showroom and see our products. If you're not here, you don't have that opportunity, so the website is vital. (C16)

These findings are in line with extant literature (e.g., Heinze & Hu, 2006; Saban & Rau, 2005; Szymanski & Hise, 2000; Voorveld et al., 2009; Zhu et al., 2004) who highlight the importance of information provided in the website, namely because that is expected to increase visitor satisfaction. Additionally, this study evidences that, for some companies, providing information may end up being the main objective defined for their websites, instead of focusing on the impacts that such information may have (e.g., attracting customers or generating sales).

Fostering Brand Image and Building Brand Awareness

Other participants narrated that their website objectives were related to improving their brand image e.g., C1, C4, C9, C17, C18) and brand awareness (e.g., C5, C6, C8, C10, C20). As simply put by Participant C1, having a website is "a matter of communicating [the brand] image", suggesting that branding should be considered the most basic feature of any website. Some participants, particularly the ones most skeptical about the ability of websites to foster business opportunities, explained that having a website is mandatory nowadays, considering that it is the main online asset of any company, in accordance with what is stressed by Chaffey and Smith (2017). One of the participants went as far as to affirm that having a website was an 'obligation', although he didn't acknowledge any advantages to his company neither in the national nor in the international markets:

The reason we have a website is merely institutional, because we have to. (...) To my company, internet doesn't provide [neither opportunities in the domestic market, nor] opportunities to internationalize. (C11)

Interviewees observed that, due to the prevalence of online searches in the consumer decision process in any sector, the website is essential to any business, because "today if you're not online, you don't exist." (C7)

Additionally, several participants (e.g., C8, C20), stressed that outdated and unappealing websites negatively impact brand image, and cause discomfort and suspicion among stakeholders and customers. Hence, participants agreed that the website should clearly communicate the brand image to foreign customers and prospects:

For foreign customers, mainly, it's fundamental to have [a good website]. The website is the company's face, the first touchpoint before [they] get acquainted with the company itself. (C16)

Overall, this study found a unanimous acknowledgement of websites as essential branding tools, especially in international markets:

It has this big advantage: to provide global visibility to the brand with low investment and that's why we are on the internet for many years and have a website for a long time, because we think it's a basic tool today. (C6)

Thus, in agreement to the evidences of Noort et al. (2012) and Voorveld et al (2009), this study further demonstrates the importance of websites to convey brand messages. More importantly, this study highlights the managers' perspectives, suggesting that branding is the most unanimous feature of websites.

Reaching new customers

Although participants identified both national and international customers and prospects as users of their websites, many recognized prospects as websites' main targets. As such, several interviewees highlighted the company's website as a lead generator:

It's a source of information and a request for information (…) from there comes, I wouldn't say 90%, but a very high percentage of potential customers. The other source is [international] trade fairs. (C10)

In some cases, participants acknowledged very frequent international leads generated by the website, and several cases of customer conversion, attesting website's success:

[We receive many] contacts interested in hiring [our] services, because they have visited the website or did some research online and found [our company's website]. (C14)

In line with the literature that underlines the importance of websites to generate international traffic for companies such as SMEs (Pajares et al., 2015), this study provides interesting examples of the international reach to the participants' websites.

Selling and Increasing Sales

While the literature often stresses the selling potential of websites (e.g., Beck et al., 2005; Xuhua et al., 2019), in this study few participants (e.g., C3, C13, C16) assumed that the main objective of their website was to increase sales. For some of them, the relevance of e-commerce is quite notorious, and the website provided essential opportunities to increase sales and also to avoid intermediaries, and thus enhance profitability:

[The website] is our main sales channel, giving opportunity for customers from all over the country and abroad to purchase [our products], it's essential to sales. (C13)

Participants (e.g., C14) also mentioned that they were planning to invest in e-commerce in order to boost international sales:

Two months ago, we launched an online store in our website to help capitalize online sales. (…) We still haven't reached our goal in terms of online sales (…) so we are considering reinvesting to improve that. (C14)

It should be noted, however, that only the participants whose websites included an online store assumed that they had selling objectives. It was often emphasized that informative and catalogue-type

websites were not considered a sales channel and did not have any selling objectives, although they had an important role in the generation of leads:

Some people establish contact through the website and then they purchase. (C3)

There's no online store, so we would never have a direct goal of increasing sales; they would come as a consequence, not as an objective. (C5)

As pointed out by these results, participants were reluctant in accepting selling objectives for websites that do not include an online store, although there is abundant evidence on sales originated by the website. Thus, despite accepting the certain outcomes from websites such as providing service and information and reaching new customers, to encourage transactions (Demangeot & Broderick, 2016; Warlina et al., 2019) and ultimately to increase exports (Qurratu'Aini & Hapsari, 2019), some companies may disregard their website's ability to foster sales. It is important to note that, while, for e-commerce websites, it is easy to define and control selling objectives, it is particularly challenging to measure direct and indirect impacts of communication platforms on offline sales. For that reason, this study suggests that the role of websites in internationalization might be often underestimated, because many managers will disregard the indirect effects on sales. Still, the synergies between different website objectives are evident, as analyzed the next section.

Website Strategies

Synergies Between Website Objectives

The excerpts included in the previous sections reveal that there are clear connections between the four types of objectives. Apparently justifying the prevalence and popularity of the informative objective, participants frequently noted that, by providing rich information to customers and prospects, the website is expected to capitalize also in terms of brand awareness and image, reaching new customers, and eventually increasing sales.

Apparently, the participants tended to describe selling and information objectives as two independent approaches to websites. Still, the examples given demonstrated that, even in the absence of an online store, information-oriented websites can be lead generators, and ultimately result in sales.

The link between informative and branding objectives was particularly referred during the interviews. Indeed, several participants (e.g., C3, C5) observed that, by presenting detailed information about the company and its offerings, the website provides brand credibility and customer trust, especially for new and small businesses, as it was the case of Participant C3. Participant C16 further added that the impact on credibility and trust is expected to be higher for international customers:

The website is obviously one of our biggest tools to maintain contact with our international customers and get new ones. (…) Mainly for international [prospects], the first impression they have is the website and it has [all information on products], they see that the website is very complete and I think it facilitates to further getting in touch with us. (C16)

Participants also pointed out that strongly informative websites help reaching new international customers, as exemplified by Participant C17:

We have many international customers that were aware of the company through the website. That stimulates everything. If we provide information on whom we work with, highlight that you're willing to increase work internationally, more changes there are for international companies to contact you. (C17)

Interestingly, literature frequently highlights the ability of websites to achieve a combination of marketing objectives, pointing out the strong associations between offering information, providing additional services, strengthening customer relationships, and fostering sales (e.g., Jean & Kim, 2020; Louw & Nieuwenhuizen, 2020; Qurratu'Aini and Hapsari, 2019; Warlina, et al., 2019). This study contributes to the state of the art by further highlighting the associations between digital marketing objectives, evidencing clear synergies between some of them.

Sector Characteristics and its Impact on Website Objectives

Previous transcripts showed that some of the participants in this study devalued the power of websites to leverage their businesses – both nationally and internationally. The reasons for this skepticism regarding the benefits of online presence were associated with sector characteristics and the perceived communication and commercial strategies' effectiveness.

For example, the focus on customized B2B products and services (e.g., C1, C6, C11) led companies to conduct all their customer interactions in person and to reduce their online presence to a minimum, often to an institutional website focusing on brand image and company achievements. Several participants stressed that, in their sectors, personal contacts were the only way to do business, even if the website was effective for reaching prospects:

[The website helps you being found by new customers] but business is not done through it. (…) It's a very technical area and we prefer to have a customized follow-up. (C2)

The website gets others to know what you do, but if there is no follow-up, forget it, the website is useless. (C19)

Another factor that was pointed out was the number of players in the sector. As explained by Participant C1, if the sector has a reduced number of companies, the website may be seen as a redundant way to reach new customers, except if the company wants to enter new markets:

We work with a niche market where everybody knows each other. [However], in more distant markets, if anyone wants to make an enquiry or search for suppliers or manufacturers of a certain product, of course an online presence offers people the chance to identify the company and reach out to you. (C1)

Customer characteristics were also pointed out by the participants in this study. Some participants (e.g., C1, C4) claimed that their potential customers do not search online for suppliers in their category of products:

[Despite the website] being an access door to new markets, to new customers (...) I'd say that perhaps [our current customer profile] would not search for us via a website. (C4)

Hence, sector characteristics was frequently mentioned as the main determinant of the website's objectives. It is important to note that extant literature frequently focus on only one sector of activity (e.g., Jean & Kim 2020; Jurado et al., 2021), and thus this study adds fresh insights by showing that, according to managers, some sectors are particularly challenging for website internationalization strategies.

Enhancers of Website Effectiveness for Internationalization

In addition to the previous two sections on website objectives and strategies, two aspects stood out as enhancers of website effectiveness: its articulation with other marketing communication tools such as international fairs and sales force that provide efficiency gains for both prospects and the company, and a search engine optimization strategy. These aspects are analyzed in detail in the following sections.

The Website as an Integrated Marketing Communication Tool

As already mentioned, the majority of participants in this study considered selling objectives as non-priority goals of their websites. Still, it was clear by the explanations and examples they provided that, by featuring rich information, the websites become essential business facilitators and assist sales force and other commercial teams, providing efficiency gains.

Overall, the website was acknowledged as an essential complement to the sales force (e.g., C2, C7, C16), especially in the context of professional/sector international fairs (e.g., C5, C17). Due to the synergies that the website creates with other communication tools, it was often described as a communication facilitator, particularly when its main goal is to "facilitate communication and information broadcast with current and potential customers" (C8). The participants indicated that the website is both the trigger of personal contacts (e.g., C17) and a follow up tool for commercial meetings (e.g., C8), as demonstrated by the next statements:

[We created a new website] mainly to support the commercial team. They were constantly reporting that people started to find it odd not to have an active website, wondering if there was something wrong with the company. (C20)

One of the essential things that our [account managers' team does during] the sales process is to invite people to visit our website, or, even in face-to-face meetings, show our portfolio. (C7).

Participants suggested that providing this type of information on the website was clearly advantageous for both the companies and their customers and prospects. Overall, results demonstrate that the website is an efficient channel to communicate technical and complex information and allows to save resources (both money and time).

Additionally, making this type of information available on the website allows customers and prospects to go through the initial stages of the decision process, making the commercial efforts much more effective. When customers finally contact the company, they are qualified leads who have already done their research and are ready to finalize the deal. This was explained by Participant C16.

[After visiting the website], the customer already has an idea of what he wants (…) and it's much simpler dealing with issues and moving forward with the order. It facilitates communication a lot because [the website] provides very complete information that [customers] can use. (C16)

As such, this study supports contributions in the literature that position websites as essential supplements of physical presence in international markets (Shneor & Flåten, 2008; Forsgren & Hagström, 2001; Petersen et al., 2002) and as an enhancer of commercial performance. Additionally, this study suggests that a full recognition of the role of websites in internationalization processes ought to take these indirect impacts into account. Considering that part of the website effectiveness might be indirect, it is essential to find ways to effectively measure these impacts, and hence to rigorously evaluate the business outcomes that websites generate to different companies.

Search engine optimization

Despite the fact that reaching new international customers was considered an important objective for websites, most participants denoted website's insufficient success in that respect: "The website helps to find new customers, not frequently, but regularly." (C6)

Considering that prospects are often directed to the website by a search engine, the website ability to reach new customers and generate leads depends on the implementation of search engine optimization (SEO). Participant C7 explained the reasons behind her website's success as follows:

[The website] relies on some strategy, it has good indexation, which allows any person that searches for [the main keywords associated with our products] to typically see our website and then have the possibility of consulting [our portfolio]. (C7)

It should be noted, however, that a good indexation in search engines seems more difficult to achieve when companies consider international markets. Obviously, there is increased competition and search engine features that prioritize local/national businesses in search engine results pages. Furthermore, while many of the participants' websites are still missing SEO, this problem seems more evident in the case of international customers/prospects, as SEO is essentially done in the mother tongue:

I'd like international customers to have an easier access to the website. For example, if they search [by the name of our products] in English or by [sector, and] Portugal, they could find more easily the website through SEO support or something similar. (...) In Portugal, if we search in Portuguese, it appears immediately (...) but abroad it's not like that at all. (C16)

Accordingly, several participants (e.g., C3, C15, C16) stressed that their digital marketing priority at that time was SEO:

(…) we're focusing on [SEO] to ensure that the website appears more easily in searches (…) not only when people search for our brand, but also for related topics, so that we have a better positioning. (C15)

As noted in the literature, website traffic is generally acknowledged as a key variable to assess online performance (Ghandour, 2015). Still, website popularity depends in particular on optimizing content (Butkiewicz, et al., 2011) and consequently increasing its reach.

This study provides fresh evidence on these aspects, and also demonstrates that many managers recognize the importance of search engine optimization to website success, particularly in international markets.

DISCUSSION

The main purpose of this study was to explore the role of websites in internationalization strategies of B2B companies of different sizes and sectors of activity. The study highlights distinct evidence regarding website adoption.

Overall, findings are in agreement with literature contributions (e.g., Gemino et al., 2006; Jurado et al., 2021; Ramayah et al., 2016) that emphasize the role of websites as a necessary asset to the company, although assuming different objectives according to the company's profile and field of action. One transversal consideration is that websites are effective in business communication, assuming an essential informative role, especially relevant when dealing with complex products or services, or in e-commerce. The assessment of the website as a branding tool, contributing to disseminate the brand image, and building trust and loyalty among customers and prospects, is similarly observed in all quadrants of respondents. Acting as a relevant support to the sales force, namely in international events, providing product demos, facilitating direct contact, highlighting specificities with detailed explanations and therefore conveying credibility, are aspects of institutional websites referred by participants.

Sector characteristics may confer distinct nuances to websites, namely regarding sales objectives. Although all participants considered websites as essential, the purposes underlying their content and layout may differ. E-commerce companies appreciate websites not only for their presence as brand ambassadors, but also as a lead-generators, contributing decisively to sales' results. Others, acting in niche markets or with highly specific offers, tend to depreciate the indirect effect of websites' effectiveness in this regard, dismissing reach and sell purposes.

In general, B2B companies believe that a website is as an important brand management asset, resulting in a positive impression to customers. Websites serve as a prime communication tool, becoming essential business facilitators, thus providing efficiency gains. However, the branding effectiveness of a website cannot be taken for granted and depends, among other things, on the efficient use of SEO, to increase traffic (Harto, 2019).

Thus, the analysis resulting from this qualitative exploratory study contributes with interesting perspectives on the significance of websites to the internationalization strategy of SMEs, concluding that websites are essential branding tools that assume differentiated purposes and strategies in international markets, namely according to the portfolio of products and services, industry specific characteristics and target audiences. The study highlights that all companies participating in the study require a website to accomplish their essential activity of informing, communicating and reaching customers, aligned with literature (Pajares et al., 2015; Saban & Rau, 2005; Zhu et al., 2004).

The study helps practitioners, academics and marketing professionals to assess and explore the necessity and potential role of websites in internationalization strategies, considering as an important foundational aspect the relationship between the industry sector and customer specific needs. In addi-

tion, it helps to monitor the status of important aspects of digital marketing, namely the use of SEO in SMEs, and reflects on the relevance of improving digital practices to succeed in a fast-moving market.

SOLUTIONS AND RECOMMENDATIONS

In this study, additional evidence was collected on the main challenges faced by companies in their internationalization processes. Besides the traditional challenges of adapting to different cultures and contexts (e.g., Gong, 2009; Shneor, 2012; Singh et al., 2009), participants stressed the additional challenges for using websites as an internationalization tool:

- identifying valid prospects and potential intermediaries (e.g., C1, C2, C6, C16);
- dealing with budget limitations, stressing the high costs associated with fair participation and other internationalization initiatives (e.g., C2, C8);
- being received by potential customers, creating relationships and building trust with international customers and prospects (e.g., C4, C12, C16, C19);
- increasing brand awareness internationally (e.g., C1, C4, C17).

This chapter argues that an adequate website strategy can help companies to deal with the referred challenges. Indeed, the website plays an unquestionable role in offering services, particularly information, reaching prospects, and, consequently, enhancing brand awareness. Also, websites offer important advantages to increase sales, including indirect benefits. It is evident that indirect benefits are difficult to be measured, and, considering the empirical evidence provided by this chapter, are often disregarded. As such, it is recommended that companies take into account both the direct impacts of websites and the indirect ones, namely offline sales that are originated by the website. Only a rigorous assessment of website impacts will allow an accurate evaluation of its performance.

FUTURE RESEARCH DIRECTIONS

The chapter demonstrates that, despite the interesting contributions in the literature regarding the impacts of digitalization on internationalization success, more studies are needed to disclose the views and experiences of managers and companies in different sectors. Two avenues for future research stand out. Firstly, the analysis of the challenges and opportunities posed by other digital marketing tools (e.g., social media, interactive ads, search ads) to a broader type of companies acting in various sectors. Secondly, the development of assessment instruments to measure digital business internationalization, particularly considering the indirect effects of digital tools. Given the importance of internationalization to business survival and to reach specific segments of customers, including niches, studies on this topic are urgent to guide managers in their tactics and investments. In addition, comparisons between B2C and B2B companies on the topic would be relevant to inform practitioners and marketing professionals on future best practices.

CONCLUSION

The main findings resulting from data collection can be summarized as follows.

Website Objectives:

- The existence of a website is mandatory; first touchpoint with the brand, especially in international markets; low-cost branding tool.
- Basic features: communicate and foster brand message and image, build awareness, provide information, increase customer retention, compensate lack of face-to-face interaction.
- Selling and generating leads internationally can be a primary objective for certain companies, namely e-commerce; other may consider selling and generating leads as secondary, non-applicable, non-essential or inefficient.
- Efficiency gains are acknowledged transversally, even when selling objectives are not established as a priority.
- Well-designed and detailed websites contribute to customer trust and loyalty.

Website Strategy:

- A comprehensive approach maximizes brand awareness, image and credibility.
- First contacts by international customers often result from visits to the website.
- Informative and selling purposes tend to be assessed as separate aspects, especially by companies with no online stores.
- Some skepticism regarding website effectiveness in leveraging the business.

Enhancers of Website Effectiveness for Internationalization Purposes:

- Websites can be an essential support to the sales force in international markets.
- The website works as a trigger to attract international customers.
- SEO's efficiency in international markets is still low; the majority of SMEs does not have a strategy for SEO yet.

Two main conclusions are suggested. On the one hand, it is particularly important that the website provides valuable tools to the company's collaborators in order to take full advantage of its features and generate communication synergies. On the other hand, it becomes evident that even websites without online stores are able to facilitate international business and hence have an indirect impact on increasing sales. It would be important to measure those impacts, in order to properly assess the website outcomes and performance. More than establishing the priority of reach and sell objectives in websites, it would be essential to enhance digital marketing competences and knowledge to adapt and adopt adequate strategies to support the company's international positioning.

REFERENCES

Al-Bakri, A. A., & Katsioloudes, M. I. (2015). The factors affecting e-commerce adoption by Jordanian SMEs. *Management Research Review*, *38*(7), 726–749. doi:10.1108/MRR-12-2013-0291

Altman, S., & Bastian, P. (2020). *DHL Global Connectedness Index*. https://www.dhl.com/content/dam/dhl/global/dhl-spotlight/documents/pdf/spotlight-g04-gci-2020-highlights.pdf

Bala, H., & Feng, X. (2019). Success of small and medium enterprises in Myanmar: Role of technological, organizational, and environmental factors. *Journal of Global Information Technology Management*, *22*(2), 100–119. doi:10.1080/1097198X.2019.1603511

Beck, R., Wigand, R. T., & Konig, W. (2005). The diffusion and efficient use of electronic commerce among small and medium-sized enterprises: An international three-industry survey. *Electronic Markets*, *15*(1), 38–52. doi:10.1080/10196780500035282

Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.

Butkiewicz, M., Madhyastha, H. V., & Sekar, V. (2011). Understanding website complexity: Measurements, metrics, and implications. *Proceedings of the 2011 ACM SIGCOMM conference on Internet measurement conference*, 313-328. 10.1145/2068816.2068846

Cermak, R., & Smutny, Z. (2018). A framework for cultural localization of websites and for improving their commercial utilization. In S. Sarma (Ed.), *Global observations of the influence of culture on consumer buying behavior* (pp. 206–232). IGI Global. doi:10.4018/978-1-5225-2727-5.ch013

Chaffey, D., & Smith, P. R. (2017). *Digital Marketing Excellence: Planning, Optimizing and Integrating Online Marketing*. Routledge. doi:10.4324/9781315640341

Chakraborty, G., Lala, V., & Warren, D. (2002). An empirical investigation of antecedents of B2B Websites' effectiveness. *Journal of Interactive Marketing*, *16*(4), 51–72. doi:10.1002/dir.10044

Chhibber, R., & Chadha, C. (2020). Adoption of localization in e-commerce: Impact of localization on emerging SMEs. *Lecture Notes in Electrical Engineering Book Series*, *612*, 419–432. doi:10.1007/978-981-15-0372-6_34

Chiu, H. C., Hsieh, Y. C., & Kao, C. Y. (2005). Website quality and customer's behavioural intention: An exploratory study of the role of information asymmetry. *Total Quality Management & Business Excellence*, *16*(2), 185–197. doi:10.1080/14783360500054277

Clavijo-Olmos, S. (2018). Breaking language and cultural barriers: A key to improve stakeholder relationships of SMEs. In R. Pérez-Uribe (Ed.), *Handbook of Research on Intrapreneurship and Organizational Sustainability in SMEs* (pp. 73–94). IGI Global. doi:10.4018/978-1-5225-3543-0.ch004

deLeon, A. J., & Chatterjee, S. C. (2017). B2B relationship calculus: Quantifying resource effects in service-dominant logic. *Journal of the Academy of Marketing Science*, *45*(3), 402–427. doi:10.100711747-015-0467-0

Demangeot, C., & Broderick, A. J. (2016). Engaging customers during a website visit: A model of website customer engagement. *International Journal of Retail & Distribution Management*, *44*(8), 814–839. doi:10.1108/IJRDM-08-2015-0124

Durkin, M., McGowan, P., & McKeown, N. (2013). Exploring social media adoption in small to medium-sized enterprises in Ireland. *Journal of Small Business and Enterprise Development*, *20*(4), 716–734. doi:10.1108/JSBED-08-2012-0094

Elbeltagi, I., Hamad, H., Moizer, J., & Abou-Shouk, M. A. (2016). Levels of business-to-business e-commerce adoption and competitive advantage in small and medium-sized enterprises: A comparison study between Egypt and the United States. *Journal of Global Information Technology Management*, *19*(1), 6–25. doi:10.1080/1097198X.2016.1134169

Forrester Consulting. (2020), *The State of Commerce Experience*. http://go.bloomreach.com/rs/243-XLW-551/images/The-State-Of-Commerce-Experience.pdf

Forsgren, M., & Hagström, P. (2001). Ignorant internationalization? Internationalization patterns for internet-related firms. *Communications & Stratégies*, *42*, 209–224.

Gemino, A., MacKay, N., & Reich, B. H. (2006). Executive decisions about website adoption in small and medium-sized enterprises. *Journal of Information Technology Management*, *17*(1), 34–49.

Ghandour, A. (2015). Ecommerce website value model for SMEs. *International Journal of Electronic Commerce Studies*, *6*(2), 203–222. doi:10.7903/ijecs.1403

Gong, W. (2009). National culture and global diffusion of business-to-consumer e-commerce. *Cross Cultural Management*, *16*(1), 82–101. doi:10.1108/13527600910930059

Gregory, G., Karavdic, M., & Zou, S. (2007). The effects of e-commerce drivers on export marketing strategy. *Journal of International Marketing*, *15*(2), 30–57. doi:10.1509/jimk.15.2.30

Hagsten, E., & Kotnik, P. (2017). ICT as facilitator of internationalisation in small-and medium-sized firms. *Small Business Economics*, *48*(2), 431–446. doi:10.100711187-016-9781-2

Hamad, H., Elbeltagi, I., & El-Gohary, H. (2018). An empirical investigation of business-to-business e-commerce adoption and its impact on SMEs competitive advantage: The case of Egyptian manufacturing SMEs. *Strategic Change*, *27*(3), 209–229. doi:10.1002/jsc.2196

Harto, A. B. (2019). Implementing website design based on search engine optimization (SEO) checklist to increase web popularity. *Journal of Applied Information*. *Tongxin Jishu*, *6*(2), 87–97.

Heinze, N., & Hu, Q. (2006). The evolution of corporate web presence: A longitudinal study of large American companies. *International Journal of Information Management*, *26*(6), 313–325. doi:10.1016/j.ijinfomgt.2006.03.008

Houghton, K. A., & Winklhofer, H. (2004). The effect of website and e-commerce adoption on the relationship between SMEs and their export intermediaries. *International Small Business Journal*, *22*(4), 369–388. doi:10.1177/0266242604044305

Jean, R., & Kim, D. (2020). Internet and SMEs' internationalization: The role of platform and website. *Journal of International Management*, *26*(1), 1–14. doi:10.1016/j.intman.2019.100690

Jurado, E. B., Moral, A. M., Ucles, D., & Virueld, M. (2021). Online popularity as a development factor for cooperatives in the winegrowing sector. *Journal of Business Research*, *123*, 79–85. doi:10.1016/j.jbusres.2020.09.064 PMID:33041394

Kim, S., & Stoel, L. (2004). Apparel retailers: Website quality dimensions and satisfaction. *Journal of Retailing and Consumer Services*, *11*(2), 109–117. doi:10.1016/S0969-6989(03)00010-9

Laroche, M., Habibi, M. R., & Richard, M. O. (2013). To be or not to be in social media: How brand loyalty is affected by social media? *International Journal of Information Management*, *33*(1), 76–82. doi:10.1016/j.ijinfomgt.2012.07.003

Löbler, H. (2013). Service-dominant networks: An evolution from the service-dominant logic perspective. *Journal of Service Management*, *24*(4), 420–434. doi:10.1108/JOSM-01-2013-0019

Loureiro, S. (2015). The role of website quality on attitude and intentions to visit and recommend island destination. *International Journal of Tourism Research*, *17*(6), 545–554. doi:10.1002/jtr.2022

Louw, C., & Nieuwenhuizen, C. (2020). Digitalization strategies for SMEs: A cost vs. skill approach for website development. *African Journal of Science, Technology, Innovation and Development*, *12*(2), 195–202. doi:10.1080/20421338.2019.1625591

Martin, L. M., & Matlay, H. (2003). Innovative use of the internet in established small firms: The impact of knowledge management and organisational learning in accessing new opportunities. *Qualitative Market Research*, *6*(1), 18–26. doi:10.1108/13522750310457348

Mohtaramzadeh, M., Ramayah, T., & Jun-Hwa, C. (2018). B2B e-commerce adoption in Iranian manufacturing companies: Analyzing the moderating role of organizational culture. *International Journal of Human-Computer Interaction*, *34*(7), 621–639. doi:10.1080/10447318.2017.1385212

Nasution, M. D. T. P., Rafiki, A., Lubis, A., & Rossanty, Y. (2021). Entrepreneurial orientation, knowledge management, dynamic capabilities towards e-commerce adoption of SMEs in Indonesia. *Journal of Science and Technology Policy Management*, *12*(2), 256–282. doi:10.1108/JSTPM-03-2020-0060

Noort, G. V., Voorveld, H. A. M., & Reijmersdal, E. A. V. (2012). Interactivity in brand web sites: Cognitive, affective, and behavioral responses explained by consumers' online flow experience. *Journal of Interactive Marketing*, *26*(4), 223–234. doi:10.1016/j.intmar.2011.11.002

Ocloo, C. E., Xuhua, H., Akaba, S., Shi, J., & Worwui-Brown, D. K. (2020). The determinant factors of business to business (B2B) e-commerce adoption in small-and medium-sized manufacturing enterprises. *Journal of Global Information Technology Management*, *23*(3), 191–216. doi:10.1080/1097198X.2020.1792229

Oliveira, T., & Martins, M. (2011). Understanding the determinant factors of Internet business solutions adoption: The case of Portuguese firms. *Applied Economics Letters*, *18*(18), 1769–1775. doi:10.1080/13504851.2011.564116

Pajares, E., Moral, A., Jurado, E., & Virueal, J. (2015). Efficiency and exports: Evidence from Southern European companies. *Journal of Business Research*, *68*(7), 1506–1511. doi:10.1016/j.jbusres.2015.01.042

Petersen, B., Welch, L., & Liesch, P. (2002). The Internet and foreign market expansion by firms. *Management International Review*, *42*(2), 207–221.

Qurratu'Aini, H., & Hapsari, A. (2019). Interests influence of digital marketing product sales in exports by SMEs in Bandung. *Global Business and Management Research*, *11*(1), 217–225.

Ramayah, T., Ling, N. S., Taghizadeh, S., & Rahman, S. (2016). Factors influencing SMEs website continuance intention in Malaysia. *Telematics and Informatics*, *33*(1), 150–164. doi:10.1016/j.tele.2015.06.007

Raymond, L. (2001). Determinants of web site implementation in small businesses. *Internet Research*, *11*(5), 411–423. doi:10.1108/10662240110410363

Raymond, L., Bergeron, F., & Blili, S. (2005). The assimilation of e-business in manufacturing SMEs: Determinants and effects on growth and internationalization. *Electronic Markets*, *15*(2), 106–118. doi:10.1080/10196780500083761

Rivera-Trigueros, I., & Olvera-Lobo, M. D. (2021). Internet presence and multilingual dissemination in corporate websites: A portrait of Spanish healthcare SMEs. *Journal of Global Information Management*, *29*(6), 1–17. doi:10.4018/JGIM.20211101.oa24

Ryu, J. S., & Fortenberry, S. (2017). Understanding young consumers' personal-level cultural orientation and shopping intentions: Implications for small-town retailers. *Journal of Small Business Strategy*, *27*(3), 1–8.

Saban, K. A., & Rau, S. E. (2005). The functionality of websites as export marketing channels for small and medium enterprises. *Electronic Markets*, *15*(2), 128–135. doi:10.1080/10196780500083803

Shneor, R. (2012). Influences of culture, geography and infrastructure on website localization decisions. *Cross Cultural Management*, *19*(3), 352–374. doi:10.1108/13527601211247099

Shneor, R. & Flåten, B. (2008). The Internet-enabled internationalization process: A focus on stages and sequences. *Journal of e-Business, 8*(1,2), 44-53.

Simmons, G., Armstrong, G. A., & Durkin, M. G. (2008). A conceptualization of the determinants of small business website adoption: Setting the research agenda. *International Small Business Journal*, *26*(3), 351–389. doi:10.1177/0266242608088743

Simmons, G., Armstrong, G. A., & Durkin, M. G. (2011). An exploration of small business website optimization: Enablers, influencers and an assessment approach. *International Small Business Journal*, *29*(5), 534–561. doi:10.1177/0266242610369945

Sin, K. Y., & Sin, M. C. (2020). Factors influencing e-commerce adoption: Evaluation using structural equation modelling (SEM). *International Journal of Business and Society*, *21*(3), 1192–1202.

Singh, N., & Baack, D. (2004). Web Site adaptation: A cross-cultural comparison of US and Mexican web sites. *Journal of Computer-Mediated Communication*, *9*(4), 946. doi:10.1111/j.1083-6101.2004.tb00298.x

Singh, N., & Boughton, P. D. (2005). Measuring Website Globalization: A Cross-Sectional Country and Industry Level Analysis. *Journal of Website Promotion*, *1*(3), 3–20. doi:10.1300/J238v01n03_02

Singh, N., Toy, D. R., & Wright, L. K. (2009). A diagnostic framework for measuring website localization. *Thunderbird International Business Review*, *51*(3), 281–295. doi:10.1002/tie.20265

Sinkovics, R. R., & Penz, E. (2005). Empowerment of SME websites: Development of a web-empowerment scale and preliminary evidence. *Journal of International Entrepreneurship*, *3*(4), 303–315. doi:10.100710843-006-7858-8

Sumiyana, S., & Susilo, G. F. (2021). Beneficial explanation for SME's e-commerce adoption: The sequential stages of organizational, industrial and national readiness. *Economia e Sociologia*, *14*(2), 252–273. doi:10.14254/2071-789X.2021/14-2/14

Szymanski, D. M., & Hise, R. T. (2000). E-satisfaction: An initial examination. *Journal of Retailing*, *76*(3), 309–322. doi:10.1016/S0022-4359(00)00035-X

Varadarajan, P. R., & Yadav, M. S. (2002). Marketing strategy and the Internet: An organising framework. *Academy of Marketing Science*, *30*(4), 296–313. doi:10.1177/009207002236907

Voorveld, H. A. M., Neijens, P. C., & Smit, E. G. (2009). Consumers' responses to brand web sites: An interdisciplinary review. *Internet Research*, *19*(5), 335–365. doi:10.1108/10662240920998887

Walker, J. H., Saffu, K., & Mazurek, M. (2016). An empirical study of factors influencing e-commerce adoption/non-adoption in Slovakian SMEs. *Journal of Internet Commerce*, *15*(3), 189–213. doi:10.10 80/15332861.2016.1191049

Warlina, L., Siddiq, F. F., & Valentina, T. (2019). Designing website for online business in the agricultural sector. *Journal of Physics*, *1402*(6), 66080.

Xuhua, H., Elikem, O. C., & Akaba, S. (2019). Effects of business-to-business e-commerce adoption on competitive advantage of small and medium-sized manufacturing enterprises. *Economia e Sociologia*, *12*(1), 80–99. doi:10.14254/2071-789X.2019/12-1/4

Ye, B. H., Barreda, A., Okumus, F., & Nusair, K. (2019). Website interactivity and brand development of online travel agencies in China: The moderating role of age. *Journal of Business Research*, *99*, 382–389. doi:10.1016/j.jbusres.2017.09.046

Zhu, K., Kraemer, K. L., Xu, S., & Dedrick, J. (2004). Information technology payoff in e-business environments: An international perspective on value creation of e-business in the financial services industry. *Journal of Management Information Systems*, *21*(1), 17–54. doi:10.1080/07421222.2004.11045797

ADDITIONAL READING

Carter, S. (2021). UX and E-Commerce: Comparing the Best Practices in Europe, Asia, North America, South America, and Africa. In Handbook of Research on User Experience in Web 2.0 Technologies and Its Impact on Universities and Businesses (pp. 316-352). IGI Global.

Carvalho, L. C., & Isaías, P. (Eds.). (2018). *Handbook of Research on Entrepreneurship and Marketing for Global Reach in the Digital Economy*. IGI Global.

Castro, R. L., & Costa, J. (2021). Struggling for Survival: Internationalization Drivers in Family SMEs–A Strategic Guideline to Overcome the Crisis Based on the Literature. In Cases on Small Business Economics and Development During Economic Crises (pp. 179-206). IGI Global.

Cook, M., Duan, S., & Krivokapic-Skoko, B. (2021). SMEs Internationalization Through Electronic Commerce: Benefits, Disadvantages, and Barriers. In Rural Entrepreneurship and Innovation in the Digital Era (pp. 80-102). IGI Global.

Denga, E. M., Vajjhala, N. R., & Rakshit, S. (2022). The Role of Digital Marketing in Achieving Sustainable Competitive Advantage. *Digital Transformation and Internationalization Strategies in Organizations*, 44-60.

Kasemsap, K. (2017). Advanced Issues of Internationalization, International Entrepreneurship, and Entrepreneurial Marketing in SMEs. In Entrepreneurship: Concepts, Methodologies, Tools, and Applications (pp. 2093-2107). IGI Global.

Pelet, J. E. (Ed.). (2020). *Handbook of Research on User Experience in Web 2.0 Technologies and Its Impact on Universities and Businesses*. IGI Global.

Raisinghani, M. S. (2021). Empirical Investigation of Factors That Influence Website Performance. *International Journal of Technology and Human Interaction*, *17*(4), 19–34. doi:10.4018/IJTHI.2021100102

KEY TERMS AND DEFINITIONS

Brand Awareness: It measures the familiarity and acknowledgement of a brand by its customers and prospects, helping to determine the percentage of the market that knows the brand and associates it with its products.

Brand Image: A set of impressions and associations that a customer or prospect has regarding a brand.

Digital Marketing: The adaptation of marketing management and strategy to the digital touchpoints, comprising a particular set of tools and strategies (e.g., social media, e-mail, interactive advertising, websites, search engine optimization, digital marketing planning) in accordance to customers' needs, preferences and digital behaviors.

Prospect: A potential customer for a business, brand, or company.

Search Engine Optimization: A set of techniques, including on-page activities, that improve the probability of a website page to be highly ranked on SERP.

Search Engine Results Page (SERP): The list of results that is presented to search engine users after entering a particular research query.

Website Reach: The total number of persons who visited a website. This is different from website visits, as each person can make multiple visits over time.

Section 3

Digital Transformation Success Strategies: Selected Case Studies

Chapter 17
Drivers of SME Digital Transformation in the Context of Intergenerational Cooperation in Slovakia

Anna Pilková
Faculty of Management, Comenius University in Bratislava, Slovakia

Marian Holienka
Faculty of Management, Comenius University in Bratislava, Slovakia

Juraj Mikuš
Faculty of Management, Comenius University in Bratislava, Slovakia

ABSTRACT

Digital transformation is one of the key recent trends in business organizations, entire business sectors, and whole economies, and it reflects the recent economic, social, and technological challenges across societies. One of such challenges is the intergenerational context of (not-only) business enterprises that has become apparently relevant in recent years. In the following chapter, the authors offer a blended perspective on these two phenomena, with a purpose to examine the lived experiences of small business owner-managers from various generational groups with an aim to identify the key drivers, and experiences with digital transformation in Slovakia with the emphasis on the intergenerational cooperation. This chapter starts with introducing the context of the subject under investigation and explaining its background. Then, the empirical research undertaken by the authors is explained, its results are presented and discussed, and conclusions are offered.

DOI: 10.4018/978-1-7998-9008-9.ch017

INTRODUCTION

Entrepreneurship is one of the key drivers of the economic, social, and environmental development of society. Recent economic, social, and technological trends, such as fair sustainability of economic growth, digitalization and the industry 4.0, population aging, and the growth of the silver economy present many challenges that manifest into a change of typology of competitive advantage, nature of jobs, jeopardy of a significant proportion of jobs, to new requirements on knowledge and skills, but also lifestyle of individual groups of the population. These trends also pose challenges for the sustainability and development of entrepreneurial activities and need to be flexibly responded by finding new approaches to solve them. Europe is facing an industrial transformation that is part of long-term and structural global changes. Up to 70% of European businesses report a threat to their investment due to a lack of skills, while it is a particular challenge for SMEs (European Union, 2019). In Slovakia, SMEs represented 99,9% of all business entities, employed close to 70% of employees and contributed to the export by 40% as of 2019 (SBA, 2020).

The topic of digitalization and digital transformation has been pronounced in Slovakia since 2019 when the Government approved the 2020 Digital Transformation Strategy for Slovakia (Ministry of Investments, Regional Development and Informatization of the Slovak Republic, 2019). The aim of this document is for Slovakia to become a modern country by 2030 with an innovative and ecological industry benefiting from the digital knowledge and data economy, with an efficient public administration ensuring intelligent use of land and infrastructure, and with an information society whose citizens will reach their full potential and live a quality and safe life in the digital age. The document defines the policy and specific priorities of Slovakia in the context of the ongoing digital transformation of the economy and society under the influence of innovative technologies and global megatrends of the digital age. The strategy places primary emphasis on current innovative technologies, such as Artificial Intelligence, the Internet of Things, 5G Technology, Big Data, and Analytical Data Processing, blockchain, and supercomputers, which will become a new engine of economic growth, strengthening Slovakia's competitiveness. This document is followed by the Action Plan for the Digital Transformation of Slovakia for 2019-2022. It covers all areas of the vision of Slovakia's digital transformation in the fields of the economy, society and education, public administration, territorial development, and research. Despite the existing institutional framework, there is still a shortage of information on SMEs adoption level and how they cope with the ongoing digitalization and digital transformation, especially under the COVID-19 situation.

There is no doubt that key skills in the field of entrepreneurship are influenced by digitalization. Digitalization transforms entrepreneurship in two ways. First, it is the emergence of new entrepreneurial opportunities in the economy. Secondly, it is about transforming business practices, the ways in which these opportunities are best realized. Digitalization has an impact on the radical change/innovation of business models in entrepreneurship (Autio, 2017). This change affects both entrepreneurs in the early stages of entrepreneurship (starting entrepreneurs) and existing small and medium-sized enterprises (established entrepreneurs). As far as starting entrepreneurs are concerned, the new entrepreneurial dynamics will affect both those who want to start a business (stand-up stage and that will affect their choice), those in the start-up stage (in search of a scalable business model) as well as those who are already in the growth phase and have already found a scalable business model. In established small and medium-sized companies, digitalization affects their business models as well as their overall management systems (Autio, 2017). As for the particular benefits related to digitalization of SMEs, the most frequent positive effects include improved financial performance (Eller et al., 2020; Nwankpa and Roumani, 2016; Rivza

et al., 2019), improved communication and outreach towards customers through digital channels (Rivza et al., 2019), and developed internationalization capabilities (Dethine et al., 2020; Herve et al., 2020),

The issue of digitalization concerning entrepreneurship is complex and requires the successful identification and implementation of non-traditional solutions. One such solution is the perspective of intergenerational entrepreneurship in times of digitalization. Intergenerational entrepreneurship is defined as sharing knowledge, skills, experience, and resources through partnerships and collaboration between different age generations (emphasizing seniors and youth) across all stages of the entrepreneurial process to achieve economic, social, and environmental objectives (Pilková et al., 2017). Although in the last two years intergenerational entrepreneurship has been increasingly mentioned as a new standard of business organization or a new form of setting up and financing of start-ups by entrepreneurs or consultants, neither entrepreneurial policies nor research has yet adequately taken into account and developed this phenomenon. Each generation has a unique set of skills and attitudes associated with it. Knowing how the generations behave in the process of digitalization and digital transformation in an entrepreneurial context shall lead to increased success and efficiency of these processes.

Therefore, the purpose of the study presented in this chapter is to examine the lived experiences of small business owner/managers from various generational groups and identify the key drivers of digital transformation in Slovakia emphasizing the intergenerational cooperation.

BACKGROUND

Digitalization means leveraging digital technology to replace former social (i.e. human interactions, relationships, norms) and/or technical (i.e. technology, tasks, routines) aspects of structures, e.g. products, services, user experiences, processes, etc. (Osmundsen et al., 2018). It is about the integration of digital technologies into everyday life (Osarenkhoe and Fjellstrom, 2021). In the entrepreneurship context, it refers to the everyday life of entrepreneurs and all activities and operations of a business enterprise. According to Osarenkhoe and Fjellstrom (2021), digitalization should not be perceived as an issue of technology, but as a way to better run a business and increase its competitiveness. Further, digital transformation can be simply and generally defined as "disruptive implications of digital technologies" (Nambisan et al., 2019). In the case of business enterprises, it refers to applying digitalization to enable major changes to the way how their business is conducted, leading to its significant transformation (Osmundsen et al., 2018). Accordingly, Vial (2019) conceptualizes digital transformation as a process in which digital technologies imply disruptions leading to strategic responses of organizations in terms of altering their value-creating paths and organizational structures and systems. Thus, in principle, digital transformation should represent a higher level of engagement of digital technologies and their higher strategic relevance for an enterprise. Besides this distinction following the key "buzzwords" in the field, several authors developed their own perspectives of digital technology adoption levels in business organizations. For example, Garzoni et al. (2020) proposed and empirically validated the four-level engagement model classifying different stages of adoption, namely digital awareness, digital enquirement, digital collaboration, and digital transformation. In addition, such hierarchical distinctions between the terms are in line with the concept of various so-called digital maturity models that can be found in different contexts (including business organizations) among researchers (e.g., Carolis et al., 2017; Williams et al., 2019) as well as practitioners (e.g., Deloitte, 2018). In the context of SMEs, according to a systematic literature review undertaken by Williams et al. (2019), the digital maturity models are typically used as

roadmaps explaining the path towards digital transformation, its stages, and related capabilities. Yet, as the authors argue, the factors behind successful digital transformation are often overlooked when digital maturity models are developed (Williams et al., 2019).

Digitalization and/or digital transformation of an enterprise is operationalized with a business-centric (rather than technology-centric) perspective, as with the entrepreneurial lens, the main emphasis is put on products, processes, and other organizational aspects (Matt et al., 2015). While the digital transformation of an enterprise is clearly a firm-level event, it always takes place in a broader context. In most cases, it is driven by both internal and external factors, including facilitation by multiple external environment subjects. These factors might act as fostering factors as well as impediments. Various systematizations and overviews of digital transformation drivers have been provided by several authors and organizations, indicating major similarities together with certain nuances, depending on the specific perspective adopted. Generally, such works can be found among academic research, policy initiatives as well as practitioner and business sector bodies, which reflect the newness and relevance of this phenomenon, and a broad array of attempts to bring more insights and understanding.

As for the particular works, for example, OECD, in the concept note on its Digital for SMEs Global Initiative (OECD, 2019) identifies three key areas of relevance for SME digitalization. Namely, these are enabling framework conditions (that include infrastructure, regulatory environment, and market conditions), firm-level triggers (especially innovation assets, finance, and skills and digital awareness), and transformations in supply chains and business models driven by digital technologies (such as digital platforms, cloud computing, Big Data, A.I., blockchain, FinTech trends, or IoT). Another perspective is provided in a research-based public policy paper developed by Vodafone together with Deloitte (Vodafone, 2020) that yields three main dimensions of challenges that SMEs need to face in digitalizing. These are the availability of the required digital tools and technologies (where the following key categories of technologies have been identified: connectivity, process digitalization and automation, cloud, and online presence, collaboration, and communication), the capacity of SMEs to engage with digital transformations (especially in terms of time and financial capacity), and capability of SMEs to undertake their digital transformations through digital skills. Further, Osmundsen et al. (2018) in their systematic literature review of empirical research focused on digital transformation identified four main drivers (in case of their work, these were considered as external triggers) of digital transformation: changes in behavior and expectations of customers, industry changes and trends related to digital technologies, changing situation in competition (in terms of new challenges, expanding range of various competitors, and competitors' digital advances), and changes in regulations. Finally, another systematic literature review (Morakanyane, 2017) yielded the following list of drivers that affect and enable the digital transformation: digital technologies, digital capabilities, strategies, business models, and value chain.

The phenomenon of digital transformation gains another dimension when perceived through the lens of intergenerational entrepreneurship that refers to sharing knowledge, skills, experience, and resources through partnerships and collaboration between different age generations (emphasizing seniors and youth) (Pilková et al., 2017). Different generations are, in general, defined by different systems of thinking, values, and behavioral patterns (Strauss and Howe, 1991), as well as diverse work-related attributes. For example, senior individuals are usually considered as qualified and experienced in their professional field, and possessing higher social capital and larger networks, while youth are generally expected to possess higher skills (especially related to ICT and foreign languages) and cognitive abilities, and to be more innovative, creative, enterprising, and motivated (Pilkova et al., 2020). Yet, at the same time, an increased emphasis has been recently put on understanding entrepreneurship among older individuals and

seniors while breaking the traditional stereotypes on ideal entrepreneurs (Ratten, 2018). Nevertheless, as a considerable part of digital transformation drivers is determined by internal attributes of business enterprises, those enterprises with an intergenerational setting are in a different position compared to their counterparts without an intergeneration element. Coexistence and cooperation of different generations might imply various positive as well as limiting specifics. For example, a digital divide between older and younger generations impacts not only the adoption of digital technologies but also might become a source of intergenerational conflicts. At the same time, however, the intergenerational context might also help to bridge this divide through intergenerational learning and empowerment, which seem to generate positive outcomes (Breck et al., 2018). Also, as the human factor related to digital transformation also includes the end customers who might face difficulties when trying to use new sophisticated products (Sestakova, 2019), the intergenerational nature of a firm might improve its empathy towards the older generation customers and a firm's response to their needs.

Overall, the phenomenon of digital transformation of enterprises in the intergenerational context is rather under-researched. We came across only a few studies with such a focus. For example, Ano and Bent (2021) explored digital transformation strategy drivers in multigenerational family firms in France, with a special focus on firms' human capital. They found that implementing a successful digital strategy with an intergenerational synergy is driven by a long-term orientation, attachment to the firm, intergenerational entrepreneurial legacy, personal involvement of family members, and family business's key focus on employees. Then, the study by Liu (2021) on family firms' response to digital trends indicates that family firms that have undergone successful intergenerational succession tend to emphasize digitalization visions more frequently.

Based on the digital transformation drivers identified in the literature, and based on the specifics of intergenerational context and cooperation in entrepreneurship, the authors have hypothesized the framework of the most relevant drivers of digital transformation in the context of intergenerational entrepreneurship (Table 1). The following parts of this chapter will further contribute by empirically examining this question in the context of small and medium-sized businesses in Slovakia.

Table 1. Digital transformation drivers in the context of intergenerational entrepreneurship – a summary of the literature review

Category	Mechanism	Drivers
Internal drivers	Intergenerational character directly affects the respective attributes within a business enterprise (direct effect)	• Digital skills and capabilities (Morakanyane, 2017; OECD, 2019; Vodafone, 2020) • Digital awareness (OECD, 2019) • Innovation assets (OECD, 2019)
External drivers	Intergenerational character might leverage or reduce a business enterprise's ability to respond to the respective attributes (indirect effect)	• Digital infrastructure (OECD, 2019; Vodafone, 2020 • Regulations (OECD, 2019; Osmundsen et al., 2018) • Market conditions and competition (OECD, 2019; Osmundsen et al., 2018; Verhoef et al., 2021) • Consumer behavior and expectations (Osmundsen et al., 2018; Verhoef et al., 2021) • Digital technologies (Morakanyane, 2017; OECD, 2019; Verhoef et al., 2021; Vodafone, 2020) • Digital shifts in the industry (Osmundsen et al., 2018)

Source: elaboration by the authors.

Next to the digital transformation drivers, another direction that attracts researchers', as well as practitioners' attention are the practices of successful digital transformation. In their systematic literature review, Osmundsen et al. (2018) propose the following set of factors that are required to successfully accomplish the digital transformation of an enterprise: a supportive and agile organizational culture, well-managed transformation activities (in terms of both internal processes and infrastructure, as well as setting up the digital channels and adopting multichannel strategies to reach out to end-users), ability to leverage external and internal knowledge, engaging managers and employees in digital transformation processes, information systems capability (related to infrastructure, business applications and proactive attitudes), development of dynamic capabilities, and development of a digital business strategy together with alignment between business and information systems perspectives. Further, based on their study, Bollweg et al. (2019) emphasize that earlier experience with using digital tools in certain agendas (e.g., administration, marketing) might trigger further digital development of a firm.

MAIN FOCUS OF THE CHAPTER

The research presented in this chapter is of a qualitative nature, executed through a phenomenological study (Shank, 2006). It aimed to carry out an in-depth analysis to examine the lived experiences of small business owner/managers from various generational groups and identify the key drivers and experiences with digitalization in Slovakia emphasizing the intergenerational cooperation. Qualitative research focused on two broader issues that reflect the set research questions. To answer them, the phenomenological study was conducted involving 12 respondents, Slovak SME owner/managers, who participated in in-depth semi-structured interviews (each lasting approx. 1 hour) with the aim to obtain information based on respondents´ experience or circumstances. All interviews followed a uniform methodology to ensure consistency of approach. The interviews took place from December 2020 to March 2021 both on-site and online. The data collection and analysis followed an inductive approach as suggested by Gioia et al. (2013). First, the authors articulated a phenomenon of interest. Then, the existing literature was initially studied, and a questionnaire was designed. The authors paid special attention to data collection and followed all recommendations for conducting qualitative research (Hsieh a Shannon, 2005). The authors withheld biases and judgement about conclusions to enable them discovering new insights. Respondents were treated as knowledgeable agents while interviewers guided the interviews and adjusted the protocol based on informants' responses with the focus on the studied research questions. As these were semi-structured interviews, it was highly desirable to react to respondents' answers and ask sub-questions in addition to the predefined questions contained in the interview scenario. However, these sub-questions had to be fully in line with the basic research questions, asked in order for the respondent to focus on the subject of the research. The terminology of informants was used by interviewers in an attempt to not mislead the informants and likewise, the questionnaire was adjusted. After the data collection phase in which 12 interviews were obtained and recorded, the authors underwent the data analysis. They performed the initial data coding using MAXQDA software, a tool for qualitative data analysis. The coding was performed by five researchers independently of each other and in the case of differences, the differences were reassessed to unify the coding methodology. The codes were derived directly from the recordings, allowing the categories to be created directly from the qualitative data collected. The comprehensive list of 1st order terms was developed which were further organized into 2nd order themes (categories) based on identifying similarities and differences giving birth to nascent

concepts. Assembled terms, themes, and dimensions were organized into a data structure. Afterward, the results and findings were analysed in the context of existing literature, and emergent concepts and relationships were discussed. The results represent our analytical conclusions derived from respondents' views on various issues related to digitalization/digital transformation in the context of intergenerational cooperation and entrepreneurship.

Issues, Controversies, and Problems

The main objective of this research is to examine the lived experiences of small business owner/managers from various generational groups and identify the key drivers of digital transformation in Slovakia emphasizing the intergenerational cooperation. To achieve this objective, the authors have studied the following research questions:

a) What are the current state and impact of digitalization/digital transformation on SMEs and what is the role of generations in this process?
b) What are the experiences of owners/managers with the participation of particular age groups of employees in the process of digitalization/digital transformation, and what procedures or practices help in this process?

To minimize limitations of the phenomenological semi-structured interviews the authors made sure that the sample of respondents was diverse (Barbour, 2001). Respondents belonged to different age generations, had various demographic characteristics, and the character of their businesses varied as well, as shown in Table 2.

The acquired data were analysed with the lens of the defined research questions. Figure 1 presents the data structure which forms the basis of our results and was divided into four aggregate dimensions and other subsequent second-order themes.

SOLUTIONS AND RECOMMENDATIONS

The analysis of the obtained qualitative data resulted in a relatively extensive set of findings, which are accompanied by graphical processing of the main results in the form of mind maps to improve clarity. Bellow, we discuss the second-order themes separately.

Digitalization Status

According to the first research question, the respondents declared that digitalization and digital transformation are part of their business to a lesser or greater extent. Further, the interviews suggest that SMEs organizational units do not necessarily have to belong to only one regime but can separately operate in different regimes. Based on that, the authors investigated the current status of digitalization and digital transformation among interviewed SME owners/managers. The results have shown three different regimes the entrepreneurs´ exhibit. These regimes are shown in figure 2.

Table 2. Data sample information

Case	Position	Business focus	Age group	Industry	Size (empl.)	Revenues (annual)	Year of est.	Region
1	Owner – mng.	Finance, production	56 - 65	Clothing	50 - 249	up to 2 mil.	1992	Žilina region
2	Owner – mng.	Multi-focus	26 - 35	Real estate, plumbing, heating, gas supplies	10 - 49	up to 2 mil.	2017	Nitra region
3	Owner – mng.	Marketing, customers	26 - 35	Construction	0 - 9	up to 2 mil.	1990	Žilina region
4	Owner – mng.	Multi-focus	65+	Stonemasonry	10 - 49	up to 2 mil.	1990	Trnava region
5	Owner – mng.	Finance	65+	Financial markets and real estate	10 - 49	up to 10 mil.	2008	Bratislava region
6	Owner – mng.	Strategic planning, expansion	26 - 35	Business consulting, accounting services	10 - 49	up to 2 mil.	2010	Nitra region
7	Mng.	Marketing, business development	26 - 35	Polygraphy production, printer	50 - 249	up to 10 mil.	1991	Bratislava region
8	Owner	Multi-focus	46 - 55	Hospitality	0 - 9	up to 2 mil.	2015	Bratislava region
9	Owner	Multi-focus	26 - 35	Energy, electrical installations	0 - 9	up to 2 mil.	2006	Banská Bystrica region
10	Mng.	Accounting	36 - 45	Insurance intermediation	0 - 9	up to 2 mil.	2004	Bratislava region
11	Owner	Multi-focus	18 - 25	Food industry	0 - 9	up to 2 mil.	2016	Bratislava region
12	Owner	Production	36 - 45	Food industry	50 - 249	up to 10 mil.	1993	Bratislava region

Source: elaboration by the authors.

The SMEs in the first regime are characterized by ***basic use of digitalization*** without any ambitions for their own adjustments. The typical examples are the use of communication platforms, utilization of cloud services, using websites for promotional purposes, online training for employees, web applications, platforms provided by partners, and dedicated software and tools. It is apparent that SMEs in this regime have currently no ambitions to further develop or apply any advanced tools or systems.

All of our communication with our subsidiaries, as well as the tracking of investment stocks and analyses, is done via the Internet or software. Partners are constantly developing new platforms, so we have no choice but to adapt. (Respondent 2)

Doing business online would be difficult for us. We plan to redesign our website, so far we have not been pushed into it because the company is well known. We don't even do online advertising. People come to us with specific orders. Of course, a lot of people already know how to work with e-mail, so they don't have to come here in person. Based on the fact that we are a manufacturing company, we have to do things physically and we make custom orders, not on stock. (Respondent 3)

Figure 1. Data structure

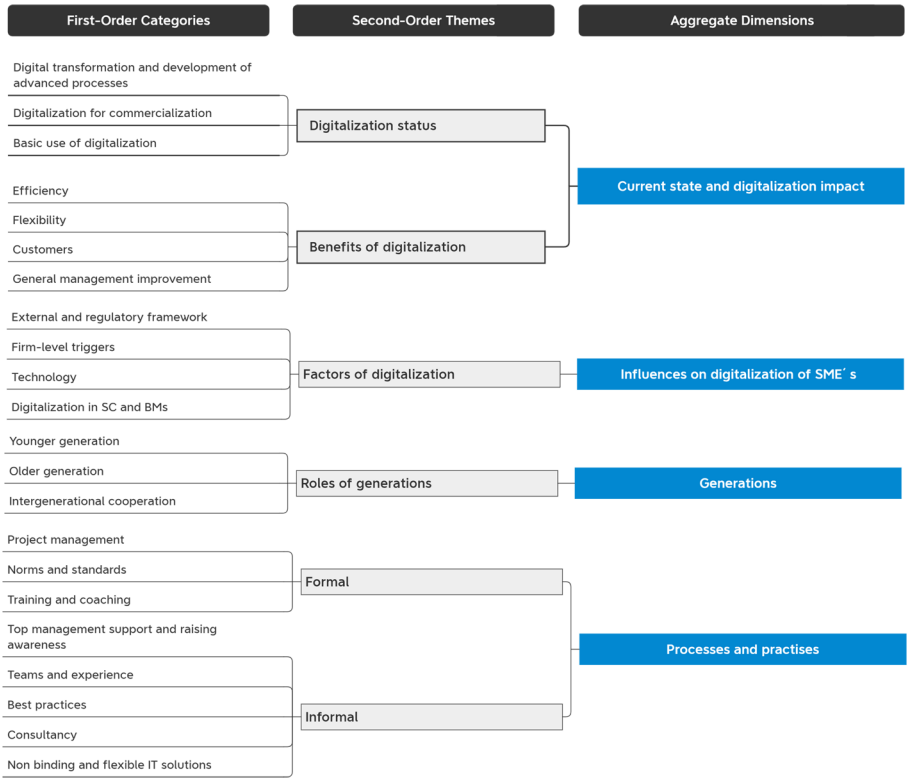
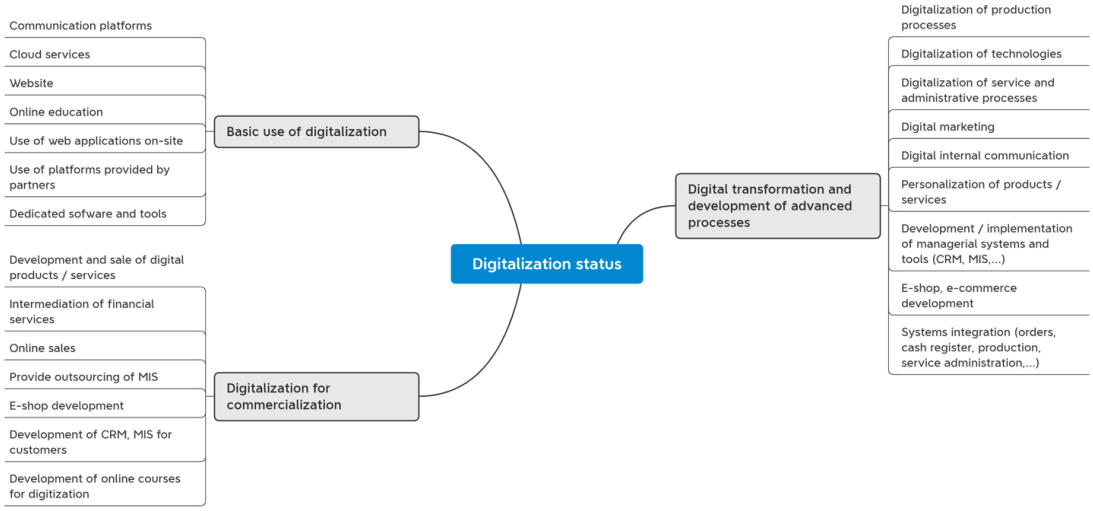


Figure 2. Digitalization status



I make the most use of available and free technologies such as Google Drive. I always have access to the data and it's a big help in development and real estate. Since our firm burnt down, I scan and back up all my documents. We only promote ourselves on the internet, we don't sell any digital products or services. I don't feel there is room for digitalization in the industries our companies are in. (Respondent 5)

We use scanners for revisions. It is especially advantageous for me because it makes my work much easier. (Respondent 9)

Another group consists of SMEs that use ***digitalization for commercialization purposes***. They are typical by developing and selling their own digital products or services, intermediation of financial services, heavily relying on online sales, providing outsourcing services, e-shop development, development of CRM and MIS or online courses. They typically perceive digitalization as means of generating revenue.

Due to the impact of the pandemic, we started making and promoting webinars as we could not provide our services in a conventional way. (Respondent 8)

We handle 95% of our retail customers online. For corporate clients, physical sales are also important. (Respondent 10)

We've been doing online for a long time, it's one of the key areas we've grown from. We are concentrating on having an online shop and we are also using social media marketing and Google adds. We are also developing a new product, online courses. It will be a digital-only product. (Respondent 11)

The last group of SMEs is undergoing ***digital transformation and develops advanced processes***. They are usually undergoing digital transformation through the digitalization of production processes. They are also in the process of digitalization of technologies, services and/or administrative processes. In addition to that, they implement various forms of digital marketing, digital internal communication, customize their products or services with the help of digital technologies. Moreover, they also develop, and/or implement various managerial systems and tools such as CRM, MIS, etc. The SMEs that develop their own e-shop or e-commerce and work on the integration of different systems like orders, cash register, production, service administration, and others, are included in this regime as well. The main difference of this regime compared to the other two is that these SMEs use advanced knowledge and technologies to significantly change and improve different areas of their company, which results in changes to their business models or value creation.

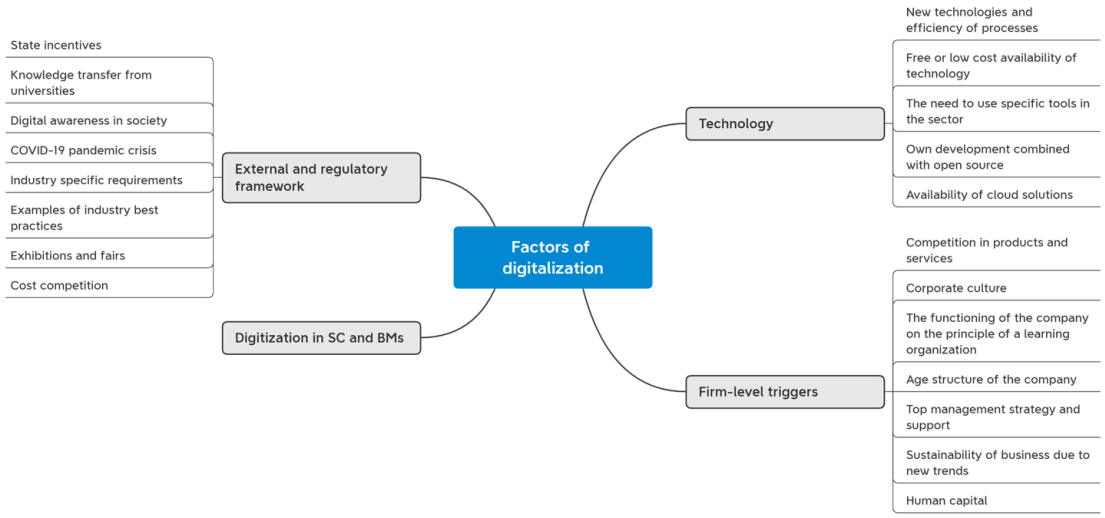
Production technology, machinery and equipment are important to us. For us, the key of digitalization lies in this aspect of the company. (Respondent 3)

Early last year my son came to work for us and started developing an e-shop, so we've got that up and running. Our main range of products is harder to sell online, but online sales have a future because people are comfortable, and no one has time. So, we're trying to adapt to that. We have also bought the technology that makes the strips and their slots, we've bought software, payroll software for example, but we've also created our own tools that calculate how much an employee produces, the time commitment of an order, production scheduling, remuneration, workplace capacity. (Respondent 6)

Factors of Digitalization

Factors of digitalization and digital transformation were frequently mentioned by the respondents and significantly influenced the current status of digitalization and related benefits within companies. Factors of digitalization serve as a catalyst of change inside companies and heavily influence the status of digitalization. Four categories of factors emerged from the interviews displayed in figure 3.

Figure 3. Factors of digitalization



The studied SMEs were not a homogeneous group (see table 2), and they were service- as well as production-oriented companies. However, all of them consider ***technology*** as the most important factor of digitalization. Typically, it is the availability and affordability of new technologies and related increased efficiency of processes that enforce SMEs to implement them. This is illustrated by the following quotes:

An important role was played by the fact that the technology has qualitatively reached a sufficient level and at the same time the price was acceptable, so this technology was also available for a Slovak company (Respondent 7)

The availability of technology is very important in the digitalization process because there are currently many solutions that are free or paid per user per month, so there is no need to pay that much at once (Respondent 1)

Also, the specific tools within certain sectors appeared to be an important factor as mentioned by respondent no. 10:

We intermediate insurance for insurance companies that have digital portals in place. We do not sell our own products but products of our partners and therefore we also have to use their websites, applications, etc.

Respondents likewise mentioned the availability of open sources combined with their own development and availability of cloud solutions as important factors of digitalization related to technology.

Digitalization and digital transformation of companies are further evoked by ***firm-level triggers***. Competition plays a crucial role that encourages the enhancement of products and services. Furthermore, the corporate culture and behavior of an organization as a learning entity can promote the uptake of innovative digital solutions. These processes are influenced by the age structures of companies´ employees that might have an impact on the digital "appetite" of companies. Top management strategy and support play a key role in companies´ digitalization / digital transformation, too. It is confirmed by numerous respondents that highlighted its key role in this process. However, it is also important to take into consideration companies´ specifics, as is demonstrated by the following quote:

The main goal of digitalization is to create sufficient control over the company, to minimize losses from theft, to speed up decision-making processes, many processes are being accelerated and simplified. (Respondent 12)

It has been found that the experience with identifying long-lasting trends is crucial for companies´ sustainability. Last but not least, respondents identified the significant role of human capital in the whole process of digitalization and digital transformation. Human capital is an important building block of each company and respondents mentioned two distinguished aspects. Firstly, they are individual characteristics such as personality traits, mindset, motivation, drive, interests, and the ability to absorb new knowledge that predetermine companies´ future prospects in adopting digitalization or digital transformation. Secondly, they are concrete digital knowledge and competencies that companies' employees have at their disposal. This aspect predetermines to what extent and how easily digitalization would be implemented in a company.

These are people who have not been trained to work with information technology, so the human factor is a problem in the introduction and implementation of digitalization. (Respondent 12)

The external and regulatory framework appears to be another important factor of digitalization and digital transformation according to the respondents. Government initiatives and incentives might be a catalyst of changes related to digitalization as stated by our respondents:

What pushed us further was the introduction of e-cashier, which was expensive and hectic, but by having to do it we thought of a solution that increased our control over the company. (Respondent 12)

By law, we have to archive contracts even after they are terminated for 10 years, so we have been forced to digitalize so that we can at least search the archive. (Respondent 10)

Another source of ideas can also come from academia – university graduates who are entering companies, collaboration, and cooperation with universities, available latest information obtained via

conferences, seminars, workshops, etc. Various actors should take an action to raise digital awareness in society that has a positive impact on general digital uptake and hence influence companies´ behavior as well. However, also recent pandemic situation pushed companies further as they were forced to implement tools to be able to work remotely.

The times and especially the situation this year have forced us to go digital. Before, I couldn't imagine working online, even though I had already noticed this trend earlier. (Respondent 8)

Specifics of industries and their requirements are important drivers of digitalization according to our respondents.

Insurers have gone digital gradually, enabled by the law to make contracts remotely. (Respondent 10)

Examples of industry best practices, exhibitions and fairs served also as an inspiration for digitalization in our interviews.

Examples of good practice are inspiring and can be built on. (Respondent 4)

Every year we attend trade fairs and exhibitions and there we gather new information on what to speed up and improve. (Respondent 6)

Among external factors of digitalization cost competition is a strong force that pushes SMEs into finding efficient solutions to be competitive.

We wanted to optimize processes, simplify, speed up, and get rid of paper as much as possible. What's driving us towards digital at the moment is to be able to get to our stuff from everywhere and then to be able to do as many things as possible from phones. The important thing is to make it financially interesting for us, make things faster, simpler, etc. Insurance companies are bigger companies, and they are moving forward in digitalization because they have to in order to be competitive. (Respondent 10)

Another broader category of factors is ***the digitalization of supply chains and business models*** that includes the digitalization of customers, suppliers, partners, and other aspects related to business models.

Partners are constantly developing new platforms, so we have no choice but to adapt to keep up with them. (Respondent 2)

We felt the need to go digital to make the exchange of information more accurate and faster. Before, information was lost or distorted, and chaos ensued. (Respondent 4)

At the moment, it's making sure that clients have as much information available to them as possible. (Respondent 10)

Benefits of Digitalization

The interviews suggest that the benefits of digitalization and digital transformation are manifold but mainly revolve around four key areas captured in figure 4. The first area and perhaps the most frequently cited one is ***efficiency***. Efficiency typically relates to cutting costs in various ways, process improvements beyond cost-cutting resulting in improved quality, design, speed, environmental benefits, protection at work, etc., and growth of value-added which creates space for higher margin.

We had a system in place to operate, but a lot of things seemed laborious, so I introduced various elements of digitalization. (Respondent 9)

In direct proportion to sales, costs are rising, so we have tried to look for room for profit. Digitalization helps us by freeing up experts to focus on the things that add the most value. (Respondent 1)

New digital technologies mean that we don't have to stay here until nine o'clock in the evening. (Respondent 3)

Digital advertising is much cheaper and more targeted than conventional forms of advertising. (Respondent 4)

Digitalization has an impact on internal costs and efficiency, we don't have to read, record and process orders. The client does this work for us. (Respondent 7)

Before the crisis the company had 120 employees, today we have 60 and although the sales are a bit lower, but we make more added value. (Respondent 7)

Another key area of digitalization benefits revolves around ***customers***, which typically includes a better understanding of customer preferences through the collection of big data, use of data analysis, immediate feedback, and easier and faster access to a large amount of information. A better understanding of customer preferences but also the easy ways to communicate what customers really want, lead to higher customization of companies' products and services.

We make contact with customers while we didn't know about each other before. (Respondent 4)

Based on the use of analytics tools on the website, I know what our customers are most interested in. (Respondent 9)

The online form of selling allows the customer to customize the product according to their preferences, i.e. if they don't like something, for example. (Respondent 11)

The third key area of benefits relates to ***flexibility***, which is manifested in wider use of remote working, the ease, and versatility of marketing, and easier acquisition or involvement of customers as well as different stakeholders.

All of us who make decisions have all the information at our disposal, and that works very well for us. (Respondent 2)

We are digitalizing everything we can, especially processes, recording everything online and then to work with the data in the processes. Design, pricing, building models - everything is done digitally. We can do all the construction preparation digitally. (Respondent 4)

After the fire we lost everything, yet we still had 30 employees. You buy a couple of computers, set up a workstation for people, bring in wireless internet, and you're moving on very quickly. (Respondent 5)

The fact that things can be done remotely is a big plus and some clients prefer it. The pandemic has made it difficult for us to operate, but thanks to digitalization we have not felt any negative effects, quite the opposite. (Respondent 10)

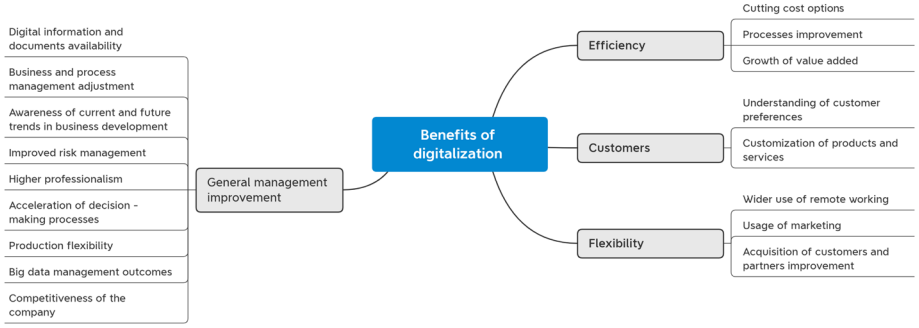
We track reports from every sale, from every campaign, so we collect data and evaluate it. It's essential to be in the spotlight so you can target your target customer group, track trends. (Respondent 11)

The broadest key area of digitalization benefits concerns ***general management improvements*** such as higher availability of information and documents, adjustments to management of the business itself as well as related processes, better awareness of current and future trends in business development, improved risk management, professionalism, acceleration of decision-making processes, and higher production flexibility. It is also possible to improve different aspects of a company based on big data analysis. Digitalization and digital transformation hence improve the general competitiveness of the company.

We use several systems to share information about competencies, orders, supply or marketing, which helps us to grow steadily and, most importantly, to make sure that everyone has the information they need. When we were few, we could tell each other, now it is based on digital tools. (Respondent 11)

If we put € 20,000 into digitalization, we will surely get it back in half a year. Stock management is very important in our company. (Respondent 12)

Figure 4. Benefits of digitalization



Roles of Generations

Roles of generations have been studied as one of the main focuses of this chapter from three perspectives (Figure 5). ***The younger generation*** typically exhibits good ICT competencies and the ability to absorb new knowledge quickly. They are also more initiative, often take leader´s role, have higher drive and motivation for digitalization. It is clear that technological advancement is very rapid and hence it is very demanding to catch up with it even for a younger generation. Knowledge of foreign languages is crucial in this process. Due to that, children in family businesses have an irreplaceable role in bringing new stimuli and ideas for digitalization.

Already a 30-year-old colleague is having a hard time keeping up with a 25 year-old one in the technology field. And this isn't even an intergenerational difference. (Respondent 1)

I have to say that for me the impulse was to work with younger colleagues who came up with different trends and ideas on how to make our company visible, what to implement and what to get involved in. Of course, I try to support them in this so that they can develop themselves, but there is a lot of initiative and motivation on their part. (Respondent 11)

On the other hand, ***the older generation*** has their own role and contribution in the process of digitalization. They are able to think in a broader context taking into consideration their lifelong professional and managerial experience. This was frequently mentioned by the respondents.

The experience of the older generation is also important, my father whom I work with doesn't know what data we need to process or how to do it technically, but he can suggest what it should do and what the output should be. The importance of the older generation is their experience, for example, my father has 30 years of experience and can tell what the long-term trends are and what is some kind of bubble. He can also apply his practical experience to things we are thinking about or when we want to improve something. (Respondent 4)

In the digitalization of companies, success also requires that the older generation pass their professional and managerial experience and knowledge to the younger generation, but also delegate competencies to them.

The older generation needs to understand that these changes need to be made and it's the thing that moves the company forward. They need to give the younger people a free hand to go digital. (Respondent 12)

The management should give a free hand to the younger generations, which means that they should also free up resources, not only financial but also in terms of time. (Respondent 1)

However, it is not enough to just delegate competencies and pass knowledge and experience, but also older generation must show some level of flexibility. Even though they are rarely leaders of digitalization in their respective companies, they have to make an effort to at least understand and accept digitalization as an inevitable trend for the current and future success of the company.

I talked to my staff a lot about digitalization when I was just tendering for a contractor, so they saw that it would add their work, but they could not imagine benefits that I explained to them well enough. For some reason, it was the younger staff who couldn't see it. My father, the owner of the company, as he studied and learned about the technology, understood benefits almost immediately. (Respondent 5)

Becoming visible in the online space is also a question of values. It's the values closer to younger people that older colleagues may see as awkward or superficial. (Respondent 11)

The third perspective that the roles of generations have been studied from, is ***intergenerational cooperation***. From this perspective, the most important aspects are competencies and experience, regardless of age and generation, as illustrated in the following quote:

As far as our business is concerned, I don't follow the age structure, I'm interested in whether a person is efficient or not and whether they have the skills they need. (Respondent 2)

Equally important is the intergenerational transfer of knowledge and experience.

Surely it should work the way that the younger generation takes experience or practical knowledge from the older generation. The priority is for the younger generation to understand the business and what the key areas to take care of are. (Respondent 4)

Father old guard, son young wind. The cooperation worked, the father did not reject new ideas. (Respondent 5)

Furthermore, our respondents suggested that various generations have complementary skill sets inevitable for successful digitalization within companies.

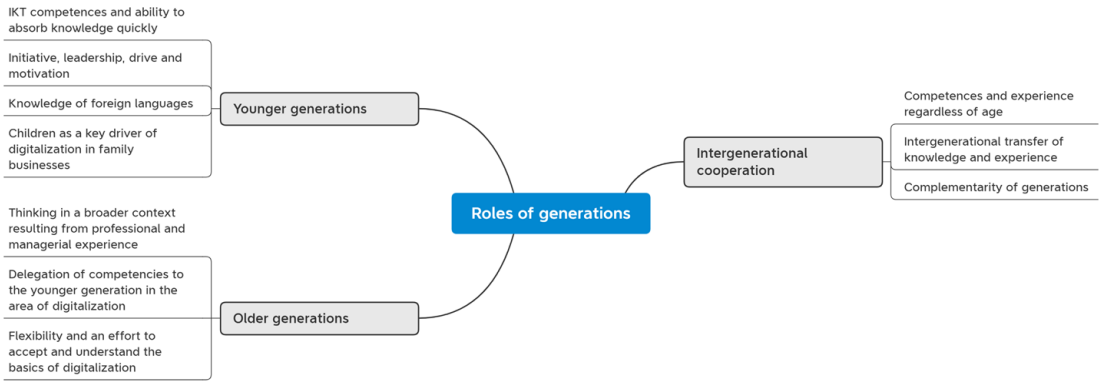
Generations should be helpful to each other. It's not only one-sided, I think. The younger generation is helpful in the implementation phase but the older generation has a role in the preparation phase. Without the older generation, that first phase might not have gone in the right direction. The comments of the older staff have helped the process to be successful. If I had chosen and managed the whole thing myself, it might not have turned out as well as it did. (Respondent 5)

In some ways, the older ones help, in some ways the younger ones help, but it's more about who is more experienced. (Respondent 7)

Processes and Practices

Following the roles of generations, the research focused on processes and practices that emerged from respondents´ experiences. They could be broadly categorized into two groups. Firstly, ***formal processes and practices*** are defined by internal or external institutions. Three key areas were identified which are inevitable for the successful digital transformation. Among them the project management, as noted by the respondents:

Figure 5. Roles of generations



When implementing digitalization, it is important to have knowledge of project management and also to give competence to the person who is responsible for it. (Respondent 7)

The implementation process is divided into three parts. The first is to invent it and find a supplier, then the application, so you need to train people and the last phase is to have constant support so when there is a problem it can be fixed. (Respondent 12)

In the process of digitalization and digital transformation also knowing norms and standards can be helpful.

ISO standards, for example, provide methodologies for dealing with a company's internal processes or internal management. (Respondent 4)

However, the respondents identified also training and coaching as an important area of formal processes and practices.

We have prepared the entire digitalization process with the age structure of our employees in mind. The most important thing was to explain it to people in the longer term, it took about a year, explaining to people what was ahead of them, what would be required, but also what it would bring them afterward because realistically the production employees also had some benefits from it. So, to bring some calm to their stressful situation, that what is coming will not be bad but should be better afterward. Alongside that, also getting to grips with the technical side of it. But the stumbling block is not in the technology but those people and that's where you need to focus, you need to be a psychologist and couch them in the long-term. (Respondent 5)

Secondly, ***informal processes and practices*** are equally important in the process of digital transformation. The emergent topics were top management support and raising awareness that was pointed out as crucial in this process, forming structurally well-balanced teams with previous knowledge with digitalization or at least good cooperation experience. Following best practices are on one hand sources

of inspiration, motivation but also instructions of how to efficiently run the process of digitalization and digital transformation and what to avoid in the process.

Examples of good practice are inspiring and can be built upon. (Respondent 4)

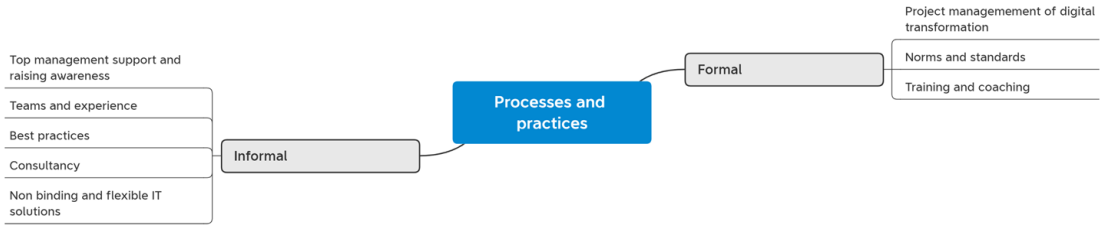
Even though explaining the importance of digitalization and overall internal company support and raising awareness in long term was mentioned frequently by the respondents, companies often appreciate external help as likewise stressed and can be seen in the following:

It has worked well to use the services of consultants, which are people who have high EQ and help get a new idea into the team and implement it. (Respondent 1)

A popular opinion was also to not implement robust binding and hence nonflexible digital solutions for companies to proceed incrementally and not go through big disruptions in a short period of time.

It is important choosing solutions that do not force us into anything. Choosing solutions that we turn on today and turn off tomorrow when they don't work. To pay as much as it is used. The best practice for digitalization is to start from scratch. It's easier to digitalize from scratch because transformation is hard. If this is not possible, a step-by-step approach should be applied. (Respondent 1)

Figure 6. Processes and practices

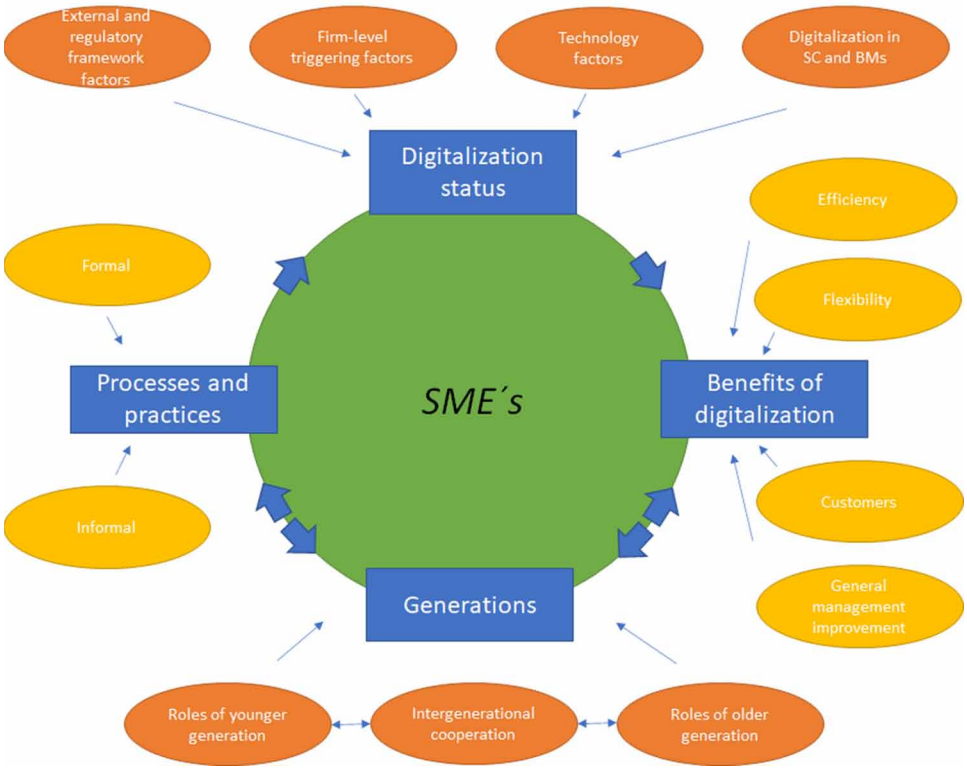


Comprehensive Model Of SME´S Digitalization and Digital Transformation with an Intergenerational Element

The respondents' lived experience was used by the researchers as the basis to create a comprehensive model of SME´s digitalization and digital transformation with an intergenerational element. This model consists of four major components. The starting point for the identification of digitalization and/or digital transformation drivers is the mapping of the current status of SMEs digitalization. The current status of digitalization is interconnected with benefits obtained from digitalization which is further influenced by generations and their cooperation. This component is interconnected with processes and practices whose impact is reflected in digitalization status. Four main groups of drivers that significantly influence the digitalization status are external and regulatory framework, firm-level triggers, technology, and digitalization of supply chains and business models. The digitalization status influences benefits

gained from digitalization. These benefits are related to efficiency, flexibility, customers, and general management improvement. In the process of gaining benefits from digitalization, inevitable and crucial roles are played by the generations and their cooperation. Each generation has its own role in the digitalization and digital transformation process, and the intergenerational cooperation is inevitable to properly realize these roles. For good intergenerational cooperation, both formal and informal processes and practices should be applied that subsequently influence the previous digitalization status. Hence, the process of digitalization/ digital transformation is complete but does not finish and repeat itself for SMEs to progress. The process is indicated in Figure 6.

Figure 7. Comprehensive model of SMEs´ digitalization and digital transformation with an intergenerational element



The results of the presented research are aligned to the previous literature on SME digitalization and/ or digital transformation, and at the same time, they significantly add to the existing body of knowledge by addressing the gaps related understanding digitalization and digital transformation in the intergenerational context. The results of the presented analysis confirmed the existence of different levels or regimes of digitalization, which is well in line with the digital maturity (Carolis et al., 2017; Williams et al., 2019). In addition to mapping the maturity stages, however, the presented research is in line with the argument of Williams et al. (2019) who underline that in such models, factors behind successful digital transformation are often overlooked. This is not the case of the presented research, as it addressed the issue comprehensively. Next, the main digitalization and digital transformation drivers identified by

the authors were also underlined in the previous works. The external and regulatory framework items cited by our respondents included especially the regulations (OECD, 2019; Osmundsen et al., 2018) and market conditions and competition (OECD, 2019; Osmundsen et al., 2018; Verhoef et al., 2021). Next, technology has been equivocally emphasized as a key driver, as previously emphasized by many (Morakanyane, 2017; OECD, 2019; Verhoef et al., 2021; Vodafone, 2020). Further, SMEs included in the study stressed the effect of digitalization of supply chains and business models, i.e. the digital shifts in the industry (Osmundsen et al., 2018) on their digitalization. As for the firm-level triggers, the presented research underlines the key role of the coexistence of digital awareness (OECD, 2019) and digital skills (Morakanyane, 2017; OECD, 2019; Vodafone, 2020).

The presented research explicitly contributes to the emerging body of knowledge by mapping the benefits, roles of generations in the SME digitalization and digital transformation context, and understanding the processes and practices that help in its facilitation. As expected, the research provides evidence that the intergenerational nature of a firm helps to bridge the digital divide through intergenerational learning and empowerment (Breck et al., 2018). Also, alike Ano and Bent (2021), the results obtained emphasize the importance of human aspect, especially in terms of long-term orientation, attachment to the firm and personal involvement. Yet, the results go beyond what, to our best knowledge, has been researched so far, in terms of providing the overall and comprehensive model of SMEs´ digitalization and digital transformation with an intergenerational element.

Research results are addressed to policymakers, academicians, and practitioners. As far as policymakers are concerned, results should help to raise their awareness about lived experiences of the Slovak SME´s owners/managers that are concrete, realistic and include a rarely investigated component – the roles of generations. Policymakers should:

a) differentiate their policies according to status of digitalization/digital transformation of SMEs,
b) reflect the key drivers in the key policy documents,
c) take the role of intergenerational cooperation seriously and reflect it in policies, too.

Academicians should build their research on these results and further investigate uncovered areas to contribute to the knowledge base on digitalization and digital transformation with the intergenerational component. Practitioners should learn from experiences of those who successfully run digitalization and digital transformation mainly from their experiences with intergenerational cooperation.

FUTURE RESEARCH DIRECTIONS

Our research has some limitations that are particularly related to the applied phenomenological study as one of the qualitative research methods. Firstly, the size of the sample (12 participants). However, according to our opinion, for the aim of the study it is sufficient, as a larger sample might mean repetition of the key phenomenon. Secondly, limitation is related to methodology of interviews and comparison of experiences of different participants. Some respondents can present a current experience and the others a long-term one. Thirdly, industries create significant differences among owners/managers' lived experiences. Triangulation, checking, and data validation served to gather as much as possible correct information.

This study offers a good starting point for further research that should be run as follows:

1. to continue with extensive research that may include additional themes (like gender, firm culture, etc.) by using quantitative methodology,
2. to study family and non-family business more in depth and compare intergenerational cooperation and digitalization separately between business owners and managers,
3. to further study industry specifics of digitalization from perspective of the intergenerational cooperation.

CONCLUSION

Digitalization is one of the key megatrends that nowadays significantly influence world´s economy. No doubt about its impact on the Slovak economy and its backbone - SMEs. Based on the phenomenological, semi-structured interviews among different generational cohorts of family and non-family business owners/managers the authors have identified four key elements that are important for identification of key drivers of SME´s digitalization and digital transformation in Slovakia. These are *status of the SMEs digitalization* that effects its *benefits*, which are also influenced by the roles of *generations* and vice versa. The role of generations is also related to *processes and the best practices* and of course they influence the status of the digitalization and digital transformation. These elements create the key building blocks of the comprehensive model of digitalization and digital transformation with the intergenerational element. This model serves as a tool to study, further and in-depth, the key drivers of the successful digitalization and digital transformation of the SMEs in Slovakia and, in further research, it can be used for international comparisons.

ACKNOWLEDGMENT

This work was supported by the Slovak Research and Development Agency under the Contract no. APVV-19-0581.

REFERENCES

Ano, B., & Bent, R. (2021). Human determinants influencing the digital transformation strategy of multigenerational family businesses: A multiple-case study of five French growth-oriented family firms. *Journal of Family Business Management*.

Autio, E. (2017). *Digitalisation, ecosystems, entrepreneurship and policy. Perspectives into topical issues in society and ways to support political decision making. Government's analysis, assessment and research activities*. Policy Brief 20/2017. Prime Minister's Office.

Bollweg, R. L., Siepermann, M., & Weber, P. (2020). Drivers and barriers of the digitalization of local owner operated retail outlets. *Journal of Small Business and Entrepreneurship*, *32*(2), 173–201. doi:10.1080/08276331.2019.1616256

Breck, B., Leedahl, S., & Dennis, C. (2018). Bridging the digital divide: Findings for older adults in an intergenerational cyber-seniors program. *Innovation in Aging*, *2*(suppl_1), 918–919. doi:10.1093/geroni/igy031.3417

Carolis, A., Macchi, M., Negri, E., & Terzi, S. (2017). A Maturity Model for Assessing the Digital Readiness of Manufacturing Companies. In *Proceedings of the IFIP International Conference on Advances in Production Management Systems (APMS)*. Springer. 10.1007/978-3-319-66923-6_2

Deloitte. (2018). *Digital Maturity Model. Achieving digital maturity to drive growth*. Deloitte.

Dethine, B., Enjolras, M., & Monticolo, D. (2020). Digitalization and SMEs' Export Management: Impacts on Resources and Capabilities. *Technology Innovation Management Review*, *10*(4), 18–34. doi:10.22215/timreview/1344

Eller, R., Alford, P., Kallmunzer, A., & Peters, M. (2020). Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization. *Journal of Business Research*, *112*, 119–127. doi:10.1016/j.jbusres.2020.03.004

European Union. (2019b). *EU policy framework on SMEs: state of play and challenges*. European Union.

Garzoni, A., De Turi, I., Secundo, G., & Del Vecchio, P. (2020). Fostering digital transformation of SMEs: A four levels approach. *Management Decision*, *58*(8), 543–1562. doi:10.1108/MD-07-2019-0939

Hervé, A., Schmitt, C., & Baldegger, R. (2020). Internationalization and Digitalization: Applying digital technologies to the internationalization process of small and medium-sized enterprises. *Technology Innovation Management Review*, *10*(7), 28–40. doi:10.22215/timreview/1373

Liu, Y. (2021). How Do Family Firms Respond Strategically to the Digital Transformation Trend? In *Academy of Management Annual Meeting Proceedings*. Academy of Management. 10.5465/AMBPP.2021.14879abstract

Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. doi:10.100712599-015-0401-5

Morakanyane, R., Grace, A. A., & O'Reilly, P. (2017). Conceptualizing Digital Transformation in Business Organizations: A Systematic Review of Literature. In *BLED 2017 Proceedings*. University of Maribor Press. doi:10.18690/978-961-286-043-1.30

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773. doi:10.1016/j.respol.2019.03.018

Nwankpa, J.K., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. In *ICIS 2016 Proceedings*. Association for Information Systems

OECD. (2019). *OECD Digital for SMEs Global Initiative. Concept Note*. OECD.

Osarenkhoe, A., & Fjellström, D. (2021). The Oxymoron of Digitalization: A Resource-Based Perspective. *Journal of Information Technology Research*, *14*(4), 1–17. doi:10.4018/JITR.20211001.oa1

Osmundsen, K., Iden, J., & Bygstad, B. (2018). Digital Transformation: Drivers, Success Factors, and Implications. In *MCIS 2018 Proceedings*. Association for Information Systems.

Pilková, A., Holienka, M., Rehák, J., Kovačičová, Z., Komorník, J., Mitková, Ľ., Mikuš, J., Letovanec, M., Smoroňová, T., & Kliáček, P. (2017). *Inkluzivita podnikania na Slovensku: stav a vývojové tendencie* [Inclusive entrepreneurship in Slovakia: state and development trends]. Univerzita Komenského v Bratislave.

Rivza, B., Kruzmetra, M., Gudele, I., & Foris, D. (2019). Digitalization as an essential growth factor contributing in SME development (experience of Latvia and Romania). *Agronomy Research (Tartu)*, *17*, 261–270.

SBA. (2020). Vznik a zánik MSP na Slovensku v roku 2019 [Formation and discontinuation of SMEs in Slovakia in 2019]. Bratislava 2020.

Šestáková, M. (2019). The Human Factor in Industry 4.0 and Some of Its Intergenerational Implications. *Proceedings of the 4th International Workshop on Knowledge Management 2019*.

Shank, G. (2006). *Qualitative Research: A Personal Skills Approach* (2nd ed.). Pearson.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. doi:10.1016/j.jsis.2019.01.003

Vodafone. (2020). *SME Digitalisation - charting a course towards resilience and recovery.* Vodafone Public Policy Paper. Vodafone.

Vysoká škola manažmentu v Trenčíne. Ministry of Investments, Regional Development and Informatization of the Slovak Republic. (2019). *Digital transformation strategy of Slovakia 2030.* Author.

Williams, C. H., Schallmo, D., Lang, K., & Boardman, L. (2019). Digital Maturity Modelsfor Small and Medium-sized Enterprises: A Systematic Literature Review. In *Proceedings of the ISPIM Innovation Conference–Celebrating Innovation: 500 Years Since daVinci*. ISPIM.

ADDITIONAL READING

Bollweg, R. L., Siepermann, M., & Weber, P. (2020). Drivers and barriers of the digitalization of local owner operated retail outlets. *Journal of Small Business and Entrepreneurship*, *32*(2), 173–201. doi:10.1080/08276331.2019.1616256

Deloitte. (2018). *Digital Maturity Model. Achieving digital maturity to drive growth*. Deloitte.

Garzoni, A., De Turi, I., Secundo, G., & Del Vecchio, P. (2020). Fostering digital transformation of SMEs: A four levels approach. *Management Decision*, *58*(8), 543–1562. doi:10.1108/MD-07-2019-0939

Morakanyane, R., Grace, A. A., & O'Reilly, P. (2017). Conceptualizing Digital Transformation in Business Organizations: A Systematic Review of Literature. In *BLED 2017 Proceedings*. University of Maribor Press. doi:10.18690/978-961-286-043-1.30

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773. doi:10.1016/j.respol.2019.03.018

Osarenkhoe, A., & Fjellström, D. (2021). The Oxymoron of Digitalization: A Resource-Based Perspective. *Journal of Information Technology Research*, *14*(4), 1–17. doi:10.4018/JITR.20211001.oa1

Osmundsen, K., Iden, J., & Bygstad, B. (2018). Digital Transformation: Drivers, Success Factors, and Implications. In *MCIS 2018 Proceedings*. Association for Information Systems.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. doi:10.1016/j.jsis.2019.01.003

Williams, C. H., Schallmo, D., Lang, K., & Boardman, L. (2019). Digital Maturity Modelsfor Small and Medium-sized Enterprises: A Systematic Literature Review. In *Proceedings of the ISPIM Innovation Conference–Celebrating Innovation: 500 Years Since daVinci*. ISPIM.

KEY TERMS AND DEFINITIONS

Digital Capabilities (in Case of a Business Enterprise): Digital technology skills possessed by the people within a business enterprise that enable the enterprise to undertake digitalization and/or digital transformation and to remain operable in a digital environment.

Digital Transformation: Engagement of digital technologies leading to strategic disruptions of organizations in terms of increasing their strategic relevance and altering the ways how an organization generates value, and/or its organization structure and systems.

Digitalization (in Case of a Business Enterprise): Integration of digital technologies into everyday life, activities and operations of an enterprise. Replacing former social and/or technical aspects of products, services, user experiences, processes, etc.

Intergenerational Entrepreneurship: Sharing knowledge, skills, experience and resources through partnerships and collaboration between different age generations (emphasizing seniors and youth) in starting and running a business enterprise.

Owner-Manager: A person who owns (entire or a part of) a business enterprise and at the same time is actively engaged in its business management.

Small and Medium Sized Businesses: A business entity with less than 250 employees and less than 50 mil. EUR in annual turnover or balance sheet total of 43 mil. EUR (according to the size classification of the European Union). Typically, it does not reach the stage where ownership and management are separated.

Chapter 18
An Ecosystem Governance Lens for Public Sector Digital Transformation:
A New Zealand Case Study

Hamish Simmonds
https://orcid.org/0000-0002-1119-7465
Deloitte, Australia & Research School of Management, Australian National University, Australia

ABSTRACT

The world's public sectors continue to introduce and struggle with digital transformation programs, responding to new demands and requirements to provide and interact with stakeholders. Far from merely digitizing services for efficiency, these changes respond to the sociotechnical reconfiguration of interdependent technology, people, relationships, culture, and organizational structures. This chapter presents a case study of digital transformation in the New Zealand public sector, examining the role of governance mechanisms in enabling this complex sociotechnical reconfiguration. The chapter draws from the increasingly prevalent lens of ecosystems in the strategy, information technology, and marketing literature to frame and investigate ecosystem governance mechanisms as central to the process of digital transformation.

INTRODUCTION

'Digital transformation' is rapidly disrupting economies, societies and how governments operate. The transformation rhetoric equally applies to governments and the public sector alongside its popular reference in private organisations (Mergel et al., 2019). The public sector is being forced to rethink how it serves its constituents alongside demands for efficiency, service quality, simplicity, transparency and accountability. Information and communication technologies (ICT) have long been transforming government services. However, we now increasingly discuss advances in artificial intelligence applications,

DOI: 10.4018/978-1-7998-9008-9.ch018

big data, blockchain and sensor technologies, enabling faster and more personal government services to individuals, altering cities' infrastructure, and the role of government capabilities (Benbunan-Fich et al., 2020; Gil-Garcia et al., 2018).

However, digital transformation is fundamentally complex, as it is not only the specifics of the technology but the increasing interdependencies between this technology and the socio-organisational components of people, relationships, culture and organisational structures (Ivančić et al., 2019; Simmonds et al., 2021; Verhoef et al., 2019). Simultaneously, transformation requires extensive multi-sectoral network cooperation. These issues are seen as magnified in the public sector driven by stakeholders' plurality and complex decision-making, accountability systems and the fundamental complexity of the diverse operations of government (Rose et al., 2015; Simmonds & Gazley, 2018). Coherent reform and transformation demand fundamental change to organisational structures, capabilities, governance and processes. As Mergel et al. (2019) argue, there is a need for systematic empirical evidence about how public administration approaches digital transformation.

This chapter focuses on this need to understand governance as the means of coordination necessary to support the development and implementation of digital transformation. Systems thinking approaches are increasingly recognised as needed for proper governance approaches to avoid the typical gaps and overlaps driven by silo-based and vertical-thinking, connecting the digitalisation of the public sector to broader public sector goals and agendas. As the basis of a system's thinking approach, this chapter applies an ecosystems lens, fore fronting multilateral technological, social and cognitive interdependence (Autio & Thomas, 2019), to an embedded case study of digital transformation in the New Zealand Public Sector. Ecosystems are distinguished from other socio-organisational structural arrangements by the nature of their governance and coordination challenges (Autio, 2021), which are fundamentally directed towards achieving alignment and mutual agreements among the members having definite positions and flows among each other (Adner, 2017).

The chapter intends, firstly, to contribute to calls to address the combined sociotechnical interactions and governance issues present in digital transformation in government (Castelnovo & Sorrentino, 2018; Henning, 2018; Mergel et al., 2019; Vial, 2019), through applying an ecosystems lens (Nambisan, 2018; Nambisan et al., 2019). Secondly, the chapter aims to contribute to understanding governance mechanisms that influence ecosystems' alignment and resulting outcomes in the context of digital transformation programmes in government (Autio, 2021; Autio & Thomas, 2020). In deriving these contributions, the chapter poses the following research question: how do governance mechanisms enable digital transformation in the public sector ecosystem through the alignment of sociotechnical ecosystem components?

The chapter is organised as follows. Firstly, the context and challenges of digital transformation programmes in the public sector are set. Secondly, an ecosystem lens is introduced as a means of framing and understanding these contexts and challenges. Thirdly a case study and research methodology are provided in response to the question: how do governance mechanisms enable digital transformation in the public sector ecosystem? A discussion of the findings of the case in response to the research question follows, highlighting four central governance features - ecosystem logic, architecture of participation, network structure and the presence of a service platform. Lastly, recommendations and conclusions are drawn in response to managing digital transformation in the public sector.

Background: Digital Transformation in Government

Across the world, public sectors continue to transform service delivery and their interactions with stakeholders, driven by budgetary pressure, rising citizen expectations and the debt of legacy technology (Picazo-Vela et al., 2018). After sustained attention to moving services online and streamlining administrative processing, ICT programmes have become digital transformation policies and strategies, shifting focus towards a more holistic and integrative view of the digital opportunities for government (Fishenden & Thompson, 2012; Magnusson et al., 2020). At the centre of these changes is a focus on joined-up government, going beyond the traditional silo structure built on creating single-purpose organisations, intra-organizational rationalisation and vertical accountability (Pilemalm et al., 2016). An integrated approach to government coordination seeks to reduce repetition and duplication, achieve horizontal coordination and create 'seamless' public services, reducing conflicts between different government policies and agency programs (Osborne et al., 2015).

Governments operate as parallel and overlapping organisations across a complex range of policy, legislative and operational environments (Juell-Skielse et al., 2017). Consequently, digital transformations contend with legislative constraints, contractual boundaries, siloed accountability and conflicting priorities, alongside vertically integrated and monolithic technology systems (Eppel & Lips, 2016; Gil-Garcia & Sayogo, 2016; Juell-Skielse et al., 2017; Weerakkody et al., 2016). Therefore, technological change is a complex social process driven by institutionalised organisational structures, politics, and management strategies (Sharif et al., 2015; Weerakkody et al., 2016). Research has indicated that the technology itself is often much less complex than achieving the desired change within organisational/managerial and political/policy factors (Yang & Maxwell, 2011). Existing research and practice describes a moderate track record in the public sector of harnessing the transformative potential of advancing technological developments (Benbunan-Fich et al., 2020; Clarke, 2020), with failures surfacing insufficient understanding and integration of the relationships between institutional arrangements, organisational factors and capabilities, and technologies, often focusing on isolated and reactive projects (Cordella & Bonina, 2012; Luna-Reyes & Gil-Garcia, 2014; Tassabehji et al., 2016; Weerakkody et al., 2016).

In overcoming these issues, effective governance – the system of institutions, strategic processes, and rules and interactions – is recognised as a central pillar for digital transformation success in government (OECD, 2019). Governance for digital transformation in public sectors requires an understanding of technology-mediated change reflecting the interactions between organisational factors (goals, processes, and resources), institutional factors (laws and regulations), new technologies, and interactions and forms of collaboration with networks of stakeholders (Benbunan-Fich et al., 2020; Christensen & Lægreid, 2013; Klievink et al., 2016; Nograšek & Vintar, 2014). This integrated sociotechnical transformation distinguishes digital transformation from the more extensive considerations of IT-enabled organisational transformation and the well-postulated alignment between organisational and IT strategies (Coltman et al., 2015; Wessel et al., 2021). As a result, this complexity in digital government transformation reflects the broader literature on digital innovation, calling for an ecosystem perspective to capture the complexity of sociotechnical dynamics and governance in digital innovation (Nambisan, 2018; Nambisan et al., 2019; Urbinati et al., 2021).

Ecosystem Innovation and Governance

'Ecosystems' research offers a focus on complex systems and the alignment of socio-organisational components (Adner, 2017; Jacobides et al., 2018; Russo-Spena et al., 2017). The ecosystem concept increasingly appears in calls for further research in digitalisation, transformation and innovation literature (Autio & Thomas, 2019; Nambisan, 2018; Nischak et al., 2017). At the centre of these calls is the emergence and growth of inter-organisational information systems and platforms, which sit alongside several streams of literature from strategy to services. Each stream shares a central concern with multilateral interdependencies and the challenges and opportunities in organising a diverse set of actors, resources, interactions and innovation activities as part of interdependent systems (Aarikka-Stenroos & Ritala, 2017; Autio & Thomas, 2019).

At the core of this system complexity is the premise that "ecosystems are defined by an alignment structure" (Adner, 2017, p. 42). The topic of 'alignment' has long been central to the Information Systems discipline and strategy literature (Baker & Singh, 2019). However, the ecosystem perspective asserts the need for a more processual, multidimensional and multileveled intra- and inter-organisational view of alignment (Baker & Singh, 2019; Gilchrist et al., 2018; Winter et al., 2014). Innovation, under this ecosystem perspective, is seen as a process, the nature and value of which emerges from changed configurations in the ways multiple actors interact and collaborate and find new ways to mobilise, combine and recombine resources (Lusch & Nambisan, 2015). Digital transformation can consequently be understood as new alignments which emerge as digital technologies enable and necessitate novel actors and actor constellations, structures, practices and beliefs that change, threaten or complement existing rules of the game within organisations and fields (Hinings et al., 2018; Vial, 2019; Wessel et al., 2021). Consequently, governance mechanisms that define how ecosystem actors, technological architecture and organisational processes interact are fundamental to digital transformation (Autio & Thomas, 2019; Jacobides et al., 2018).

Governance Features as a Means of Ecosystem Alignment

Governance features recognise the institutionalised nature of social contexts and the need to effectively coordinate actor's practices, resources and relationships to realise interactions and align value-creating systems. Therefore, governance plays a key role in the configurational interdependent interactions among the social, technological and institutional components of ecosystems. Issues of governance in the academic literature range across features such as decision rights and accountabilities (Bowen et al., 2007), centralisation versus decentralisation of processes and activities (A Tiwana et al., 2010), knowledge exchange, resource allocations, and the creation of common meanings and shared understanding (Williams & Karahanna, 2013), and leadership and organisational structures (Benaroch & Chernobai, 2017). However, the level of analysis has generally focused on a project, or the intraorganizational level (Benaroch & Chernobai, 2017; Amrit Tiwana et al., 2013; Wu et al., 2015). At the ecosystem level, the governing of platforms or technology, for example, platform access, incentives to contribute and standards and interfaces, has been the predominant focus (Huber et al., 2017; Wareham et al., 2014). Digital transformation within an ecosystem, however, requires governance to be viewed at multiple levels, emphasising the system interactions of resources, network relations and institutions joining inter-organisational actors and a field of value creation. Consequently, the academic literature calls for

the empirical exploration of the features and means of governance in the ecosystems literature (Autio & Thomas, 2019; Jacobides et al., 2018).

This chapter, therefore, intends to both contribute to the understanding of digital transformation in the public sector and the role of governance mechanisms in ecosystems, by considering the following research question:

How do governance mechanisms enable digital transformation in the public sector ecosystem through the alignment of sociotechnical ecosystem components?

Case Study

An in-depth case study was considered an appropriate research method for the digital transformation phenomenon. The case study approach works towards conclusions that are "generalisable to theoretical propositions and not to populations or universes…" (Yin, 2013, p. 13). Subsequently, the chapter focus on the illustrative exploration of digital transformation and the governance mechanisms of ecosystems to begin filling gaps in the current understanding (Autio & Thomas, 2019; Hinings et al., 2018; Nambisan, 2018; Thomas & Autio, 2020; Vial, 2019; Wessel et al., 2021). The research design draws on Graebner et al's. (2017) advice to explore a single case with multiple embedded subcases as the unit of analysis. The single case approach allows an in-depth, coherent and flexible study of an ecosystem and a multitude of actors and perspectives over time (Dubois & Gibbert, 2002; Graebner et al., 2017).

The case selected for this research is the ongoing digital transformation of the New Zealand Central Public sector. New Zealand's Central Public Sector is an effective case as it is considered a global leader in adopting digital technologies (The Fletcher School, 2018); a founding member of the Digital Nations - an international forum of leading digital governments, and; consistently ranks in the top ten nations for e-government development in the United Nations e-government survey (UN Department of Economic and Social Affairs, 2018). The focus of the research setting is the period of 2011 to 2018. Between these years, major government reform programmes, were implemented alongside significant changes in the technology market.

Case Context

In 2012, a broad transformation effort in government, 'The Better Public Service programme (BPS)', was introduced, premised on reconfiguring the government system to mobilise around specified results significant to the public and public servants. The results targeted significant social problems where responsibility spanned multiple agencies. This set of results would be a catalyst for joined-up government models in New Zealand, built on changing the decision-rights, incentives of the public management system and setting functional leadership roles designed to 'horizontally' improve the effectiveness of services and secure efficiencies across departments.

It was clear that ICT-enabled transformation was a driving force in delivering better, integrated public services. Therefore, it was central to the challenges of the BPS program. 'Digital' was not only explicit in a number of the 'results', but digital transformation would be a foundation for delivering capabilities and structures of horizontally- and vertically-integrated public sector, in response to the increased fragmentation, disaggregation, and structural devolution caused by new public management reform programs.

In 2013, the Government ICT Strategy and Action Plan was adopted, laying the foundation for the broader digital transformation of government services, systems and stakeholder interactions. The strategy

focused on a new operating model that provides system-wide coordination of investment, resources and capabilities. This model would be enabled by the core shift in the technology landscape to cloud services and the 'as-a-service' servitisation of the IT industry, reducing the need to own and operate commodity technology and enhancing technical capabilities. The access to shared configured and provisioned on-demand computing resources defined by cloud computing would feature as a central capability for the joined-up government service model.

Changes to how the government procures ICT have been central to transformation, including common capabilities and all-of-government ICT procurement contracts. Common capabilities are built on the procurement of a solution by a lead agency, which can be used by multiple agencies, or across the whole of government, meaning agencies could adopt these products from a panel of approved suppliers without the need to undertake full procurement. Historically, agencies designed, built and operated their own individual technology solutions. Infrastructure was duplicated, investment was not coordinated, and agencies did not reuse systems, opting for bespoke solutions, ignoring or unaware of solutions available. This approach was inefficient and created integration and cross-agency information sharing problems through incompatibility of software, databases and data.

This problematic state reflected a history of stop-go reform in the public sector, including E-government initiatives. Across jurisdictions, the focus on building information portals, putting transactions on government websites and having a 'front-facing online web presence' has exposed the use of technology as a cosmetic fix to make public services appear joined-up when in reality they remained fragmented across multiple administrative hierarchies, operational departments, and agencies (Andersen et al., 2010). E-government applications have a history of failing to align across the multiple autonomous 'vertical silos'. The 'clipping on' of internet technologies did little to change government ICT and its operating model, systems, processes and service delivery. This lack of transformation points to the need for extensive back-end integration, policies and technologies, and the realisation that transformation is not a linear or technology-driven initiative but a complex systemic issue.

Data Collection

This study's primary data were in-depth interviews with participants representing organisations and extensive document analysis. Interviews were conducted over 18 months across 2017 to 2019 and the document analysis collected documents published from 1995 to 2018. 24 interviews were conducted with 14 organisations and 450 documents were analysed. Participant selection utilised purposive sampling (Yin, 2013) based on their positions, including Managing directors, Chief Technology Officers (CTOs), leads of identified key programmes or ownership of relevant relationships (e.g. Director of an ICT supplier's relationship with government). Table 1 provides basic information about each interview participant. The interviews aimed to collect narrative data understanding the digital transformation process over the period and then probe participants experiences, perceived connections and reasoning for events. Documents were sought based on participants' recommendations as well as searching archival public databases.

Table 1. Organisation and roles of interview participants

Organisations	Participant Position	Supporting Justification
Organisation 1 (Local Service Provider)	CEO Director, data & analytics Regional manager	• Growth orientated cloud provider • Partnerships with major multinationals and key local networks • Involvement in multiple agencies projects
Organisation 2 (Local Service Provider)	Government IaaS business owner	• Key government service provider across a large number of agencies • Major partner with multinational providers
Organisation 3 (Multinational Consultant)	Country director	• Central partner in government transformation • Large number of agency relationships • Global and Local market outlook
Organisation 4 (Multinational Software Provider)	Country director	• Major multinational provider with a unique business model • Key relationships with local providers • Government servicing
Organisation 5 (Multinational Service Provider)	Project Management Government account director	• Very high-volume supplier to the public sector • Major industry incumbent
Organisation 6 (State-owned enterprise)	IT Manager	• Peripheral position as a State-owned enterprise • Customer of service providers
Organisation 7 (Government Agency)	CTO Relationship manager	• Central Agency • Significant Business transformation • Considerable engagement with the private sector
Organisation 8 (Government Agency)	Manager, all-of-government ICT Business change director Director relationships	• Central Agency • Core agency in ICT and digital transformation • Extensive engagement with the private sector
Organisation 9 (Government Agency)	AOG procurement manager Manager – integrated services	• Strong Procurement Function • Central Agency • Programme lead in external engagement
Organisation 10 (Government Agency)	Principal analyst	• Central Public-Sector department • Role in performance and oversight • Programme Lead
Organisation 11 (Local Service Provider)	Business manager IT solution architect	• Major National Incumbent • Key relationships with other providers • Central provider to government
Organisation 12 (Multinational Service Provider)	General manager (government)	• Central partner in government transformation • Large number of agency relationships • Global and Local market outlook • Major industry incumbent
Organisation 13 (Local Service Provider)	Associate director	• Key government service provider • High number of agencies as customers • Major partner with multinational providers
Organisation 14 (Local Consultancy)	Consultant and industry observer	• Substantial commentary • Worked in both public and private sector consulting

Source: The Author

Data Analysis

An iterative and cyclical data analysis process was implemented drawing from Dubois and Gadde's (2002) framework for systematic combining and the literature on process case studies (Langley et al., 2013). The central features of these approaches are 'matching- "going back and forth between framework, data sources and analysis" (Dubois & Gadde, 2002, p. 556), combined with a focus on connections between events, levels and units of analysis in the search for patterns of change (Langley et al., 2013). Notes and transcripts from interviews and document analysis, observations and additional data were managed by constructing a case database within Nvivo® software.

The systematic combing process draws from retroductive and abductive theorising (Blaike, 2010). Existing literature on different components of ecosystems and existing general theoretical frames for governance features provided 'sensitising theory', and an emerging framework (Lusch & Nambisan, 2015; Perks et al., 2017). The collected data was structured using narrative and visual mapping strategies for coding (Langley, 1999). Narratives were written summarising the interviews and secondary document data, focusing on the theoretical description of these narratives as an evolving ecosystem, moving back and forth between the literature and the data. Integrating the primary and secondary data provided a holistic overview of the ecosystem, triangulated from different perspectives and sources. Following the development of the narrative, we began 'recursively iterating between theory and data, creating the dialogue' of systematic combining, analysing the structured narrative through the existing general theoretical frames and postulating more specific mechanisms characterising their operation in the case (Dubois & Gadde, 2002 .

FINDINGS

Four central governance features, drawing from and combining recent literature on ecosystem governance, are introduced; ecosystem logic, the architecture of participation, network structure, and service platforms (Aarikka-Stenroos & Ritala, 2017; Lusch & Nambisan, 2015; Perks et al., 2017). These features emerge abductively from the research through systematic combining and the process of 'matching- "going back and forth between framework, data sources, and analysis" (Dubois & Gadde, 2002, p. 556).This section considers each of these in turn, offering the findings of more specific mechanisms that characterise the presence and role of these features in the digital ecosystem transformation. The findings in the following sections feature illustrative quotes, providing insight into the empirical setting (Pratt, 2009).

Ecosystem Logic

The first governance feature is creating and maintaining an ecosystem logic. Ecosystems bring together actors with many different activity frames and with differences in knowledge and skills and cognitive frames (Battilana & Casciaro, 2012). Actors operate with a range of self-interested motivations, fragmented knowledge, and diverse capabilities. Shared institutional logics are needed to enable cooperation and coordination amongst cognitively distant, diverse actors, orientating actors interests, priorities, and interaction goals (Frow et al., 2019; Taillard et al., 2016). Overarching ecosystem goals are required which engage narratives, norms and practices that enable the achievement of an ecosystem level of value creation.

The foundation of an overarching ecosystem logic is crucial to digital transformation through socio-technical alignment. Two core programmes were introduced to give precedence to cross-government directions and priorities. The Better Public Service Programme (BPS) and the Government ICT Strategy and Action Plan (ICT SAP) served to create a robust organising structure. These overarching plans created a field structure to align decision-making and coordinate management and investment in ICT through cross-government products and services. Compared to previous efforts in reform programmes, the limited number, specificity and defined nature of the BPS results, and the single ICT SAP created a structure that integrates diverging logics and paths of acceptable actions competing for the attention of ministers and managers. Previous reform cycles lacked mandated cross-government action and an institutional hierarchy of reform, resulting in fading interest and support for necessary roles and accountability frameworks. The operation and functioning of the ecosystem logic can be explained through three more specific mechanisms.

Hierarchical Alignment Under an Inter-Institutional Ecosystem Logic

Hierarchical alignment operated as a core mechanism within the ecosystem logic. As part of the two core programmes, amendments were made to central legal and regulatory institutions that set agencies' rules and responsibilities. The overarching logic supported the identification of lower-level operational institutions which were misaligned or in tension with the activity defined by joined-up government. The Privacy Act was amended to facilitate data sharing across government, setting the basis for interoperability and resource interfaces. Changes to the Public Finance Act allowed joint funding tools and the pooling of funding for collective use. This change enabled the centralisation of investment and the move to common capability and all-of-government ICT contracts. Modifications to The State Sector Act introduced new responsibilities for department CEs and collective interest performance expectations. These changes aligned accountability frameworks with system-level outcomes and moved away from siloed performance metrics. Collectively, these changes demonstrate the establishment of a hierarchy in the government's institutional system, with the reform narrative dictating the design and evolution of other rules.

The 1980s and '90s, agencies were given a lot of operational autonomy. A lack of alignment across the system, incentives, funding, responsibilities and structures all existed in legislation, which made it more difficult to collaborate and probably, most importantly, weakened the motivation and sense of shared purpose. (Manager, All-Of-Government ICT)

Bottom-Up Organising

While the top-down pressure of the whole of government reform created an organising logic, a second mechanism characterised by bottom-up organising created a connection between the micro-level of actors, targeting meso-level cross-government coordination. In establishing the BPS results programme, government put forward the results and let agencies set the basis for collaboration, prioritisation and action. Roles and accountability arrangements were set up for each result area, supported by a result team located in the lead agency and an Action Plan detailing performance measures, timeframes and responsibilities. The resulting plans became cocreated devices bringing commensurability and comparability to the outlooks and planning of agencies. These action plans structured agency four-year plans

– detailing the management of workforce, funding, and key capital investments, critical contracts, and ICT systems. This cooperation established interdependency and mutuality (shared vision, values and communication), creating the basis for dialogue and commitment.

Establishing Institutional Complementarity

The ICT SAP established digital transformation as a necessity for public sector reform. For many agencies, digitalisation has not served as a priority. However, by establishing the logic of digital change as a central component of government reform, it shifted from a peripheral framing to a central concern for agencies. This broader alignment was in contrast to previous efforts, such as the 2006 e-government strategy, which lacked digital integration as part of direct alignment in outcomes, technology, and relationships. Fundamentally, complementarity was established in recognising that the capabilities, resources, and activities needed to support the BPS reform programme, existed in the ICT Strategy and Action Plan. Moreover, the legitimacy of ICT, as a fundamental lever to modernise and improve citizen services, was grounded in its connection to the BPS results.

Architecture of Participation

The second governance feature is the presence of an architecture of participation. This feature recognises the enactment of the ecosystem logic through the meso and micro levels of the system by addressing actors' roles and the presence of authority structures. Actor roles are needed to enable ecosystem participants to engage in productive interactions that generate a coherent ecosystem-level output, channelling knowledge, skills and resources in a structured way (Möller & Halinen, 2017; Shipilov & Gawer, 2020). Interaction, performance and coordination of roles requires legitimacy and authority. The complex relationships of ecosystem participants require power relationships (Gulati et al., 2012; Jacobides et al., 2018), as authority is conferred for decision rights, accountabilities, and control over critical resources.

Roles and Inter-Level Structural Alignment

The ecosystem logic is enacted within an architecture of participation. Roles are created and structured to choreograph collaboration and resources and confer authority for expectations, resources and channel interactions. Core to the architecture of participation was shifting accountability. New mandates required CEs manage and contribute to the collective performance improvements and adopt cross-government ICT products and services. This shift aligned the macro-ecosystem logic of horizontal cross-government thinking with the meso and micro levels of roles and executive and managerial sensemaking.

Cross-government initiatives required moving away from managerial independence of CEs concerning purchasing and ownership responsibilities, funding arrangements and future investment. New system-level leadership roles were established to coordinate decision-making. Of particular note to digital transformation was enhancing an existing Government Chief Information Officer (GCIO) through the designation as the whole-of-government functional leader for ICT. The GCIO role focused on the strategic direction, policy, and standards for using and investing in ICT across the public sector. Along with further funding and resourcing the role would oversee ICT investment strategies and mandate the adoption of ICT Common Capabilities.

The most obvious manifestation is going to be the leadership function of the Government Chief Information Officer (GCIO). It's not just the funding but the mandate and the GCIO needs a strong mandate because frankly, the public service technology establishment has not responded positively or well to the changed environment. (Finance Minister)

Evolution of the Orchestrating Role

As the Strategy and Action plan progressed, the role of the GCIO shifted from a position of mandate and hierarchy to one of guidance and a more open cooperative structure. In 2015 the Partnership Framework was established by the GCIO. This framework brought together 55 senior leaders from more than 20 agencies to support an all-of-government digital system. This group was supported by other tiers of management and experts from across government in a set of working groups dedicated to technology, investment, service innovation and data/information. These groups are aligned with the ICT strategy's core features and created frameworks for interaction and resourcing, meetings and seminars. The GCIO unit was able to advise on ICT investments and planning, while allowing agencies involvement in developing capabilities and setting the direction of the ICT strategy. Agencies rely on the GCIO team's resourcing to assist them in navigating the risks that arise from adoption. This facilitates alignment with institutionalised structures and removes tensions from the decision-making of IT staff and CEs. This structure also facilitates a form of distributed power as representatives from different government areas can address their local conditions while returning to the frames of reference developed within the partnership framework.

We know there is scepticism about delivery, and services should not be foisted on the departments. Driving change from the centre is good at getting things moving, but you need to move from this stage of disruption to embedding. Embedding means taking agencies on the journey and a lot of collaborative working. (Manager – Integrated Services)

Orchestrating Role Positioning and Enablement Through Affordances

The functional leadership role and the as-a-service common capabilities model was a fundamental change to how agencies managed, owned and consumed ICT as a resource. The capacity of cloud services created affordances to standardise services, alleviating a need to negotiate between individual agencies and the need to own and operate separate hardware and software. These affordances were vital to allowing centralisation of investment and the use of all-of-government ICT procurement and capabilities.

Network Architecture

The third governance feature is the Network Architecture, which recognises the nature and impact of actors' network structure and relationships. Network membership, coupling or ties between network members and criteria for inclusion or exclusion have been recognised as central to ecosystem governance (Möller & Halinen, 2017). Inter-organisational network research findings demonstrate how the structure of the network and the strength of ties influence actors roles, their interactions and their access to resources (Aarikka-Stenroos et al., 2017). This coupling variable is central to the functioning of the ecosystem through allowing the connection and contribution of participant capabilities and the fundamental tension of coordination, between flexibility and variety versus standardisation (Lusch &

Nambisan, 2015). Flexibility addresses the need to create different configurations of actors, roles, or relationships that generate new resources, processes, and practices. In contrast, standardisation enables embedding strong connections which knit together the competencies, relationships, and resources of actors allowing control and ecosystem processes to be orchestrated (Wareham et al., 2014).

Strong Ties Drive Commitment and Investment

Creating cross-government products, particularly through the creation of All-of-government and common capabilities contracts, represented a significant change from traditional individualised relationships between agencies and service providers. Common capabilities established the supplier and common products purchased across government. The establishment of these contracts and oversight within central agencies established the government as a single customer to a panel of suppliers, negotiating standard products and conditions. This procurement process saw a dramatic change in the relational structure for negotiating from individual relationships between agencies and suppliers to a single point with the GCIO team.

Representing the government as a customer of one into the ICT marketplace meant that we got a different result. It meant that we could access the services government needed at a price they could afford. It meant they invested in the infrastructure, built $100 million data centres, across New Zealand. They put effort into creating technology we could use. (Manager of Commercial Strategy and Delivery)

The establishment of a set of products and the standardisation of the terms and conditions demonstrated the desire to shift the focus of change from an agency to a supplier lens as a way of changing the problem and shifting 'government out of the business of doing IT'. The creation of the Infrastructure-as-a-Service (Iaas) common capability and its demand portfolio stimulated increased investment, particularly in data centres' construction (an initial $70 million across two suppliers).

We needed to change the relationship between government and large ICT suppliers…We've been upfront with suppliers that we are seeking for them to change their mode of operating in order to help us transform. (Manager, All-Of-Government ICT)

Servitised Relationships

The strong ties and coordination of actor capabilities found in the Common Capabilities relationships enabled the construct to evolve further. The Software framework agreements saw the servitisation of the relationship, going beyond the procurement of a particular product and establishing government agencies as a customer of one for access to any services suppliers have available. The creation of these cooperative relationships moves the relationship beyond the linchpin of demand for products to focus on the long-term relationship, a facilitative environment of contracting and procuring and cooperative decision making on both sides of the relationship. Although these agreements required changes to operating models, terms and conditions and traditional means of engagement, the relationships were seen as long-term, legitimised and strategically valuable.

Common capabilities are market interventions, where the government sees a problem or opportunity that needs to be changed. That's a specific product that we were buying. The SFA is a different approach, where we engage with a supplier and negotiate a construct where any of their products can be sold or bought by agencies under a consistent set of terms and conditions and pricing model. SFA is a much more involved discussion with the supplier because it's about developing a strategic relationship. (Software Acquisition Strategy Lead)

Alliances for Distributed Capability

Outside of relationships directly with government, service providers also sought to establish network structures that would connect with the government market. One such example, The Stack Alliance, developed as a group of ICT companies, cooperatively offering services and solutions at different layers in the ICT stack under a memorandum of understanding. The Alliance is a group of 20 partners built on a cross-government IaaS construct, offering multiple partner alliances with flexible capabilities. Agencies can blend a range of services and technology with their infrastructure providing flexibility with access and choice in the source of capabilities while avoiding lock-in with specific service suppliers. The alliance allows smaller specialist organisations to compete with larger multinational generalists, meeting risk and capacity requirements, and utilise the established government contract to enable consortium-based solutions and legitimise these flexible capability networks. With this in place, structural flexibility is facilitated by allowing the Stack alliance to promote different configurations of actors to adapt to different requirements.

When we were competing with large generalists, they were going to agencies and offering the full stack even though their remit stops at infrastructure, which was attractive from an accountability standpoint. In response we set up the Stack Alliance. We got as many providers to sign an MOU as possible who were competing against these providers. Now, when I walk into an agency, I can bring other partners in and offer specialists. We can offer a modularised partnership and solution provision. (Service Provider Government Manager)

Bridging Ties to Maintain Independence

Elsewhere in the ecosystem loosely coupled larger organisations with sought-after resources utilised bridging approaches. These actors choose to maintain independence from adjustment or comprise to operate in perceived compatibility with government requirements. Instead, they leveraged their partners' strong ties and conformance with Government standards as a bridging tie, allowing them to prove compatibility, certify, and resell government capabilities without the organisation changing their terms and conditions or operating model.

We don't sit on a panel, and we don't want to. We do everything through our partners and they are on the panels. Some of our competitors have struck panel agreements but that also means they have to change their global T&Cs to fit with government. It's better for us to have our partners do that. It is changing our partnerships. (Director Service Provider)

Service Platform

The final feature is creating and offering a service platform that helps to liquefy resources and enhance resource density (Lusch & Nambisan, 2015). A service platform exists as a modular structure of resources and means of interaction between actors and resource bundles which serve as a foundation for interaction and resource integration, encouraging shared structures or standards (Lusch & Nambisan, 2015). Modularity recognises the ability for different components of a technological system to be offered by different producers yet function together (Shipilov & Gawer, 2020). The specifics of interconnections between modules are codified via technological interfaces, which standardise how producers of different components of the overarching system interact. Service platforms shape the ease with which actors can access diverse resources allowing the best combination of resources to be mobilised for a particular situation (resource density). Moreover, service platforms are orientated towards resource liquefaction, particularly digital decoupling (the decoupling of information from its related physical form or device), allowing resources to be shared, combined and integrated in new ways. This feature is emphasised in the platform management perspective of ecosystems and the accompanying focus on digital infrastructures (Tsujimoto et al., 2018).

Common Capabilities provided shared building blocks, allowing agencies to move to a shared set of standards and level of security, converging the use and the terms and conditions that govern the relationship with their suppliers. IaaS, particularly, provides core infrastructure allowing a common foundation for services. Rather than purchasing servers, data centre space, or network equipment, agencies instead buy those resources as an outsourced on-demand service. The costs across government are reduced through economies of scale, as each agency does not need to go through primary procurement, own and maintain infrastructure or deal with maintaining many versions of similar technology across multiple agencies. Cloud computing's core features driven by virtualised physical resources and dynamic scalability of resources make it fundamentally accessible and usable across different contexts and for different purposes, reducing asset specificity. The ability to share resources and integrate systems, platforms and data sharing is fundamental to changing the government system's operation.

Platform Generativity

The core infrastructure, provided particularly by multinational providers and government agencies' specifications, enabled the development of new services that could sit on top of the digital infrastructure. For example, the ability to share data, identity standards, datasets and leverage modular APIs (application programming interface) enables services that cut across agencies to be built that provide single interfaces for citizens, such as businesses applying for and renewing government licenses, registrations and certification.

Providers were also able to deliver innovation, building from the common infrastructure provided. One particular provider focused on delivering on-demand services and management consoles that offer flexible self-service portals. Moreover, they supported the triage of data, responding to data sovereignty issues by offering hybrid cloud in-country solutions for data management and development, which integrates applications and workloads with multinational providers' cloud infrastructure.

So, we've moved up the stack, not only focussing on raw capacity and performance, we've developed a portfolio of on-demand services, wired in public cloud offerings, and overlaid a smart management console for customers and resellers. (Executive Service Provider)

Platform Evolution

The shared infrastructure and sets of standards, along with the models provided by the Software Framework Agreements, set the foundation for creating a market platform connecting Government agencies to suppliers. Initially, a digital marketplace for public cloud SaaS aimed to change the services available and the procurement process. Suppliers can apply to join the marketplace and accept a standard agreement that enables them to offer their services and products as part of a catalogue to government agencies. This approach allows suppliers to be accepted as part of, effectively, an all-of-government panel able to be selected for agencies needs on-demand. This approach opens up data and transparency throughout the procurement and contracting lifecycle, while also promoting modular and agile approaches to contracting and the sharing and reusing of platforms and components. The marketplace allows agencies to simplify purchasing from approved suppliers while providing visibility and comparison for products from competing suppliers. The marketplace removes the need to undertake an open primary procurement process and negotiate their own contracts. The platform is open to all suppliers that meet the specific entry criteria, giving them access to agencies, with set and simplified commercial terms, reducing the time and effort needed to engage with government clients.

Traditional procurement models are really no longer fit for purpose. There needed to be a simplification, automation. Still, we need to ensure that principal-based rules of procurement and transparency are central. Importantly the marketplace removes a fairly significant barrier for smaller suppliers, traditional RFPs are often prohibitively expensive. (AOG Procurement Manager)

SOLUTIONS AND RECOMMENDATIONS

The findings illustrate the importance of the socio-organisational ecosystem lens built on integrating legal and regulatory frameworks, leadership and coordination through purpose, accountability and recognition of interdependence, network relationships and partnerships of joint investment and key enablers such as interoperability standards and shared services. The emphasis on the alignment between actors, artefacts, activities, relations, and institutions captured by the ecosystem understanding offers a richness and a complexity on issues of digital transformation as an outcome of structures, activities and actions at multiple levels (Burton-Jones et al., 2020; Hinings et al., 2018; Nambisan, 2018).

Aligning the Institutional Environment

An ecosystem logic is central to reconfiguring the institutional structure of the ecosystem on multiple levels. Digital transformation is fundamentally reliant on establishing field-level and ecosystem institutional legitimacy (Hinings et al., 2018). In the public sector, enacting digital transformation requires several building blocks and policy levers to mobilise and coordinate across government. The overarching structure of the BPS and the ICT SAP demonstrate the role of a higher-order narrative and goal for

the ecosystem as a whole defined by joined-up government. As the desired mode of operation for the ecosystem, the macrostructure allowed the identification and alignment of meso-level formal legislative institutions which had served to prevent cross-agency integration.

Built-in institutional constraints—legal, budget and policy— that reinforce vertical rather than horizontal relationships, have consistently been identified as a core misalignment to joined-up government success (Y.-C. Chen & Lee, 2018). As Bunduchi et al. (2015) note, conflicting institutional demands often prevent alignment between innovation and the institutional environment leading to abandonment. The process of changing institutional constraints (legislation) enabled technical, legal and budgetary interoperability in government allowing for the interactions between agencies, flows of resources and the affordances of technology defined within the digital transformation directive. Previous reforms did not utilise a whole system logic or mode of operation change, instead relying on structural reorganisation to improve coordination or separate efforts to improve working relationships across boundaries. No higher-order system logic was utilised to identify and change the institutions that link actors' actions and interactions.

Realising the horizontal cross-government thinking defined by the ecosystem logic was further enabled by the architecture of participation defined in the meso and micro levels of roles and executive and managerial sensemaking. Core to the architecture of participation was shifting accountability defined in new mandates requiring CEs to contribute to collective performance improvements and adopt cross-government ICT products and services. This alignment explicitly embraces field-level logics' nestedness and the resulting vertical complexity (Greenwood et al., 2011). Moreover, the salient nature of performance expectations and accountability structures as actors own self-interests and preferences, ensures a centralisation of the institutional prescriptions maximising the mechanism of institutional logics as the "focus of attention". Moreover, the integration of the ICT SAP as a core component and enabler of public sector transformation was a critical framing mechanism, demonstrating institutional binding. This connection meant the practices, assumptions and values of the two institutional logics were increasingly compatible. Subsequently, given the BPS's dominance as a logic of reform, digital transformation was increasingly centralised as part of the ecosystem functioning (Besharov & Smith, 2014). As Rose et al. (2015) argue, the success of IT projects in government is likely to depend on underlying values and motivations. Consequently, binding the public sector reform programme, built on goals that were important to civil servants, with digital transformation, is likely to enhance commitment and ultimately align efforts and motivations.

The ecosystem logic demonstrates the value of a shared worldview which serves as an order parameter. However, the rules, norms, and beliefs of joined-up interactions remain a negotiated order, requiring the intentional and more active role in shaping the ecosystem, a bottom-up process (Taillard et al., 2016). Mobilisation of the ecosystem logic was built on allowing actors to bring their interests, priorities and goals together settling on collaborative coordination rules and structures within each result area (Story et al., 2011). The resulting collectively crafted and mutually accepted system-level goal helps increase actors' commitment to collective action (Berkowitz and Dumez, 2016, Lundrigan et al., 2015). It underscores the complexity of the ecosystem logic components, including decision-making, inner politics, organisational identities and differing socio-material practices, requiring sustained alignment from the bottom up. Consequently, the importance of the interplay between higher-order institutional 'templates' and the emergence of an organising mode from actors interactions is demonstrated.

Ecosystem Orchestration

Within the architecture of participation, orchestration is a crucial channel for organising actors' knowledge, skills and resources in a structured manner and mobilising interactions that generate a coherent ecosystem-level output. The orchestration role enacted by the GCIO ensured the trajectory of the digital transformation agenda and organise competing goals and agendas. The initiation of the GCIO all of government role required both material resources and institutional authority to confer legitimacy and challenge existing rules of the game within elements of ownership, management, relationships, and procurement. The ability to secure engagement and compliance from other ecosystem actors, performing relationship brokerage activities and aligning behaviour, is seen as the most critical success factor for orchestrators (Dessaigne & Pardo, 2020). This is true not only of the other agencies and departments but crucially the technology sector actors enabling the digital transformation. The findings also demonstrate the importance of particular affordances, most prominent in shared services and ICT infrastructure capabilities that allowed the GCIO to actually broker with providers and direct agencies to align their actions with joined-up common capabilities.

Network and ecosystem literature continues to define the importance of orchestrator roles and the dynamic capabilities required (Hurmelinna-Laukkanen & Nätti, 2018; Valkokari et al., 2017). However, the findings also point to the importance of understanding the evolution of the orchestration role. Fundamentally, this changing mode is tied with the coevolutionary nature of ecosystems (Aarikka-Stenroos & Ritala, 2017). Of particular note in the case is the move to collaborative orchestration following the dominating mandate to deinstitutionalise management and ownership practices and establish a core technology infrastructure. Moreover, as part of the orchestration mode or role evolution, we demonstrate the development of role-augmentation capabilities described by Hurmelinna-Laukkanen and Nätti (2018). The findings illustrate the GCIO evolving and developing new capabilities in effectively creating a collaborative mode of governance and focusing on enabling boundary spanners to translate across boundaries and mobilise support and desired practices (van Meerkerk & Edelenbos, 2018).

Creating Integral and Modular Networks

The findings recognise the role of both strongly tied or integral and loosely coupled and modular network structures in the ecosystem (Weil et al., 2014). As a result, we see in the network architecture the necessity of standardisation to embed strong connections and flexibility to create different configurations of actors, roles, or relationships (Lusch & Nambisan, 2015). Building on Jacobides et al. (2018), the findings demonstrate the role of standardised rules and subsequent alliances which develop the ecosystem through nongeneric, nonfungible investment. The strong ties defined by all-of-government contracts and panels and the focus on foundational digital infrastructure represent these integral network structures. These relationships also required significant coevolution alongside the ecosystem and the ecosystem logic, including how the government procured and managed ICT. Network governance defined by effective alignment and adjustment of private partners' action is recognised as a barrier to government innovation (Caloghirou et al., 2016). These ties were built on the servitisation of ICT products enabled by adopting cloud computing's digital affordances. Built on resource liquefaction, structural integrity is found within a service-based co-creative value proposition built on the exchange of competencies, relationships, and information in relational service-oriented engagement over a transactional product-centric model (Lusch & Nambisan, 2015).

Network architecture flexibility was enabled by the layered–modular structure of the digital infrastructure. The use of modular actor networks reflects the ability to create different configurations of actors, resources, roles, and relationships, creating flexible solutions and subsequent resource density. Flexibility was supported by a hub firm, which defined connect and organised these networks bridging the government procurement environment where some actors would have otherwise lacked the access, trust, or cohesion to directly interact (Jansen, 2017). These modular and mediating features are important for government actors that have often stumbled to create governance practices to handle digital networks (Wang et al., 2018). Networks have often been defined by confidence and familiarity among organisations and conformity-based reductions of perceived risks, limiting the network ability to perceive potentially successful collaboration opportunities or access to innovation (Dagnino et al., 2016). The structures enabled in the case by these modular and mediating features help redress some of these central government innovation barriers (Cinar et al., 2019; Uyarra et al., 2014).

Service Platform Liquefaction and Density

Service platforms are required for resource liquefaction and density (Lusch & Nambisan, 2015). Resource liquefaction, particularly the enablement of digital decoupling, virtualisation and scalable re-programmability, was crucial to undermining asset specificity. Beyond the enablement of shared infrastructure and interoperability, the digital platform defined by layered modular architecture drives generativity through upward and downward flexibility (Perks et al., 2017). Innovation was enabled as providers built new applications on top of the infrastructure. Similarly, these applications were then able to be deployed across and draw from a range of infrastructures. This downward flexibility was important for data placement and storage, which have featured extensively in data sovereignty issues for government data, particularly built on the use public cloud infrastructure.

These same principles drove the service platform evolution into a marketplace model defined by a technical platform emerging as a new intermediation model for government procurement. Arising from the models provided by the Software Framework Agreements, this evolution supports the connection between digital servitisation and a platform approach (Wei et al., 2019). The platform model builds on layered structures based on stable core infrastructure to allow actors to build and offer services to agencies in an accessible and simplified way. This platform intermediated approach to procurement supports governance by simultaneously enabling collective coordination for servicing government agencies through the standardisation of resource interfaces and allowing individual service providers to innovate. The marketplace allows the government to exploit and control digitised resources, facilitating connections and resource interfaces built on loosening control through the usage of open networks (Yaqub et al., 2020). However, the constructed and owned platform model enables the use of rules that shape or govern the nature of resource integration by actors.

FUTURE RESEARCH DIRECTIONS

The case study presented in this chapter and the use of the ecosystem lens and subsequent governance mechanism findings point to future research opportunities. Firstly, as IT innovations abound from big data for personalised services, blockchain as a catalyst for compliance, AI as the basis for automation and optimisation, this chapter asserts the importance of adopting an encompassing perspective, that

forefront socio-technical complexity as its foundation. Secondly, as the influence of these technologies continues to impact the public sector, research will need to support the development of legal and institutional frameworks require to support the integration and adoption of these digital technologies and ensure their equitable and public-value orientated outcomes.

Further research is required to better understand, connect and balance integral and modular networks of public and private actors in enabling innovation while supporting the required investment and control. Transformation and innovation in government have suffered from closed networks built on many barriers in tendering and contracting issues (Cinar et al., 2019). Digital innovation will require access to new network forms with weaker ties and the usage of open networks. This chapter has asserted the importance of the service platform as a governance feature to support the investment in key digital enablers grounded in promoting and adopting digital standards and coherent, interoperable and resilient digital government infrastructures. Research should continue to develop frameworks and guidance for how these types of digital infrastructures can set the foundation for new types of platforms (i.e. digital marketplaces) that will improve not only the government procurement of innovation and capabilities but may help to redefine the boundaries between public and private actors, supporting technological, operating and regulatory innovations. A rich stream of research is developing that look at the role of Government as a Platform and Open Government, both which provide the conditions for the provision, innovative development and the dissemination of integrated services, built on the potential of linked open government data to stimulate innovation and transformation of public services.

Lastly, the findings see the movement to more diffuse leadership approaches to support the maturity of the ecosystem evolution and recognise the complex stakeholder landscape that can be enabled rather than commanded-and-controlled. The ability to develop a true ecosystem orchestration competency, over a traditional centralised, hierarchical command structure may be an essential enabler for digital transformation. Further research needs to address the debate on the role of central agencies and horizontal governance in advancing public management reforms (Clarke, 2020), and focus on a more adaptive approach in government built on continuous adjustments.

CONCLUSION

Applying an ecosystem lens to digital transformation in government, understood through the role of developing governance features, illustrates and reinforces the necessary alignment and coevolution between institutional arrangements, organisational factors and capabilities, technologies and interactions and forms of collaboration with networks of stakeholders. Digital transformation, beyond linear IT-enabled organisational transformation, sees digital innovation as part of coevolving technical knowledge and capabilities, values, business models, mission, incentive structures, formal regulations, laws, standards, negotiated actor roles, new actors and relationships. In responding to calls to bring the ecosystem lens to the issue of digital transformation and explore governance mechanisms in ecosystems, this chapter provides empirical examples of the roles of governance features in achieving alignment, defining digital transformation in the public sector ecosystem, and adds to the systematic empirical evidence of how public administrations approach digital transformation. Ecosystem structural properties and governance mechanisms are central to enabling and facilitating the collaborative value creation defined by digital transformation in government.

Supporting the OECD's (2019) recommendations, this chapter highlights the importance of high-level strategic governance defined by general political orientation as fundamental to digital transformation. Defining a unified vision for the transformation and a clear governance framework for digital government with enabling institutions to create a digital government environment is crucial to cut across silos and promotes sharing and collaboration. The case analysis demonstrates the interdependencies between institutional change and institutional rules, resources and practices and the need to both focus on the multiplicity of institutional logics in ecosystems research and the relevance of institutional interventions in digital innovation and transformation (Alzadjali & Elbanna, 2019; Hinings et al., 2018). Moreover, we demonstrate the importance of a multi-levelled and recursive understanding of institutions logics and the need to see how institutions influence actors from the top down and the role of inhabited and micro-processes of institutionalisation that influence institutional persistence or change (Purdy et al., 2019).

The chapter supports both the focus on the orchestrator role in ecosystem literature and furthers the discussion on central digital units in government (Clarke, 2020). We recognise establishing a centralised unit dedicated to digital transformation can play a critical role in setting a clear digital agenda, filling skill and resource gaps over the short term, and ensuring that fundamental enablers are in place to make the transformation happen. The centralised unit develops policies to accelerate and remove obstacles to digitisation and experiment with partnership models.

The chapter also points to the importance of network structure and architecture of coupling. Strong network architecture is a tool for ecosystem participants and sets the ground for building an ecosystem and drawing on the capabilities of a looser and more flexible network. The ability to develop a coevolutionary structure appears increasingly significant as government's ability to engage with service providers and evolve with significant technological and industrial reconfiguration appears fundamental to achieving the desired transformation outcomes.

This proposition is also apparent in the evolution of the service platform defined by the development of core digital infrastructure to enable the value of resource density and liquefaction (Lusch & Nambisan, 2015). Moreover, layered and modular components in this infrastructure can be harnessed to achieve innovation through the resulting upward and downward flexibility.

Central to this chapter is the need for a coevolutionary outlook, which also defines the ecosystem concept. It reflects the need for governance mechanisms to evolve, embracing changing maturity levels and the ecosystem's structure through time. Similarly, it reflects a more adaptive approach in government built on continuous adjustments to deal with their surrounding environment while also preserving stability and accountability, highly valued by government organisations.

REFERENCES

Aarikka-Stenroos, L., Jaakkola, E., Harrison, D., & Mäkitalo-Keinonen, T. (2017). How to manage innovation processes in extensive networks: A longitudinal study. *Industrial Marketing Management*, *67*, 88–105. doi:10.1016/j.indmarman.2017.09.014

Aarikka-Stenroos, L., & Ritala, P. (2017). Network management in the era of ecosystems: Systematic review and management framework. *Industrial Marketing Management*, *67*, 23–36. doi:10.1016/j.indmarman.2017.08.010

Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management*, *43*(1), 39–58. doi:10.1177/0149206316678451

Alzadjali, K., & Elbanna, A. (2019). Smart institutional intervention in the adoption of digital infrastructure: The case of government cloud computing in Oman. *Information Systems Frontiers*, *22*(2), 365–380. doi:10.100710796-019-09918-w

Andersen, K. N., Henriksen, H. Z., Medaglia, R., Danziger, J. N., Sannarnes, M. K., & Enemærke, M. (2010). Fads and facts of e-government: A review of impacts of e-government (2003–2009). *International Journal of Public Administration*, *33*(11), 564–579. doi:10.1080/01900692.2010.517724

Autio, E. (2021). Orchestrating ecosystems: A multi-layered framework. *Innovation*, ●●●, 1–14. doi:10.1080/14479338.2021.1919120

Autio, E., & Thomas, L. D. (2019). *Value co-creation in ecosystems: Insights and research promise from three disciplinary perspectives. In Handbook of digital innovation*. Edward Elgar.

Autio, E., & Thomas, L. D. (2020). Value co-creation in ecosystems: Insights and research promise from three disciplinary perspectives. In S. Nambisan, K. Lyytinen, & Y. Yoo (Eds.), *Handbook of Digital Innovation* (pp. 107–132). Edward Elgar Publishing. doi:10.4337/9781788119986.00017

Baker, J., & Singh, H. (2019). The roots of misalignment: Insights on strategy implementation from a system dynamics perspective. *The Journal of Strategic Information Systems*, *28*(4), 101576. doi:10.1016/j.jsis.2019.101576

Battilana, J., & Casciaro, T. (2012). Change agents, networks, and institutions: A contingency theory of organisational change. *Academy of Management Journal*, *55*(2), 381–398. doi:10.5465/amj.2009.0891

Benaroch, M., & Chernobai, A. (2017). Operational IT Failures, IT Value Destruction, and Board-Level IT Governance Changes. *Management Information Systems Quarterly*, *41*(3), 729–762. doi:10.25300/MISQ/2017/41.3.04

Benbunan-Fich, R., Desouza, K. C., & Andersen, K. N. (2020). IT-enabled innovation in the public sector: Introduction to the special issue. *European Journal of Information Systems*, *29*(4), 323–328. doi:10.1080/0960085X.2020.1814989

Besharov, M. L., & Smith, W. K. (2014). Multiple institutional logics in organisations: Explaining their varied nature and implications. *Academy of Management Review*, *39*(3), 364–381. doi:10.5465/amr.2011.0431

Blaike, N. (2010). *Designing social research* (2nd ed.). Polity.

Bowen, P. L., Cheung, M.-Y. D., & Rohde, F. H. (2007). Enhancing IT governance practices: A model and case study of an organisation's efforts. *International Journal of Accounting Information Systems*, *8*(3), 191–221. doi:10.1016/j.accinf.2007.07.002

Bunduchi, R., Smart, A., Charles, K., McKee, L., & Azuara-Blanco, A. (2015). When innovation fails: An institutional perspective of the (non) adoption of boundary spanning IT innovation. *Information & Management*, *52*(5), 563–576. doi:10.1016/j.im.2015.04.001

Burton-Jones, A., Akhlaghpour, S., Ayre, S., Barde, P., Staib, A., & Sullivan, C. (2020). Changing the conversation on evaluating digital transformation in healthcare: Insights from an institutional analysis. *Information and Organization*, *30*(1), 100255. doi:10.1016/j.infoandorg.2019.100255

Caloghirou, Y., Protogerou, A., & Panagiotopoulos, P. (2016). Public procurement for innovation: A novel eGovernment services scheme in Greek local authorities. *Technological Forecasting and Social Change*, *103*, 1–10. doi:10.1016/j.techfore.2015.10.016

Castelnovo, W., & Sorrentino, M. (2018). The digital government imperative: A context-aware perspective. *Public Management Review*, *20*(5), 709–725. doi:10.1080/14719037.2017.1305693

Chen, Y.-C., & Lee, J. (2018). Collaborative data networks for public service: Governance, management, and performance. *Public Management Review*, *20*(5), 672–690. doi:10.1080/14719037.2017.1305691

Christensen, T., & Lægreid, P. (2013). Context and Administrative Reforms: A Transformative Approach. In C. Pollitt (Ed.), *Context in Public Policy and Management* (pp. 131–156). Edward Elgar. doi:10.4337/9781781955147.00019

Cinar, E., Trott, P., & Simms, C. (2019). A systematic review of barriers to public sector innovation process. *Public Management Review*, *21*(2), 264–290. doi:10.1080/14719037.2018.1473477

Clarke, A. (2020). Digital government units: What are they, and what do they mean for digital era public management renewal? *International Public Management Journal*, *23*(3), 358–379. doi:10.1080/10967494.2019.1686447

Coltman, T., Tallon, P., Sharma, R., & Queiroz, M. (2015). Strategic IT alignment: Twenty-five years on. *Journal of Information Technology*, *30*(2), 91–100. doi:10.1057/jit.2014.35

Cordella, A., & Bonina, C. M. (2012). A public value perspective for ICT enabled public sector reforms: A theoretical reflection. *Government Information Quarterly*, *29*(4), 512–520. doi:10.1016/j.giq.2012.03.004

Dagnino, G. B., Levanti, G., & Destri, A. M. L. (2016). Structural dynamics and intentional governance in strategic interorganizational network evolution: A multilevel approach. *Organization Studies*, *37*(3), 349–373. doi:10.1177/0170840615625706

Dessaigne, E., & Pardo, C. (2020). The network orchestrator as steward: Strengthening norms as an orchestration practice. *Industrial Marketing Management*, *91*, 223–233. doi:10.1016/j.indmarman.2020.09.007

Dubois, A., & Gadde, L.-E. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research*, *55*(7), 553–560. doi:10.1016/S0148-2963(00)00195-8

Eppel, E., & Lips, M. (2016). Unpacking the black box of successful ICT-enabled service transformation: How to join up the vertical, the horizontal and the technical. *Public Money & Management*, *36*(1), 39–46. doi:10.1080/09540962.2016.1103417

Fishenden, J., & Thompson, M. (2012). Digital government, open architecture, and innovation: Why public sector IT will never be the same again. *Journal of Public Administration: Research and Theory*, *23*(4), 977–1004. doi:10.1093/jopart/mus022

Frow, P., McColl-Kennedy, J. R., Payne, A., & Govind, R. (2019). Service ecosystem well-being: Conceptualisation and implications for theory and practice. *European Journal of Marketing*, *53*(12), 2657–2691. doi:10.1108/EJM-07-2018-0465

Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. *Public Management Review*, *20*(5), 633–646. doi:10.1080/14719037.2017.1327181

Gil-Garcia, J. R., & Sayogo, D. S. (2016). Government inter-organisational information sharing initiatives: Understanding the main determinants of success. *Government Information Quarterly*, *33*(3), 572–582. doi:10.1016/j.giq.2016.01.006

Gilchrist, A., Burton-Jones, A., & Green, P. (2018). The process of social alignment and misalignment within a complex IT project. *International Journal of Project Management*, *36*(6), 845–860. doi:10.1016/j.ijproman.2018.04.004

Gong, Y., Yang, J., & Shi, X. (2020). Towards a comprehensive understanding of digital transformation in government: Analysis of flexibility and enterprise architecture. *Government Information Quarterly*, *37*(3), 101487. doi:10.1016/j.giq.2020.101487

Graebner, M. E., Han, S., & Ozcan, P. (2017). Single cases: The what, why, and how. In M. Raza & J. Sanjay (Eds.), *The Routledge Companion to Qualitative Research in Organization Studies* (pp. 114–134). Routledge.

Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, *90*, 102098. doi:10.1016/j.technovation.2019.102098

Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R., & Lounsbury, M. (2011). Institutional complexity and organisational responses. *The Academy of Management Annals*, *5*(1), 317–371. doi:10.5465/19416520.2011.590299

Gulati, R., Puranam, P., & Tushman, M. (2012). Meta-organisation design: Rethinking design in interorganizational and community contexts. *Strategic Management Journal*, *33*(6), 571–586. doi:10.1002mj.1975

Henning, F. (2018). A theoretical framework on the determinants of organisational adoption of interoperability standards in Government Information Networks. *Government Information Quarterly*, *35*(4), S61–S67. doi:10.1016/j.giq.2015.11.008

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, *28*(1), 52–61. doi:10.1016/j.infoandorg.2018.02.004

Huber, T. L., Kude, T., & Dibbern, J. (2017). Governance practices in platform ecosystems: Navigating tensions between cocreated value and governance costs. *Information Systems Research*, *28*(3), 563–584. doi:10.1287/isre.2017.0701

Hurmelinna-Laukkanen, P., & Nätti, S. (2018). Orchestrator types, roles and capabilities–A framework for innovation networks. *Industrial Marketing Management*, *74*, 65–78. doi:10.1016/j.indmarman.2017.09.020

Ivančić, L., Vukšić, V. B., & Spremić, M. (2019). Mastering the Digital Transformation Process: Business Practices and Lessons Learned. *Technology Innovation Management Review*, *9*(2), 36–50. doi:10.22215/timreview/1217

Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, *39*(8), 2255–2276. doi:10.1002mj.2904

Jansen, D. (2017). Networks, Social Capital, and Knowledge Production. In W. M. K. U. S. B. Hollstein (Ed.), *Networked Governance: New Research Perspectives* (pp. 15–42). Springer Nature. doi:10.1007/978-3-319-50386-8_2

Juell-Skielse, G., Lönn, C.-M., & Päivärinta, T. (2017). Modes of collaboration and expected benefits of inter-organisational E-government initiatives: A multi-case study. *Government Information Quarterly*, *34*(4), 578–590. doi:10.1016/j.giq.2017.10.008

Klievink, B., Bharosa, N., & Tan, Y.-H. (2016). The collaborative realisation of public values and business goals: Governance and infrastructure of public–private information platforms. *Government Information Quarterly*, *33*(1), 67–79. doi:10.1016/j.giq.2015.12.002

Kolloch, M., & Dellermann, D. (2018). Digital innovation in the energy industry: The impact of controversies on the evolution of innovation ecosystems. *Technological Forecasting and Social Change*, *136*, 254–264. doi:10.1016/j.techfore.2017.03.033

Langley, A. (1999). Strategies for theorising from process data. *Academy of Management Review*, *24*(4), 691–710. doi:10.5465/amr.1999.2553248

Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organisation and management: Unveiling temporality, activity, and flow. *Academy of Management Journal*, *56*(1), 1–13. doi:10.5465/amj.2013.4001

Luna-Reyes, L. F., & Gil-Garcia, J. R. (2014). Digital government transformation and internet portals: The co-evolution of technology, organisations, and institutions. *Government Information Quarterly*, *31*(4), 545–555. doi:10.1016/j.giq.2014.08.001

Lusch, R. F., & Nambisan, S. (2015). Service Innovation: A Service-Dominant Logic Perspective. *Management Information Systems Quarterly*, *39*(1), 155–175. doi:10.25300/MISQ/2015/39.1.07

Magnusson, J., Koutsikouri, D., & Päivärinta, T. (2020). Efficiency creep and shadow innovation: Enacting ambidextrous IT Governance in the public sector. *European Journal of Information Systems*, *29*(4), 1–21. doi:10.1080/0960085X.2020.1740617

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, *36*(4), 101385. doi:10.1016/j.giq.2019.06.002

Möller, K., & Halinen, A. (2017). Managing business and innovation networks—From strategic nets to business fields and ecosystems. *Industrial Marketing Management*, *67*, 5–22. doi:10.1016/j.indmarman.2017.09.018

Nambisan, S. (2018). Architecture vs. ecosystem perspectives: Reflections on digital innovation. *Information and Organization*, *28*(2), 104–106. doi:10.1016/j.infoandorg.2018.04.003

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773. doi:10.1016/j.respol.2019.03.018

Nischak, F., Hanelt, A., & Kolbe, L. M. (2017). Unraveling the Interaction of Information Systems and Ecosystems-A Comprehensive Classification of Literature. ICIS.

Nograšek, J., & Vintar, M. (2014). E-government and organisational transformation of government: Black box revisited? *Government Information Quarterly*, *31*(1), 108–118. doi:10.1016/j.giq.2013.07.006

OECD. (2019). *Digital Government in Chile – A Strategy to Enable Digital Transformation*. OECD.

Osborne, S. P., Radnor, Z., Kinder, T., & Vidal, I. (2015). The SERVICE framework: A public-service-dominant approach to sustainable public services. *British Journal of Management*, *26*(3), 424–438. doi:10.1111/1467-8551.12094

Perks, H., Kowalkowski, C., Witell, L., & Gustafsson, A. (2017). Network orchestration for value platform development. *Industrial Marketing Management*, *67*, 106–121. doi:10.1016/j.indmarman.2017.08.002

Picazo-Vela, S., Gutiérrez-Martínez, I., Duhamel, F., Luna, D. E., & Luna-Reyes, L. F. (2018). Value of inter-organizational collaboration in digital government projects. *Public Management Review*, *20*(5), 691–708. doi:10.1080/14719037.2017.1305702

Pilemalm, S., Lindgren, I., & Ramsell, E. (2016). Emerging forms of inter-organisational and cross-sector collaborations in e-government initiatives: Implications for participative development of information systems. *Transforming Government: People. Process and Policy*, *10*(4), 605–636.

Pratt, M. G. (2009). From the editors: For the lack of a boilerplate: Tips on writing up (and reviewing) qualitative research. American Society of Nephrology.

Purdy, J., Ansari, S., & Gray, B. (2019). Are logics enough? Framing as an alternative tool for understanding institutional meaning making. *Journal of Management Inquiry*, *28*(4), 409–419. doi:10.1177/1056492617724233

Rose, J., Persson, J. S., Heeager, L. T., & Irani, Z. (2015). Managing e-Government: Value positions and relationships. *Information Systems Journal*, *25*(5), 531–571. doi:10.1111/isj.12052

Russo-Spena, T., Tregua, M., & Bifulco, F. (2017). Searching through the jungle of innovation conceptualisations: System, network and ecosystem perspectives. *Journal of Service Theory and Practice*, *27*(5), 977–1005. doi:10.1108/JSTP-10-2015-0224

Sharif, M. H. M., Troshani, I., & Davidson, R. (2015). Public sector adoption of social media. *Journal of Computer Information Systems*, *55*(4), 53–61. doi:10.1080/08874417.2015.11645787

Shipilov, A., & Gawer, A. (2020). Integrating research on interorganizational networks and ecosystems. *The Academy of Management Annals*, *14*(1), 92–121. doi:10.5465/annals.2018.0121

Simmonds, H., & Gazley, A. (2018). Service ecotones: The complex boundary zones of service (eco) systems. *Journal of Service Theory and Practice*, *28*(3), 384–404. doi:10.1108/JSTP-08-2017-0136

Simmonds, H., Gazley, A., Kaartemo, V., Renton, M., & Hooper, V. (2021). Mechanisms of service ecosystem emergence: Exploring the case of public sector digital transformation. *Journal of Business Research*, *137*, 100–115. doi:10.1016/j.jbusres.2021.08.008

Story, V., O'Malley, L., & Hart, S. (2011). Roles, role performance, and radical innovation competences. *Industrial Marketing Management*, *40*(6), 952–966. doi:10.1016/j.indmarman.2011.06.025

Taillard, M., Peters, L. D., Pels, J., & Mele, C. (2016). The role of shared intentions in the emergence of service ecosystems. *Journal of Business Research*, *69*(8), 2972–2980. doi:10.1016/j.jbusres.2016.02.030

Tassabehji, R., Hackney, R., & Popovič, A. (2016). Emergent digital era governance: Enacting the role of the 'institutional entrepreneur' in transformational change. *Government Information Quarterly*, *33*(2), 223–236. doi:10.1016/j.giq.2016.04.003

The Fletcher School. (2018). *UN E-Government Survey 2018.* https://www.un.org/development/desa/publications/2018-un-e-government-survey.html

Thomas, L. D., & Autio, E. (2020). Innovation ecosystems in management: An organising typology. In M. A. Hitt & R. J. Aldag (Eds.), *Oxford Encyclopedia of Business and Management*. Oxford University Press. doi:10.1093/acrefore/9780190224851.013.203

Tiwana, A., Konsynski, B., & Bush, A. (2010). Platform evolution: Coevolution of platform architecture, governance, and environmental dynamics (research commentary). *Information Systems Research*, *21*(4), 675–687. doi:10.1287/isre.1100.0323

Tiwana, A., Konsynski, B., & Venkatraman, N. (2013). Information technology and organisational governance: The IT governance cube. *Journal of Management Information Systems*, *30*(3), 7–12. doi:10.2753/MIS0742-1222300301

Tsujimoto, M., Kajikawa, Y., Tomita, J., & Matsumoto, Y. (2018). A review of the ecosystem concept—Towards coherent ecosystem design. *Technological Forecasting and Social Change*, *136*, 49–58. doi:10.1016/j.techfore.2017.06.032

UN Department of Economic and Social Affairs. (2018). *Gearing e-government to support transformation towards sustainable and resilient societies*. U. Nations.

Urbinati, A., Manelli, L., Frattini, F., & Bogers, M. L. (2021). The digital transformation of the innovation process: Orchestration mechanisms and future research directions. *Innovation*, 1–21. doi:10.1080/14479338.2021.1963736

Uyarra, E., Edler, J., Garcia-Estevez, J., Georghiou, L., & Yeow, J. (2014). Barriers to innovation through public procurement: A supplier perspective. *Technovation*, *34*(10), 631–645. doi:10.1016/j.technovation.2014.04.003

Valkokari, K., Seppänen, M., Mäntylä, M., & Jylhä-Ollila, S. (2017). Orchestrating innovation ecosystems: A qualitative analysis of ecosystem positioning strategies. *Technology Innovation Management Review*, *7*(3), 12–24. doi:10.22215/timreview/1061

van Meerkerk, I., & Edelenbos, J. (2018). Facilitating conditions for boundary-spanning behaviour in governance networks. *Public Management Review*, *20*(4), 503–524. doi:10.1080/14719037.2017.1302248

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2019). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. doi:10.1016/j.jsis.2019.01.003

Wang, C., Medaglia, R., & Zheng, L. (2018). Towards a typology of adaptive governance in the digital government context: The role of decision-making and accountability. *Government Information Quarterly*, *35*(2), 306–322. doi:10.1016/j.giq.2017.08.003

Wareham, J., Fox, P. B., & Cano Giner, J. L. (2014). Technology ecosystem governance. *Organization Science*, *25*(4), 1195–1215. doi:10.1287/orsc.2014.0895

Weerakkody, V., Omar, A., El-Haddadeh, R., & Al-Busaidy, M. (2016). Digitally-enabled service transformation in the public sector: The lure of institutional pressure and strategic response towards change. *Government Information Quarterly*, *33*(4), 658–668. doi:10.1016/j.giq.2016.06.006

Wei, R., Geiger, S., & Vize, R. (2019). A platform approach in solution business: How platform openness can be used to control solution networks. *Industrial Marketing Management*, *83*, 251–265. doi:10.1016/j.indmarman.2019.04.010

Weil, H. B., Sabhlok, V. P., & Cooney, C. L. (2014). The dynamics of innovation ecosystems: A case study of the US biofuel market. *Energy Strategy Reviews, 3*, 88-99.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, *22*(1), 102–129. doi:10.17705/1jais.00655

Williams, C. K., & Karahanna, E. (2013). Causal Explanation in the Coordinating Process: A Critical Realist Case Study of Federated IT Governance Structures. *Management Information Systems Quarterly*, *37*(3), 933–964. doi:10.25300/MISQ/2013/37.3.12

Winter, S., Berente, N., Howison, J., & Butler, B. (2014). Beyond the organisational 'container': Conceptualising 21st century sociotechnical work. *Information and Organization*, *24*(4), 250–269. doi:10.1016/j.infoandorg.2014.10.003

Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organisational performance: Insights from a matched survey of business and IT managers. *Management Information Systems Quarterly*, *39*(2), 497–518. doi:10.25300/MISQ/2015/39.2.10

Yang, T.-M., & Maxwell, T. A. (2011). Information-sharing in public organisations: A literature review of interpersonal, intra-organizational and inter-organisational success factors. *Government Information Quarterly*, *28*(2), 164–175. doi:10.1016/j.giq.2010.06.008

Yaqub, M. Z., Srećković, M., Cliquet, G., Hendrikse, G., & Windsperger, J. (2020). Network innovation versus innovation through networks. *Industrial Marketing Management*, *90*, 79–89. doi:10.1016/j.indmarman.2020.07.001

Yin, R. (2013). How to do Better Case Studies. In L. Bickman & D. Rog (Eds.), *The SAGE Handbook of Applied Social Research Methods* (pp. 254–282). SAGE Publications.

ADDITIONAL READING

Barcevičius, E., Cibaitė, G., Codagnone, C., Gineikytė, V., Klimavičiūtė, L., Liva, G., Matulevič, L., Misuraca, G., & Vanini, I. (2020). *Exploring Digital Government transformation in the EU*. Publications Office of the European Union.

Eggers, W. D. (2016). *Delivering on Digital: The Innovators and Technologies That Are Transforming Government*. RosettaBooks.

Eggers, W. D., & Bellman, J. (2015). *The journey to government's digital transformation.* Deloitte. https://www2.deloitte.com/content/dam/insights/us/articles/digital-transformation-in-government/DUP_1081_Journey-to-govt-digital-future_MASTER.pdf

Falk, S., Rommele, A., & Silverman, M. (Eds.). (2017). *Digital Government*. Springer. doi:10.1007/978-3-319-38795-6

Greenway, A., Terrett, B., Bracken, M., & Loosemore, T. (2018). *Digital Transformation at Scale: Why the Strategy Is Delivery: Why the Strategy Is Delivery*. London Publishing Partnership.

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, *28*(1), 52–61. doi:10.1016/j.infoandorg.2018.02.004

KEY TERMS AND DEFINITIONS

Cloud Computing: Cloud computing is a model network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Hybrid Cloud: A network of servers operating as a cloud in a combination of On-Premise, Public and Private forms brought together to allow data and applications to be shared between them to meet an organisation's ICT infrastructure requirements.

ICT Common Capability Contracts: A government sourcing programme. Any business or ICT capability that can potentially be used by more than one agency, or across the whole of government, to support the delivery of business outcomes.

ICT Infrastructure: ICT infrastructure includes hardware (mainly physical servers), software, networks, data centres, facilities, and related equipment, which is used to develop, test, operate, monitor, manage, and support ICT services.

Infrastructure as a Service (IaaS): Infrastructure as a service (IaaS) delivers cloud computing infrastructure—servers, storage, network, and operating systems—as an on-demand service. Rather than purchasing servers, data centre space, or network equipment, clients instead buy those resources as a fully outsourced on-demand service.

Private Cloud: Infrastructure that emulates some of the cloud computing features, like virtualisation, but does so on a private network.

Public Cloud: Public cloud is infrastructure that consists of shared resources. A cloud model is 'public' when the services are rendered over a network owned by a third-party which is usually available to anyone who wants to use or purchase them. Public cloud services provide massive on-demand scalability and management but are problematic for companies and government agencies who must comply with particular security mandates and data governance regulations.

Software-as-a-Service (SaaS): A model for distributing software in which a provider hosts applications and makes these available to users over the Internet. A provider licenses a SaaS application to customers as an on-demand service, either through a subscription or through a pay-as-you-go model.

Chapter 19
Smart Management for Digital Transformation in China

Poshan Yu
https://orcid.org/0000-0003-1069-3675
Soochow University, China & Krirk University, Thailand

Muchen Yu
Independent Researcher, China

Michael Sampat
Independent Researcher, Canada

ABSTRACT

Under the situation of an epidemic, the new industry based on digital technology and the rise of new platforms has injected new vitality into many economic subjects and enterprises, also bringing a series of new challenges such as digital asset security, digital financial risk, and platform monopoly. China is no exception. As one of the world's major economic entities, China has begun to emphasize the importance of digital economy for real economy or enterprise transformation; through government support and related policies, enterprises' own transformation planning has brought new opportunities for digital economic development. This chapter will focus on China's digital transformation of intelligence. Through data integration and data collection, the author conducts academic research on the characteristics of transformation, policy regulation, case studies, and existing shortcomings and challenges of smart management in China's digital transformation.

INTRODUCTION

The digital economy is held its breath in 2020 (Schwandt, 2020). As a new economic form, the digital economy is becoming an important driving force to promote quality improvement, boost efficiency, and power upgrading of economic development, and also the commanding point of a new round of global

DOI: 10.4018/978-1-7998-9008-9.ch019

industrial competition and a new momentum of promoting the revitalization of the real economy and accelerating the transformation and upgrading (CAICT, 2021).

China's digital transformation is in a stage of steady development, which not only creates new development opportunities for economic transformation, but also provides vitality and models for the world's digital intelligent management. At the same time, there are still problems and unsolved challenges, this chapter will discuss the intelligent management of China's digital transformation, analyze the current digital development status, summarize the development characteristics, and list the opportunities and challenges, finally make suggestions for China's digital transformation and give something worth learning for the transformation of other countries.

BACKGROUND

According to the World Economic Forum (2016), digital transformation represents an immense opportunity to create value for both industry and society, promote social equality, and even surpass the value of industry.

Walkme (2020) defined digital transformation as an ongoing effort to rewire all operations for the ever-evolving digital world, by adopting the latest technologies to improve processes, strategies. Expressions may vary, but most definitions of digital transformation tend to revolve around the same theme. Digital transformation is the use of digital technology to transform business processes and services from non-digital to digital. This includes, for example, using technical devices and tools to communicate and collaborate, and automating processes to move data to the cloud.

The spending of global digital transformation shows a trend of steady increase year by year (Figure 1). "IDC has forecast global digital transformation spending to exceed $10 trillion over a five-year period," said Craig Simpson (IDC, 2021). Over the past decade, China has become a leading global force in several areas of the digital economy and is home to one-third of the world's unicorns (Woetzel et al., 2017). In e-commerce, for example, about a decade ago, China accounted for less than 1 percent of global transaction value, but now it is more than 40 percent (Smith, 2018).

The digital economy is based on digital knowledge and information as the key factor of production, digital technology as the core driving force, modern information networks as an important carrier, through the deep integration of digital technology and the real economy, and continuously improving the level of digitalization, networking, and intelligence, accelerating the reconstruction of economic development and the governance model of the new economic form, according to digital economy development in China (2021).

In recent years, China has attached great importance to the development of the digital economy. China's global digital transformation market share would be the third-largest in 2019, behind the United States and Western Europe (Figure 2). At the end of June 2019, Chinese President Xi Jinping said at the special session of the G20 Osaka Summit on digital economy that "to jointly improve the rules of data governance" and "to promote the integration and development of the digital economy and the real economy" (Xinhua, 2021). China's "14th Five-Year Plan" (2021) lists the digital economy as one of the key areas of development to meet the new requirements of digital economic, but also has brought new opportunities. China's digital economy is growing at a steady and rapid pace, the value-added of China's digital economy reached 35.8 trillion yuan ($5.12 trillion) last year, accounting for 36.2 percent of the country's GDP, according to the White Paper on the Development of China's Digital Economy (2020),

which was released by China Academy of Information and Communications Technology (CAICT) on July 3. The steady growth in the value-added of China's digital economy from $2.5 trillion in 2014 to $5.6 trillion in 2019 is positively correlated with China's GDP growth (Figure 3).

Figure 1. Spending on digital transformation technologies and services worldwide from 2017 to 2024 (in trillion U.S. dollars)
Source: IDC; Statista estimates; Salesforce.com
*Note: *Forecast data. The values for 2022 and 2023 are taken from a pre-COVID forecast. The 2018 figure is calculated by Statista based on 2019 spending and the annual growth rate provided by the source. The source has not released any data for 2021.*

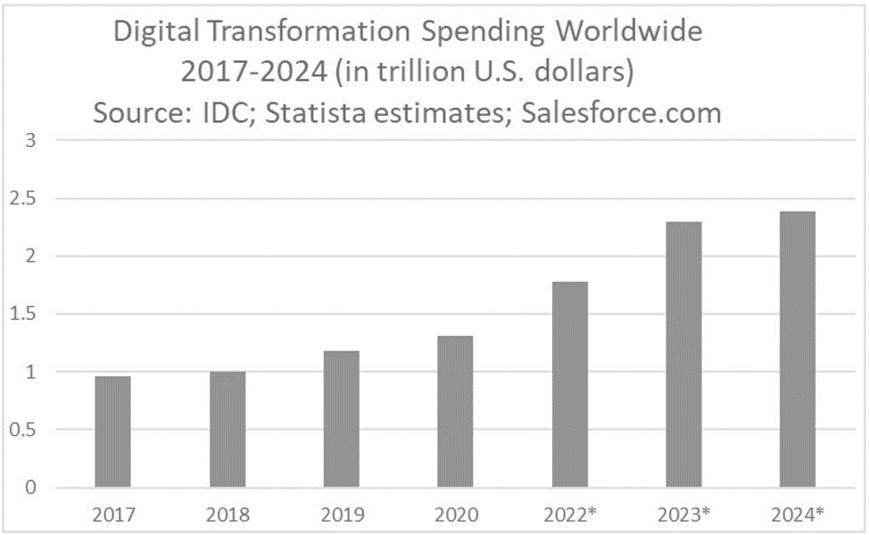


Figure 2. Digital transformation market sharing worldwide in 2019, by region
Source: IDC

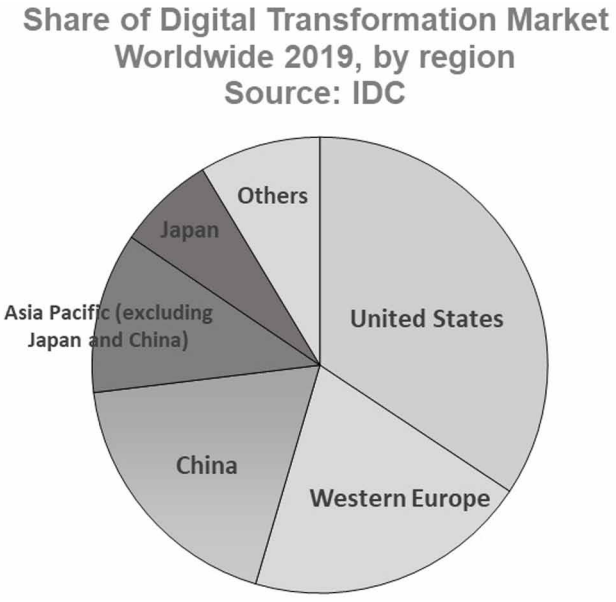


Figure 3. Contribution of China's digital economy to economic growth
Source: CAICT

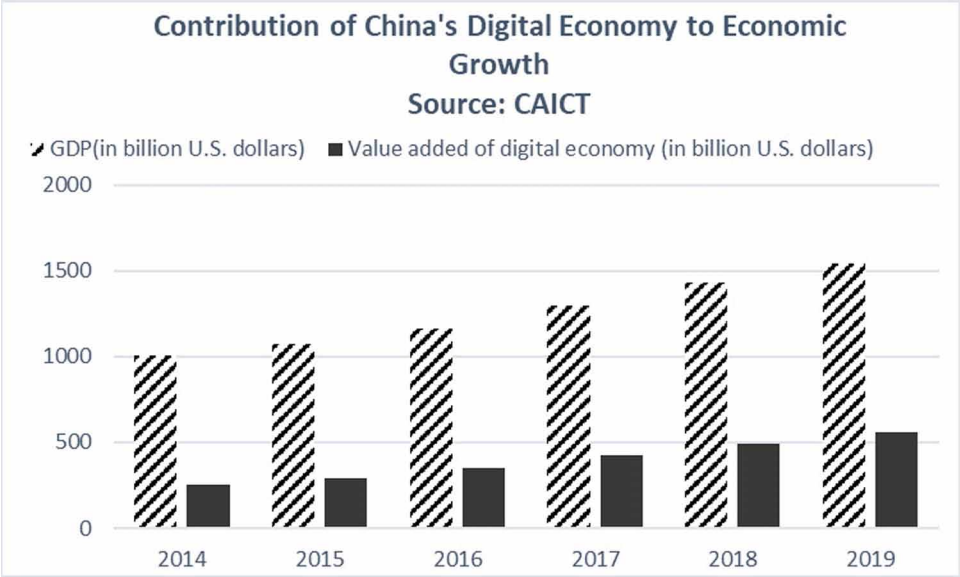
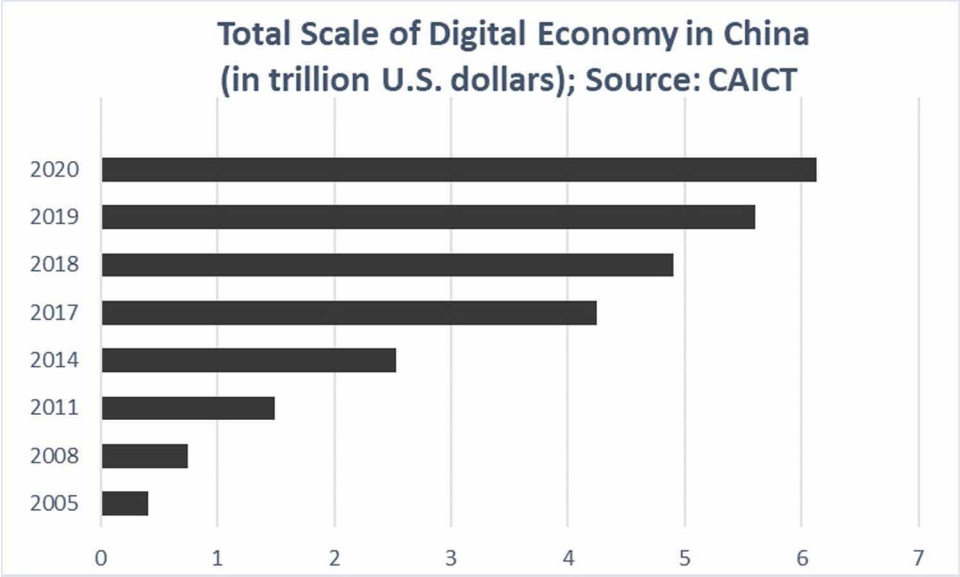


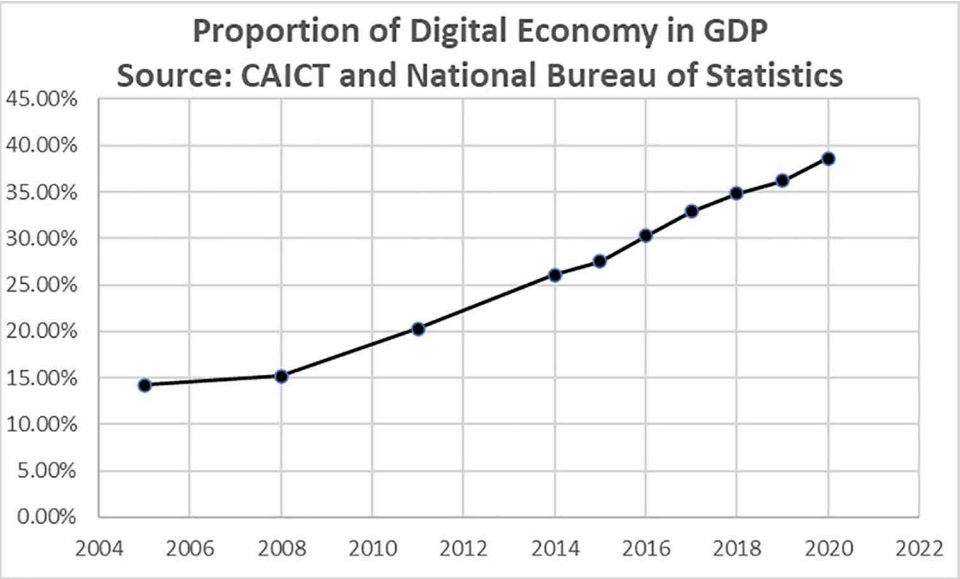
Figure 4. Scale and proportion of China's digital economy value added
Source: CAICT



In 2020, China's digital economy continued to flourish, expanding from $0.41 trillion in 2005 to $6.13 trillion (Figure 4). According to the White Paper on the Development of the Digital Economy in China (2020), the digital economy has been growing at a rate of more than 10% from 2005 to 2019, an increase of about 12.7 times. With the new round of scientific and technological revolution and indus-

trial reform continuing to advance, combined with the impact of the epidemic, the digital economy has become the most dynamic, the most innovative radiation of the most extensive economic forms, one of the core growth areas of the national economy (CAICT, 2021).

Figure 5. Proportion of digital economy in GDP
Source: CAICT and National Bureau of Statistics



The digital economy has become more and more prominent in the national economy, its share of GDP has been increasing year by year, showing a steady growth trend in the past five years, accounting for 38.6% in 2020, increased by 2.4% on a year-on-year basis (Figure 5), and China's digital economy is writing a history of development that has amazed the world (AFM, 2021).

The digital economy plays a key role in promoting economic development and is an important embodiment of the internationalization of the digital economy (Zhang, 2020). Dai and Chen (2019) suggested China's digital economy has become a main driver of the country's economy and exponential sector growth is expected to continue over the next decade. China's digital trade continues to deepen, extensive development, e-commerce, sharing economy and other economic models are developing particularly rapidly, and constantly inject power into the development of the digital economy. For example, China has launched more than 400 innovative 5G projects in industry, transportation, medical and other fields (CAICT, 2021).

"China's digital economy keeps growing rapidly and is becoming a new engine for high-quality economic development," remarked He Wei (2021), deputy director of the institute of politics and economy of CAICT.

CHARACTERISTICS OF DIGITAL TRANSFORMATION OF CHINESE BUSINESSES

China's digital transformation is already having a profound impact on its own economy and is likely to have an increasing influence on the worldwide digital landscape (Woetzel et al., 2017). The White Paper on China's Digital economy development (2020) outlined that it is the core of the development of the digital economy to reshape productivity through digital industrialization and industrial digitization.

Bain recently released the "Digital Economy Internet China's Digital Development Model" (2021) research report showing that China's digital development model has four major characteristics:

- Efficient aggregation of supply and demand resources: in an open and inclusive manner, the collection and matching of externally dispersed supply-side and demand-side resources, including technology, products, services, traffic and other multi-dimensional resources;
- Flowing data value, with the massive flow of user data as the cornerstone, opening up the end-to-end data interface, with the help of iterative recommended technology and the development of multi-scenario application data tools, to achieve the two-way flow of data for efficient use;
- Localized innovation-driven technology empowerment, based on localized market characteristics and needs for technological innovation, with innovative technology resulting in the form of a platform to export energy, to reduce the threshold of innovation;
- Deep operational empowerment of the full value chain goes beyond purely technical output to deep participation in all aspects of the business operation, providing complete solutions and assisting the business to land and improve operational efficiency.

Digital transformation is inseparable from market promotion, the characteristics of China's digital transformation cover a wide range of consumer diversity, determine the personalization of market demand, enterprise innovation consumption model, explore new development paths is the way to promote the success of transformation. This is explained specifically by the following example.

On April 16, 2021, JD.com Supermarket and Liang Pin shop signed a 2021 strategic cooperation agreement, the two sides will focus on omnichannel supply chain innovation, domain-wide marketing upgrade, C2M (Customer-to-Manufacturer) new product co-creation and user operations to carry out in-depth cooperation, and jointly explore the development model of the field of instant consumption, to open up new blue seafood consumption trends (Kang, 2021).

According to JD.com and Liang Pin shop (2021), in the field of regional marketing, the two sides will carry out user operation mode in-depth co-creation, from the station to the station, from the pan-crowd to the precise population transformation, greatly improving marketing efficiency. The two sides will also increase cooperation with new channels to create live channels, with the new brand incubation program to explore the content marketing innovation model in-depth, collaborative brand building and product dissemination of the whole link.

Not only that, JD.com supermarkets and Liang Pin shops are constantly excavating the new blue sea of the food market (Kang, 2021). In 2019, Liang Pin shop put forward a focus on high-end snack strategy, and JD.com supermarkets to jointly develop new brands and new products for the market targeted consumer demand, such as, for children's snacks "salt reduction and sugar reduction" demand launched children's snack sub-brand "good food fairy"; for weight loss fitness crowd demand for fitness sub-food

brand "good products fly". The two brands in JD.com supermarket rapid growth at the same time led to the growth of new consumption trends.

According to Tencent (2021), China's digital transformation continues to rise on the promise of China's major medium- and long-term strategies, led by first-tier cities such as Shanghai, Beijing, Shenzhen and Guangzhou, driving other regions and cities, from the local to the holistic level.

The economies of scale of original digital industry players, such as e-commerce and network finance, are significantly ahead of traditional industries. They have become the backbone of the digital development of the industry. But with the accelerated adoption of new infrastructure, traditional industries are accelerating digital transformation.

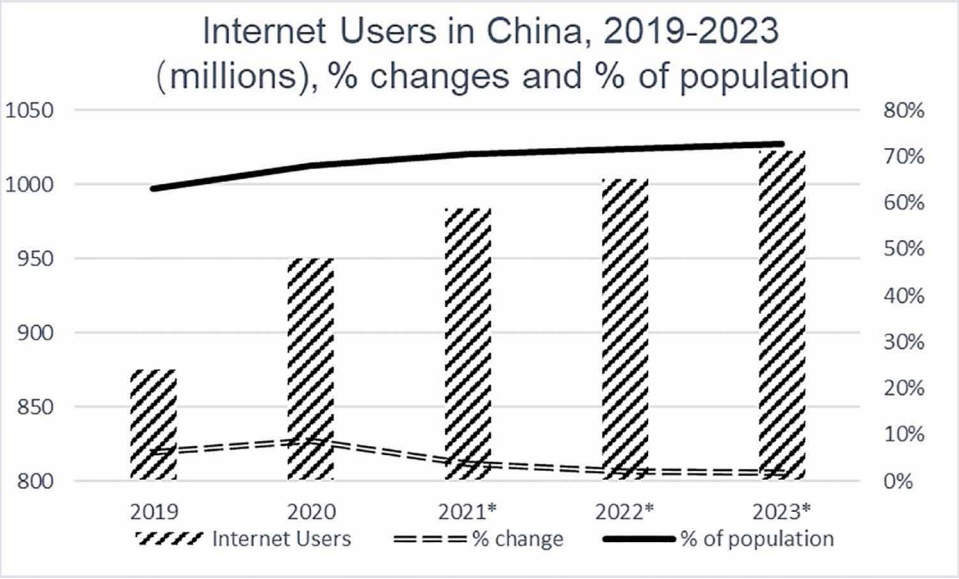
Government, enterprises and consumers all occupy a key position in the process of China's digital transformation. Tripartite coordination and joint promotion are an important feature of digital transformation.

The long-term growth trend of China's digital transformation has not changed and will enter a period of co-existence of power and pressure, with many risks and challenges, such as data management and environmental regulation.

CHINA'S DIVERSE CONSUMER DEMAND IS DRIVING THE DIGITALIZATION OF THE INDUSTRY

Globally, China's large Internet user base, as the rest of the world does not have a very dynamic consumer market and diverse consumer demand, is the driving force to continue to promote socio-economic transformation and development. China's consumers are globally digital and more inclusive in their attitude to digital use, creating massive amounts of liquidity data value and providing unique conditions for digital economic development and transformation (Wang et al., 2017).

Figure 6. Internet users and cumulative growth in online retail in China (%)
Source: eMarketer, Feb 2021



Note: individuals of any age who use the internet from any location via any device at least once per month; excludes Hong Kong; * Forecast data.

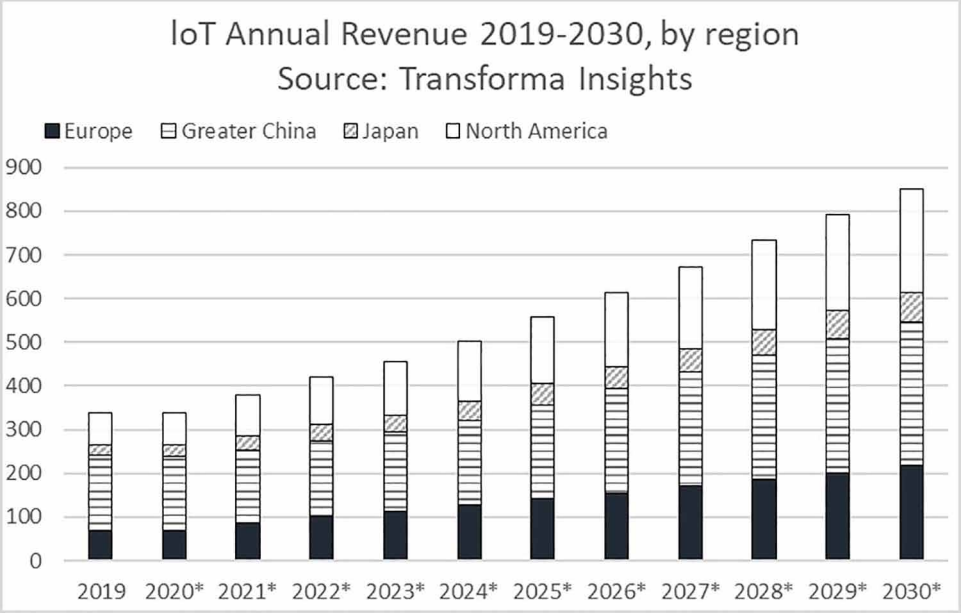
China will have 983.7 million Internet users this year, making it the world's largest digital society, with the number of Internet users growing by 8.6% in 2020, the fastest growth since 2012. China's Internet user growth rate will slow to 3.6 percent this year, raising Internet penetration to 70.4 percent (Figure 6).

There are many driving factors, the main driver is the accelerated outbreak of new coronary pneumonia from the individual, enterprises to the government of all aspects of the social digital transformation wave. On the individual side, the isolation of the epidemic and the relevant government policies control the development of the offline real economy so that individuals are more inclined to use the Internet. Users' willingness to access the Internet and their Internet habits accelerate the trend (CNNIC, 2021). According to PwC (2021), China's mobile payment usage rate is 86%, the highest in the world, more than twice that of the United States and 2.5 times the global average. Individuals use mobile media platforms and social platforms to obtain information, online shopping, online takeaway, solving daily life needs, online government applications, and health code travel, sharing the digital dividends of the Internet. It is this passion for technological innovation and internet platform-driven lifestyle convenience that leads the world in digitization for Chinese consumers (CNNIC, 2021).

Figure 7. China cumulative growth in online retail sales percent (%)
Source: National Bureau of Statistics

From 2020 to February 2021, online retail sales showed a steady growth, with the cumulative growth in online retail sales more than tripled from late 2020 to February 2021 according to official Chinese data (Figure 7). Between December 20 and February 21, when the outbreak was at its worst, online sales grew by more than 20%, and online consumption has become the choice of the vast majority of people (CAICT, 2021).

Figure 8. Internet of Things (IoT) annual revenue from 2019 to 2030, by region (in billion U.S. dollars)
Source: Transforma Insights, December 2020.
*Note: Revenue is defined as annual spending by end customers on IoT hardware, connectivity, and services. IoT connections are defined as connections to remote sensing and actual devices. This includes associated aggregation devices such as hub devices, * Forecast data.*



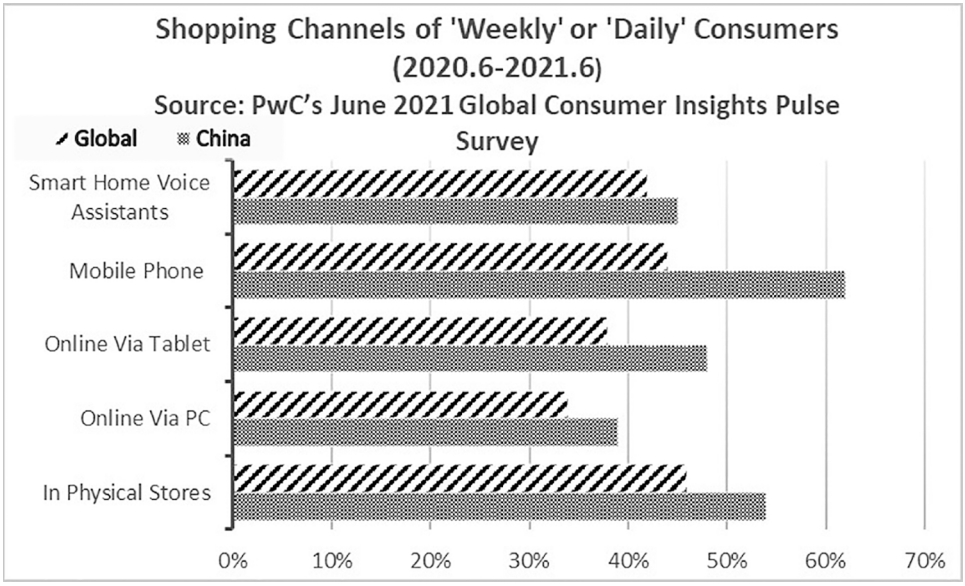
China is expected to dominate the Internet of Things (IoT) market with $328.2 billion in revenue by 2030, about a third of the market. North America and Europe are expected to lag in terms of regional revenues (Figure 8), according to Transforma Insights (2020).

Online services reduce mobility, reduce the risk of outbreak transmission, and make a positive contribution to stabilizing economic growth, outlined by Wang and Wu (2020). For example, many schools actively use the Internet to teach students online, China has nearly 300 medical units for the outbreak to provide online consultation, daily excellent fresh, ding-buy vegetables and other fresh platform daily orders increased 3 to 4 times year-on-year. In addition, the online development of offline demand will stimulate the digital economy to release the multiplier effect and lead to a gradual economic recovery. McKinsey (2021) estimates that for every additional unit of online consumption, 61% replaces the original demand and 39% adds new demand. In contrast, the digital economy has significant advantages over the real economy in responding to the epidemic, which not only helps effectively prevent and control epidemic spread but also mitigates the negative impact of the epidemic on the economy to some extent.

China is more familiar with the use of Internet services than the rest of the world. Compared with the world, Chinese consumers are more accustomed to online shopping and online transactions through a variety of channels (Figure 9).

Research shows that, in daily life, the application of new technologies provides consumers with a more convenient life, allowing consumers to embrace the Internet, widely using a variety of Internet products and services (Bain, 2021). “Mobile First, Digital Everything”, Jamie Dimon (2018) said, the chairman and CEO of JPMorgan Chase. China’s regional economic cities are full of vitality.

Figure 9. In the last 12 months, how often have you bought products (e. g. clothes, books, electronics) using the following shopping channels?
Source: PwC's June 2021 Global Consumer Insights Pulse Survey



For instance, Beijing-Tianjin-Hebei, Yangtze River Economic Belt, Guangdong, Hong Kong and Macao Bay Area, Chengyu Region, such as the two-city economic circle and other regions continue to focus on the development of advanced computing, artificial intelligence, high-end chips and other core industries of the digital economy, become the digital economy region innovation highland. In the Beijing-Tianjin-Hebei region, Beijing's scientific research innovation and digital transformation of the service industry are strong, and the role of application innovation and radiation-driven is becoming more and more significant. Along the Yangtze River Economic Belt, Shanghai has accelerated the construction of the Yangtze River Delta Science and Technology Innovation Community, paying attention to the integration and utilization of resources in the Yangtze River Delta, and fully activating the innovative elements of resources. Guangdong, Hong Kong and Macao Bay Area in the spatial layout of the construction of "double-core one corridor two zones", play a radiation-led and demonstration-driven role, accelerate the pace of building a global digital economy and industry center. Chengyu region has made great efforts to promote the digitalization, networking and intelligent transformation of traditional industries, laying a solid foundation for industrial restructuring and transformation and upgrading (CAICT, 2020).

THE ROLES OF GOVERNMENT IN ASSISTING CHINESE BUSINESSES DIGITAL TRANSFORMATION

The institutional theory introduces a unique approach regarding the study of social, economic, and political dynamics (DiMaggio & Powell, 2000). Institutions form the rules of the game within society (North, 1991). Institutions exist, Douglass C. North (1993) argues, due to the uncertainties involved in human interaction; they are the constraints devised to structure that interaction. As a developing coun-

try, China recognizes that the system facilitates and revitalizes the process and that policies to promote digital transformation are deepening and landing. Incentives embodied in belief systems as expressed in institutions determine economic performance, Douglass C. North (1993) said.

Since the 18th National Congress of the Communist Party of China (CPC) in 2012, the Chinese government has attached great importance to the development of the digital economy and gradually promoted the digital economy as a national strategy. On the whole, China's digital economy development strategic planning has gone through the rapid development and iterative evolution of information and communication technology to the in-depth integrated development of economic and social fields (CAICT, 2020).

At present, the development strategy of the digital economy focuses on cultivating new forms of economic and social development with data as the key element (CAICT, 2021). Each province has laid out how to transition to digitalization.

At the central level, the "digital economy" will be included in the government's work report for the fourth time in 2020, explicitly to "comprehensively promote the 'Internet + ' and build a new advantage of the digital economy" (Li, 2020). According to CCID (2020), the average 2020 China Digital Economic Development Index is 29.6, of which 10 provinces (cities) are above average. Guangdong has an index value of 65.3 to maintain the national digital economic development level TOP1 (Figure 10).

The digital economy is becoming an important engine of economic development in post-development cities, which is expected to promote the narrowing of regional development differences. The digital economic index and economic development trend are about the same in each province, but it is not simply positively correlated, and there are obvious differences between the level of digital economic development and the size of the economy in some areas (CAICT, 2021).

Figure 10. 2020 China's provincial and digital economic development index
Source: CCID consultant 2020.09

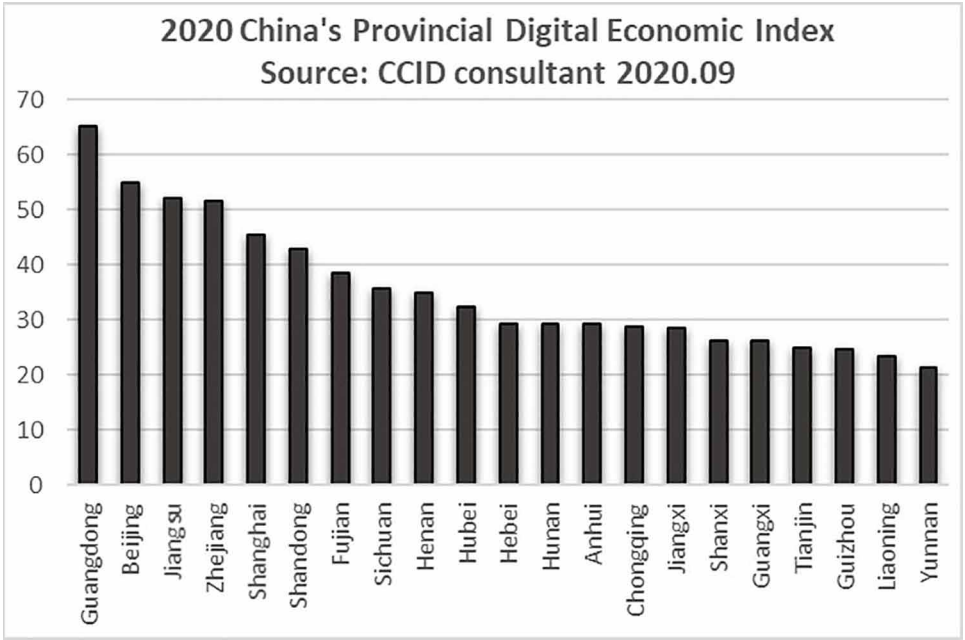


Table 1. Chinese government's policies to promote the digitalization process

	Policies related to China's digital economy
2020.4	On supporting the healthy development of new mode of employment, activating the consumer market to promote the expansion of employment views
2020.4	About advancing the 'Upper Cloud with Numbers' initiative
2020.3	Special action program for digital empowerment of small and medium-sized enterprises
2020.3	Notice of the General Office of the Ministry of Industry and Information Technology on accelerating the development of the industrial Internet
2019.10	Implementation plan of the National Digital Economy Innovation and Development Pilot Zone
2016.12	13th Five-Year Plan' national information planning
2016.3	Outline of the 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China

Source: http://www.gov.cn/

Since China proposed its strategy to build big data in 2015, policies to promote digital economic development and digital transformation have been deepened and implemented. The outline of China's 14th Five-Year Plan proposes to meet the digital age, activate the potential of data elements, promote the construction of a strong network, accelerate the construction of a digital economy, digital society and digital government, and drive the transformation of production, lifestyle and governance as a whole through digital transformation (Sun, 2021). The outline of the 14th Five-Year Plan of 15 provinces and cities, such as Shanghai, calls for the development of the digital economy and puts forward the goal of digital economic development. Government policy supports the preservation of the digital process.

Table 2. Digital policies in China provinces by February 2021

	China's provincial digital development policy (Before 2021.2)	
Time	Place	Policy
2021.1	Shanghai	Opinions on comprehensively promoting the digital transformation of Shanghai's cities
2020.12	Zhejiang	Regulations on the Promotion of Digital Economy in Zhejiang Province
2020.11	Jiangsu	Opinions on furthering the development of digital economy
2020.9	Beijing	Beijing's Platform for Action for The Development of Digital Economic Innovation
2020.4	Hebei	Digital economic development planning in Hebei Province
2018.11	Anhui	Support a number of policies for digital economic development

Source: Report on the Development of China's Regional and Urban Digital Economy (2020)

From the policy focus, the development policy of the leading areas of the digital economy has expanded from development itself to regional development, and then to drive development, such as Jiangsu and Ningxia jointly released in May 2020 "The key work of digital economic cooperation in Ningxia, Jiangsu Province 2020." Shanghai, Zhejiang, Guangdong and other places have begun to plan the digital economy management and supervision framework, while the Ministry of Inner Mongolia, Xinjiang and other places are still mainly focused on infrastructure construction (CAICT, 2021).

As businesses transform digitally, calls for governments to follow suit are growing. By digitizing, governments can deliver services to meet the constantly evolving needs of citizens and businesses, increasing efficiency and reducing costs, Bjarne Corydon, Vidhya Ganesan, and Martin Lundqvist (2016) suggested. The outline of the 14th Five-Year Plan points out that digital technology should be widely used in government management services, promote the re-engineering and optimization of government governance processes, and continuously improve the scientific nature of decision-making and service efficiency. Further putting digital government on the top level of national design, government digital is leading the digital transformation of various industries to promote digital economic development.

Zhang and Chen (2019) outlined that the essence of the digital transformation of government is reform, the reform and innovation of the traditional government operation mode and the traditional government information construction mode, and the systematic reform carried out under the background of deepening the reform and the information technology revolution in an all-round way. Pan (2021) suggested that to promote the innovation and integration of traditional industries and enterprises by promoting the reform of the administrative examination and approval system, perfecting the government governance system, creating a high-quality business environment for new industries and new models, and promoting the deep integration of digital technology and the real economy. Meanwhile, there are some problems. The existence of information resource silos, the lack of a standard specification system, and the interaction mechanism linking government still need to be improved (Ding, 2019). Furthermore, due to current digital government construction supply and demand imbalance, resources cannot be effectively allocated. Influenced by the regional socio-economic development level and the difference of technical basis, the construction efforts of digital government are very different. The level of government information development in developed cities represented by Shenzhen and Guangzhou is among the highest in the country, while the construction investment of third- and fourth-tier cities and townships is seriously inadequate (Pan, 2021).

DISCUSSION OF THE CASES OF DIGITAL TRANSFORMATION IN CHINA

The digital contest is underway. Businesses and society are undoubtedly undergoing a technology-driven transformation that has accelerated as the coronavirus crises have pushed the market to an inflection point. The pace of change, delivery and operations is separating leaders from followers; small and medium-sized enterprises (SMBs) in the Asia-Pacific region are not immune (IDC, 2020). For them, this proactive customer orientation is the most consistent driver of customer value and competitive advantage in the digital era (Blocker, C.P. et al., 2010).

Chen (2021) analyzed that a large number of local enterprises in China, in accordance with China's unique market environment, explore a series of innovative business models suitable for digital transformation. Alibaba, JD.com and other local Internet enterprises launched Alipay, JD.com self-employed logistics and other models. They successfully use digital economy means to solve the need for a long

time to take industrialization to complete the construction of market trust and business environment, adapt to the 'four synchronizations' (industrialization, urbanization, agricultural modernization and digitalization). It has greatly facilitated the simultaneous process of digitalization and industrialization in China. This is the reason it competes with internet giants in developed Western countries such as eBay, Amazon and Uber in China, Southeast Asia and other emerging markets (Chen, 2021).

Some of the examples of digital transformation and some results achieved in 2020 are as follows:

Table 3. Some cases of China's successful digital transformation

	Digital transformation		
	Product and service transformation	Operational transformation	Business model transformation
Financial services	China Merchants Bank	China Construction Bank	Pingan
Manufacturing	Sany Heavy Industries	Midea	Siemens
Retailing consumer goods	Starbucks	Baodao Glasses	Suning

As one of the manufacturing giants, Midea's digital transformation from traditional manufacturing step by step in the past decade, from Chinese manufacturing to Chinese intellectual manufacturing, can be regarded as a typical example of the transformation and upgrading of Chinese manufacturing enterprises (E-works, Huang, & Huang, 2020).

Since 2011, the core development ideas of Midea have shifted from scale-oriented to the pursuit of growth quality. The following year, with the rise of Internet enterprises, facing the profit margins are squeezed, the market response is slow, inventory backlog, capital occupation and other challenges. Based on this, Midea in the "product leadership, efficiency-driven, global operation" strategy under the main axis, began to carry out digital integration and construction, a drastic digital transformation and management changes began, according to Liang and Zhu (2019).

2013-2015 is the first stage of the digital transformation process, digital 1.0, which is initiated by Midea through a comprehensive refactoring of ITS systems. Through the full implementation of the 632 strategies, the construction of the Group's internal six operating systems, three management platforms, two portals and integrated technology platform, to achieve "one beautiful, one system, one standard" landing. In this process, Gu outlined (2020) Midea has accumulated a profound digital capability, through big data applications to continuously improve operational efficiency, with the help of quantitative data to achieve the professionalization and standardization of production management, unified process data system, formed a unified management system, for its deepening digital transformation provides a solid foundation.

In 2016-2017, Midea entered Digital 2.0 to create data-driven customer customization capabilities throughout itself. It puts forward flexible customization modes such as C2M and realizes data early warning and data drive by putting the site in the washing machine business unit first. It promotes business changes and system upgrades such as digital marketing, smart customer service, standardized modu-

larization, and digital flexible manufacturing. And in November 2016 set up the Company. Based on a summary of changes across the entire value chain during the multi-year digital transformation process, Beauty released its new Midea M. loT in October 2018 (E-works, 2020).

In 2020, Midea's strategy was upgraded to launch its second major transformation, upgrading "full digitalization and full intelligence" to the Group's core strategy, to transform Midea's transition into a data-driven technology group. These include the accelerated development of the three major platforms of Midea Cloud Sales, the Internet platform represented by Mercure, and the industrial Internet.

In the digital transformation, Midea has explored a unique development path from traditional manufacturers to technology enterprises, providing more enterprises with an experience worth learning from, but still facing challenges, how to maintain the leading position and establish the ability to innovate and create a new environment are important issues to consider in the new transformation (Liang & Zhu, 2019).

Against the background that all industries are aware of the importance of digital transformation, the retail consumer industry, which is based on China's huge consumer market, has innovated its digital approach.

Suning, as China's leading retail enterprise, is a typical enterprise with online and offline integration. Suning in 2009 officially launched the process of digital operation, the transformation of the Internet, and IBM based on Suning complex retail state in the industry for the first time put forward the concept of China and Taiwan, to carry Suning online and offline multi-industry, multi-scene digital demand (Bi, 2020).

On the road of the full link digitization of the store, Suning through the scene, covering the customer base and the matching level of the online industry, from the opening of the store location, into the store, shopping and after-sales dimensions for the contact fine landing digital capabilities. In addition, the shopping process is unmanned, virtualized, intelligent, improving the experience while fully collecting user data, and ultimately reverse guidance of the store's process design, management and operational strategy. Suning successfully verified the store digital solutions, the continuous iteration of a typical representative of the digitalization of Suning stores (Luo, 2019).

Suning offline digital layout, the realization of the online and offline scenes, service fusion, so that the online and offline become an extension of each other, on the one hand for consumers to provide the ultimate consumer experience, on the other hand for the retail industry to provide a model for learning from the cost-effectiveness (Bi, 2020).

In analyzing the successful enterprises' strategy of digital transformation, it can be found that they all combine with digital technology according to their own characteristics, locate the digital business organization, build the data platform, to promote the overall digital transformation of enterprises, master autonomy and initiative.

But digital transformation failure rates are also high. Enterprises need to consider not only their own strategic characteristics and competitors' but also to examine their own market environment and their own innovation (Wan, 2020).

The digital transformation of Procter & Gamble (P&G) in the Chinese market has not been smooth, and the market share has declined significantly. P&G is the industrial era of "big production, big retail, big channels, big brands, big logistics" products, like the Ford T-type car, to produce a good thing, through national advertising, national channels, contact with consumers across the country. Consumers don't need another choice. However, now from the industrial era to the information age, and further to the data era, many brands can use the network channels to reach their audience. Consumers demand further differentiation, personalization, customization. Although some changes have been made, the

perspective of transformation and their brand is not consistent. The investment of capital and manpower, to explore an effective implementation plan is also in vain. If P&G still did not take an effective digital transformation strategy, in the future it will face multiple pressures, the market will also be constantly updated products crowded. Market trends determine that the traditional business plan is no longer suitable, timely transformation is the only way for P&G wants to go further (Ke, 2016; Morgan, 2019).

OPPORTUNITIES AND CHALLENGES FOR CHINESE COMPANIES IN DIGITALIZING THEIR BUSINESS OPERATIONS

The progress made in digital transformation in China is unsurprising, as it evolves on China's unique strengths, creating opportunities and providing dynamism while also preparing for challenges and solving problems.

Three factors suggest there is huge upside for digital in China, and these may also have an impact on the characteristics of China's digital transformation (Woetzel et al., 2017).

- The large and young Chinese market offers scale advantages for digital business transformation;
- Well-capitalized BAT players are building a rich digital ecosystem that is now growing beyond them;
- The government gave digital players space to experiment before enacting official regulation and is now becoming an active supporter.

The coronavirus crises brought opportunities for change. Online office, online education, network video and other digital new business models in the epidemic under the pressure of the boom, a large number of enterprises to use big data, industrial Internet and other strengthening of supply and demand accurate docking, efficient production and integrated deployment (CAICT, 2020). The Covid-19 epidemic is a lively digital training session and a powerful digital accelerator.

The penetration rate of the digital economy in the three major industries is increasing year by year. In 2020, China's service, industrial and agricultural digital economies accounted for 40.7%, 21.0% and 8.9% of the added value of industries, respectively. (Figure 11). Digital transformation of industry accelerates, and the integration and development evolve to a deep level (CAICT, 2021).

From the perspective of the internal structure of the digital economy, it is an inevitable trend for the development of the digital economy that the proportion of digital industrialization decreases year by year and the proportion of industrial digitization increases year by year (Figure 12). The role of the digital economy in 'complementing' under the epidemic is highlighted. On the one hand, the strength of digital industrialization has been enhanced, driving many big data, cloud computing, artificial intelligence enterprise innovation and development, the industrial production system is more complete, to the global industrial chain in the high-end leap forward. On the other hand, the in-depth development of industrial digitization access to new opportunities. New digitalization models such as e-commerce, platform economy and sharing economy have replaced the prospects of digitalization upgrading of service industry, industrial digital transformation to breed a broad growth space for enterprises to digital output strong power (Lu, 2021).

Figure 11. Penetration rate of the digital economy in China 2016-2020, by industry
Source: CAICT

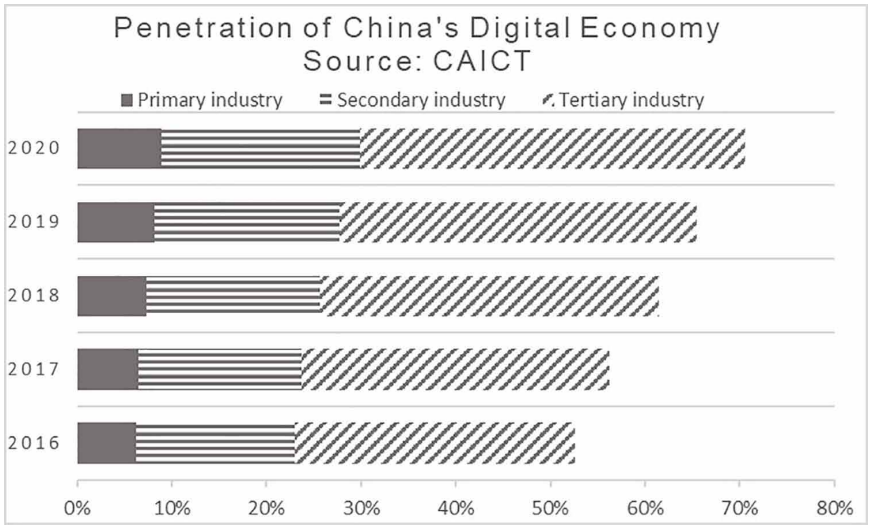
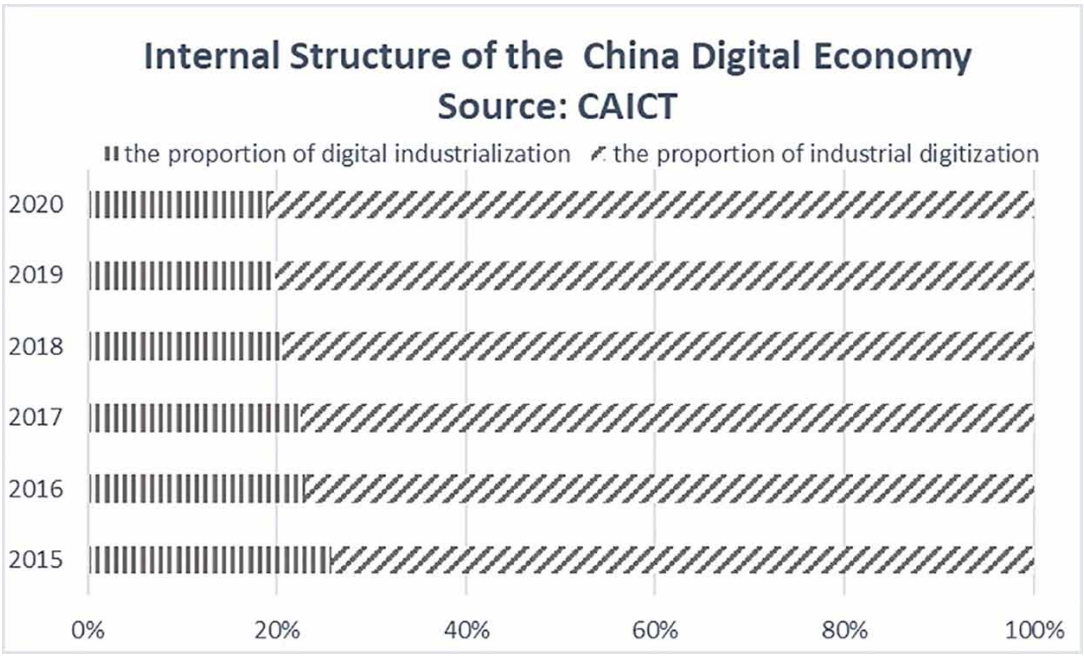


Figure 12. Internal structure of China digital economy
Source: CAICT



The digital consumption field has further expanded digital technology to provide new digital products involving work, learning, consumption, entertainment, social, and other scenarios around people's escalating consumer needs; new products, new services are emerging (CAICT, 2021; Hu, 2021).

During the epidemic, the online content industry, represented by games, reading, consumption, etc., ushered in the development of a new wind, to meet the personalized, diversified consumer demand. WeChat is China's most used social media app, with users spending over a billion hours a day on it. ByteDance's Tik Tok is second, followed by Kuaishou and Weibo (Foote & Atkinson, 2020).

Digital investment subject from a single to diversified development, PPP (Public-Private Partnership) model is widely used, investment return to achieve a new leap, the marginal efficiency of capital decreasing, and the investment structure from hard and soft to structural optimization. CT services account for an increasing proportion of digital investment, and the difference between digital economic hardware investment represented by communication equipment and digital economic services investment represented by software and databases is gradually narrowing (CAICT, 2021).

China's focus on innovation-driven approaches means driving sustainable business growth in complex environments with cutting-edge technologies such as cloud, artificial intelligence (AI), Internet of Things (IoT), 5G, blockchain, and robotics, says Jayesh Verma (2021). As CAICT (2021) concluded, the investment market evolves from an inefficient market to an effective market, and the new generation of information technology application market has been developed, taking 5G network construction investment as an example. China's investment in 5G technology is expected to exceed one trillion yuan ($145 billion) in the next five years (Yang, 2019).

Lin (2020) believes that China has advantages in digital industries such as the Internet, artificial intelligence, and 5G, allowing China to develop alongside developed countries. To further popularize digital transformation, China plans to build a large number of big data, super data, and edge computing data centers by 2025 to meet the growing demand for data storage (AFM, 2021).

In digital trade, the application of information and communication technologies has reduced the cost of cross-border trade in services, retail, software development and other services gradually 'de-localized' and 'globalized', the online remote model has changed the choice of service sectors, and the high degree of tradability has improved efficiency (CAICT,2021). Digitalization is based on the formation of new competitiveness of inter-enterprise synergies, and the development of core key technologies, countries and enterprises will benefit from digital trade.

Under the epidemic, China's digital delivery services have been given new opportunities. Digital delivery services are international trade in electronic-format goods delivered remotely through the INFORMATION and communications network, and according to UNCTAD, China's exports of digital delivery services amounted to 1.55 billion dollars in 2019, imports to 1.38 billion dollars and net exports amounted to 0.16 billion dollars (Figure 13).

In the face of strong government support and the huge potential of the Chinese market, while the external business environment is good, small- and medium-sized-based Chinese enterprises are facing many challenges, including how to overcome the highly dispersed supply and demand, weak technical and operational base, and the need for external help (Bain, 2021).

According to a survey conducted by Cisco in early 2020, 17% of SMBs in the Asia-Pacific region believe that the shortage of digital skills and talent within the company is a major challenge to digital transformation. According to SMBs surveyed, other major challenges are the lack of the necessary technologies to enable digital transformation, manage budgets and commitments, and insight into operations and customer data.

For laborers, digitalization increases productivity and rebalancing and creates jobs in new areas (Gu, 2020), but at the same time increasing demand for digital talent and increasing job matching and distribution (Ouyang, 2021). World Bank (2016) estimates that 77 percent of employment in China is susceptible

to automation. As a key resource in the process of enterprise operation, talent for digital transformation has a vital impact, with high-quality digital literacy of talent demand gap and weaker than the attraction of the Internet industry, so that the traditional industry in the process of digital transformation, facing the problem of talent dilemma, cannot be ignored (Wang, 2021). Furthermore, digitalization can disrupt traditional industries and lead to increased polarization in the labor market, especially among middle-skilled workers in manufacturing, where there are downside risks to employment if AI is continued and applied, and there is considerable uncertainty about the future development of AI, including technology bottlenecks, the legal framework and social inclusion it requires, and its surge could lead to greater-than-expected disruption in the labor market (UN, 2017).

Figure 13. China's digital delivery service import and export scale (in billion U.S. dollars)
Source: UNCTAD

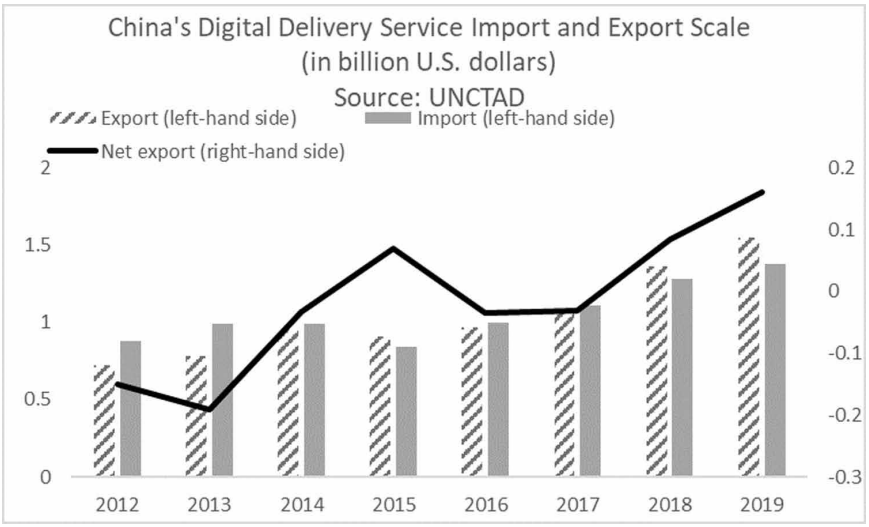


Table 4. Leading challenges in digital transformation among small- and medium-sized businesses (SMBs) in Asia Pacific in 2020

Leading challenges in digital transformation among small- and medium-sized businesses (SMBs) in Asia Pacific in 2021 (%)	
Shortage of digital skills and talent within my company	17
Lack of necessary technologies to enable digital transformation	14
Lack of budget/commitment from management	11
Lack of insight into operational and customer data	11
Lack of proper digital transformation roadmap	10
Lack of digital mindset/cultural challenges in the organization	10
Cultural resistance to change	10
Digital transformation is too big, we don't know where to start	9
Too expensive/not worth it in my industry	9

Source: Cisco Systems; IDC

For enterprises, some of the pitfalls are noteworthy, the concept of enterprise is difficult to change and not unified, the essence of digital transformation is not a purely technical problem, but the company's strategic business and value creation problems, the current enterprise managers, employees at all levels do not understand digital, do not agree, it is difficult to change from the industrial era of hardware thinking into the digital era of software thinking is a major challenge facing digital transformation. The internal transformation path of the enterprise is not clear, and the lack of a clear path is also one of the common difficulties in the digital transformation of the enterprise. Even if enterprises realize the importance of digital transformation and the strong desire to promote digital transformation, most enterprises still lack clear strategic objectives and realization path, no comprehensive planning of digital transformation path, and lack of systematic thinking on digital transformation (Wang & Xie, 2021). Deloitte's findings show that about 60 percent of companies that are advancing digital transformation have yet to establish a transformation path.

SOLUTIONS AND RECOMMENDATIONS

Designing the digital talent ability model and development strategy, and optimizing the talent mechanism, is the soft power to enhance the digital transformation of enterprises.

Talent is the first resource, digital talent is the basis to support the healthy development of the digital economy. China's digital economy and digital economic transformation from the demand side to the supply side at the same time, the role of the market is increasingly emphasized, and as a marketing interface with consumers to logistics, research and development, manufacturing, and other industrial chain upstream penetration trends (Chen, 2021). According to Yu (2021), under the background that the vast majority of urban and rural individuals in China can afford and realize basic digital access, the digital skills gap between urban and rural areas and individual residents in the region is becoming more and more obvious. The demand for digital talents is the reserve army of digital transformation and a development opportunity as well as future, is also the first resource and core driving force of the comprehensive digital transformation of China's economy in the next stage. Its collection, integration, analysis and practice of data upstream and downstream of the industrial chain are complementary and collaborative with information technology professional skills, with digital literacy of cross-border talents (Chen, 2020).

In addition, Chen (2021) pointed out that with the widening of the digital divide, the Internet field rules are not perfect, unreasonable orders and other pitfalls were highlighted, and network environment security is one of the keys to promoting digital transformation. In order to strengthen the protection and defense of the digital environment, it is essential that enterprises train network security personnel.

On the other hand, data governance needs to be perfected. Wang and Xie (2021) considered data is the most core production factor to drive the digital transformation of enterprises, there are big barriers to data sharing and fusion application between various departments within enterprises and between enterprises and governments, and the use of data circulation is hindered. Data Asset Management Practice White Paper 4.0 (2019) shows that 98% of businesses have data silos. The lack of incentive mechanisms and benefit distribution mechanisms also makes all parties reluctant to share their data. The ownership and use rights of data, and user privacy security issues, are still gray areas. All bring challenges to enterprise data management. The solution of policy and legal problems is related to the processing schemes of data ownership, data security protection, and tracking illegal data transactions. Moreover, market boundaries

have become blurred, enforcement arbitrariness has grown, and challenges to antitrust enforcement are growing (Zhang, 2020).

China's digital transformation brings opportunities, challenges come with it. Whether it is emerging industries or traditional industries should be prepared, summarized as the enterprise's own planning and application capacity is insufficient; cooperation between major companies and the government to be perfected; the lack of regulatory environment corresponding laws and regulations. In addition, there are still loopholes that have not been widely investigated and discovered which will need to be corrected and perfected.

FUTURE RESEARCH DIRECTIONS

Digital transformation has become the main feature of China's economic and social innovation and development, bringing future research opportunities, not only focusing on the use of big data, blockchain, artificial intelligence and other technology fields, but also exploring how to promote the integration and renewal of digital technology and traditional industries.

In China, digital transformation as a whole drives changes in production methods, lifestyles and governance methods. The 14th Five-Year Plan and the outline of long-term goals for 2035 clearly give full play to the advantages of massive data and rich application scenarios, and promote the deep integration of digital technology and the real economy.

China's digital transformation has also brought opportunities to the world, for example, China has proposed to build a "Digital Silk Road" to promote cooperation among countries in cutting-edge fields such as the digital economy, artificial intelligence, nanotechnology, and quantum computers, which will promote the development of cross-border e-commerce.

CONCLUSION

COVID-19 has increased the uncertainty of international economic development (Padhan et al., 2021). China's economic pattern is being adjusted under international and domestic pressure and demand. The resilience and adaptability of the digital economy are evident, which has become an important dynamic to support the stable development of the macro-economy.

At present, the growth of the digital economy is driving a comprehensive digital transformation of the Chinese economy, and China's digital economy is at a critical point, transitioning from quantitative to qualitative change, proposed by the 19th National Congress of the Communist Party of China in 2017. As rapidly changing market conditions and evolving technologies put increasing pressure on the competitiveness of SMBs, COVID-19 emphasizes the importance of technology, making it clear that digitalization is no longer an option, but a necessity, and that accelerating digitalization is key to enhancing resilience and shaping future advantages (CISCO, 2020).

With a favorable environment and related support policies, Chinese enterprises in different industries will explore the path of digital transformation suitable for themselves. Determine the appropriate development strategy and pay attention to talent innovation incentives in order to reserve digital talent resources for smart transformation. China has identified its strengths in its digital transformation, working with associated companies to match supply and demand. Start with consumer demand and use big data tools

to enhance their innovation and practical ability. At the same time, the government in promoting digital transformation to play its full role, not only need to fill regulatory deficiencies, but the formulation and timely updating of policies, programs (Jarrar, 2017; Yuji Miura, 2018).

But the pitfalls and challenges that have been faced require industries and businesses to respond and change promptly, who are required to learn to analyze success stories and manage smartly in digital transformation. Gu (2020) considered that developing the digital economy is an inevitable choice for China to adapt to and lead the global economic development trend.

It is worth noting that empirical and practical research indicates China's digital transformation is based on her unique history and special political and economic system (Xu, 2011). Although Western companies cannot fully replicate this model, they still can find common ground with it, picking up ideas and inspiration. China's digital transformation will be a long-term project, full of challenges and opportunities (He, 2021), not only for China but also for the world's digital development, providing a model for the international community's advancement.

ACKNOWLEDGMENT

The authors extend sincere gratitude to:

• Our colleagues from Soochow University, the Australian Studies Centre of Shanghai University and Krirk University as well as the independent research colleagues who provided insight and expertise that greatly assisted the research, although they may not agree with all of the interpretations/conclusions of this chapter.

• China Knowledge for supporting our research.

• The Editor and the International Editorial Advisory Board (IEAB) of this book who initially desk reviewed, arranged a rigorous double/triple blind review process and conducted a thorough, minute and critical final review before accepting the chapter for publication.

• All anonymous reviewers who provided very constructive feedbacks for thorough revision, improvement, extension and fine tuning of the chapter.

REFERENCES

AFM Editorial Office. (2021, July). *China's digital transformation.* Asia Fund Managers. https://www.asiafundmanagers.com/int/china-digital-transformation/

AliResearch, Baidu., & Bain & Company. (2021). *The development model of China's digital economy Internet with Chinese characteristics.* Bain. https://www.bain.cn/pdfs/202103300524126586.pdf

Bi, L. (2020). *Viewing the Digitization of Traditional Enterprises from the Transformation of Suning Internet.* http://finance.people.com.cn/n1/2020/0722/c1004-31793552.html

Blocker, C. P., Flint, D. J., Myers, M. B., & Slater, S. F. (2010). Proactive customer orientation and its role for creating customer value in global markets. *Journal of the Academy of Marketing Science*, *39*, 216–233.

Cai, X. (2018). *China's Digital Economy: Innovation Policies and Reflections.* APEC. http://mddb.apec.org/Documents/2018/EC/EC%20CONF/18_ec_conf_006.pdf

CCID. (2020). *China Digital Economy Development Index (DEDI).* CCID Consulting. https://www.mtx.cn/#/report?id=684266

Chen, J. (2021). *To protect China's network security.* People's Daily. http://paper.people.com.cn/rmrb/html/2021-11/05/nw.D110000renmrb_20211105_3-09.htm

Chen, T. (2020). *2019 Social Media Report.* WalktheChat. https://walkthechat.com/china-tech-company-report/

Chen, Y. (2021). *Develop the digital economy vigorously.* People's Daily. http://paper.people.com.cn/rmrb/html/2021-01/20/nw.D110000renmrb_20210120_2-09.htm

Chen, Y., & Ma, Y. (2020). *Digital Transformation: Digital Talents and China's Digital Economy Development*. China Social Sciences Press.

China Academy of Information and Communications Technology. (2019). *Data Asset Management Practice White Paper 4.0.* CAICT.

China Academy of Information and Communications Technology. (2020). *White Paper on the Development of the Digital Economy in China.* CAICT.

China Academy of Information and Communications Technology. (2021). *White Paper on the Development of the Digital Economy in China.* CAICT.

China Academy of Information and Communications Technology. (2021). *China Digital Economy Employment Development Research Report: New Forms, New Models, New Trends*. CAICT.

China Academy of Information and Communications Technology (CAICT) & China Media Group (CMG). (2020). *Report on The Digital Economic Development of China's Regions and Cities.* CAICT.

CISCO. (2020). *Cisco 2020 APAC SMB Digital Maturity Study.* https://www.cisco.com/c/en_in/solutions/small-business/digitalmaturity-2020.html

CNNIC. (2021). *The 47th China Statistical Report on Internet Development.* http://www.cac.gov.cn/gzzt/ztzl/zt/cnic/A0920010802index_1.htm

Corydon, B., Ganesan, V., & Lundqvist, M. (2016). *Transforming government through digitization.* https://www.mckinsey.com/industries/public-and-social-sector/our-insights/transforming-government-through-digitization

Dai, X., & Chen, J. (2019). *Digital transformation in China: on the crest of a wave.* Swiss Re Institute. https://www.swissre.com/institute/research/sigma-research/economic-insights-digital-transformation-china-economy.html

Ding, Y. (2019). *China's current situation and trend of e-government development.* http://echinagov.com/news/246958.htm

Duneja, R., Lasku, A., Pichai, H., & Kilefors, P. (2018). *Digitalization of government services.* Arthur D. Little. https://www.adlittle.com/en/Government_Digitalization

Foote, C., & Atkinson, R. (2020). *Chinese Competitiveness in the International Digital Economy.* Information Technology and Innovation Foundation.

Gu, S. (2020). *Digital economy a new growth engine.* China Daily. http://global.chinadaily.com.cn/a/202006/05/WS5ed97e71a310a8b24115af95.html

Gu, X. (2020). *Midea's smart manufacturing transformation practice.* https://www.chuandong.com/news/news242913.html

He, B. (2021). *Transformation and empowerment: the digital nature of enterprises has surfaced.* https://new.qq.com/omn/20210406/20210406A0B78M00.html

He, W. (2019). *Report on the results of the digital economy.* http://www.caict.ac.cn/pphd/zb/ict/2020/main/201912/t20191225_272511.htm

Hu, J. (2021). Challenges and opportunities for digital economic development during the 14th Five-Year Plan period. *Governance: An International Journal of Policy, Administration and Institutions*, *4*(1), 15–18.

Huang, P., & Huang, J. (2020). *Under the wave of digital transformation, the butterfly of Midea.* https://articles.e-works.net.cn/iot/article147709.htm

IDC. (2021). *New IDC spending guide shows continued growth for digital transformation as organizations focus on strategic priorities.* https://www.idc.com/getdoc.jsp?containerId=prUS48372321

Insights, T. (2020). *Internet of Things (IoT) annual revenue from 2019 to 2030, by region (in billion U.S. dollars).* Statista. https://www.statista.com/statistics/1194715/iot-annual-revenue-regionally/

Institute for Global Industry, Tsinghua University. (2020). *Research report on digital transformation of Chinese enterprises.* https://finance.sina.com.cn/tech/2020-12-26/doc-iiznctke8555321.shtml

Ire. (2021). *2020 China Enterprise Digital Transformation Path Practice Research Report.* https://www.huxiu.com/article/411052.html

Jamie, D. (2018). *How J.P. Morgan is leading the digital revolution.* https://www.jpmorgan.com/news/how-jpmorgan-is-leading-the-digital-revolution

Jarrar, Y. (2017). *What is the role of government in the digital age?* World Economic Forum. https://www.weforum.org/agenda/2017/02/role-of-government-digital-age-data/

Kang, L. (2021). *Liang Pin shop and JD.com sign strategic cooperation to explore the development model of instant consumption.* https://new.qq.com/omn/20210419/20210419A05R8D00.html

Ke, E. (2016). *Why did P&G decline and never recover?* https://www.huxiu.com/article/146067.html

Kituyi, M. (2021). *'Going digital': How to build an inclusive digital economy in the wake of COVID-19.* UNCTAD. https://unctad.org/news/going-digital-how-build-inclusive-digital-economy-wake-covid-19

Kohtamäki, M., Parida, V., Oghazi, P., Gebauer, H., & Baines, T. (2019). Digital servitization business models in ecosystems: A theory of the firm. *Journal of Business Research*, *104*, 380–392.

Kuijpers, F., & Eijdenberg, E. (2020). Economic Effects of Natural Disasters. In Showcasing Entrepreneurs' Responses to Severe Drought: Qualitative Findings from Cape Town, South Africa (pp. 131-146). Academic Press.

Lawless Research. (2020). *COVID-19 Digital Engagement Report.* https://pages.twilio.com/rs/294-TKB-300/images/UPDATE_Aug_Twilio_COVID-19_Digital_Engagement_Report.pdf

Li, K. (2020). *2020 Government Work Report.* http://www.gov.cn/guowuyuan/2020zfgzbg.htm

Liang, C., & Zhu, Y. (2019). Midea's sample: How traditional manufacturing is transforming into digital. *China's Industry and Information Technology*, *9*(16), 38–43.

Lin, Y. (2020). *2020 Lenovo Innovation and Technology Conference.* https://baijiahao.baidu.com/s?id=1681882529705790456&wfr=spider&for=pc

Lu, Z. (2021). *Analysis of market size and employment structure in China's digital economy industry in 2021.* https://ecoapp.qianzhan.com/detials/210519-39518452.html

Luo, H. (2019). *"Suning Experience" on the Digital Road of Retail Enterprises.* https://news.tom.com/201912/4571197208.html

Miura, Y. (2018). China's Digital Economy—Assessing Its Scale, Development Stage, Competitiveness, and Risk Factors. *Pacific Business and Industries, 18*(70). https://www.jri.co.jp/MediaLibrary/file/english/periodical/rim/2018/70.pdf

Morgan, B. (2019). Companies that Failed at Digital Transformation and What We Can Learn from Them. *Forbes*. https://www.forbes.com/sites/blakemorgan/2019/09/30/companies-that-failed-at-digital-transformation-and-what-we-can-learn-from-them/?sh=7ebc359b603c

Moschella, D., & Atkinson, R. (2020). *Competing with China: A Strategic Framework*. https://itif.org/publications/2020/08/31/competing-china-strategic-framework

North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press. doi:10.1017/CBO9780511808678.017

North, D. (1993). *Economic Performance through Time.* https://www.nobelprize.org/prizes/economic-sciences/1993/north/lecture/

O'Dea, S. (2021). *Number of smartphone users from 2016 to 2021* [Graph]. Statista. https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

Olorundare, J. K., Ahiauzu, C. N., Thompson, A. F., Olorundare, A. O., Ekanoye, O. E., Akinbo, A., & Ayorinde, A. (2020). Impact of COVID-19 Contagion on Digital Transformation and Economy. *American Journal of Science*, *Engineering and Technology*, *5*(4), 158–166.

Ouyang, R., & Meng, H. (2018). *Charting the Path of Digital Economy in China.* http://www.chinatoday.com.cn/ctenglish/2018/tpxw/201812/t20181207_800150937.html

Padhana, R., & Prabheeshb, K. P. (2021). The economics of COVID-19 pandemic: A survey. *Economic Analysis and Policy*, *70*, 220–237. doi:10.1016/j.eap.2021.02.012

Pan, H. (2021). *Improve the effectiveness of digital government services and promote digital economic development.* http://www.echinagov.com/viewpoint/292628.htm

People's Daily. (2020). *Digital economy: powerful new engine for China's development.* http://english.scio.gov.cn/chinavoices/2020-07/10/content_76257735.htm

Petersen. (2019). *Digital Economy: How is digitalization changing global competitiveness and economic prosperity?* GED. https://ged-project.de/digitization-and-innovation/digital-economy-how-is-digitalization-changing-global-competitiveness-and-economic-prosperity/

Priyadarsini & Verma. (2021). *Digital transformation trends and priorities within China utilities.* https://www.idc.com/getdoc.jsp?containerId=AP46517821

PwC. (2021). *PwC's June 2021 Global Consumer Insights Pulse Survey.* https://www.pwc.com/gx/en/consumer-markets/consumer-insights-survey/2021/gcis-june-2021.pdf

Schwandt. (2020). *Digital Economy Compass 2020.* Statista. https://www.statista.com/study/83121/digital-economy-compass/

Senyo, P. K., Liu, K., & Effah, J. (2019). Digital business ecosystem: Literature review and a framework for future research. *International Journal of Information Management*, *47*, 52–64.

Siebel, T. M. (2019). *Digital Transformation*. Rosetta Books.

Smith, R. (2018). *42% of global e-commerce is happening in China.* World Economic Forum. https://www.weforum.org/agenda/2018/04/42-of-global-e-commerce-is-happening-in-china-heres-why/

Tang, R. (2021). "New Economy" regulation in the new stage of development: Ideas, means and models. *Governance: An International Journal of Policy, Administration and Institutions*, *4*(1), 19–23.

Tedder, D. (2016). *The Four Characteristics of Digital Transformation that Deliver Spectacular Results.* https://www.institutefordigitaltransformation.org/four-characteristics-digital-transformation/

Tencent. (2021). *Digital Transformation Index Report 2021.* https://new.qq.com/omn/20211106/20211106A0804E00.html

UN. (2017). *The impact of the new technological (AI) revolution on the labor market and income distribution.* http://www.199it.com/archives/658527.html

Walkme Team. (2020). *The only digital transformation definition you need.* https://blog.walkme.com/digital-transformation-definition/?t=21&camp=adoption-blog

Wan, F. (2020). *Crisis under the "broken kettle sinking boat": traditional enterprises urgently need to inject new kinetic energy.* https://m.hexun.com/news/2020-05-21/201397125.html

Wang, F., & Li, C. (2020). *Digital Transformation in China: Opportunities for Growth.* https://www.prophet.com/2020/10/digital-transformation-in-china-opportunities-for-growth/

Witt, F. H., Linowski, D., & Singh, V. P. (2020). *Digital Transformation in China*. Globalization in Crisis – Challenges of International Management. doi:10.13140/RG.2.2.33639.60321/1

Woetzel, J., Seong, J., Wang, K., Manyika, J., Chui, M., & Wong, W. (2017). *China's digital economy A leading global force*. McKinsey Global Institute. https://www.mckinsey.com/featured-insights/china/chinas-digital-economy-a-leading-global-force

Woetzel, J., Seong, J., Wang, K., Manyika, J., Chui, M., & Wong, W. (2017). *Digital China: Powering the economy to global competitiveness.* McKinsey Global Institute. https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness

World Economic Forum. (2016). *Demystifying Digital and Securing $100 Trillion of Value for Society and Industry by 2025.* http://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/wef-digital-transformation-2016-exec-summary.pdf

Xinhua. (2021). *Xi Jinping's speech at the first phase of the 16th G20 Summit.* http://www.gov.cn/xinwen/2021-10/30/content_5647892.htm

Xu, C. (2011). The Fundamental Institutions of China's Reforms and Development. *Journal of Economic Literature*, *49*(4), 1076–1151. doi:10.1257/jel.49.4.1076

Yang. (2019). *China to invest over 1t yuan in 5G tech by 2025.* China Daily. http://global.chinadaily.com.cn/a/201907/31/WS5d413bcca310d83056402035.html

Yu, X. (2021). *Accelerate digital development and promote the construction of digital China.* http://www.echinagov.com/viewpoint/293922.htm

Zeisl, Y. (2021). *Risks and Opportunities of the Digital Transformation for Businesses.* Global Risk Intel. https://www.globalriskintel.com/insights/risks-and-opportunities-digital-transformation-businesses

Zhang, J. (2020). *Digital economy becoming key driver of China's growth*. http://www.chinadaily.com.cn/a/202007/03/WS5efeee75a3108348172571b9.html

Zhang, L., & Chen, S. (2019). *China's Digital Economy: Opportunities and Risks*. IMF Working Paper No. 19/16.

Zhang, W. (2020). *Digital Economy Era: Re-examining the Economic Foundation of Antitrust Policy.* https://finance.sina.com.cn/china/gncj/2020-11-05/doc-iiznezxs0160564.shtml

Zhu, W., & Hu, M. (2021). Digital economy key for nation's development. *China Daily Global, 4*(4), 3.

ADDITIONAL READING

Adilah, H., & Heru, S. (2021). Challenges of Digital Transformation: Impact on Culture and the Role of HRM. Handbook of Research on Big Data, Green Growth, and Technology Disruption in Asian Companies and Societies, 18(14), 256-275. doi:10.4018/978-1-7998-8524-5.ch014

Ana, L., & Jorge, P. (2021). New Trends and Tools for Customer Relationship: Challenges in Digital Transformation. *Research Anthology on Digital Transformation, Organizational Change, and the Impact of Remote Work, 101*(95), 1916-1934. doi:10.4018/978-1-7998-7297-9.ch095

China Academy of Information and Communications Technology. (2021). *White Paper on the Development of the Digital Economy in China*. CAICT.

Frank, A. G., Dalenogare, L. S., & Ayala, N. F. (2019). Industry 4.0 technologies: Implementation patterns in manufacturing companies. *International Journal of Production Economics*, *210*, 15–26. doi:10.1016/j.ijpe.2019.01.004

Hu, J. (2021). Challenges and opportunities for digital economic development during the 14th Five-Year Plan period. *Governance: An International Journal of Policy, Administration and Institutions*, *4*(1), 15–18. doi:10.16619/j.cnki.cn10-1264/d.2021.13.003

Kamaljeet, S. (2020). *Digital Transformation and Innovative Services for Business and Learning*. doi:10.4018/978-1-7998-5175-2

North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press. doi:10.1017/CBO9780511808678.017

Ulaş, D. (2020). Productivity in Digital Transformation. *Internet of Things (IoT) Applications for Enterprise Productivity*, *11*(2), 25–61. doi:10.4018/978-1-7998-3175-4.ch002

KEY TERMS AND DEFINITIONS

Big Data: A large-scale data collection that greatly exceeds the capabilities of traditional database software tools in terms of acquisition, storage, management, and analysis.

Digital Government: The form of national administrative management of government affairs in a digital and networked environment.

Digital Talents: Employers have ICT-related digital skills.

Digital Transformation: Established on the basis of Digitization and Digitalization, further touch the company's core business, high-level transformation with the goal of creating a new business model.

Emerging Industry: A new economic sector or industry that emerges with the birth and application of new scientific research results and emerging technologies.

Industry Digitization: With the support and guidance of a new generation of digital technology, the process of digital upgrading, transformation and reengineering of all elements in the upstream and downstream of the industrial chain.

Internet of Things: An information carrier based on the Internet, traditional telecommunication networks, etc., which allows all ordinary physical objects that can be independently addressed to form an interconnected network.

Internet Plus: Use information and Internet platforms to integrate the Internet with traditional industries, and use the advantages and characteristics of the Internet to create new development opportunities.

Chapter 20
The Role of Digital Transformation in the Oil Industry:
The Case of Brazilian Subsea Production Systems

Manuel Victor Martins de Matos
Federal University of Rio de Janeiro, Brazil

ABSTRACT

The Brazilian oil industry is facing a period of significant techno-economic challenges to meet the increase in reserves and production in ultra-deep waters. The subsea production system is an essential technological frontier to ensure the technical and economic viability of oil fields. Thus, the use of digital technologies fits in with these goals and already shows promising results, which stimulate companies in the development of digitalization. For this, the main aim of this chapter is to investigate the role of digital transformation to the subsea productive system of the Brazilian oil industry. By using the analytical and theoretical framework of innovation system, the author explores the relevance, capacity, and strategy developed for the use of digital transformation into subsea production system activities. It was possible to identify the critical features of techno-economic development and conclude that despite the existing capacity, coordination, interactions, and funding are issues to be promoted and improved.

INTRODUCTION

The Brazilian oil industry has been experiencing technological challenges since the 1970s with the development of exploration and production activities in deep and ultra-deep waters. However, the discovery of large reserves in the pre-salt and the need for recovery of mature fields require the advancement of the technological frontier to enable production in the best cost benefit of resources and time (IEL & Pinto Jr, 2018; Rystad, 2019). The exploitation potential and the high productivity of fields in pre-salt

DOI: 10.4018/978-1-7998-9008-9.ch020

environment raise the production forecast to levels that place the country as one of the world's leading producers (Mendes et al., 2017; EPE, 2020). In 2019, according ANP (2020), the Brazilian oil production presented an increase of 7.8% in the early comparison and the offshore production represented 96.3% of total. Only Pre-Salt accounted for more than 60% of national production.

Greenfield contracts realized in the Brazilian marine environment demand technological and knowledge development (Rystad, 2019). According to Bai and Bai (2016), the activities in marine environment are complex due to depth, coast distance, temperature, pressure and corrosivity. Moreover, activities related to supply services and equipment production for subsea processing mobilize investments, innovations as well as subsea engineering from different agents (Globaldata, 2018).

Recently, the Brazilian Subsea Productive System (SPS) needed to improve their technological developments due to the increasing complexity demanded in the pre-salt environment as well as the financial constraints (IEL & Pinto Jr, 2018). And the technological improvement has been involving a range of innovations with the use of advanced materials, mechanical engineering, robotic, electronic, computational platforms, etc.

The digital transformation impacts the entire oil industry by means of the improvement in equipment production, the reduction of costs and time operation, the redesign of activities as well as the maintenance of asset integrity (Evaristo & Filho, 2018). The potential of this technologies in Subsea Productive System is driven by need to build data analysis and forecasts, enable real-time insights, optimize productivity, guarantee the operational security and pursue the redesign of subsea arrangement to reduce the topside of platform (BHGE, 2017; Clifford et al., 2018). Petrobras, the country's leading oil company, dedicates a position on the executive board for digital transformation and innovation. Other large multinational suppliers with relevant market share in the Subsea Productive System market follow the same organizational strategy.

Then, the main aim of this chapter is investigating the role of digital transformation in the Subsea Productive System of the Brazilian oil industry. By using the analytical and theoretical framework of Innovation System, the author explores the relevance, capacity and strategy developed for the use of digital transformation in subsea productive system activities.

BACKGROUND

Subsequently, a description of the main technical aspects and key economic activities of the SPS is provided. Also, the methodological and analytical dimension for the development of the next sections is discussed. Here it is important to note the difficulty of oil industry defining what digitalization is. It occurs due to companies' reports and websites that point out a variety of technologies doing reference to digitalization. Larsson (2019) quotes the use of digital twin, internet of things and big data analytics into software. The Brazilian Institute of Oil & Gas (IBP) (2019) and EY Oil&Gas (2019) discusses investments in digitalization and quotes internet of things, cloud data, artificial intelligence, machine learning, blockchain and robotic automation. The Norwegian oil operator, Equinor, recognizes that "digitalization has many meanings, but in our industry, it refers to replacing manual or physical tasks with digital solutions'' (Equinor, 2021). Additionally, the company lists the key elements: internet-of-things, big data, predictive analytics, automation and artificial intelligence. In view of this difficulty, the author suggests that digitalization concerns the following: (1) intelligence production (artificial intelligence,

digital twins, machine learning, automation, big data, cloud computing), (2) internet of things (sensors, microelectronics) and (3) communication networks (optic fiber, wireless communication, blockchain).

Brief Presentation of Subsea Productive System

The offshore oil production depends on activities and submarine technologies of diverse complexity which demand a submarine engineer and an integration with other industries. Each offshore field development project is unique due to the imposed circumstances and several specificities concerning: nature of the reservoir, quantity and positioning of wells, positioning of the production unit if any, economic aspects, subsea relief and water sheet (Bai & Bai, 2016). The challenge to overcome when developing a subsea field, according to Bai and Bai (2016), is to maximize gains in the safest and most cost-effective manner available under the conditions of the production environment.

Therefore, each project must consider critical factors such as:

- engineering and design;
- cost and budget;
- location of the well and complexity of completion;
- flexibility for field expansion;
- ease of subsea equipment construction and fabrication;
- capacity for intervention;
- installation and commissioning;
- reliability and risk of field architecture; and
- accessibility of robotic vehicles.

Table 1. Description of the SPS activity package

Technology Packages	Main Activity	Main equipment's and related services
Subsea Equipment	• Control and manage the oil, water and gas flows from production.	• Wet Christmas Tree, Manifolds, Pumps • Installation (requires specific vessels, underwater vehicles and environmental monitoring) • Logistic services (requires ferries, cranes etc.) • Geotechnical services (requires specific vessels, underwater vehicles and laboratories) • Project management (requires software and engineer laboratories) • Underwater vehicles services (requires specific vessels and umbilical)
Subsea Umbilical, Risers and Flowlines (SURF)	• Carrying out the flow of products as well as chemicals and channeling electrical energy to the subsea equipment.	• Risers, flowlines, umbilical and support buoys. • Installation (requires specific vessels, underwater vehicles and environmental monitoring) • Logistic services (requires ferries, cranes etc.) • Geotechnical services (requires specific vessels, underwater vehicles and laboratories) • Project management (requires software and engineer laboratories) • Underwater vehicles services (requires specific vessels and umbilical)
Integrity Management	• Monitoring and control of subsea assets and services; data collection; data analysis and interventions in equipment and structures; and sales of equipment and software.	• Sensors, vessels, robots, underwater vehicles, cameras, software, etc. • Services for monitoring, testing, inspection, maintenance and evaluation of equipment involved in production (welding, testing lab, advanced materials, environmental monitoring, etc.)

Source: Elaborated by the author

Thus, this chapter assumes that the Subsea Productive System (SPS) involves aspects related to the set of techno-economic elements that interact in order to provide equipment, structures and services for the oil subsea exploitation and production. Into the SPS are gathered companies and their associations, governmental institutions and research institutions towards system development. Table 1 presents the technology packages of SPS and their main activities as well as the related equipment and services. In general, these packages correspond to control, transport and integrity of production.

As can be seen in table 1, the oil SPS needs to connect knowledge areas (geotechnical, management, chemistry, engineering, computing etc.) and industrial systems (naval, robotic, logistic, vehicles etc.). The insertion of digital transformation is in progress and it will reach all SPS productive chain. These advances help to solve a distance problem between wells and equipment at seabed and production unit at surface, reducing huge operating costs and time spent.

Focusing on the Brazilian SPS, this demand for digitalization depends on national and international inter-sector connections in order to provide and develop technologies. In Brazil, all technological packages of SPS already take into account digital technologies; nevertheless, it does not reach all activities.

In the Subsea Equipment package, digitalization is used specially in submarine equipment through a control panel and software central (in the production unit) which supports the management of equipment and operation. It provides indicators that can be used to alert about any productive inconsistency and to take a decision. Other activities such as management projects and geotechnical services demand analysis laboratories with advanced software to decide the best set up to produce. Digital technologies can be identified from the three groups suggested (intelligence production, internet of things and communication networks).

The SURF package uses digital technologies specially into management projects and geotechnical services activities. In these activities, the benefit of applying digital transformation is the analytical choice of the best disposal of transport equipment on the seabed. In addition, sensors have been used in the transportation equipment to create a dataset from the marine environment that may affect production. The main digital technologies applied are related to the internet of things and communication networks.

The last package concerns integrity of equipment and production which assists on security of operations and assess the life cycle duration of SPS equipment. This one already successfully applies some digital technologies and presents future potential for technological development. All services, except maintenance, stand out in digitalization due to the use of sensors, robotic automation, underwater vehicles and other instruments to intervene into marine environments and equipment. Increasingly, the dataset from interventions of monitoring and inspection is used to apply the best decision in real time. With the digital technologies of intelligence production, it is possible to evaluate and test the integrity of production in order to give options for acting or to act automatically based on an algorithm and key variables. Also, in this package, digital technologies can be identified from the three groups suggested.

Analytical and Methodological Dimensions: The Innovation System Framework

First of all, digital technologies are an essential part towards the advance of the technological frontier in SPS and to investigate this theme demands a researcher's immersion. The methodology used will be based on a qualitative investigation, because the qualitative research has the following advantages according to Creswell (2009): development of details and involvement about the object, multiple and interactive methods, possibility of refining the investigation throughout the research, description of the

scenario and interpretation of the data through the personal lens of the researcher, and attends the study of complex, interactive and wide-ranging phenomenon.

The innovative answer of companies depends on a capacity not interpreted yet and on a strategic decision in view of the market conditions and application risks of technologies (Dosi, 1982; 1988). The advance in technological frontier is also capable of modifying the institutional and cultural context as well as requires new regulations, specializations and strategies.

In developing countries, the technological and productive development faces structural, historical, and strategic constraints in a global context of barriers to entry in markets and production chains with higher added value and technological content. For this reason, building opportunities and incentives can reduce entry barriers for domestic firms and create market niches for the development of new firms (Perez & Soete, 1988; Lee & Malerba, 2014).

An analytical and methodological framework capable of gathering these features in order to study a productive system is the innovation system (IS) framework. This concept refers to aspects of the economic and production structure and the institutional framework that affect the techno-economic development in a given production system in a broad perspective (Lundvall, 1992). The IS referential highlights the importance of the learning process, the commercial and innovative interactions, and the cooperation policies that can potentialize business opportunities, the development of the production chain, and the inter-industrial relations (Soete et al., 2010; Lundvall & Johnson, 2016; Cassiolato et al., 2017).

This framework has relevance in developing countries in the thought about socioeconomic development, because it recognizes the asymmetries between conditions, trajectories, and historical and structural processes of technological development. According to De Negri (2017), countries with a sophisticated IS are able to advance to the technological frontier and have a developed scientific, institutional, and infrastructure base. In contrast with a linear and unique model or path, to achieve such a degree of sophistication, it is necessary to support and build policies and incentives based on the cultural, social and economic specificities of each country's trajectory (Lundvall, 2007; Cassiolato et al., 2014; Cassiolato et al., 2017).

In a sectoral point of view, the catching up process between countries depends on the open windows of opportunity and the efforts to reach industrial leadership. Latecomer countries need to prepare a sector-specific capability that develops and improves existing actors, networks and institutions (Lee & Malerba, 2016). Moreover, according Malerba & Nelson (2011) the main variables that can be implicated in a technological development in sectors are: domestic learning and capacity building; access to external knowledge and international networks; human capital development; and the existence of government policies.

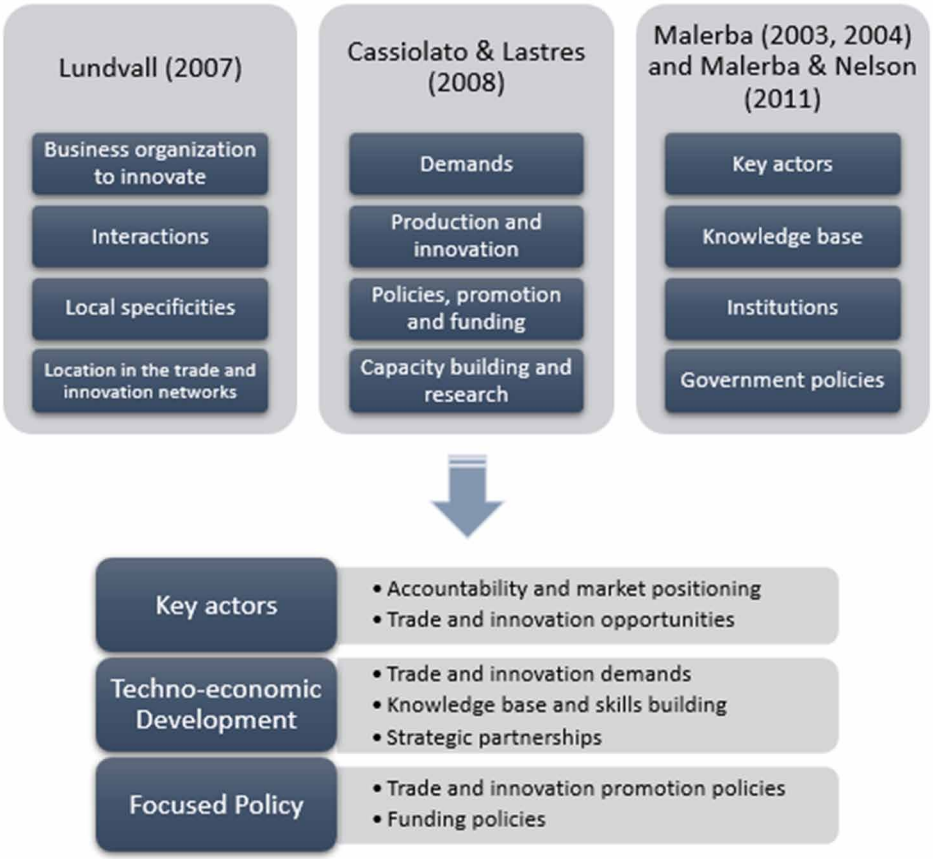
Following these IS framework considerations, the author built the methodological path and analytical structure of chapter through three methods suggested in works by Lundvall (2007), Cassiolato & Lastres (2008) and Malerba (2003, 2004) as well as Malerba & Nelson (2011). These papers point out the main features of IS analysis that support a discussion around the aims of this chapter.

In a broad analytical sense, Lundvall (2007) designs a method from the micro to the macro level of a production system with four steps. First, look inside the firms in terms of innovation by the light of organizational and human resources. Then, analyze the interaction between firms and the knowledge infrastructure, including domestic and international interconnections. Another step is to explore the national specificities of education, labor market, financial market, welfare regimes, and property law regimes. Finally, use the organization of firms and positioning in networks as factors that explain the specialization and performance of the innovation system.

The work of Cassiolato & Lastres (2008) pursues a portrayal of the national innovation system framework suggesting the study of sub-systems for comprehending narrow perspectives. The dimension of demand includes structure of consumption and organization of basic infra-structure. Another sub-system is the production and innovation that concerns the structure of economic activities, the level and quality of employment and the innovative efforts. The capacity building and research sub-system considers topics as education level and technology information, research and development efforts as well as intellectual property. Finally, there is a policies, promotion and funding sub-system which gathers the regulation and innovation and industrial policies as well as the availability of financial resources.

The third method is focused on sectoral innovation systems. Malerba (2003, 2004) and Malerba & Nelson (2011) propose an analysis of blocks: technological domain (sectorial specificities and complementarities of knowledge base), key actors (actors with main relationships and dynamic networks), institutions (enforcements, patent and financial institutions), and government policies.

Figure 1. Arrangement and presentation of the analytical-theoretical framework
Source: Elaborated by the author



The figure above sums up the three methods presented. It indicates three analysis groups and a respective list of topics that aim to gather the essential ideas of IS methods. Taking in consideration these IS methods, this work proposes to present the study case of development of digital transformation in

Brazilian oil SPS from three analysis groups. It is a methodological path that supports the understanding of the presence and developments of digital transformation in the referred productive system. Therefore, below is presented the general questions for analyzing digital insertion in SPS for each analysis group and main topics.

Table 2. Main topics and questions for analysis of the incorporation of digital transformation in the Brazilian SPS

IS Analysis Groups	Main topics	General questions for analyzing digital insertion in Brazilian SPS
Key actors	Accountabilities and market position	What is the role of the Brazilian SPS key actors in digital activities?
	Trade and innovation opportunities	What are the developed digital technologies and market gaps to be exploited?
Techno-economic development	Trade and innovation demand	What is the technological frontier to be overcome towards the digital activities of the Brazilian SPS?
	Knowledge base and skills building	How are technological competencies organized and how are they developing?
	Strategic partnerships	How and with whom do the main actors of the SPS digital activities establish exchanges of information and services?
Targeted policies	Trade and innovation promotion policies	How can the trade and innovation promotion policies stimulate the technological development?
	Funding policies	What sources of funding are available for innovation and research in digital technologies?

Source: Elaborated by the author

These questions are part of the investigation strategy and they will be answered through bibliographical research, interviews applied by the author and secondary sources of interviews with stakeholders. For background information, the interviews conducted by the author were part of a broad work related to the Brazilian SPS (Matos, 2020). Twenty interviews were performed during the period September 2019 and February 2020 with representatives and experts from oil companies, suppliers and research institutions. The applied questions of particular interest to this work are: What disruptive technologies are important for the technological development of the Brazilian Submarine Productive System? Who are the key suppliers/providers of disruptive technologies? Which technologies depend on the establishment of partnerships?

ANALYSIS OF THE ROLE OF DIGITAL TRANSFORMATION IN BRAZILIAN OIL SUBSEA PRODUCTIVE SYSTEM

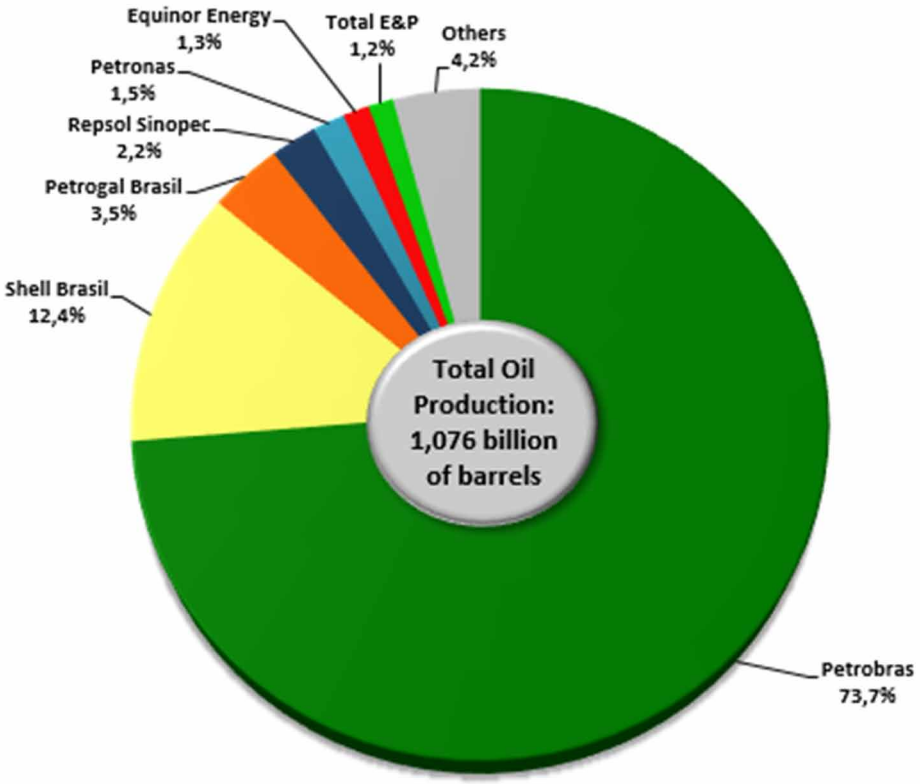
Key Actors

This section concerns topics related to responsibilities and position into trade and innovation networks. It means to identify what kind of actors are enabled to catch up on opportunities in digital technologies. Therefore, it is important to understand the role of key actors into Brazilian SPS markets and niches.

Accountabilities and Market Position

First, in a market analysis, the oil operators are central. These companies need to decide, from the bidding of fields to how to develop the exploitation of wells, the subsea infrastructure design, the production program and, the infrastructure decommissioning. That is to say all trade and innovation SPS demand depends on the strategic decisions of oil operators such as Petrobras, Shell, Petrogal, and RepsolSinopec. Most of them have infrastructure in the country and have been organized with the creation of research and innovation departments/centers to meet the technological demands and the volume of financial resources of the National Agency for Oil, Natural Gas and Biofuels (ANP, Brazilian acronym) investment obligation. Below, the figure presents the participation of oil operators in Brazilian oil production that surpassed one billion barrels in 2020 (ANPa, 2021a).

Figure 2. Share of oil production in 2020 by operating company
Source: (ANP, 2021a)



Other essential players are the multinational suppliers that offer products and services for SPS operation development. There are big companies which perform in different parts of the oil industry chain with expertise to meet the oil operators demands around the world. Additionally, these companies gather a diverse technical capacity searching for technological frontier and may establish high investment partnerships. In Brazil, these players have better chances in bidding submission due to experience and greater technical, financial, and organizational capacity to meet the requirements.

The Brazilian suppliers, in general, are a small/medium specialized company and a spin-off of research institutions. These players take advantage of providing services and products for oil operators and multinational suppliers in different parts of the SPS chain. Some of them are inserted in other productive systems besides the oil industry as a way of diversifying the business and developing the application of technologies.

According to Mendes et al. (2012) work, in the early 2010s the Christmas tree and manifold market structure was composed by companies actually called OneSubsea (54.2%), Aker Solutions (24.7%), TechnipFMC (16.4%) and BHGE (4.8%)[1]. The flowlines market structure was a duopoly consisting by currently called TechnipFMC (61.8%) and BHGE (38.2%). In both cases – essential equipment of the SPS market - the market dominance was of the multinationals.

In order to update the composition of the Brazilian SPS market structure, the author conducted a research in April 2019 on the Transparency Portal of Petrobras - Brazil's leading oil producer - to assess the contracts established with fourteen SPS suppliers. A total of 325 active contracts were found with Petrobras that add up to more than 18 billion contracts in reais and almost reach 2 billion in dollar contracts. OneSubsea has the largest share of contracts (28.9%), followed by BHGE (25.2%), TechnipFMC (14.8%) and Subsea7 (8%). In a range of contract participation between 3% and 4% are companies such as Aker Solutions, Fugro, Dril-Quip, Oceaneering and Tenaris. For the values of contracts in reais, BHGE (24.3%) and TechnipFMC (20.2%) stand out in the share of the total. Between 8% and 13% are Subsea7 (13%), OneSubsea (12.9%), Dril-Quip (11%), and Tenaris (8.2%). For the dollar contracts, three integrated para petroleum giants - TechnipFMC, OneSubsea and BHGE represent almost the totality (98.4%).

The research institutions support the knowledge base of companies installed in the country and suggest research and development areas of improvement. They are a strategic partner for oil operators due to wide knowledge of offshore environments and RD&I investment obligations.

The regulator player, ANP, acts in both technical and market terms. ANP develops technical and security requirements for offshore exploitation and production (E&P) environments as well as manages the promotion of local content, RD&I investments and human resources qualification. Then, the agency may drive recommended international best practices, routines and investments.

Finally, the state funders players, especially Financier of Studies and Projects (FINEP) and National Bank for Economic and Social Development which support and select projects for innovation and industry development. From the mid-2020s on, the financial resources provided by these institutions became scarcer and consequently lost importance in the development of digital technologies.

Trade and Innovation Opportunities

Digital transformation into SPS is in progress and it means that not all potential was used yet. Moreover, the oil price decrease of the mid-2010s and the recent constraints of coronavirus delay this process and the expected investments. In turn, the RD&I project selection has become more rigorous towards getting the best cost benefit in the short term. In the Brazilian SPS, digital technologies are tools that can enhance and improve the cost-to-time ratio of field infrastructure design, the subsea and mechanical engineering used, and asset integrity. Below, the main digital technologies are listed for SPS package and if these are in use or development.

Table 3. Main digital technologies of Brazilian SPS

Technology Packages	Uses and developments of digital technologies in Brazilian SPS
Subsea Equipment	• Uses of a software system for activating a pressure-generating hydraulic unit that aims to control equipment operation, data acquisition, and real-time reporting. • Development of the Nautilus System - an automated subsea chemical storage and injection system that impacts operational costs and risks. • Development of a control system using pressure and temperature sensors and an electric actuator connected to a cloud data history interface and an autonomous system. Siemens
Subsea Umbilical, Risers and Flowlines (SURF)	• Uses of automated systems for interconnecting risers and hoses to avoid shallow diving. • Uses of an autonomous riser cleaning and inspection system (AURI), installed around the riser.
Integrity Management	• Using non-intrusive sensors with fiber optic technology to monitor the temperature and pressure of subsea lines. • Uses of intelligent systems to process the data and indicate interventions enabling the combination of preparation, welding, and inspection tools based on prescriptive and descriptive analysis for decision making. • Uses of predictive maintenance software systems for monitoring efficiency and asset condition. • Uses a flexible riser with connector to the Optical Direct-to-Wire Monitoring (MODA) system. Known as “Magic Eye”, it assists in the identification of tensile reinforcement rupture events in the flexible duct, avoiding the risk of riser global failure, extended production stoppages, and environmental damage. • Uses of monitoring techniques using images captured by underwater vehicles to increase the efficiency and reliability of underwater operations. • Uses of fiber optic sensors for temperature and deformation monitoring in risers and flowlines.
Common to all packages	•Mobile robotic system for monitoring and possibility of interventions (DORIS). This is a teleoperated vehicle capable of capturing and analyzing audio, video, thermal imaging, vibrations, and atmospheric composition. • Uses of autonomous underwater vehicles for equipment inspection, data collection and environmental monitoring. • Development of a prototype of the “FlatFish” (type of autonomous underwater vehicle) in Brazil. The need was verified for a low-cost autonomous underwater vehicle that can reside and autonomously direct itself to an underwater docking station in operations. • Uses of data analysis platforms to acquire, process and interpret geological, geotechnical, oceanographic, meteorological and geographic data. • Uses of blockchain technology for supply chain transactions, trading and regulatory compliance (DNV GL, 2019). • Development of physical and computational modeling of geological processes to improve exploratory interpretation.

Source: Elaborated by the author

Nevertheless, to reach the full potential of these developments (Table 3) in Brazil, it is essential to catch opportunities in open market gaps. All three SPS packages find income questions can be improved digital transformation. The country has a variety of factories, engineering offices, and research centers for the production and development of subsea equipment and pipelines, but there is still a gap for underwater vehicles, logistics and in the integrity package. Some inputs of the SPS production chain have shown important technological development and demand for highly specialized goods. However, the country has not been able to adequately and/or competitively offer some of these inputs that are fundamental for the SPS digital transformation, such as electronics, microelectronics, nanotechnology, fiber optic and software.

For example, the subsea equipment package has a constraint related to the production of microelectronic parts in control panels – almost all of equipment – and the need for importation. The Brazilian SURF package is widely used for sensors and autonomous robotics, but the companies have difficulty

finding fiber optic and electronics suppliers. The integrity package faces the same problems, added to the high cost of some engineer software.

Currently, who may undertake easier these supply constraints are the multinational suppliers due to the domain of technology development and the capacity of combined experience in the offshore operation as well as access to digital technologies. Meanwhile, an important share of Brazilian spin-offs has the technical capacity to do the same if they can promote the establishment of trade and innovation partnerships and have financial support to access the international market.

Techno-Economic Development

The techno-economic development assumes that both efforts in technology opportunities and business management drive the advance of technical change and technological paradigm (Perez & Soete, 1988). subsea productive system (SPS) case reflects well this concept why increasingly the oil industry must be open to inter-industrial development of technologies specially related to digitalization. The benefits of digital transformation into SPS drive the future structure of the market since those who do not know how to take advantage of this will probably have problems in maintaining its market share (Borne, 2021; Offshore, 2021). However, as Van Den Haak said in a panel at the Offshore Technology Conference, "leaders must recognize that digital technology will shape the form of the company's future, at the same time the company's future will shape the form of the digital transformation." (Offshore, 2021)

According to research from the DNV GL company, related to the oil and gas industry´s RD&I agenda, the digitalization and subsea technologies were top priorities for investment in 2019. Also, in Brazil, this research shows 69% of respondents see embracing digitalization as key to increasing profitability (DNV GL, 2019). The Brazilian main question is how to connect the digital technologies with the offshore experience at Brazilian fields in order to create and apply the huge benefits in costs, time of operation as well as integrity of assets, employees and environment.

Trade and Innovation Demands

Globally, the successful use of digital technologies into SPS continues to depend on short run results in various demands of industry such as safety, reliability, asset health, operational efficiency, and profitability. The choice of projects is based on these demands due to the need for balancing the companies accounts at a low price during the last 5 years of the 2010s. For these reasons, intelligence production is the first step of digitalization in SPS. It can provide great benefits with low cost and uses an input well-known for the oil industry as data.

From real-time data collected and gathered across all activities and in different life cycles of operations, opportunities arise to build valuable forecasts for companies (Noshi et al., 2018). For this reason, the authors discuss the use of the so-called "machine learning" in oil exploration and production, which from AI methods and big data creates artificial neural network models to use an intelligent interface for interpretation and simulation in operations and equipment. This even allows an autonomous and intelligent performance in monitoring, prediction, interpretation, model selection, diagnostics, estimation, and risk management, among other operational actions.

Thethi et al. (2020) found that the use of artificial intelligence technologies combined with subsea engineering can reduce cost and lower the risk of subsea equipment downtime, in comparison with a

non-digital approach: "Shifting operations to the cloud can cut costs and improve efficiency, data capture, decision-making, and modeling." (Offshore, 2021)

Another technological frontier is the so-called "subsea factory". In the subsea factory, there is no need for the use of floating units since the production is routed to the onshore processing plant. This eliminates the use of floating units and can make it feasible to produce economically unattractive wells through conventional technology.

There are some economic advantages to using this configuration. The main advantage is in not using platforms, given the high CAPEX (capital expenditure) and OPEX (operational expenditure) related to platforms and their long construction time. The costs of transporting cargo and people are eliminated and the number of workers at sea is substantially reduced. In addition, without a floating production unit, the operational safety is greater and the environmental impact is lower.

Thus, gradually, there is a trend in SPS to operate remotely and the use of internet of things and connection networks technologies may leverage this. Both of them can maximize communication between SPS components in a large field, however the internet of things is more advanced on the factory floor of industries and on the topside of the offshore oil industry.

Figure 3. The path to aggregate value through digital maturity
Source: GE Oil&Gas (current BHGE) (2017)

As Brazil is one of the main offshore production environments in the world, it will probably be a laboratory for the advancement of these digital technologies. From the Brazilian SPS point of view, the SURF and integrity package gather more capacity to reply to the digital demands than the subsea equipment package, in which technology reaches a high level of maturity and central technological advance is related to mechanical engineering. Process automation, cloud-based applications/databases, and data platforms are the most cited high investment priorities by DNV GL`s research in Brazil (DNV GL, 2019).

An important player in the future demands of digitalization are the oil operators. Petrobras' digital transformation and innovation director is emphatic "our ambition is to work more and more remotely ... not only reducing costs but, above all, mitigating risks for our employees" (BNAmericas, 2020). Between 2021-2025, Brazilian operator plans to invest US$ 46.5 billion in E&P -directing 70% in ultra-Deepwater pre-salt - and US$1.5 billion in digital transformation and innovation with a strategy for the upstream focused on (1) artificial intelligence and analytics for predictive maintenance and machine learning, (2) digital twins for integrity management and digital stone, (3) innovation in pre-salt production systems for reduction of carbon emission and human risk exposure as well as robotization and subsea processing, and finally (4) augmented reality for 360° immersive navigation for inspection and maintenance

of assets (Petrobras, 2020). For this, the Petrobras director understands that 5G, internet of things and cloud is essential in order to connect and transmit the huge amount of data generated as well as permit new arrangements of subsea infrastructure (BNAmericas, 2020).

For Petrobras' digital transformation general manager, "The goal of the digital transformation initiative is to change how we achieve results. We want to use digitalization to reduce the cost of both internal and external transactions down towards zero." (DNV GL, 2019) This is in line with the aim of pursuing breakeven reduction. The idea is to lower the lifting cost of E&P by 9.0 US$/boe in 2015-2019 average for 5.2 US$/boe between 2021-2025 (Petrobras, 2020).

Petrobras wants to bring external technologies based on cultural transformation – implementing new partnerships, design thinking and hackathons – and a less bureaucratic and paperless company (BNAmericas, 2020). The manager explains that "Machines and software can take over operational work that humans do, but people can also use them to empower themselves and their activities. (…) As part of the cultural change, we are trying to create managers who know how to do that and help people embrace the change" (DNV GL, 2019).

Knowledge Base and Skills Building

In general, all of the big oil operators and multinational suppliers in Brazil have a lot of know-how and experience in the marine environment. Also, they have programs to build capacities through knowledge exchange with different companies and research institutions around the world. Add to this, they are present with factories, engineering offices and research centers connected into the global value chain.

The oil operators have invested in all areas of digital transformation in Brazil as has been discussed in the previous sections. On the other hand, multinational suppliers import through headquarters and subsidiaries the digital technologies which they understand are required to meet operator demands in Brazil. This is most recurrent in the subsea equipment package. In the other packages this is less recurrent as these packages require more of the local specifics of the production and marine environment.

The national specialized suppliers are not numerous companies. However, they are present in the SURF and integrity packages with engineering offices and, in some cases, factories for developing and producing service tools. Usually, they are spin-offs and have been able to absorb the expertise of research institutions in robotics, sensing, software, management, geotechnics and environment areas. They have offered services and products with digital technologies to oil operators, multinational suppliers, and eventually other industrial sectors.

Research institutions are widespread in Brazilian territory, usually in universities. Many research institutions have built and hold capabilities in the development of digital technologies. Due to the RD&I investment obligation policy, the operators invest in projects of different levels of priorities and funding with research institutions. No digital transformation thematic was found in relation of RD&I thematic, which indicates that there is no focus on them (ANP, 2021b). However, it does not mean that digital technologies are not present in these projects. And, it is possible to localize words in a relation of RD&I projects related to digital technologies into titles and objectives as the following: artificial intelligence, machine learning, automation, big data, cloud computing and sensing. That is, the existing ones are focused on intelligence production. Until 2018, the frequency of key words of RD&I projects related to digital technologies was low, but in 2021 the words machine learning and artificial intelligence stand out (ANP, 2021b).

Strategic Partnerships

The oil operators seek the establishment of strategic partnership in order to create an innovation ecosystem, either in research institutions and specialized national suppliers or in partnerships with multinationals in the country. They encourage the formation of partnerships with a diversity of players because it is understood that the results are enhanced by the interaction of experiences and knowledge. However, multinational suppliers establish few partnerships with research institutions due to the access to headquarters and subsidiaries specially in digital technologies.

A characteristic of Brazilian SPS companies is that they are usually born out of the cooperation and training of a research institution and are more open and willing to commercial and innovative cooperation. This is related to the need to gather information, learning, competencies, and knowledge. These companies are especially found in the integrity package, as it presents a greater niche of digital opportunities. This is despite the difficulties to establish, compete and grow in robust and financially powerful SPS markets. PhDsoft -assess and prediction of management of integrity of assets through digital twin- is an example of a successful national company whereby digital developments and research institutions partnerships were crucial. The company was created in Rio de Janeiro, today it has a headquarter in Houston/USA and it is in the top ten of most promising oil & gas startups of the year 2020 (Min et al., 2020).

Subsea equipment and SURF packages have the interaction of oil operators and multinational suppliers as the central partnership which enables the digital transformation. In the SURF package the partnership with research institutions is more common than in the subsea equipment package. Integrity package shows more cooperation between all players, and in some cases the suppliers seek partnerships with research institutions. In this package, specialized suppliers are required by big oil companies because there is a wide technology development to explore towards digital transformation.

Targeted Policies

In Brazil there are no specific policies regarding the digital transformation or SPS. Nevertheless, in this work is presented the main policies that may promote digital developments and products in Brazilian SPS. Then, the policies are divided by trade and innovation promotion, and funding.

Trade and Innovation Promotion Policies

This section selected four trade and innovation promotion policies:

1. The local content policy establishes that preference will be given to contracting goods and services from Brazilian suppliers in cases where offers are similar in price, quality, and deadline to those of other invited suppliers. This policy aims to increase the participation of the national industry in E&P projects on a competitive basis. The question in this policy is if the oil operators are able to comply with the local content aimed. In the mid-2010s ANP applied huge fines and penalties for some oil companies which forced the agency to grant waivers.
   A new model was defined in 2017 and the following adjustments were introduced: local content is no longer a factor considered in the scoring of field bids, minimum percentages are reduced, and companies' commitments are simplified. The requirement defined for offshore areas is an overall commitment of 18% for the exploration phase and, in the case of the development stage, mini-

mum commitments were set for three macro groups: well construction (25%); collection and flow system (40%); and stationary production unit (25%). The highest requirement is in the collection and flow system where SPS is most involved and it guarantees a demand for suppliers in national industrial parks. That is, the logical outcome of the policy would be the prioritization of Brazilian SPS suppliers in the choices of oil operators which would encourage digital developments in the country. However, due to the deficit of digital inputs and the advantages of low value aggregate resources, the oil operators prefer to implement supply arrangements that satisfy this policy and internationally competitive prices.

2. Petrobras as a mixed economy company complies with the legal statute set forth in the State Companies Act (13.1303/2016) establishing procedures and responsibilities. This law determines that all hiring must be through public bidding, opening opportunities for all interested parties able to meet the requirements set forth in the public notice. The unique selection method for bidding is to choose the lowest bid for the supply of goods and services described in the public notice. It discourages technology developments in the sense that a technology supplier has the chance of losing biddings although it offers a more efficient solution rather than a cheaper one. However, solutions for this situation are being studied through new laws such as innovation law and the introduction of essential specificities in a worldwide best practice standard for the operations. This can promote the insertion of digital technologies in Petrobras' bids and ensure the contracting of these demands.
3. Repetro-Sped is the special customs regime of tax exemption for export and import of goods for the activities of research and extraction of oil and gas deposits. It is a relevant policy because it helps multinational companies in the exchanges related to the dynamics of global chains and is an attractive factor for investments and infrastructure installations in the country. In SPS, many components, parts and inputs of the SPS equipment and the digital technologies originate abroad.

Repetro-Sped will be in effect until the year 2040 and is composed of four modalities of regimes:

i. a special customs regime of temporary admission for economic use with exemption from proportional payment;
ii. a special customs regime of temporary admission for economic use with proportional payment
iii. a special tax regime of definitive importation with total suspension; and iv) a special tax regime of industrialization.

The benefits of this policy consider qualifications of the oil operator, the operator's supplier and the operator's sub supplier, and cover assets such as vessels (tankers, research vessels and support vessels); machinery, apparatus, instruments, tools and miscellaneous equipment (including, for example, ANM, manifold, sensors); drilling and exploration platforms; flowlines, risers and umbilical's; and structures specially designed to support oil platforms.

4. The Management System of Subsea Systems is a mostly non-prescriptive regulatory model, in which the ANP establishes guidelines to be followed by the operator. The regulator identified the existence of risk factors for more frequent occurrences of critical incidents: lack of knowledge of the subsea arrangement of infrastructures in Brazilian fields, absence of ANP supervision activities, old installations and growing demand. The idea is to seek better performance through an operational

> safety system adapted to the characteristics of each facility, a posture of encouraging technological innovation and permanent monitoring of operational performance. (Siqueira, 2018)

These regulatory guidelines set a precedent for the need for technological developments and new business in SPS. Not least because operators are required to act within these practices and present an Integrity Management Program to prove that the operation and logistics are safe. According to Siqueira (2018), the main challenges are: building a history of SURF integrity data, inspections and tests, building methodologies for life extension, and eliminating underreporting of incidents. Thus, digital technologies should be further explored given their potential in the reported activities.

Funding Policies

This group of policies has three highlights:

1. Through the RD&I investment clause it is established the application of a percentage of the oil companies' gross revenue - a range of 0.5% and 1% - of the production depending on the type of contract. The amounts can be used by the oil company itself, in supply companies established in Brazil or in institutions accredited by the ANP. When there is a consortium of oil companies each company must take responsibility for its proportion of production in making the investments.

This is the funding policy with a huge mobilization of players and financial amounts. The RD&I investment clause gathered more than R$ 8 billion in started projects and summed 1913 until September 2021 (ANP, 2021). The major company executors and funders, in order, are Petrobras, Shell and Repsol Sinopec. The most research requested institutions are UFRJ, PUC RJ, USP and Unicamp.

2. The National Plan for Science and Technology in the Oil and Natural Gas Sector (known as CT-Petro), according to FINEP (2019), is a fund created in 1999 with the aim of stimulating innovation and partnerships in the oil industry production chain and to qualify human resources.

The executors are FINEP and the National Council for Scientific and Technological Development, with resources coming from a fund composed of 25% of the Union's portion of the royalties that exceed 5% of oil and natural gas production. These are financial resources available for studies, research projects, projects to support the RD&I infrastructure, scholarships, and events.

The CT-Petro's target public are public administration bodies and private non-profit entities. Companies are encouraged to participate technically and financially, and can be signatories of the agreements by means of an expression of interest in the partnership with research institutions. Projects with this profile are given preference over others. However, a criticism is the high level of demand in the projects and in the documentation, which do not always have applicability or more effective results in a context where the resources are not non-reimbursable.

3. In 1999, the ANP's Human Resources Training Program was created to stimulate educational institutions to organize and offer students professional specializations that are strategic to the development of the oil industry in Brazil. Therefore, scholarships are offered to students enrolled in institutions selected in a public notice to support their activities.

The program was maintained by resources from CT-Petro and the RD&I Investment Clause, but in 2015 and 2016 the values fell sharply and in 2017 no resources were made available. The ANP considers the results relevant to the objectives proposed so far. A new format was modeled and the ANP is the coordinator and responsible for the public call, guidelines of the lines of study and coordination of events. FINEP assumes the role of technical and financial manager and the oil companies are the scholarship funders through resources from the investment obligation of the RD&I clause. Finally, the educational institutions run the program by selecting the scholarship recipients and receiving the resources.

Thus, starting in 2019, according to ANP (2021b), around 880 scholarships/year are offered for undergraduate, master's and doctoral degrees in 55 contemplated programs, with an estimated total investment of R$ 220 million over five years. The agency reported that the first contribution of the new format has been authorized, with Petrobras as the financier of R$ 60 million over five years.

DISCUSSION AND RECOMMENDATIONS

The connection between Subsea Productive System and the use and development of digital technologies was explored in the last chapter by topics of Innovation System analysis groups. In this way, table 4 is elaborated from main potentialities and weaknesses identified for the development of digital transformation in the subsea productive system.

The conclusions of key actors group suggest a capacity to attract companies of SPS market and value chain as well as specialized digital suppliers. It was possible specially for three central reasons: high levels of offshore production are expected, public policies that stimulated and guaranteed demands and investments in the last two decades and the efforts of Petrobras, research institutions, and public agents in advancing technological development and unvderstanding the productive environment. Therefore, the Brazilian SPS has a diversity of actors with expertise that enable the digital transformation process.

Conversely, the Brazilian SPS market in almost all activities is highly concentrated and few in number as well as dependent on parts of the supply chain of higher added value. It is true that this is a reflection of highly specialized activities, but this oligopolistic structure is notable in mature activities such as the wet Christmas tree, manifolds and flowlines markets.

From the analysis of techno-economic development group a great opportunity for digital technologies implementation is identified. First, the increase of ultra-Deepwater offshore production requires efforts from the SPS market to invest in digital technologies that reduce costs and amplify the remote efficacy, this forces companies to include the development of these technologies in their radar. Second, all players presented have a relevant capacity for implementing digital transformation. The central question is how to connect and fit this capacity into the aims of oil operators considering the structural problems of supply inputs and strategic partnership. Multinational suppliers are essential in this techno-economic dynamic because they may improve and support the implementation of research, technologies and partnerships in the digital field both backwards and forwards in the Brazilian SPS chain.

In the last group, it is possible to identify mechanisms for facilitating and ensuring the process of digital developments in essential areas of techno-economic development such as demand, technologies and knowledge imports, human resources qualification and investments in RD&I. However, the lack of policies for financing projects under development in companies and contracting based on bids with large specifications and that consider only the price, limit the chances of relevant technological developments

Table 4. Main potentialities and weaknesses identified for the development of digital transformation in the subsea productive system

IS Analysis Groups	Main topics	Main potentialities	Main weaknesses
Key actors	Accountabilities and market position	• Diversity of players and public institutions	• Concentrated market structure for both oil companies and suppliers
	Trade and innovation opportunities	• Diversity of digital technologies are already in use or under development in all SPS technology packages • There are suppliers installed in the country capable of developing digital technologies in the SPS.	• Essential inputs for digital transformation need to be imported and/or Brazilian market is not internationally competitive and/or Brazilian capacity to produce is low
Techno-economic development	Trade and innovation demand	• Brazil will be an important laboratory of application of digital technologies in the SPS and the main productor -Petrobras – has on the radar the E&P in ultra-Deepwater and the use of digital technologies to follow the advancement of the technological frontier	• Subsea equipment package has low capacity to explore and implement digital technologies
	Knowledge base and skills building	• All players present a relevant capacity for develop digital transformation	• Usually, the multinational suppliers import the digital technologies developments and/or their most aggregate value inputs • Oil operators focus on research projects in intelligence production despite the importance of the digital technologies of the Internet of Things and connection networks
	Strategic partnerships	• The oil operators have promoted partnerships with different players together • Specialized spin-offs from research institutions are a qualified option for the SPS market. These companies are present especially in SURF and integrity packages which are more open to the insertion of digital technologies.	• Multinational suppliers establish few partnerships with research institutions • Research institutions are a source of digital knowledge and they should be explored further by oil operators as well as big suppliers
Targeted policies	Trade and innovation promotion policies	• All the policies related to SPS promote the digital development facilitating the demand and imports	• Lack of policies to stimulate the connection of digital technologies with SPS
	Funding policies	• There are policies that address the need for investments in RD&I and human resources	• Brazilian SPS innovation investment is dependent of RD&I obligation investment clause • Brazilian SPS public agents have few financial resources to fund and improve infrastructures

Source: Elaborated by the author

becoming a reality in the SPS market. This directly affects companies that face strong market barriers such as specialized national suppliers.

Considering this applied analytical tool, the author provides three recommendations in order to improve the techno-economic development of digital technologies in Brazilian SPS.

1. **Improve Interaction with Specialized Companies and Research Institutions that Develop Digital Technologies:** both oil operators and multinational suppliers, especially the second, need to rely on companies and research institutions specialized in digital technologies. This would facilitate the exchange of information and knowledge in order to create more symbioses and technologies that can be transformed into products and services. Brazil has specialized digital players that never operate in the oil industry, nevertheless has valuable digital capacities to cooperate with all players of the SPS chain.
2. **Creation of Mechanisms for Multinationals to Develop Digital Technologies in the Country:** encouraging multinationals to develop digital technologies in Brazil would prevent or reduce dependence on inputs for the development of digital technologies. This should take into consideration whether the gap in the production chain could be filled with competitive prices in the world market. The business strategy of multinationals is usually based on price competitiveness, but the higher value-added parts are usually at the origin. Conditioning investments in business and RD&I partnerships on activities with global market entry potential and with small specialized companies and research institutions would help in this goal.
3. **Creation of Mechanisms to Facilitate the Entry of Companies Specialized in Digital Technologies into Gaps in the SPS Chain:** to support the risks of techno-economic development in a concentrated SPS market is hard. Financing, demand and technical guidance are key to the success of a company's entry into a market. This lack of business opportunity for digital specialized national suppliers is a big constraint in an attempt to fit into a SPS chain gap.

FUTURE RESEARCH DIRECTIONS

A fundamental object of study on the development of digital technologies is to deepen the analysis at the sub-supply chain level. It would be interesting to identify the main actors and interactions, pointing out their main clients in the Brazilian industry, cooperation with SPS suppliers, and price and production competitiveness in the Brazilian SPS.

CONCLUSION

Brazil has a unique opportunity to leverage large amounts of investment from oil companies to develop ultra-Deepwater production and the development of digital technologies. In addition, there is great potential for disruption in digital transformation and this can be spread throughout the economy. However, coordination and funding are needed to better improve the existing capacity of the diversity of players in the Brazilian SPS and the fruits of their interactions.

The main constraints on pursuing the development of digital technologies in Brazilian SPS are the low number of digital companies in market niches – it decreases the trade and innovation competition in activities – and the input gaps of digital technologies. The lack of incentives to develop, attract and access suppliers and sub-suppliers qualified in digital technologies applicable to the Brazilian SPS hinders the applicability of RD&I in the market. If multinational SPS suppliers are more willing to adapt technically and collaborate productively, this can help in the advancement of the digital technological frontier. Oil operators have already realized that the most efficient interactive mix brings together diverse types of experiences, knowledge and players.

ACKNOWLEDGMENT

This research was supported by the Coordination for the Improvement of Higher Education Personnel of Brazil.

REFERENCES

ANP. (2020). *Anuário Estatístico ANP 2020*. http://www.anp.gov.br/arquivos/central-conteudos/anuario-estatistico/2020/anuario-2020.pdf

ANP. (2021a). *Anuário Estatístico ANP 2021*. https://www.gov.br/anp/pt-br/centrais-de-conteudo/publicacoes/anuario-estatistico/anuario-estatistico-2021#Apresentação

ANP. (2021b). *Projetos de PD&I*. https://www.gov.br/anp/pt-br/assuntos/pesquisa-desenvolvimento-e-inovacao/investimentos-em-pd-i/projetos-de-pd-i

Bai, Y., & Bai, Q. (2016). *Sistemas marítimos de produção de petróleo: Processos, tecnologias e equipamentos offshore*. Elsevier.

BHGE. (2018) *Lead the digital transformation*. Baker Hughes a GE Company. Report presented in BHGE.com.

BNAmericas. (2021). *Our ambition is to work more and more remotely*. https://www.bnamericas.com/en

Borne, R. (2021). *Digital Transformation of the Oil and Gas Industry in an Altered Market*. https://jpt.spe.org/digital-transformation-of-the-oil-and-gas-industry-in-an-altered-market

Cassiolato, J. E., & Lastres, H. M. M. (2005). Sistemas de inovação e desenvolvimento: As implicações de política. *São Paulo em Perspectiva*, *19*(1), 34–45. doi:10.1590/S0102-88392005000100003

Cassiolato, J. E., & Lastres, H. M. M. (2008). *Discussing innovation and development: Converging points between the Latin American school and the Innovation Systems perspective?* Globelics Working Paper Series. Nº2.

Cassiolato, J. E., Lastres, H. M. M., Szapiro, M., & Matos, M. (2017). Local production and innovation systems in Brazil: balance of 20 years. *Texto para Discussão - Redesist, 4*.

Cassiolato, J. E., Matos, M. P., & Lastres, H. M. M. (2014). Innovation systems and development. In B. Currie-Alder, R. Kanbur, D. M. Malone, & R. Medhora (Eds.), *International development ideas, experience, and prospects* (pp. 566–581). Oxford University Press. doi:10.1093/acprof:oso/9780199671656.003.0034

Clifford, M., Perrons, R., Ali, S., & Grice, T. (2018). *Extracting Innovations: Mining, Energy, and Technological Change in the Digital Age*. Taylor & Francis Group. doi:10.1201/b22353

Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (3rd ed.). Sage Publications.

De negri, F. (2017). Por uma nova geração de políticas de inovação no Brasil. In *Políticas de apoio à inovação tecnológica no Brasil: avanços recentes, limitações e propostas de ações*. Brasília: Ipea.

DNV GL. (2019). *Petrobras puts people at the heart of its digital transformation*. https://www.dnv.com/oilgas/perspectives/petrobras-puts-people-at-the-heart-of-its-digital-transformation.html

Dosi, G. (1982). Technological paradigms and technological trajectories: As suggested interpretation of the determinants and directions of technical change. *Research Policy*, *11*(3), 147–162. doi:10.1016/0048-7333(82)90016-6

Dosi, G. (1988). Sources, procedures and microeconomic effects of innovation. *Journal of Economic Literature*, *26*, 1120–1171.

Empresa de Pesquisa Energética. (2020). *Energy National Plan 2050. Ministério de Minas e Energia. Empresa de Pesquisa Energética*. Brasília: MME/EPE.

https://www.epe.gov.br/sites-pt/publicacoesdadosabertos/publicacoes/PublicacoesArquivos/publicacao227/topico563/Relatorio%20Final%20do%20PNE%202050.pdf

EQUINOR. (2021). *Technology, digitalisation and innovation*. https://www.equinor.com/en/what-we-do/digitalisation-in-our-dna.html

Evaristo, S. R. B.; Filho, A. C. S. S. (2018). *Transformação digital: tendências e desafios para a implantação em empresas de O&G no Brasil*. Rio Oil & Gas 2018.

EY Oil&Gas. (2019). *How digitalization can streamline oil and gas*. https://www.ey.com/pt_br/oil-gas/how-digitalization-can-streamline-oil-and-gas-operations

GE Oil & Gas. (2017). *Digital Transformation in Oil & Gas*. *Annual Meeting Presentation*.

GLOBALDATA. (2018). *Brazil drives global capex for upcoming oil and gas projects*. Offshore Technology. https://www.offshore-technology.com/comment/brazil-drives-global-capex-upcoming-oil-gas-projects/

Instituto Brasileiro de Petróleo e Gás (IBP). (2019). *Padronização e digitalização da indústria de óleo e gás em debate*. https://www.ibp.org.br/noticias/padronizacao-e-digitalizacao-da-industria-de-oleo-e-gas-em-debate/

Instituto Euvaldo Lodi (IEL). (2018). *Estudo de sistema produtivo petróleo e gás. Nota técnica: Indústria 2027: riscos e oportunidades para o Brasil diante de inovações disruptivas*. Author.

Larsson, J. (2019). *Why digitalisation matters for oil and gas*. https://www.pipelineoilandgasnews.com/interviewsfeatures/interviews/2019/may/why-digitalisation-matters-for-oil-and-gas/

Lee, K., & Malerba, F. (2014). *Changes in industry leadership and catch-up by the latecomers: toward a theory of catch up cycles*. Seoul National University and CRIO Bocconi University.

Lee, K., & Malerba, F. (2016). Catch-up cycles and changes in industrial leadership: Windows of opportunity and responses of firms and countries in the evolution of sectoral systems. *Research Policy*, *46*(2), 338–351. doi:10.1016/j.respol.2016.09.006

Lundvall, B. A. (1992). *National Systems of Innovation*. Pinter Publishers.

Lundvall, B. A. (2007). *Innovation System Research: where it came from and where it might go*. Globelics Working Paper Series.

Lundvall, B. A., & Johnson, B. (2016). The learning economy. In B. A. Lundvall (Ed.), *Org.) The learning economy and the economics of hope*. Anthem Press. doi:10.26530/OAPEN_626406

Malerba, F. (2003) Sectoral systems and innovation and technology policy. *Revista Brasileira de Inovação, 2*(2).

Malerba, F. (2004). Sectoral Systems: How and why innovation differs across sectors. In *The Oxford Handbook of Innovation*. Oxford University Press.

Malerba, F., & Nelson, R. R. (2011). Learning and catching up in different sectoral systems: Evidence from six industries. *Industrial and Corporate Change*, *20*(6), 1645–1675. doi:10.1093/icc/dtr062

Matos, M. V. M. (2020). *Desenvolvimento tecnológico e indústria petrolífera brasileira: redes e estratégias do Sistema Produtivo Submarino. Tese (Doutorado em Políticas Públicas, Estratégias e Desenvolvimento) – Pós-graduação em Políticas Públicas, Estratégias e Desenvolvimento, Instituto de Economia*. UFRJ.

Mendes, A. P. A., Romeiro, R. A. P., & Costa, R. C. (2012). Mercado e aspectos técnicos dos sistemas submarinos de produção de petróleo e gás natural. In *BNDES Setorial 35* (pp. 155–188). BNDES.

Mendes, A. P. A., Teixeira, C. A. N., Rocio, M. A. R., & Oliveira, L. A. S. (2017). Panoramas Setorias 2030: Petróleo e Gás. In *Panoramas setoriais 2030: desafios e oportunidades para o Brasil*. BNDES.

Min, B., Kwon, S., Park, G., Jeong, D., & Lee, H. (2020). Current Status and Prospects of Artificial Intelligence in the Oil and Gas Exploration and Production Business. *Journal of the Korean Society of Mineral and Energy Resources Engineers*, 295-308. doi:10.32390/ksmer.2020.57.3.295

Noshi, C. I., Assem, A. I., & Schubert, J. J. (2018). The Role of Big Data Analytics in Exploration and Production: A Review of Benefits and Applications. *SPE International Heavy Oil Conference and Exhibition*. 10.2118/193776-MS

OFFSHORE. (2021). *OTC 2021: Offshore industry must fully embrace digital transition, says Amazon official*. https://www.offshore-mag.com/special-reports/article/14208861/otc-2021-offshore-industry-must-fully-embrace-digital-transition-says-amazon-official

Perez, C., & Soete, L. (1988). Catching-up in technology: entry barriers and windows of opportunity. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical Change and Economic Theory* (pp. 458–479). Pinter Publishers.

PETROBRAS. (2020). *Petrobras Day.* https://api.mziq.com/mzfilemanager/v2/d/25fdf098-34f5-4608-b7fa-17d60b2de47d/174ab356-7f22-96e7-6828-94b10fcb3349?origin=1

Rystad. (2019). *Subsea Market set to surge in the next five years*. Free Report Subsea.

Siqueira, J. R. (2018). *Gerenciamento de Integridade de Sistemas Submarinos de Produção de Petróleo & Gás.* Apresentação SPetro.

Soete, L., Verspagen, B., & Weel, B. T. (2010). Systems of Innovation. In H. B. Hall (Ed.), *Rosenberg, N. (Org.) Handbook of Economics of innovation* (Vol. 2). Elsevier.

Theti, R., Vadel, D., Haning, M., & Tellier, E. F. (2020). Digital innovation in subsea integrity management. *APPEA Journal*, *60*(1), 215. doi:10.1071/AJ19123

ADDITIONAL READING

Nelson, R. R. (1993). *National Innovation Systems: A Comparative Analysis* (3rd ed.). Oxford University Press.

KEY TERMS AND DEFINITIONS

Industrial Policy: The strategic effort by the state to encourage economic transformation, i.e., the shift from lower to higher productivity activities, between or within sectors.

Innovation Policy: Is the interface between research and technological development policy and industrial policy and aims to create a conducive framework for bringing ideas to market.

Integrity Management: Term used to describe the practice of managing an asset (power plant, oil rig, refinery, etc.) to ensure the efficient operation, maintaining the safety of environment and professionals.

Oil Operator: The owner of the right to produce an oil and gas well. The company that serves as the overall manager and decision-maker of a drilling project.

Subsea: Subsea is fully submerged ocean equipment, services and operations. Usually related to the offshore exploitation and production, in deep ocean waters, or on the seabed.

Subsea Engineering: The knowledge area responsible for the design and installation of equipment and structures below the surface of the sea.

Underwater Vehicle: A vehicle designed to operate underwater. It can be autonomous or remotely operated.

Chapter 21
Designing a Digital Marketing Strategy for Start-Up Luxury Brands: The Case of Vidda Royalle

Gitte Rosenbaum
University of Southern Denmark, Denmark

Marta Isabel Coutinho Carneiro
University of Porto, Portugal

Cristina Maria Norte Gomes
University of Porto, Portugal

Laura Andrade Marques
University of Porto, Portugal

ABSTRACT

This study investigates how a luxury start-up can use a digitalization strategy to overcome the liabilities of smallness and newness and compete with well-established incumbents. Given that many luxury firms have been relatively slow in adopting digital technologies out of brand-dilution concerns, start-ups can compete if they can successfully manage the "internet dilemma" of marketing high-value brands online, and especially if these competences can be leveraged across geographical markets. This study examines the case of Vidda Royalle, a Portuguese luxury start-up already operating in international markets. Based on case data, the authors find that Vidda Royalle´s digital strategy is based on the brand´s ability to leverage its unique collaboration with renowned artists in the production of its luxury bedlinen. The study presents a series of strategic recommendations based on the RACE framework (reach, act, convert, engage) for further enriching the online customer journey, and enhancing its competitive advantage.

DOI: 10.4018/978-1-7998-9008-9.ch021

INTRODUCTION

Luxury is a large and relentlessly proliferating industry (Baker et al., 2018), even during times of crises (Barbosa et al., 2018). Incessant demand is driven by the six core characteristics of luxury brands, namely that they, (a) offer emotional, hedonic experiences, (b) at a premium price exceeding their functional value, (c) tied to heritage and culture, (d) in limited editions, (e) accompanied by auxiliary services, and (f) affording a sense of symbolic privilege through conspicuous consumption (Kapferer & Bastien, 2012).

However, while an estimated 70% of new value created over the next decade will come from digitally enabled platform business models (World Economic Forum, 2021), the above-mentioned characteristics of luxury products do not necessarily lend themselves to e-commerce strategies. First, while luxury products exude connotations of exclusivity and high social status (Vigneron and Johnson, 2004), the internet provides ubiquitous accessibility where clients are indistinguishable from the masses (Barbosa et al., 2018). Second, online platforms represent the future for tech-savvy consumers, while luxury is associated with heritage, history, storytelling, and a rich past (Corbellini & Saviolo, 2009). Third, the internet is associated with low prices, whereas the opposite applies to luxury (Okonkwo, 2010). Fourth, luxury products are experience goods – clients paying large sums for emotional and hedonistic experiences may be reluctant to order without being able to assess quality prior to purchase (Hagtvedt & Patrick, 2009). Fifth, luxury brands pride themselves on strong customer relationships, where discriminating clients enjoy being pampered and seek personalized, tactile retail experiences usually provided by mono-brand bricks-and-mortar stores, whereas online platforms by their very (non-human) nature, de-personalize this interaction.

Accordingly, many scholars have questioned the compatibility of luxury and online sales, the so-called "internet dilemma" (Baker et al., 2018). E-commerce is still only expected to account for 18% of luxury goods sales by 2025 (Quach & Thaichon, 2017). Compared to other sectors, luxury brands have shown low commitment to digital platforms (Okonkwo, 2009), with 40-50% of luxury firms electing not to sell on e-commerce sites (Baker et al., 2018), and those luxury brands which have adopted digital technologies are considerably more hesitant to engage in digital marketing such as tweets and posts (Ilyashov, 2015).

However, luxury brands are increasingly realizing that many of their customers are millennials for whom e-commerce is indispensable (Quach & Thaichon, 2017). This has given rise to the term "masstige" (mass and prestige) brands (Chandon et al., 2016), requiring luxury brands to navigate in the world of digital marketing. Furthermore, traditional luxury brand incumbents are being increasingly challenged by the entry of new start-ups, emergent brands heavily financed by venture capital and private equity firms. As such, there has been a burgeoning number of new start-ups in the luxury fashion industry in recent years (Ehrensperger et al., 2020; Ramadan & Nsouli, 2021). To compete in an industry where brand names, heritage (time compression diseconomies), and traditions are important prerequisites, luxury start-ups can successfully overcome the liabilities of smallness and newness by implementing digital strategies which allow for rapid and extensive exposure whilst obviating the need for costly intermediaries or expensive mono-brand stores (Gimenez-Fernandez et al., 2020). Interestingly, the very resistance of the incumbents in the world of luxury brands to establish online presence until relatively recently (Okonkwo, 2009) is actually an advantage to a digitally oriented new start-up, which can catch-up relatively quickly to their competitors´ online platforms without heavy resource expenditure (Gimenez-Fernandez et a., 2020).

Moreover, this exposure is not purely limited to the start-up´s domestic market. Given globalization, a general convergence of demand preferences in luxury segments across countries, and a current number

of over 4bn internet users (Makrides et al., 2020), internationally oriented start-ups are frequently basing their B2C strategies on digital marketing tools. These firms are often classified as "international new ventures" (INVs), defined as "a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries (Oviatt & McDougall, 1994). INVs can utilize digital marketing technologies to facilitate international expansion in a cost-effective manner, by reducing the risk, time, and financial costs of entering new markets (Cavusgil & Knight, 2015; Lee & Falahat, 2019; Jean et al., 2020). Digitalization strategies not only allow INVs to develop a global customer base, but also to engage in partnerships and resource sharing, which can often lead to competitive advantages (Schmitt & Baldegger, 2020). This is particularly valuable given that luxury consumers are increasingly from emerging markets, predominantly China. Indeed, contrary to the traditionally held notion of the importance of perceptions of exclusivity, tech-savvy Chinese luxury brand consumers expect an online marketing presence, and exhibit no such "dilution of exclusivity" concerns (Liu et al., 2019). As such, so-called "born-digital start-ups" can deploy digital strategies to disrupt traditional business models and remove established incumbents in luxury industries. Specifically, as encapsulated in the RACE model, firms need to develop a compelling presence ("reach"), interact with consumers, encourage participation and emotional stability, build trusting relationships and customer advocacy ("act"), convince them to purchase products online ("convert") and then ensure the preservation of relations and future sales i.e. increase customer equity throughout the period of the exchange relationship ("engage").

However, while certain scholars have examined the role of digital platforms in facilitating the internationalization of new start-ups (Jean et al. 2020), there do not appear to be any prior studies examining how luxury INVs employ digital marketing strategies to manage the "internet dilemma" in global markets (Ojala et al., 2018; Makrides et al., 2020). We contribute to filling the gap in the literature by examining the case of Vidda Royalle (VR), a Portuguese firm which is an INV in the luxury fashion market seeking to base its global B2C growth on its digitalization strategy. The specific research question which drives this line of enquiry is as follows: "How do start-up luxury brands manage the internet dilemma in international markets?". We adopt a single case study approach, gathering data from interviews of VR´s founders, content analysis of projects and slides prepared by Digital Marketing Master´s students in Portugal, and secondary data.

The case findings show the various strategies adopted by Vidda Royalle in the different stages of the RACE digital marketing plan framework. In terms of "reach", the brand successfully uses its collaboration with celebrated local artists to increase its brand exposure among individuals interested in art, heritage, and culture. This unique collaboration has resulted in several magazine articles, further increasing the brand´s exposure. Regarding the "act" stage, the data show that VR has successfully used blogs to firmly position itself as a brand which combines art and luxury, but also as one with heritage and a strong sense of sustainability. Collaborations with luxury hotels which differentiate themselves by their artistic interior design further strengthen this symbolic linkage in the eyes of prospective customers and customers. In terms of "convert", while still relatively new, VR has been capable of providing a customer journey which expedites the transition from prospect to customer. Finally, in the "engage" stage, VR employs unique means of personalizing the brand-customer relationship by including, for example, hand-written poems in consignments, further enhancing its image as a brand linking luxury and artistic creativity.

The book chapter is organized as follows: First, we present an overview of the literature, followed by a description of the research methodology. Then we analyze our findings, which provide input to the strategic recommendations. Finally, the study will conclude and present an agenda for future research.

BACKGROUND

The present literature review is constructed based on a thorough search of the prior literature in the primary search engines using the key words of "luxury", "digital marketing" and "international new venture". When conducting literature reviews, it is equally important to search for potentially relevant articles under synonyms. Correspondingly, the term "luxury" was widened to include such search words as "high-fashion brands", "digital marketing" was broadened to include related terms such as "digital transformation", "internet technologies", and "digital platforms", while "international new venture" was expanded to include synonyms such as "INVs", "Born Globals", "global start-ups", and "international entrepreneurs". The search process involved using combinations of the above terms.

The above search process led to several articles which were then provisionally screened (by reading the abstracts), resulting in a small number of most relevant articles for the purposes of addressing the current research question. The resultant literature review based on this subset of articles is thus subdivided into two overarching sections: Firstly, how luxury firms manage the "internet dilemma", and secondly, how luxury start-ups use digitalization strategies when internationalizing. Each of these will now be elaborated upon.

How do Luxury Firms Use Digital Marketing Strategies to Manage the "Internet Dilemma"?

The literature shows that there are two broad streams of thought regarding the degree to which luxury firms can manage the so-called "internet dilemma". Scholars in the first stream emphasize how the distinctive characteristics mentioned at the beginning of the introduction account for the marked reluctance of many luxury firms to consider new business models emphasizing digital channels. For example, Yu et al. (2018) note how purchasing premium priced brands online implies a high level of risk for consumers since their evaluation of the products cannot be based on direct, tangible experiences with the product. As Okonkwo (2009) reports, this accounts for why many luxury fashion firms such as Versace and Prada did not have company websites until relatively recently. Scholars in the second stream recognize the indispensable nature of interactive tools in modern marketing and therefore attempt to reconcile these characteristic features of luxury products with internet technologies. This field is further divided between, on the one hand, those scholars favouring a purely brand communication strategy for luxury brands i.e. absent digital sales platforms predicated on the belief that selling undermines the aura of exclusivity (Kapferer & Bastien, 2012), and on the other, those advocating that luxury producers should embrace digital technologies that allow them to both communicate and sell to customers (Baker et al., 2018).

Whichever approach is adopted, scholars note that the most important part of any digital marketing plan is to understand the customer journey. Currently, around 80% of luxury sales are 'digitally' influenced, meaning shoppers hit one or more digital contact points in their luxury shopping journeys, even though they may not be purchased online (Dauriz et al., 2018). The literature is replete with studies on the luxury consumer journey. Several articles in the literature review invoke Cheffey and Smith´s (2013)

RACE model to understand a firm´s digital marketing plan/strategy through the customer journey (e.g. Chaffey & Patron, 2012; Erkollar & Oberer, 2017). The RACE digital marketing framework comprises four distinct online marketing activities or stages in the customer buying journey to optimize digital marketing performance through the customer lifecycle or marketing funnel. The RACE model comprises: Reach, act, convert, and engage. To ensure that the goals for each of these stages is achieved, data and analytics are necessary (Chaffey & Smith, 2013). Each of these four stages is therefore associated with different key performance indicators (KPIs), and will be elaborated upon in the below.

Reach: The first stage in a firm´s digital marketing strategy is to raise brand exposure and -awareness of potential customers who are typically evaluating alternative suppliers. Specifically, this is achieved using digital platforms designed to ensure an increase in traffic by driving visits to the website and social networks (through, for example, blogs, search engine optimization). As Chaffey and Smith (2013) recommend, the need in this stage is to build brand awareness through delivering precisely the right message to lead potential customers to the firm´s webpage. As noted in the foregoing, this awareness should be aroused by conveying a sense of history, art, traditions, and so forth, through a digital medium. In terms of KPIs, brand exposure is measured by how many more people are exposed to brand every day (number of searches, number of unique visitors), while brand awareness concerns how many people are aware of the brand every day (such as the number of inbound links). Another important KPI metric in the reach stage is average page loading speed – how quickly can prospective customers access websites using either computers or smartphones. Several scholars have addressed how luxury brands drive traffic on to their respective homepages through building brand awareness, especially Millennials, who have been heavily exposed to technology most of their lives, and who are very motivated to access internet sites which especially provide hedonic pleasure and entertainment (Dabbous & Barakat, 2020).

Act: The second stage of the RACE framework refers to how firms use digital strategies to generate leads and interact with potential clients on the website and social networks. In this stage, potential customers have now reached the firm´s webpage or SoMe community, and the aim is thus to persuade them to act i.e. make a decision. The idea in this stage is to encourage users to interact with the brand and other consumers through, for example, content marketing/blogs/vlogs/online videos/photos, which attracts comments, sharing, messages, etc. or searching for products by the target audience. As Baker et al. (2018) note, this stage progresses from viewing firm-customer communication from being one-way to two-way, stimulating interactive relationships. This stage is about persuading visitors/prospects to take the next step of interacting on their journey. This is particularly important for luxury products as electronic-word-of-mouth in posted reviews provide valuable external cues of quality and brand credibility (Nam & Kannan, 2020). To do so, content has to be valuable, engaging and interesting with clear focus on how to create value for the customer. For luxury consumers, this value is typically in the form of personalized experiences, with the overall intention (within the service-dominant logic) to engage prospects/customers in the value co-creation process and build a brand community. Many firms use influencers ("online ambassadors") to inculcate a strong sense of brand community. Key KPIs at this stage of the buying process include "prospects per content item" (how many prospects come from each content), "online conversion" (how many prospects become customers), "page views per visit", and "engagement rate" (totalling the numbers of likes and comments and dividing them by the number of followers). Luxury firms are used to one-way communication through strong branding, so it is often difficult for them to consider the need for constant two-way interactivity (Baker et al., 2018). The challenge is further to preserve a feeling of selectivity and rarity on the universally available internet (Geerts & Veg-Sala, 2011), and specifically, to use the internet, but only engage in communication with a se-

lected (socially stratified) portion of the population (Vigneron & Johnson, 2004). Luxury firms need to combine emotion and image and create a multi-sensory, aesthetically appealing experience using digital platforms (Atwal & Williams, 2009).

Convert: The third stage in the RACE framework is to convert a lead/prospect to a customer, in other words, achieving sales online. While some luxury firms choose to solely use the internet for communicating, others also use it as a sales channel (Baker et al., 2018). In terms of the latter strategy, firms have to demonstrate the value of the brand and its products to the point where the user commits to forming a monetary relationship. The number of sales driven by visits to the website directed to online shop which requires a clear path for the customer journey on the website directing traffic to the online shop. Several scholars have discussed the drivers for online sales including a sense of self-success (Kapferer & Valette-Florence, 2019) and personal values (Salehzadeh & Pool, 2017). Studies show that perceptions of positive interactions on social media are associated with a higher purchase intention (Martin-Consuegra et al., 2019). However, other studies caution that the greater number of touch options (ordering, payment, and so forth) in a digital environment may cause customer fatigue (overloading them with information), which may cause them to disengage at this point in their purchase journey (Nam & Kannan, 2020). Relevant KPIs for this stage include conversion rates, revenues, and average order values.

Engage: The final phase in the RACE framework concerns advocacy. Specifically, it refers to digital customer retention strategies designed to create long-term relationships in the post-purchase moment, and ultimately, encourage repeat business and entice customers to share experiences with others. To achieve this end, typical tools in the digital marketing plan of firms include follow-up emails alerting new products, invitations to follow the brand on SoMe platforms or share photos, joining clubs, newsletter subscriptions. In this regard, different SoMe platforms have different goals. For example, Twitter creates excitement about events in real time, Facebook offers a delivery system for targeted offers, while Pinterest specializes in inspirational content. The goal is to design personalized online communication to continue to engage customers. Many luxury brands have now developed apps which offer exclusive offers to loyal customers, which can be designed to offer more of the same product, offer other products ("cross-selling") and offer higher value items in the firm´s product portfolio ("up-selling"). The most relevant KPIs in this stage include brand loyalty (number of brand mentions), number of likes, subscription months and conversions being created each week/month, online advocacy (number of recommendations and shares of brand to someone else), and repeat purchases.

How can Luxury Start-Ups use Digital Marketing to Expand Internationally?

As mentioned in the foregoing, digitalization offers newly launched ventures the opportunity to compete with more established incumbents in a cost-effective manner. Given that luxury customers are global, luxury preferences are converging across countries, and competitors are increasingly omnipresent i.e. changing market dynamics, it is therefore imperative for luxury start-ups to compete on multiple markets as quickly as possible from inception (Lee et al., 2019). Compared to their purely domestic counterparts, such international new ventures (INVs), face the challenge of having to leverage their already scarce resources over greater time and space in order to compete viably on different national markets without having to expend valuable resources on developing distribution channels, establishing sales offices or manufacturing operations on host-country markets, and so forth (Knight & Cavusgil, 2004; Lee & Falahat, 2019).

Many of these INVs offer products or (especially) knowledge-based services, which more readily lend themselves to internet-enabled business models to rapidly achieve global reach. As INVs craft new market niches using innovative technologies and novel business models (Tanev, 2017), digital platforms allow for the collection and analysis of data about international markets to expedite decision-making, establish market footholds, develop positions in local networks, adapt products to idiosyncratic national consumer preferences, and so forth. It is therefore crucially important that luxury INVs carefully consider how to deploy their international digitalization strategy that allows them to compete with the e-commerce sites of larger rivals and acquire a global customer portfolio while remaining in their home market (Coviello et al., 2017).

Such concerns include whether luxury INVs can employ more cost-effective standardized digitalization strategy, or whether they need to opt for the more expensive adaptation strategy, where online platforms are customized to different national markets. Recent studies attest to the fact that customer journeys are likely to differ across national markets due to differences in culture or socioeconomic factors (Nam & Kannan, 2020). For instance, Briggs et al. (2017) report that Chinese customers are accustomed to interacting with a myriad of touchpoints on major online hubs (Tmall, Taobao, etc.) in their customer journey (for instance, news sites, games, videos), their Western counterparts prefer stand-alone mono-brand touchpoints. Similarly, Chinese customers engage in more hedonic online shopping (seeking adventure and excitement), while Western customers prioritize convenience and efficiency (Briggs et al., 2017).

However, while digitalization strategies offer a viable medium for INVs to compete simultaneously in multiple geographic markets, and disrupt the business models of incumbent firms, the previously discussed characteristics of luxury render this approach a challenge (Baker al el., 2018). For example, how do luxury INVs achieve emotional stability and overcome trust issues on e-commerce, when they lack history and an established brand name? How can their online strategies compensate in some measure for their lack of offline presence? Should luxury INVs prioritize certain markets, and to what extent can their digital offerings be standardized, or conversely, are they required to adapt their offerings to the idiosyncrasies of different national markets? With the above in mind, the management of digital strategies in international markets is a critical task (Jean et al., 2020).

RESEARCH METHOD

To gain insights into the B2C digitalization strategy for an international new venture in the luxury fashion industry, the authors conducted an exploratory single-case study. Single-case studies are especially useful to gain in-depth knowledge of a phenomenon where context is highly important (Stake, 1995), rather than generalizing to a wider category of firms. Case studies are most appropriate when investigating "how" and "why" type research questions (Yin, 1981), as is the case in the present study. It is exploratory in nature as the phenomenon is understudied, as highlighted by the research gap.

In order to examine how INVs manage the paradox of designing digitalization strategies for luxury products, case selection was based on the following three criteria: (a) the firm had to be a new start-up which had already internationalized very soon after inception (INV), (b) it had to be in the luxury fashion industry, and (c) its B2C strategy had to be based on digital platforms. The application of these criteria led to the choice of Vidda Royalle as the case firm.

Case description

Vidda Royalle (VR) was established in 2020 in the UNESCO World Heritage Site of Guimarães in northern Portugal by a female entrepreneur, Teresa Silva, and a Danish holding company. The company name Vidda Royalle ("The Royal Life") alludes to the fact that the firm shares its birthplace with the first king of Portugal. Vidda Royalle incorporates Guimarães´ regal past, and centuries of artisan traditions and exquisite hand-crafted products by creating luxury, hand-finished bedding, decorated by unique designs of celebrated local artists. Vidda Royalle´s concept is epitomized in its slogan "Where art meets luxury", with these beautiful designs being integrated into the bed linen using Jacquard techniques, organic cotton, and silk. The inaugural such collaboration (the first two collections) with renowned local artist, Pedro Guimarães, who has his designs displayed in the luxury mansions of global sports personalities, Prime Ministers, and royal families.

In addition to appealing to sophisticated and discerning clients interested in art, heritage, and culture, Vidda Royalle offers the opportunity to customize any order with monograms, family crests, motifs, and so forth to render the product as personalized as possible. Product lines are limited edition, enhancing the feeling of exclusivity, and product extensions include hand-made gold jewelry in the same designs as the bedding itself. Furthermore, Vidda Royalle focuses strongly on sustainability, with part of its production being on-demand, thus minimizing textile wastage, while its factory is fully certified by several sustainability bodies.

Already within its first year, Vidda Royalle has sold to clients in its native Portugal, but also to customers in other European countries. Given that the majority of its turnover actually stems from foreign markets, Vidda Royalle can clearly be classified as an INV, and therefore a highly appropriate case firm with which to analyze the present research question.

The case setting

The global luxury bedding market was valued at US$ 2.02bn (2017), with an expected CAGR of 2.6% in terms of revenue (2018–2025), and is predicted to surpass US$ 2.44bn by 2025. In terms of demographics, the B2C market for luxury bedding is especially driven by Gen Y (millennials) consumers, whose share of the luxury bedding market is expected to rise from 32% in 2020 to 50% in 2025 (Dauriz et al., 2018).

The luxury bedding market is characterized by well-established incumbents, many over a century old, which have assumed a strong digital presence in the market, often in conjunction with bricks-and-mortar flagship stores. Based on the targeted luxury segment, there are four main competitors within Vidda Royalle´s strategic group: Frette, Sferra, Peacock Alley, and Amalia. The oldest incumbent (established in 1860), Frette, hails from Italy. In addition to its online presence both on its own homepage and third-party homepages of multi-brand retailers, it has a well-established network of offline stores in premium locations around the world, primarily in capitals of Western Europe and most prominent cities in several emerging markets such as China, Russia, and Vietnam. Established in 1891, Italian Sferra has third-party retail outlets in such prestigious stores as Harrod´s. Peacock Alley, formed in 1973 has a number of bricks-and-mortar stores in its native US. Portuguese Amalia has been producing luxury bed linens since 1922 and is now a fourth-generation family business, selling online and offline through selected retailers. These four main competitors have a digital presence both on their proprietary websites, but also the websites of multi-brand retailers such as Bloomingdales, Fine Linens, Gilt, Neiman Marcus, Nordstrom, Perigold, and Saks Fifth Avenue.

While immediately differentiating itself from the competitors through its exclusive collaborations with renowned artists to produce beautiful designs on the most luxurious bedding, Vidda Royalle´s challenge remains overcoming liabilities of smallness, newness, and foreignness to achieve a competitive advantage in the luxury bedlinen market. As a new start-up, how can Vidda Royalle embrace a digital strategy which emphasizes its differentiated offerings and allows it to outcompete the main primary incumbents, who collectively, have almost 500 years of market presence, in global markets?

Data collection

Consistent with the case study method (Eisenhardt, 1989), data were collected from multiple sources, namely interviews, content analysis of documents, and secondary data obtained from both the case firm and its four main competitors. Data collection proceeded in two main phases. In the first phase, the above challenge was presented to eight groups of final-year Master´s students on the Digital Marketing class at the University of Porto in Spring 2020. The students, who formed groups of 5-6 students, were challenged to identify a digitalization strategy for Vidda Royalle to compete effectively on international markets. The founders of Vidda Royalle presented the marketing challenge to the students and their professor at the beginning of March 2021 in an online meeting lasting approximately one hour. The first part of this challenge involved the founders presenting the case firm and above luxury bedding setting to the students, which lasted approximately 20 minutes. The students were then afforded the opportunity to ask the founders whatever questions deemed relevant for them to most optimally complete the challenge, and this process lasted approximately a further hour. We refer to this in the data collection process as "interviews", as the students asked questions which the founders answered in plenum. The questions asked could be classified into four different categories, namely (a) the specific context of Vidda Royalle (its experience, resources, and competences), (b) the industry situation (market drivers, customer preferences, competitors), (c) the international dimension (foreign market potential, customer presence) and (d) cost considerations (necessary budgets to achieve goals). Based on this initial dialogue, the mandate was to design a digital marketing plan for Vidda Royalle which could facilitate growth in international markets. The groups were subsequently afforded seven weeks to prepare their strategy for the focal brand, which was presented to the authors in the form of a digital marketing plan presentation and a project report. Digital data on various dimensions of online performance were collected in the period 01/03/2021 to 06/04/2021 using Google Analytics.

In the second phase of data collection, each of the eight groups presented their digital marketing proposal to Vidda Royalle´s founders, their professor, and peers at the end of April 2021. Three of the authors were present throughout these presentations. Each group´s presentations lasted approximately 10 minutes, and were replete with accompanying slide decks. At the end of each group presentation, the founders asked a series of questions, and the answers were additionally incorporated into the ensuing analysis. The data collected throughout the above-mentioned process were subsequently triangulated with secondary data obtained from both the case firm and the four main competitors to ensure validity of the data. If there were any inconsistencies between the content analyses and the secondary data, the founders of the case firm were contacted to provide clarification or elaboration.

DATA ANALYSIS

The present study utilized qualitative content analysis techniques to analyze the data (Eisenhardt, 1989). Content analysis has been a preferred research strategy for scholars collecting data on the characteristics and functionality of different firms´ websites (Baker et al., 2018). Specifically, open thematic content analysis techniques were applied to identify the main themes and constructs (Corbin & Strauss, 2014). Following the approach of Ojala et al. (2018), the data were first reduced by removing unnecessary elements from the content analysis. Then, the text data obtained from the groups´ 20-page projects and accompanying slide decks were coded.

The content analysis was founded on an a priori classification of the terms from the RACE digital marketing plan framework together with the data provided by Google Analytics. In addition, recurring terms and concepts inductively emerging from the data were coded and included in the overall analysis. In concrete terms, the four dimensions of the RACE framework were used as umbrellas (for example, "act") with all concepts belonging to each dimension (such as "interactivity" or "posts") being classified under that specific umbrella (Corbin & Strauss, 2014). Using these coding categories renders it possible to compile and compare data across the various projects and slide decks. Students then used web analytics to review key KPIs for the four different activities in the RACE model.

Reach: The case data show that Vidda Royalle´s strategy for building brand awareness through increased traffic to different web presences is based on several components. First, it successfully uses its unique selling point – the close collaboration with famous artists, to generate user traffic. This collaboration has attracted the interest of several magazines which have featured Vidda Royalle, and its principal founder, Teresa Silva. Second, the collaboration with renowned local artist, Pedro Guimarães, directs traffic of art connoisseurs to the homepage of Vidda Royalle, building a brand community. As a manifestation of this brand community, customers can join the Vidda Royalle club and receive privileged offers. Given the traditional positive correlation of price and quality in consumer perceptions, this club/community membership ensures that customers can buy on the internet at lower prices without perceiving the quality of goods to be lower. Third, it uses social media content to re-direct prospects to its homepage. For example, its first posted video on Youtube features a classical cellist, who composed a music piece purely for Vidda Royalle. Once again, this directs individuals appreciating classical music and art towards its homepage. Given that interested parties must be tech-savvy to be using these platforms, Vidda Royalle is able to manage the dilemma of combining tech-savvy consumer expectations with (non-tech) history, heritage, and traditions.

In terms of an international strategy, VR is developing a partnership with local artists in other parts of the world, who can be commissioned to produce unique designs to boost brand awareness in their respective countries. In terms of average loading page speed, the Google Analytics data revealed that the fastest of the competitors was Amalia with a loading speed of 1 second on the desktop and 3 seconds on a mobile device, while Vidda Royalle performed almost similarly with loading speeds of 1 second and 4 seconds, respectively. The firm with the highest number of visits in the last six months was Peacock Alley which had approaching 150,000 visitors to its site during this period. In terms of session duration, users spent, on average, 2.46 minutes on Vidda Royalle´s site, which is relatively high for a new start-up. The highest level available was Frette with 3.15 minutes, while some bedding brands outside the strategic group were considerably lower (e.g. 2.18 minutes for Parachute). This indicates that, once attracted to Vidda Royalle´s homepage, users tend to spend time examining its content.

Act: Vidda Royalle encourages brand-lead interaction in several ways. Firstly, a series of blogs have been directly focused on heightening the connection between art and luxury, for example, through profiling its collaboration with local artists. Blogs also have been employed to establish expert legitimacy, given the factory´s four decades of milling expertise. It further highlights its heritage. Although a new start-up, the family-owned factory provides a highly integrated manufacturing facility, replete with full strategic sourcing of materials, design capabilities, and warehousing and logistics facilities. Content of this nature is intentionally designed to mitigate eventual potential customer reservations about the ability of a new start up to endure. Third, the brand attracts prospects interested in sustainability issues to its website and social media platforms. This profiling has led to an increasing follower base on social media platforms such as Linkedin and Instagram. Vidda Royalle has now entered its first collaboration with a luxury hotel, the Grand Palace Hotel in the diplomatic quarter of Addis Ababa, where the Vidda Royalle bedding in the hotel´s presidential suites have QR codes directing guests to the Vidda Royalle website. Table 1 provides information for Vidda Royalle and the four main competitors in its strategic group related to the act phase in the digital marketing plan framework.

Table 1. Competitive benchmarking of digital strategies

		Frette	Sferra	Peacock Alley	Amalia	Vidda Royalle
Instagram	No. posts	22	28	27	13	30
	No. likes	358	83	72	34	80
	Engagement rate (%)	0.67	0.77	0.48	0.8	0.56
Facebook	No. posts	22	25	22	14	15
	No. likes	53	6	6	7	48
	Engagement rate (%)	0.09	0.06	0.07	0.4	0.11

Table 1 reveals that Vidda Royalle has been able to successfully engage users in the act phase despite its newness and smallness. Its number of likes/number of posts ratio on Instagram (2.66) is almost exactly the same as Sferra, Peacock Alley and Amalia, though they are all considerably lower than that of Frette. On Facebook, Vidda Royalle boasts the highest like/post ratio. Similarly, Vidda Royalle´s engagement rate on Instagram compares favourably with its more established rivals, while its engagement rate on Facebook is actually higher than most of its rivals.

Convert: While still relatively new, the brand has already been able to convert leads into customers through clearly navigating them along the customer journey.

Engage: The engage stage is naturally harder for newly established ventures as customers have only been so for a relatively short period of time. Vidda Royalle follows up each order with a personal telephone call from Teresa Silva to the customer two weeks after despatch of the bedlinen to enquire whether everything is to their entire satisfaction. A personal, hand-written note in the form of a short poem composed by Teresa Silva accompanies the shipment. This is designed to strengthen emotional stability and promote trust. Customers are encouraged to share photographs of the bedding in their houses which are then used to populate the image board on VR´s homepage. The website is also used for upselling (bundles of products) and for product extensions in the form of hand-made jewellery produced

in the same designs as the bedding. Interestingly, many products sold are to residents of small, wealthy enclaves close to larger cities. This indicates the value of customer advocacy in the form of physical word of mouth. In this regard, Vidda Royalle utilizes a highly personal approach to manage the internet dilemma that the ubiquity of the internet precludes the ability of firms to imbue a sense of exclusivity. Furthermore, it demonstrates that start-up luxury firms can manage the internet dilemma and build personal relationships through otherwise de-personalized electronic transactions.

STRATEGIC RECOMMENDATIONS

Based on the data gathered, we are now in a position to recommend which digital strategy Vidda Royalle should employ as an INV in the luxury bedding market. To ensure consistency, these strategic recommendations will be decomposed into the four different stages of the digital marketing plan.

Reach: Given its differentiation strategy of combining luxury bedding with beautiful artistic creations, Vidda Royalle needs to continue profiling this connection to increase brand awareness. This is particularly in artistic, musical, and cultural circles. Furthermore, the luxury start-up needs to establish partnerships in target markets to facilitate entry and extend the brand online in target markets by collaborating with host market artists. The data from the content analyses strongly recommend that Vidda Royalle additionally needs to develop collaborations with micro-influencers who can entice their followers onto Vidda Royalle´s homepage and increase search engine optimization. The students´ reports also noted that Vidda Royalle should define a set of fixed and appropriate hashtags, in addition to creating a "follow us" section highlighting the firm´s social media accounts. Furthermore, the data proposed initiating advertising campaigns (paid content) on social networks – particularly Instagram, Facebook, and especially Pinterest. Pinterest plays an important role in driving traffic to these competitors' websites representing almost 50% of all social media traffic in Frette and Peacock Alley. Vidda Royalle could also consider publishing videos more regularly on Youtube – for example, Frette has 49 different Youtube videos used as content marketing. Similarly, Vidda Royalle could adopt social listening tools such as Buzzsumo which can perform content analysis across competitors to optimize the impact of content marketing. Finally, Vidda Royalle could increase its brand exposure by having its products on the websites of third-party multi-brand retailers. While this is a clear strategy for the four competitors in this analysis, one platform which none of the firms has engaged in is Portuguese-founded Farfetch, which does not, as yet, sell bedlinen on its luxury platform.

Act: Based on the data resulting from the interview and content analysis, the strategic recommendations for this particular stage are as follows: First, VR should continue its series of blogs showcasing its link between luxury and art, but should increase their frequency and broaden its sphere of interest. Focus should be on highlighting the personal value of the brand to potential customers in terms of impeccable style, beautiful interior design, healthy lifestyles and inner well-being, and so forth. Second, given its unique heritage, VR should enhance its storytelling activities, particularly focusing on traditions, heritage, and craftmanship associated with its royal birthplace. This is particularly important for many international clients, for example, from Japan, which place a premium on royalty (which the other featured brands cannot boast). Third, the brand should incorporate more artificial intelligence into its website, for example, the automation of customer support systems (Chatbots) which allow for a high degree of customization over the added time and space boundaries of multiple geographic markets. This could also be in the form of augmented reality, such as virtual try-ons (for instance, being able to superimpose Vidda Royalle´s

bedding into photographs of potential client´s bedrooms) or 360 degree views, which further personalize the experience. Furthermore, the website could incorporate special features such as scheduling of virtual appointments with the artists and designers. Fourth, Vidda Royalle should follow some competitors by offering sites in multiple languages – in Vidda Royalle´s case, Portuguese, Chinese, and Japanese. For instance, Sferra offers webpages in 14 different languages. Relatedly, blogs and other posts should be made available in several languages to stimulate greater international involvement. Based on the insights from prior studies (e.g. Briggs et al., 2017), Vidda Royalle should also consider differentiating its content to different national markets, with, for example, more emphasis on excitement and adventure for Chinese users to promote activity levels. Fifth, Vidda Royalle should establish additional partnerships with complementary retailers such as Boca do Lobo which sells furniture (but not as yet bedding) or fellow luxury brands offering complementary products such as UK-based The Luxury Bed Company. Sixth, the brand should work on creating greater integration between the different digital channels (i.e. between the website and its various social network platforms) and grow its presence on Facebook, Instagram and Pinterest. For example, Frette, Sferra, and Peacock Alley had 307,000, 220,000, and 808,000 monthly views, respectively, on Pinterest. While Table 1 highlighted the relatively high engagement rates on the competitors´ Instagram platforms, the comparable rates for Facebook for all competitors were relatively low. This offers an opportunity for Vidda Royalle to focus on activities promoting engagement on Facebook, as a means of increasing website traffic (for example, by sharing a hyperlink on the Facebook posts and through the use of the Facebook store). Finally, VR should consider how to tweak its website design to increase its performance in its chosen KPIs. For instance, to raise the average number of page views per visit, it could change the layout of pages, the placing or naming of links, the size of images, and so on. If the number of Twitter mentions is one of the priority KPIs, then images could be added to the brand's tweets to increase the likelihood that they will be retweeted.

Convert: The data from the students´ projects clearly confirmed the need to continue the interaction in the previous stage to build up the trust necessary to convert prospects to customers. VR should also strengthen its sales strategy in social networks (using the available tools). Similarly, VR should consider creating an Instagram shop to sell its collections. Moreover, the brand should increase cross-selling and up-selling (which ordinarily accounts for between 10-30% of e-commerce revenue). Cross-selling (increasing basket size) could be brand extensions such as throws, whereas up-selling could involve more systematic promotion of VR´s exclusive, hand-made jewellery line. It is further recommended that the brand improve and simplify access to its bespoke services, for instance, by allowing customers to simulate the final result by integrating photographs of their bedrooms and varying choice of colours, monograms, and so forth. Finally, given its international focus, the firm should provide check-out facilities in multiple currencies.

Engage: To create long-term relationships and leverage its customer loyalty, the case data recommend that VR needs to invoke post-purchase surveys to ensure customer loyalty drivers, and institute a comprehensive CRM system to create and maintain the value of customer interactions. Furthermore, the brand should further develop its exclusive club and online loyalty scheme.

Finally, the control aspect of digital marketing is highly important, specifically the need to monitor the impact of different digital initiatives. The KPIs should be collected and assessed on a weekly basis to examine how tweaks to website design or different types of content analysis or influencer strategy affect key metrics along the customer purchasing journey.

FUTURE RESEARCH DIRECTIONS

While the research objective of the present study was to contribute to filling a gap in our understanding of how luxury INVs deploy digitalization strategies to grow internationally. The present case study clearly shows how a new start-up in the luxury industry can successfully manage the "internet dilemma" by prudently personalizing its offerings through a medium without social stratification, imbuing a strong sense of history and heritage to tech-savvy consumers, charging lower online prices without reducing consumer perceptions of quality, and using the otherwise de-personalized (non-human) digital tools to enhance personal relationship building.

The findings from this exploratory study should, however, be seen as the commencement of academic enquiry in this particular field in an attempt to understand the growing phenomenon of new start-ups in the luxury industry which seek to leverage their digital platforms and competences to expand in global markets. As such, there are numerous productive future areas of research to continue this line of enquiry. First, while the present study utilized a single case study of a luxury bedding producer, Vidda Royalle, future studies could apply the same type of methodology to better understand the digitalization strategies of INVs in other luxury industries, such as jewelry or clothing. This would enhance the external validity of the present study by generalizing the findings to a wider set of luxury firms. Second, it would be highly instructive to collect data longitudinally to examine how luxury INVs change their digitalization strategies over time as individuals in different geographic markets become more familiar with its brand image, thereby increasing emotional stability and trust among its customers. Third, given the infancy of this particular subfield, future studies should investigate the degree to which digital strategies in one country can be replicated in others without significant adverse effects on the chosen KPIs. Such studies would improve our understanding as to the ability of firms to implement more cost-effective standardization strategies, rather than having to adopt more costly adaptation strategies associated with customizing digital plans to different national markets.

CONCLUSION

This study set out to explore how a luxury international new venture used digital strategies to compete with large, well-established competitors in global markets. The research is compelling given the strong trends of globalization and digitalization, combined with growing number of global start-ups in the luxury industry. Digitalization allows INVs to rapidly gain brand exposure and access multiple markets in a cost-efficient manner, thereby reducing the competitive advantages of the incumbents such as physical bricks-and-mortar stores. However, digital marketing platforms experience inherent challenges in terms of overcoming the "luxury dilemma" i.e. how to balance the distinctive characteristics of luxury firm clients (for example, the desire for exclusivity and personalization, and the preference for tactile, emotional experiences) with the ubiquity and de-personalized interactions associated with digital platforms. This so-called "internet dilemma" is arguably compounded in global markets where brand exposure is significantly greater, but where the opportunities for creating an aura of exclusivity and personalization become harder, especially for resource constrained INVs.

To explore this luxury dilemma in the context of an INV, the study utilizes the case of Vidda Royalle, a luxury bedding manufacturer from the UNESCO Heritage Site of Guimarães in northern Portugal. We identify how Vidda Royalle incorporates its unique collaboration with famous artists (creating the

designs of its luxury bedlinen) throughout the four different stages of the customer buying journey summarized in the RACE model of digital marketing ("each", "awareness", "convert", and "act"). The study recommends how the brand can further leverage these collaborative arrangements to further raise brand awareness, encourage interactivity on digital platforms, ensure conversions from prospects to clients, and implement measures for engaging customers in future sales.

The findings of the case study into the digital strategy adopted by Vidda Royalle demonstrate that new start-ups in the luxury industry can prudently manage the internet dilemma, and that these digital strategies can be successfully leveraged into global markets.

REFERENCES

Atwal, G., & Williams, A. (2009). Luxury brand marketing – the experience is everything! *Journal of Brand Management*, *16*(5-6), 338–346. doi:10.1057/bm.2008.48

Baker, J., Ashill, N., Amer, N., & Diab, E. (2018). The internet dilemma: An exploratory study of luxury firms´ usage of internet-based technologies. *Journal of Retailing and Consumer Services*, *41*, 37–47. doi:10.1016/j.jretconser.2017.11.007

Barbosa, B., Remondes, J., & Teixeira, S. (2018). Luxury marketing challenges and opportunities in the digital era. *International Journal of Marketing*, *Communication and New Media*, *4*, 1–5.

Briggs, C., Chande, A., Chen, L., Mathews, E., Mercier, P., & Wang, A. (2017). *Chinese consumers online journey from discovery to purchase. In BCG Perspectives*. Boston Consulting Group.

Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. *Journal of International Business Studies*, *46*(1), 3–16. doi:10.1057/jibs.2014.62

Chae, H., & Ko, E. (2016). Customer social participation in the social networking services and its impact upon the customer equity of global fashion brands. *Journal of Business Research*, *69*(9), 3804–3812. doi:10.1016/j.jbusres.2015.12.072

Chaffey, D., & Ellis-Chadwick, F. (2019). *Digital Marketing: Strategy, implementation, and practice* (7th ed.). Pearson Education.

Chaffey, D., & Patron, M. (2012). From web analytics to digital marketing optimization: Increasing the commercial value of digital analytics. *Journal of Direct, Data and Digital Marketing Practice*, *14*(1), 30–45. doi:10.1057/dddmp.2012.20

Chaffey, D., & Smith, P. R. (2013). *Emarketing Excellence – Planning and Optimizing Your Digital Marketing* (4th ed.). Routledge. doi:10.4324/9780203082812

Chandon, J.-L., Laurent, G., & Valette-Florence, P. (2016). Pursuing the concept of luxury: Introduction to the JBR special issue on "Luxury marketing from tradition to innovation". *Journal of Business Research*, *69*(1), 299–303. doi:10.1016/j.jbusres.2015.08.001

Corbellini, E., & Saviolo, S. (2009). *Managing Fashion and Luxury Companies*. Etas.

Corbin, J., & Strauss, A. (2014). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). Sage Publications.

Coviello, N., Kano, L., & Liesch, P. W. (2017). Adapting the Uppsala model to a modern world: Macro-context and microfoundations. *Journal of International Business Studies*, *48*(9), 1151–1164. doi:10.105741267-017-0120-x

Dabbous, A., & Barakat, K. A. (2020). Bridging the online offline gap: Assessing the impact of brands´ social network content quality on brand awareness and purchase intention. *Journal of Retailing and Consumer Services*, *53*, 101966. doi:10.1016/j.jretconser.2019.101966

Dauriz, L., Remy, N., & Sandri, N. (2018). *Luxury shopping in the digital age*. McKinsey.

Ehrensperger, E., Erkhova, D., Yadavalli, A., & Krohmer, H. (2020). What really matters for start-ups in luxury: Entrepreneurial luxury excellence. *Journal of Research in Marketing & Entrepreneurship*, *22*(1), 37–63. doi:10.1108/JRME-03-2019-0020

Eisenhardt, K. M. (1989). Building theories from case studies. *Academy of Management Review*, *14*(4), 532–550. doi:10.2307/258557

Erkollar, A., & Oberer, B. (2017). Digital marketing planning with the brand dashboard approach. *Marketing and Branding Research*, *4*(2), 192–205. doi:10.33844/mbr.2017.60336

Geerts, A., & Veg-Sala, N. (2011). Evidence on internet communication management strategies for luxury brands. *Global Journal of Business Research*, *5*, 81–94.

Gimenez-Fernandez, E. M., Sandulli, F. D., & Bogers, M. (2020). Unpacking liabilities of newness and smallness in innovative start-ups: Investigating the differences in innovation performance between new and older small firms. *Research Policy*, *49*(10), 104049. doi:10.1016/j.respol.2020.104049

Hagtvedt, H., & Patrick, V. M. (2009). The broad embrace of luxury: Hedonic potential as a driver of brand extendibility. *Journal of Consumer Psychology*, *19*(4), 608–618. doi:10.1016/j.jcps.2009.05.007

Ilyashov, A. (2015). *Here's how luxury brands are doing social media very wrong (& the few who break the mold*. Retrieved from https://www.refinery29.com/en-us/2015/10/95018/luxury-fashion-brands-social-media

Jean, R.-J., Daekwan, K., & Cavusgil, E. (2020). Antecedents and outcomes of digital platform risk for international new ventures´ internationalization. *Journal of World Business*, *55*(1), 101021. doi:10.1016/j.jwb.2019.101021

Kapferer, J. N., & Bastien, V. (2012). *The luxury strategy: Break the rules of marketing to build luxury brands*. Kogan Page Publishers.

Kapferer, J. N., & Valette-Florence, P. (2019). How self-success drives luxury demand: An integrated model of luxury growth and country comparisons. *Journal of Business Research*, *102*, 273–287. doi:10.1016/j.jbusres.2019.02.002

Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born global firm. *Journal of International Business Studies*, *35*(2), 124–141. doi:10.1057/palgrave.jibs.8400071

Lee, Y.-Y., & Falahat, M. (2019). The impact of digitalization and resources on gaining competitive advantage in international markets: Mediating role of marketing, innovation and learning capabilities. *Technology Innovation Management Review*, *9*(11), 26–39. doi:10.22215/timreview/1281

Lee, Y.-Y., Falahat, M., & Sia, B.-K. (2019). Impact of digitalization on the speed of internationalization. *International Business Research*, *12*(4), 1–11. doi:10.5539/ibr.v12n4p1

Liu, S., Perry, P., & Gadzinski, G. (2019). The implications of digital marketing on WeChat for luxury fashion brands in China. *Journal of Brand Management*, *26*(4), 395–409. doi:10.105741262-018-0140-2

Makrides, A., Vrontis, D., & Christofi, M. (2020). The gold rush of digital marketing: Assessing prospects of building brand awareness overseas. *Business Perspectives and Research*, *8*(1), 4–20. doi:10.1177/2278533719860016

Martin-Consuegra, D., Diaz, E., Gomez, M., & Molina, A. (2019). Examining consumer luxury brand-related behavior intentions in a social media context: The moderating role of hedonic and utilitarian motivations. *Physiology & Behavior*, *200*, 104–110. doi:10.1016/j.physbeh.2018.03.028 PMID:29604320

Nam, H., & Kannan, P. K. (2020). Digital environment in global markets: Cross-cultural implications for evolving customer journeys. *Journal of International Marketing*, *28*(1), 28–47. doi:10.1177/1069031X19898767

Ojala, A., Evers, N., & Rialp, A. (2018). Extending the international new venture phenomenon to digital platform providers: A longitudinal case study. *Journal of World Business*, *53*(5), 725–739. doi:10.1016/j.jwb.2018.05.001

Okonkwo, U. (2009). Sustaining the luxury brand on the internet. *Journal of Brand Management*, *16*(5-6), 302–310. doi:10.1057/bm.2009.2

Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. *Journal of International Business Studies*, *25*(1), 45–64. doi:10.1057/palgrave.jibs.8490193

Quach, S., & Thaichon, P. (2017). From connoisseur luxury to mass luxury: Value co-creation and co-destruction in the online environment. *Journal of Business Research*, *81*, 163–172. doi:10.1016/j.jbusres.2017.06.015

Ramadan, Z., & Nsouli, N. Z. (2021). Luxury fashion start-up brands´ digital strategies with female Gen Y in the Middle East. *Journal of Fashion Marketing and Management*. Advance online publication. doi:10.1108/JFMM-10-2020-0222

Salehzadeh, R., & Pool, J. K. (2017). Brand attitude and perceived value and purchase intention toward global luxury brands. *Journal of International Consumer Marketing*, *29*(2), 74–82. doi:10.1080/08961530.2016.1236311

Schmitt, C., & Baldegger, R. (2020). Editorial: Digitalization and internationalization. *Technology Innovation Management Review*, *10*(4), 3–4. doi:10.22215/timreview/1342

Stake, R. E. (1995). *The Art of Case Study Research*. Sage Publications.

Vigneron, F., & Johnson, L. W. (2004). Measuring perceptions of brand luxury. *Journal of Brand Management*, *11*(6), 484–506. doi:10.1057/palgrave.bm.2540194

World Economic Forum. (2021). Retrieved from https://www.weforum.org/platforms/shaping-the-future-of-digital-economy-and-newvalue-creation

Yin, R. K. (1981). The case study as a serious research strategy. *Science Communication*, *3*(1), 97–114.

KEY TERMS AND DEFINITIONS

CAGR (Compound Aggregate Growth Rate): The estimated growth rates for a particular industry which are then compounded for a particular period (typically 5 years).

CRM (Customer Relationship Management): Using digital technology to measure relationships and interactions with customers, thereby allowing firms to better understand purchasing behaviour of their customers, ultimately enhancing profitability.

KPIs (Key Performance Indicators): Metrics which are invoked to measure the performance of one firm vis-à-vis its competitors, thereby establishing grounds for competitive advantage.

INV: A new start-up venture which has internationalized relatively soon after inception (typically within the first 3 years), and which earns a large proportion of its turnover from foreign markets.

RACE: The acronym for the oft-used digital marketing plan framework which comprises four phases: "Reach", "Act", "Convert", and "Engage".

Chapter 22
Digital Transformation in the Feed Industry Business:
The Development of the GMP+ International Academy for Knowledge Exchange on Feed Safety

Sunamita Iris Rodrigues Borges da Costa
Universidade Federal de Pernambuco, Brazil

Johannes Willem Eduard Lodders
Hans Lodders Management BV, The Netherlands

ABSTRACT

Access to valuable knowledge about feed safety is crucial for the globalized animal feed business, which is linked to food production and, therefore, human health. However, due to differences between regions and actors in the production chain, the demand for knowledge varies strongly. Digital transformation helps to spread knowledge and to make it accessible throughout the globe, but there are some other conditions to make access to knowledge successful. The case of the development of the worldwide GMP+ Academy on feed safety shows that besides the application of digital tools and channels, a relevant but not competitive subject is essential, as well as the leading role and position of the organization that created the academy. Last but not least, successful knowledge sharing depends on collaboration and a clear value proposition for all stakeholders.

INTRODUCTION

The digital transformation has created, despite geographical distances, necessary conditions for knowledge share and communication. These changes make it possible to connect diverse and complementary information sources, essential to innovation. At the same time, they allow the creation of coordinated strategies capable of including actors from one or multiple global production chains in a collaboration.

DOI: 10.4018/978-1-7998-9008-9.ch022

Such associations, however, do not happen effortlessly. The cognitive distances within a dense and complex production chain, composed of several activities that vary in the skills and types of required knowledge, the competition to reach and maintain markets with many stakeholders, and the costs involved in such an undertaking, are some of the challenges. Even more, knowledge exchange in a global productive chain must deal with the specificity of knowledge levels and needs. These particularities vary geographically, according to socio-territorial characteristics, and have a significant impact on the economic sector's behavior and rules.

All these challenges and the diversity of demands yet increase the importance of cyberphisical structures, created by multi-stakeholders' collaboration, to fit the specificities that characterize each sector. In addition to this, other conditions must be provided to achieve industry wide results for collective issues with high individual impact over economic activities.

This chapter presents and discusses a case study of GMP+ Academy for Feed Safety. It is an experience that illustrates the coalition of some important conditional factors that enabled to surpass the boundaries to knowledge exchange for a worldwide transformation through cooperation between capitalist actors in the international Feed Industry by using possibilities offered by digital transformation. Despite the limits of generalizations in this specific methodology, the case presents insights for analyzing other examples in different contexts.

The underlying problem regarding knowledge in the Feed business is that it grows globally, which makes it harder to reach a relevant level of knowledge by all the actors and regions that are involved in the production of animal feed. At the same time, due to feed safety scandals in the past and increasing regulations to guard safe feed production methods, the demand and importance of up-to-date and correct knowledge increases.

The present paper aims to contribute to reflection about innovation and digital transformation of business by knowledge transfer through e-learning platforms. This goal is centered in the specific needs of activities with diverse technological intensity levels and performed in distinct social-territorial contexts. In addition to this, the chapter deals with the developments in the Feed Industry and its challenges regarding access to valuable knowledge in feed safety. In face of this, this research describes the actual development of the international GMP+ Academy, including its methodology, target audiences, business model and organization. The discussion ends showing an organizational chart of the Academy, and an impression of the newly developed knowledge platform on Feed Safety. Based on this, recommendations and conclusions have been formulated.

BACKGROUND: THE CHALLENGES FOR KNOWLEDGE TRANSFER IN DIGITAL TRANSFORMATION

Considering the theme of this chapter, explaining the author's starting point of view requires a little historical context. As a phenomenon, the roots of the current digital-technological scenario are present in the flexibilization of the industrial process to deal with the structural crisis of the capitalist accumulation system at the end of 1960's. Briefly, the fixed accumulation system created in the second industrial revolution and consolidated after the World War II was based on large production structures. These were composed of lots of capital immobilized in factories and machinery. This productive model provided the conditions for expanding the consumer goods offer. However, it proved to be extremely dependent on energy supply, human workforce, and the continuity of the industrial products demand from relatively

secure markets (Harvey, 2002). As a circling crises-based system, though, it did not resist the changes on its optimum conditions: the reconstruction of the nations after the conflict, the industrialization in undeveloped countries, the laborers organization, and the expansion of their demands, as well as the rising prices of energy sources (Schumpeter, 1982; Harvey, 1982).

Since these transformations, the Capital took science, technology, and innovation (S,T&I) as strategic requirements to restructure production and add flexibility in productive processes, products and consumption patterns (Harvey, 2002; Albuquerque, 2009; Borges da Costa, 2018). This flexibilization process is based on high rates of commercial, technological, and organizational innovations. Such strategy was applied to reduce the capital immobilization, the dependence of workforce, and to enable geographical dispersion of the flexible industry. Such flexibilization was sustained on a global scale from transport, communication, and management technologies. From then on, innovative development becomes one of the main economic growth factors and an essential element in contemporary capitalism, responsible by a new world labor division (Sassen, 1998). This continuous drive for flexibilization through innovation is dialectically connected with digitalization by the evolution of internet, from a military application to a global communication and interaction network (Mazzucato, 2014).

Nowadays, the digital transformation process strongly influences the progressive technological change. It happens by the inclusion of cyberphisical structures as modernization strategy, integrating business and productive functions beyond the borders of each organization by holistic automation. This became a central characteristic of the 4.0 industry (Lydon, 2016). However, these changes are not restricted to the industrial domain. They overflowed to every social sphere by the advent and popularization of the global computer network system, or Internet (Surrat, 2001).

The technological changes created by the digital transformation exponentially expanded the access and exchange of a potentially infinite volume of "information" sourced from different parts of the globe. So, the scientific-technological advances experienced in the last century have produced a technical system of planetary proportions driven by progress in information and communication technologies (ICT) s (Santos, 2008). These techs became essential tools to the codification, digitalization, and sharing of information, promoting remote access to a wide range of knowledge sources. In the same way, ICTs are responsible to generate contact channels beyond territorial borders, reducing (operational) barriers to interaction, shortening distances, and enhancing the possibilities for cooperation (Nonaka;Takeuchi, 1995; Foray; Lundvall, 1996; Morgan, 2011).

All these transformations and new potentialities have boosted the innovative progress, transforming the capitalist economic foundations into an even more global and knowledge-based dynamic. It has a decisive impact over the business models, marketing, and competitive strategies in such a significant way that the current era is supposed to be named as "Internet economy" or "Digital Economy" (Stoyanov, 2017) Lundvall (1996), however, two decades before, described the current moment in a more bold and extensive way as "Learning economy". This idea expresses that, not just the access to unlimited amounts of information, but the learning - forgetting skills are decisive to determine the position of organizations and regions in the development progress process:

The learning economy indicates an economy where the success of individuals, firms, regions, and national economies reflect their capability to learn (and to forget which is often a prerequisite especially for learning new skills). The learning economy is an economy where change is rapid and where the rate at which old skills get obsolete and new ones become in demand is high (Lundvall, 1996, p.2).

The virtualization of the world is responsible for integrating markets, creating new products and services, but, more deeply, changing the relational perspectives in many levels, originating the idea of a global village (Hudson, 2011). The scale, velocity and intensity of transformations in the so-called age of technology created the perspective of overcoming distances. It should enable connecting actors despite barriers as geographical, social, and cultural conditions, as well as it is supposed to amplify the innovative dynamic potential by the "unrestricted information access" (Negroponte, 1995; Cairncross, 1997). However, even in a context where the means for transmitting information over long distances have reached unprecedented levels, there are also other factors to consider. Firstly, the gap between tacit and coded knowledge still exists. Secondly, the barriers to dissemination, that concern not only the capacity of the actor's virtual outreach, but also the conditions of access that are often territorial and socially restricted to certain groups. Finally, the dissociation between access to information and absorption of knowledge persists in the face of obstacles to understanding (Morgan, 2001).

The exchange of knowledge consists in establishing flows among a varied set of complementary information, held by different individuals and organizations. These, by the way, are in many parts of the globe and perform their activities in a landscape with diverse physiographic and social structures. Such diversity was carved along particular historical processes, generating specific political and cultural systems, that are both cause and consequence of social commitments (Borges da Costa, 2018). This builds important cognitive diversity between individuals and organizations from distinct contexts. It highlights the importance of knowledge produced and innovations conceived, and eventually delimited, in specific territorial -local, regional, national innovation systems (Vertova, 2014).

Another important point to be considered is the specificity of different economic sectors and the diverse economic activities that compose each productive chain. Sectors, and here we include the economic activities inside each sector, do not demand external knowledge sources in the same way, since there is no uniform understanding of the relevance of this knowledge as criteria for market competitiveness (Malerba, 2009). It also differs according to the socio-territorial contexts where the economic activities are executed. These scenarios create specific technological backgrounds and knowledge demands that refer to the level of competitiveness and exigency of the internal market and the position of the companies it houses in broader and more rigorous markets outside (Ruffoni, 2010).

To consider the sectorial knowledge demands, then, implies the recognition of the diverse needs, particular of each organization, and shared collectively. It also requests understanding the dissymmetry among the niches of economic activity. This framework of actors (individuals and organizations), functions and dynamics present in each sector of activity, create a set with learning processes, skills, organizational structure, and behaviors. Those are related to knowledge bases, technological standards, market inputs and outputs, present and potential future demands (Borges da Costa, 2018,).

In face of the market globalization, to attend this sectorial knowledge demands and develop organizational solutions for sectorial problems request the use of tools provided by digital transformation beyond the organizational borders (Malerba 2004). Nevertheless, investing resources and efforts in strategies to stimulate the knowledge exchange continue to be a challenging decision, even more considering the market failures and the characteristics of systems in which the actors operate. These efforts are, also, discouraged by their minimum scale of efficiency and by the degree of uncertainty inherent to these investments (Rubio; Tshipamba, 2010). It is not easy to define whether, when and how the investment returns will come, which can lead to underinvestment by the productive sector, in general. Likewise, it may lead to resistance and more conservative approaches for cooperative strategies. These compromise

the potential for reaching solutions to shared problems, rebuilding distances that the digital transformation put down (Morgan, 2011).

Considering all the factors that make the development and exchange of economic and social useful knowledge a complex and tough goal, what enables this kind of association for a global production chain? What makes it possible to bring together, in a common marketplace, actors who, even though they are complementary links of the same production chain, operate in areas with different technological and complexity levels? Actors, by the way, who originate from different parts of the planet and often compete. Most definitely, the conditions provided by the digital transformation allow the technical environment that makes it viable or even imaginable to work together in these complex tasks, for example by using collaborative learning platforms. But would it be enough to overcome the many obstacles to collaborate? The example of GMP+ International Academy on Feed Safety and its joint work with knowledge producers and feed industry companies can help to enlighten these questions.

The Feed Industry: Globally Linked and Strongly Related to Human Health

The international Feed business consists of the growth, harvesting, creation, production, and distribution of animal feed across the globe. According to the International Feed Industry Federation (IFIF, 2021), the Mondial Commercial Feed Manufacturing generates an estimated annual turnover of over US$400 billion; in 2018, the global animal feed production was, approximately, 1.085 billion tons, distributed between regions and countries.

Since animals are kept becoming part of the human food chain, the feed and food industry are strongly connected. The livestock sustained mainly by the compound feed production fed the herds that generated 1,172.4 million metric tons of protein production (71.3 bovine, 124.6 of poultry, 120.7 pigs, 15.3 ovine and 840.5 million metric tons of milk, in 2018, 1,180.7 million metric tons in the following year. It is important to note that, in the period from 2012 to 2018, seven countries were responsible for more than 50% of the compound feed production (Table 1). These countries export globally their commodities, reinforcing the international character of this industry.

Table 1. Compound feed estimated production 2012 - 2018 (Tons)

Compound Feed	2012	2013	2014	2015	2016	2017	2018
TOTAL	954.400	962.780	980.000	995.600	1.032.000	1.070.000	1.103.000
Europe/% total	151.364 / 15.9	151.750 / 15.8	153.372 / 15.7	155.021 / 15.6	156.798 / 15.2	160.430 / 15	163.322 / 14.8
7 big countries/% total	540.039 / 56.6	533.750 / 55.4	536.260 / 54.7	543.480 / 54.6	552.010 / 53.5	569.000 / 53.2	580.800 / 52.7
China	198.340	189.130	182.690	179.930	187.200	186.900	187.900
USA	168.460	168.680	172.450	173.730	169.700	173.000	177.200
Brazil	66.285	66.990	66.150	68.700	68.930	69.900	68.700
Russia	23.350	24.510	25.660	29.090	29.090	37.600	39.200
Mexico	28.536.	29.120	30.700	31.110	33.880	34.400	34.600
India	26.837	26.420	29.430	31.540	31.360	34.200	38.700
Spain	28.231	28.900	29.180	29.380	31.850	33.000	34.500

Data Source: (based on data from Fefac, 2021; Alltech, 2021)

While connections between producers and consumers expand worldwide, this long production chain becomes progressively complex, adding more and more steps to the animal feed production process (Figure 1).

Figure 1. the animal feed chain, excluding the farmers (both producers and customers)
Source: (GMP+, 2021)

Compound Feed	2012	2013	2014	2015	2016	2017	2018
TOTAL	**954.400**	**962.780**	**980.000**	**995.600**	**1.032.000**	**1.070.000**	**1.103**
Europe[% total]	151.364 [15,9]	151.750 [15,8]	153.372 [15,7]	155.021 [15,6]	156.798 [15,2]	160.430 [15]	163.322
7 big countries[% total]	**540.039** [56,6]	**533.750** [55,4]	**536.260** [54,7]	**543.480** [54,6]	**552.010** [53,5]	**569.000** [53,2]	**580.800**
China	198.340	189.130	182.690	179.930	187.200	186.900	187
USA	168.460	168.680	172.450	173.730	169.700	173.000	177
Brazil	66.285	66.990	66.150	68.700	68.930	69.900	68
Russia	23.350	24.510	25.660	29.090	29.090	37.600	39
Mexico	28.536.	29.120	30.700	31.110	33.880	34.400	34
India	26.837	26.420	29.430	31.540	31.360	34.200	38
Spain	28.231	28.900	29.180	29.380	31.850	33.000	34

The increasing connectivity provided by digital transformation integrates markets using advanced commercial and control cybertools. It makes possible that a set of diverse activities with different technological intensity levels are part of the same global productive chain (Sassen, 1998). These activities, by the way, can be developed in different regions where the physiographic and social structures differ. Such diversity creates specific understanding about what and how the productive procedures are supposed to be executed in each place. On the one hand, this diversity represents a rich source of information due to the geographically distinct experiences. On the other side, the uniformization of a global standard is difficult to be achieved, which in this sector represents a cross-border risk to security related to feed safety issues.

That is because, beyond the amount of capital generated, the importance of the feed business is highlighted by its impact on human lives, since feed and food industry are strongly connected. Safe feed, then, is a key subject and a challenger threat that link all the actors in this industry.

GMP+ AND THE FEED SAFETY ISSUE

The feed sector is traditionally vulnerable to pollution incidents, as control mechanisms were not always as tight as in the food sector, since this last one has an acknowledged direct impact on human health. Because of the absence of strict control measures and sometimes a weak culture on Feed Safety, several incidents took place in the past. Some examples of these crises events are the Bovine Spongiform Encephalopathy; Foot-and-Mouth Disease; dioxin, mycotoxin, E.coli O157:H7 contaminations; and the development of antimicrobial resistance (FAO, 2021). As the Food and Agricultural Organization (FAO) of the United Nations furthermore states on its website:

Feed safety is a prerequisite for food safety and human health, as well as a necessity for animal health and welfare. … In fact, feed is an integral part of the food chain, and its safety has been recognized as

a shared value and a shared responsibility. Feed production must thus be subject, in a similar manner as food production, to the quality assurance of integrated food safety systems (FAO, 2021).

In face of the growing sectoral economic relevance during the nineties of the last century, companies demanded certification to their activities. This 'safety seal' should ensure their reliability beyond the national territory, looking for new and bigger cross-border markets. This is one of the reasons why, in 1992, (Good Manufacturing Processes) GMP was established in The Netherlands. This organization had the goal to certify feed industry companies that proved to provide feed products manufactured in a controlled way.

The real change regarding the importance of feed safety, however, took place at the end of the last century. A sad milestone was the occurrence of an animal feed contamination incident, which started in Belgium and affected a big part of Europe. On May 27, 1999, it was made public on radio and television that poisonous dioxin had been found in chicken feed, and later also in the fat of chickens. Although the public statement mentioned that "all necessary measures had been taken", it was the start of disastrous developments for the food industry, because the contaminated feed was used by several livestock companies. As a result, many animals were killed as well as meat, milk, eggs, and consequently, related food products were affected.

The outcome of the pollution incident was significant. In Belgium alone, for example, out of precaution, 7 million chickens and 60,000 pigs needed to be killed (Boerenbond Belgium, 2019). Because of this, the production of many food products came to a complete stop, and consumers were confronted with empty shelves in the supermarkets. Therefore, what became known later as the 'dioxin crises' changed the face of the agricultural industry in Western Europe.

This remarkable incident amplified GMP's role from a mainly economical to also a political European representative. The organization became, then, GMP+, because of the international acknowledgement of the Dutch agricultural industry relevance and its feed safety standards. The organization work was no longer restricted to controlled production certification. Its scope evolved into compliance to legal regulations, to secure the exchanges of feed industry products, and so, the supply and quality of human food. To achieve this, GMP+ deployed a set of procedures and recommendations that composed its feed certification scheme. This document codified in a structured process and objective actions the latest regulations and best practices in feed safety. When companies implement the scheme correctly, the achieved certification ensures secure production within the GMP+ community (GMP+, 2021).

Since the scheme was established, over 19,000 companies, in 87 countries worldwide have been certified. By applying the GMP+ scheme, these companies guarantee methods and procedures to ensure, as much as possible, safe feed production and trade. However, the company's efforts to change procedures and practices are not only motivated by ethical but also by economic reasons. As the GMP+ certification scheme covers the entire production feed chain, to have this seal gives a company in the feed business also access to other companies that are part of the same community. This network connects suppliers and customers up in the feed chain and guaranteeing the reduction of risks and resources dedicated to complying to regulations and to inspections. In the same line, as GMP+ is the market leader of certification schemes in the globally dominant feed markets of Northern Western Europe, being certified by this organization safeguard access to the second biggest market in the world (Heuvelmans, 2017). As a result of its relevance, GMP+ is reaching regions where knowledge about Feed Safety is not as common as in Northwestern Europe and Northern America (AFIA, 2021). Considering the international character of

the sector, being qualified by GMP+ is an important competitive factor to open and maintain progressively more rigorous markets.

The GMP+ is a relatively small organization, mainly focusing on keeping up to date its quality scheme. This includes activities like doing research to determine if new product may or may not be allowed as an ingredient for safe animal feed, offering additional information and services for certified companies, such as early warning systems in case of contaminations, and auditing companies. In order to have a global reach, GMP+ collaborates with 34 'Certification Bodies' (CB's). These partners issue the GMP+ certificates in specific regions of the world and check the correct implementation with 373 locally acknowledged auditors. Furthermore, GMP+ works with certified consultants, that have in-depth knowledge of how to implement the GMP+ scheme in the right way within feed companies in the whole feed chain.

For the different types of sectors within the industry, GMP+ has developed different 'scopes', for example: rules for a transport company differ from those of a production plant. To keep the scheme and community up to date, GMP+ gathers valuable information regarding feed safety assurance and shares it worldwide. With this focus on its core products and services, and by collaborating with CB's and consultants, the GMP+ organization manages to be operational in 87 countries. Its staff consists of approximately 30 people nowadays, with a yearly budget of 5 million euros (GMP+, 2021). This shows the breadth of the organization with a relatively small internal staff. But would it be enough to overcome the challenge inherent to the sector and its problems?

Since globalization causes increasing dependency on all links of the chain to perform optimally, to achieve safe feed production requests access to relevant knowledge. Therefore, it highlights the serious challenge for the industry, that is to bridge the feed safety knowledge gap between the different actors who work in diverse technological levels in the feed industry chain, taking into consideration social, cultural, and educational differences (Strambach; Dieterich, 2011). And more, this knowledge set must be global enough to ensure international standards but, at the same time, must be adapted to their local situation and their position in the chain since:

- Legislation differs per region or country
- Awareness of the importance of feed safety can differ per company and region
- Different languages create barriers for accessing knowledge
- Trustworthy knowledge is not available everywhere, or does not meet the same reliable quality level as required in the leading regions and companies
- Regulations and the complexity of feed safety rules differ per organization in the feed chain (a truck driver needs to know other feed safety rules than the quality manager of a feed production Plant)

In this scenario, knowledge is a condition for safe production processes, but what knowledge? By digital transformation, a non-absorbable amount of information became available. But how to define the relevance of this information? How to overcome the distance between codified and tacit knowledge? and how to transform reliable and relevant knowledge in a learning process accessible and adaptable to different cultures, activities, and people with many educational levels? How to break through the gap between the increasing necessity of knowledge and the growing complexity of availability and accessibility of reliable knowledge? To overcome these and many other challenges, GMP+ was requested to take a position.

DIGITALIZATION AND COLLABORATION FOR KNOWLEDGE EXCHANGE: THE GMP+ ACADEMY

In November 2017, during the international GMP+ 25 years anniversary conference in Amsterdam, The Netherlands, representatives of the Feed Industry stated that knowledge about Feed Safety Management is key for the future of the feed business internationally. GMP+ was asked to take the lead and to investigate the market needs looking for a solution. Until then, knowledge transfer from GMP+ towards several stakeholders, using the organization website, had taken place on a basic level. Some consulting firms and trainers were mentioned on the website as well as a short number of articles were passively shared online. The content, yet, was not aimed to be accessible, nor designed, for the many different target audiences.

This ambition highlighted the need for active collaboration that is supposed to include a bigger number of partners from the industry, but also from knowledge suppliers like academic and commercial training institutes. These organizations were identified as important sources of relevant information. At the same time, the knowledge suppliers have the essential expertise to assist in the construction of training programs based on strategic knowledge, adding value to the different actors in the chain, in different regions. Facing the collective demand for knowledge and encountering the broad number of needs, GMP+ realized that a possibility might be the construction of a new, global, academy. This should host a digital platform dedicated to bringing together the international feed industry and the knowledge suppliers to deal with feed safety issues by exchanging knowledge.

The goal of the new academy was to actively create, enhance, and share knowledge about feed safety and its practical application. The GMP+ Academy, then, should collect feed safety expertise in collaboration with educational and industrial partners, improving and distributing this knowledge together. Other goal of the Academy would be to make this knowledge accessible for relevant target audiences around the globe. The chosen way to achieve this goal was through digitally transforming the current academy, creating an online marketplace where the stakeholders can find relevant knowledge and potential partners. There also, the stakeholders can share key information and experiences, contributing to a collaborative digital collection and being part of a strong and supportive network endorsed by GMP +.

With the purpose to create this digital environment that is the Academy itself, a multi-disciplinary team was founded. This group consisted of members of general management, business and learning development, marketing professionals, and information management. A plan of approach was constructed to develop the new, worldwide operating academy. The strategy, then, was a broad mix of methodologies and models, based upon principles coming from the 'Double Diamond Design Model' (Caulliraux, et al., 2020), and Lean Start-up (Ries, 2011). This can be recognized in the development of the new organization, that went through the following five stages:

- Taking interviews with companies and consultants, active in the Feed Industry, to deepen the insights into their daily work and the consequences of the lack of knowledge (exchange), resulting in *personas* of future customers;
- Determine problems/challenges and related potential solutions that could solve the barriers regarding access to relevant knowledge for professionals in the Feed business, using the Value Proposition Canvas (Osterwalder, 2014);
- Design the solution, the potential value propositions to be offered by the GMP+ Academy, using the Business Model Canvas (Osterwalder, 2010) and the Golden Circle theory (Sinek, 2009);

- Test of propositions and launch of a Minimum Viable Product (MVP);
- Maintenance and continuous development and improvement, based on feedback and actual behave of users of the GMP+ Academy.

The creation of GMP+ Academy started with a Project plan of Approach where were defined: its phases and actions, an estimation of the means needed (people and budget), and the planning and the project organization. This took a few months to establish and get approved by management.

One of the aspects to highlight is the team that was established to develop the Academy: apart from an external project manager, this group consisted of both members of the management, the marketing manager, the business development manager, the IT manager and a Learning and Development expert, externally hired. So, a mix of people that know the market and the challenges the industry faces, and external professionals, hired for their specific expertise align with the project goals, named, setting up new organizations and creating learning content.

The process of building the academy was then structured in five steps (Figure 2).

Figure 2. The five steps of the process
Source: (created by the authors)

The five steps are described in more detail below.

Step 1: Getting to know the industry, the people, and the challenges they face

The starting point was to determine the actual problem the Academy had to solve: how do people in the industry deal with these problems? How do they experience these challenges and why they are indeed a problem? How does it affect their daily work and how does it might be solved? Would be an independent academy indeed a solution for the pointed problems?

To address these questions, 16 companies were invited to take part in an interview of approximately one hour, consisting of 14 questions. In the end, ten people were interviewed, a diverse group from organizations based in The Netherlands, Germany, Ukraine, Spain, France, and Brazil. Some of those were working for the industry, others for consulting firms specialized in feed industry. All respondents were selected for their direct connection with feed safety processes implementation.

The structured interview touched the following topics: How does the company relate to feed safety? How does the company keep their knowledge about feed safety up to date? What needs do you have to keep knowledge better up to date and what needs do your employees, suppliers and customers have on this subject? How might these needs be best fulfilled? Who should play a role in potential solutions? Are you (the company) willing to contribute yourself to knowledge sharing?

Based on the outcome of the answers, a picture was starting to emerge of the actual needs regarding learning and access to knowledge were wide and diverse. From the interviews it became clear that every professional working in the feed business must have some knowledge about feed safety. However, the type and depth of knowledge that is required varies a lot between the different sectors and job. For example, a quality manager of a compound feet plant has to have in-depth knowledge of all feed safety procedures. A truck-driver that transport the commodities, on the other hand, only needs to know very specific knowledge about transporting feed in a safe way. But both must have knowledge about feed safety that underlies the rules applied, as well as the operational procedures to be followed to prevent or mitigate potential contaminants from being introduced or disseminated through the production chain. It is a horizontal learning process that must universalize the problem understanding and conduct the workforce to act accordingly in all productive stages and levels.

Also, it became clear that a wide variety of educational content should be available and in many different languages, fitting the different target audiences and their needs. Furthermore, educational content should fit the local situation and be pragmatic. As many professionals in the feed industry don't speak English, and work outside Europe, but do business with companies from Europe or other countries. Related to this, many respondents also indicated that not only finding relevant and qualitative learning content was essential, but also the possibility to find trustworthy trainers and consultants. In many countries, it is unclear what consultant or trainer has truly up to date knowledge about the latest Feed Safety regulations, for example.

It also became clear that an independent actor like GMP+ had a unique position to fulfil a role in the creation, accessibility and spread of knowledge, since its independence and its wide network. Although this position was being recognized, it was also pointed that the amount of different learning content could not be created by the new academy alone. Partnerships were needed to fulfil the knowledge needs, also to prevent the Academy to become a competing force for her own partners. The most people that were interviewed presented also as willing to contribute to sharing knowledge.

Lastly, based on the interviews and an internal workshop with the project team members, some personas were created, representing users that don't really exist, but are described as such, even receiving a face. It aims to bring this imaginary people alive since you can test assumptions with persona's by guessing how a real person with these characteristics would respond. Each persona is described in terms of demographics, needs, biography and preferences, among other things, as the examples presented in Figure 3.

Figure 3. personas of end-users (professionals in the feed industry)
Source: (Project documentation, based on internal work session at GMP+ on December 20, 2019)

When designing the actual value propositions, the personas profiles support the estimate of how each represented target would rate the solution. The presented figures are examples of the personas that were created based on the interviews, and that were used in the further process of the development of the academy.

Step 2: Determine problems/challenges and related potential solutions

After the interviews, a series of workshops were organized with the project team members. These workshops were dedicated to map the goals and ambitions of professionals in the feed business, as well as the barriers they face to achieve their goals, regarding access to knowledge. After doing so, the next step was to define potential solutions to remove these barriers, or to enhance their success. For this, the Value Proposition Canvas (Osterwalder, 2014) was used.

The goal of these sessions was to define potential solutions and services that were to be delivered by the future academy, and that would be truly relevant and adding value to users and to potential partners. The outcome of these sessions is depicted below in figure 4

Step 3: Design the solution and define the potential value propositions to be offered by the GMP+ Academy

After mapping the issues, barriers and challenges of the relevant target audiences, a series of workshops were organized. This procedure aimed to brainstorm and discuss the actual value proposition and solutions the Academy were to offer. These solutions, thus, would be both for professionals in the feed industry as well as for partner organizations like training institutes. For this, the Business Model Canvas, or BMC, (Osterwalder, 2010) was being used. In the same way, the Golden Circle approach (Sinek, 2009) defining the 'why' (what are the issues that need to be solved), the 'what' (what solutions can be used to solve the challenges) and the 'how' (in what way are the solutions brought to the market) was applied.

Both models were used because they are accessible, cover the main aspects of a new business and give a good overview of the choices that have been made. The schematic canvas that the BMC offers were later constantly used as a guideline when the Academy was designed and organized. The final BMC for the GMP+ Academy on Feed Safety is depicted below in Figure 5.

The BMC shows that there are two main target audiences for the Academy: the end-users, professionals working in the Feed Industry, and the trainers, suppliers of learning content for professionals in the feed business. These two target groups are depicted on the right side of the BMC.

At the heart of the BMC are the value propositions, or services, mentioned, that were to be offered by the Academy to the market. These services were based upon the Value Proposition Canvas, which links potential solutions to actual problems of target audiences. Services were aimed both to bring value to the end-users, as the potential partners, the trainers. The left side of the BMC shows specific activities that are necessary to bring the services to the market. In the case of the Academy, specific activities were for example the maintenance of the Knowledge Platform, and translating market demands into actual learning solutions, together with partners.

The added value of bringing together these elements, is that it gives a comprehensive and clear overview of what the Academy, and the people working for the Academy, need to do. Especially since the Academy was new to GMP+, it helped to align and structure the project teams efforts in the right direction.

Figure 4. Filled in Value Proposition Canvasses for end-users and partners
Source: created during work sessions at GMP+ in February 2020

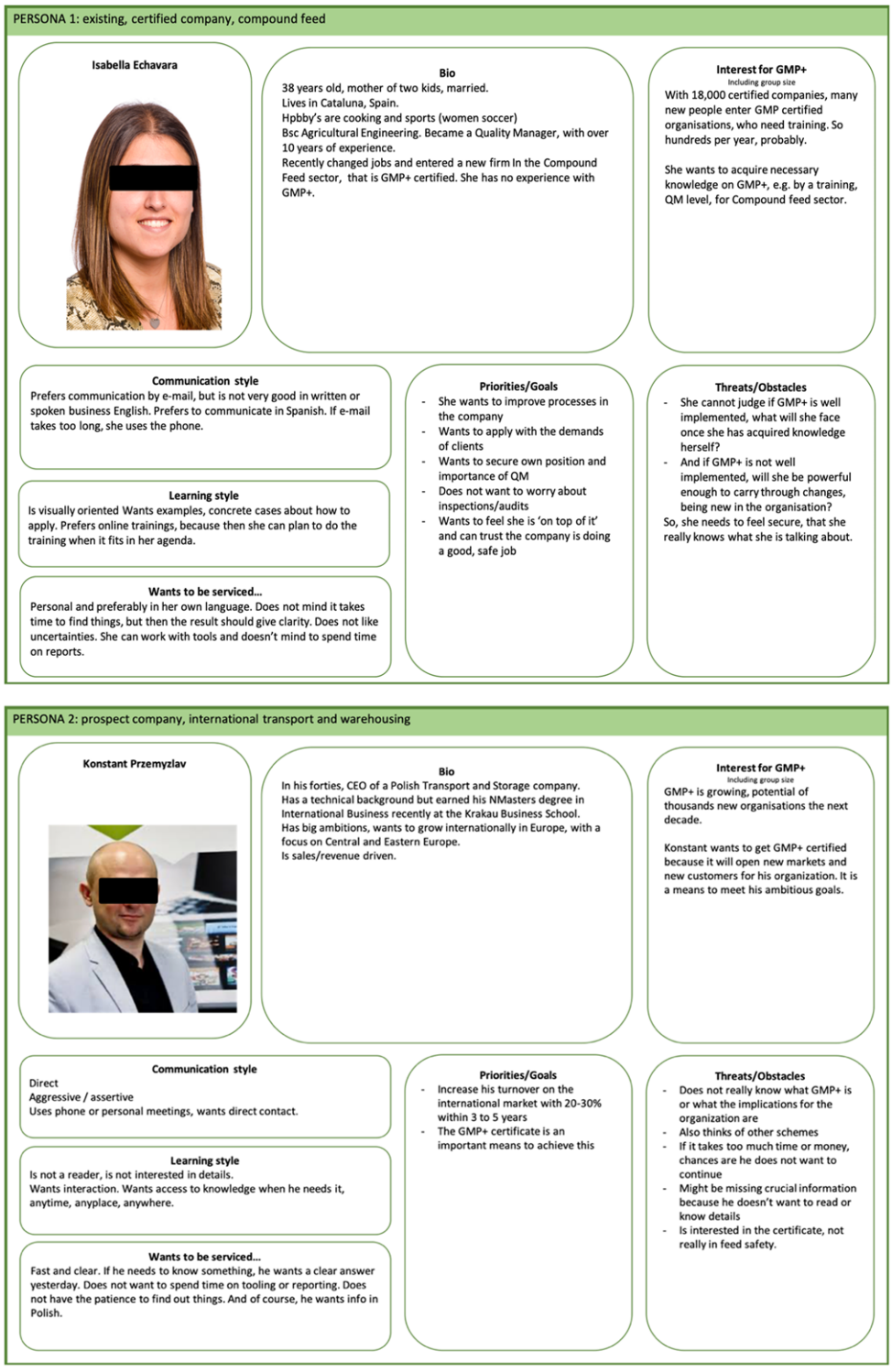
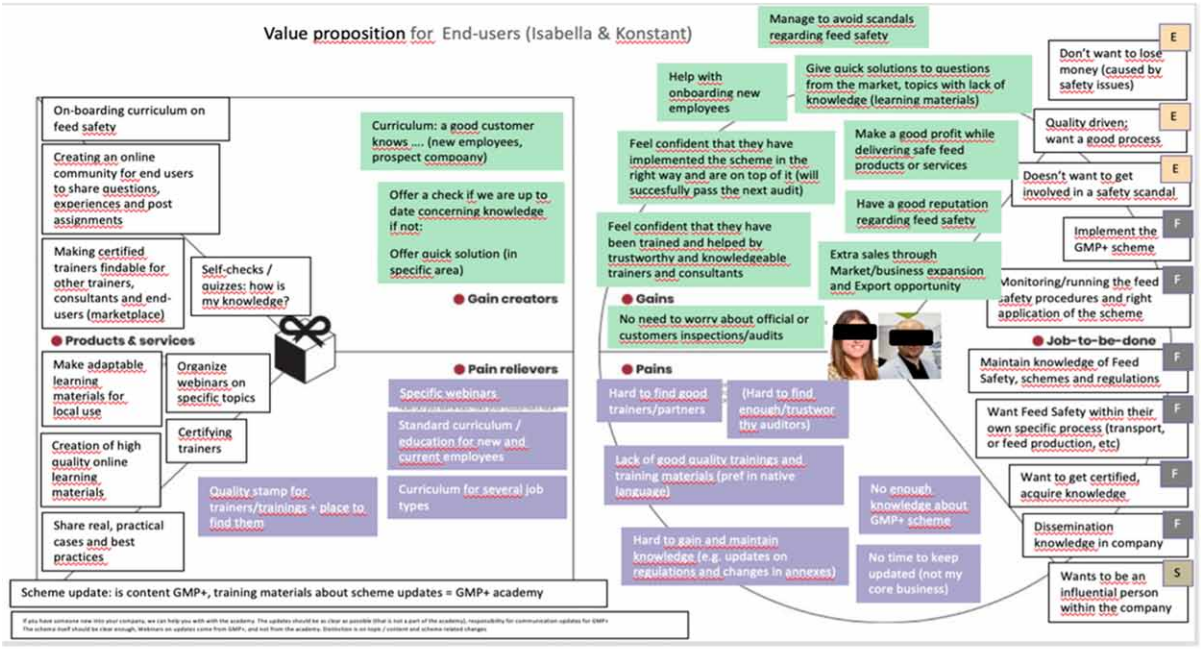


Figure 5. The Business Model Canvas for the GMP+ Academy
Source: created during work sessions at GMP+ in February 2020



Step 4: Test of propositions and launch of a Minimum Viable Product (MVP)

GMP+ had no skills, ambitions, or means to become an actual, physical academy, with classes, staff and teachers. Also, this would not solve the challenge of making useful knowledge broadly accessible

to the different target audiences around the globe. So, to fulfil the role of bringing together demand and supply on Feed Safety knowledge, the chosen solution was a digital platform. As said, it would not be feasible to create a physical marketplace considering the mentioned international character of the feed business and the diversity of social-territorial challenges that complexify it. Bringing together professionals and trainers physically requires enormous investments in both time and money, for all involved parties. It is, in other words, very inefficient and for this, digitalization was found as the only way to create a platform that connects the relevant players in the Feed Industry. Based on the outcome of the BMC and the related discussions, two sets of actions were defined:

1. to define a digital platform that could join the demands and supply of knowledge about Feed Safety, bringing together a) professionals in the Feed Industry searching to find training materials and trustworthy trainers, and b) selected high quality partners, that could bring training materials and local training to several sectors and regions of the Feed Industry. Based on this definition, IT suppliers could be selected to develop the platform.
2. to design and build e-learning materials about a relevant number of topics in the Feed Industry, for two reasons. The first was to experience managing educational projects and how to create an educational product collaborating with Subject Matters Experts from potential partners. Secondly, to test the market and see how it would respond to educational products brought to the market by GMP+ Academy to identify if the professionals would recognize the subject, what level of quality was required and if there was a market willing to pay for these e-learning materials.

Both actions were set in motion. The e-learning development took half a year and its launch brought valuable insights about how the market responds to this content. It was essential to present realistic numbers of users and what they were willing to pay for e-learning provided by a trusted party. These insights were used to finish the business model of the Academy, defining the potential costs and earnings of the digital platform.

Based on this first experience, it became clear that micro-learnings were a good path to follow in the future, because of their several advantages:

1. they are easily adaptable – when there are new insights, one does not need to create whole new e-learning, but only the specific micro-learning;
2. they can be easily translated into different languages using for example voice-over texts;
3. They are relatively easy to make, and can be made internally, using software tools that are widely available on the market;
4. They do not take much time to develop, being brought fast and easily to the market, which would give the GMP+ Academy the opportunity to respond swiftly to changing or new needs in the industry.

The development of the online learning platform took almost a year, during which the following steps were taken:

- defining the requirements and set-up a list of potential ICT suppliers;
- selecting and contracting an ICT supplier as a partner to develop the knowledge platform;

- determine the Minimum Viable Product (MVP), the minimum set of functionalities that need to be available, in order to go live;
- developing the actual knowledge platform, using SCRUM as a project management method.

During the development of the knowledge platform, it was determined what other aspects of the BMC needed to be minimally filled till the GMP+ Academy launch. It means to estimate the minimum number of partners and amount of content that must be on the platform. It is part of making it attractive for professionals – launching an 'empty' platform without content does not add value.

For this, several digital brochures were developed to be used during discussions with potential partners, highlighting the benefits the GMP+ Academy could bring to them. For example, when becoming a partner, they would become part of a network and could bring their learning products under the attention of potentially thousands of professionals in the feed business. For these advantages, a financial contribution would be asked by the Academy, creating the base for its business model.

On July 7, 2021, the GMP+ Academy was successfully launched during a worldwide online event that brought together more than two hundred professionals from all over the globe. At the moment of the launch, the digital platform was ready. Five Training Institutes had registered as partners and contributed with valuable content, and GMP+ had added some materials as well.

Step 5: Maintenance and continuous development and improvement, based on feedback and actual behave of users of the GMP+ Academy

As stated, the launch was not the end point of the GMP+ Academy. It was merely the starting point. From this moment on, the users on the platform needed to be monitored closely, to see what topics were being searched for, what e-learnings were successful, which were less successful, and so on. Also, in September and October 2021, several meetings were organized with the (paying) partners, Registered Training Institutes, to gain their feedback on the GMP+ Academy.

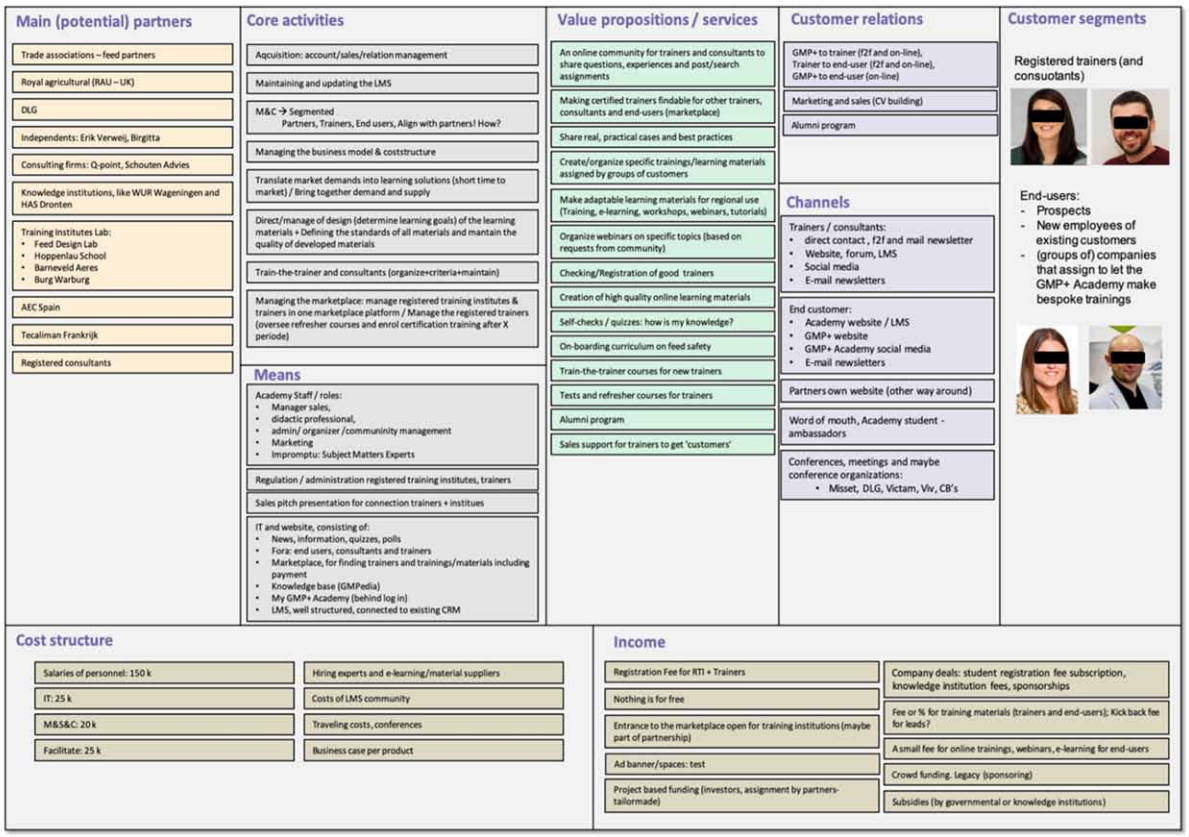
Based on this feedback and the analysis of the use, the second phase will be defined to add new functionalities to the knowledge platform.

During this stage, the GMP+ developed a new initiative: the Collective Knowledge Program, or CKP. The goal is to develop e-learning materials together with a group of companies from within the Feed Industry, on subjects that are not well covered. These e-learning focus on topics that are relevant for them all, but where they lack the resources, scale or skills to develop learning materials individually. Under the guidance of the Academy, competing companies now have started to work together on creating a set of micro-learnings covering topics on Feed Safety Culture, which will become available on the platform for the whole industry.

Next to this specific initiative, the Academy also started to develop a series of micro-learnings, to offer more valuable content on the platform. More content will attract more visitors, and more visitors mean more value to the partners of the Academy as well. Examples of this are the creation of nine multilingual micro-learnings, specifically for the transport sector, and the development of an international payment module. Finally, the project team will be slowly dissolved, and a fixed team will be searched for, to become the staff of the Academy. The team will be multi-disciplinary, consisting of sales and business development, a learning and development project manager, and a community manager who will handle the interaction on the platform and applications by potential partners.

Figure 6 present the current homepage of the knowledge platform, which is the core of the Academy, showing learning products both created by the Academy itself, and by some of its partners.

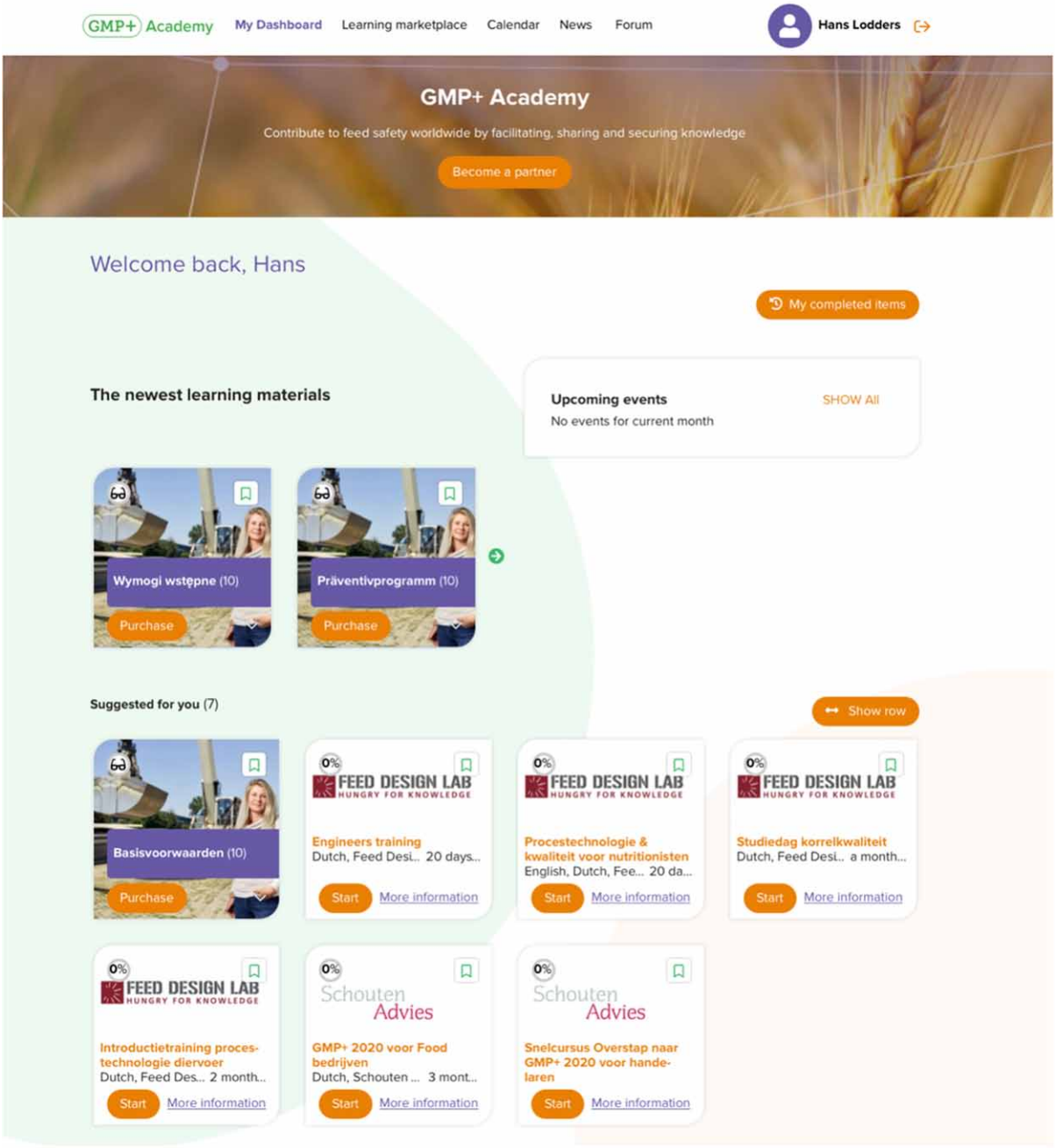
Figure 6. Homepage of the digital Knowledge Platform of the GMP+ Academy
Source: (GMP+ Academy web site, 2021)



To keep this platform updated and perform the activities that were defined in the BMC, GMP+ created an organizational structure that will compose the Academy when the fixed team is in place (Figure 7).

As Figure 7 shows, the GMP+ Academy organization uses a mix of staff, a part being hired solely to do work for the Academy in core activities. Those are presented in green at the organizational scheme of functions. The other positions are supported by staff from the GMP+ 'mother organization', mainly typical 'back-office' functions, sharing the costs between GMP+ and its Academy. The GMP+ Academy has its own Profit and Loss administrative organization. That means it has its own budget, needs to guard its own expenses, and should be able to generate its own income. Discussions are being held that the GMP+ Academy might become an independent legal entity in the future. This change would aim to guarantee its independent position, and to underline the fact that it is a 'non-for-profit' organization.

Figure 7. Organizational chart of the GMP+ Academy, as it will be organized once the project team is replaced by a 'fixed team'
Source (Project documentation, based on internal work session at GMP+ on December 20, 2019)



SOLUTIONS AND RECOMMENDATIONS

Based upon the case study and the theory, we present the following recommendations:

1. If a problem or challenge in a certain industry exists, try to **make this problem as concrete as possible** by researching the **collective problem** on an **individual/organizational level**. This seems to be necessary to allow the creation of solutions that have a fit with the problems, as they are experienced, and it prevents that an abstract problem is solved by a vague solution. Furthermore, an actual business model can be constructed based on solving real problems, with a **solid market perspective** by understanding how these collective issues are shared by the members of the sector.
2. Be very **critical about the position of the organization** that will solve the problem: is it governmental, university based, an NGO or a company? If there is no party that meets the requirements (in the case of this article, an independent organization working on a global level), it might be possible that a *new* hybrid organization must be created first, where stakeholders work together.
3. At the same time, be aware that industry-wide business challenges must be solved by **collaboration**; as both the theory and the case show the many different needs cannot be fulfilled by one organization, nor should it be. Because many different demands need many different angles to solve it properly.
4. Be aware that **digitalization** is most certainly a **key** to create scalable and accessible business solutions. That is a phenomenon that **works on more than one level**: both in the use of channels (spreading information using a digital marketplace), as in the content itself (creating interactive e-learning and micro-learnings).
5. **The mixed method approach to developing a new** organization with several stakeholders for different target audiences, creating several value propositions, proved useful. They supplied specific tools for each step of the organization and the platform construction processes. In this case, the 'double-diamond' model, the use of personas, the Value Proposition Canvas, the Business Model Canvas, the Golden Circle approach, and lastly elements from the Lean Start-up practices.

FUTURE RESEARCH DIRECTIONS

Future research might be interesting on the following topics:

The further development of the Collective Knowledge Program should be studied more. The situation that competitors for the industry work together to create schooling for the entire sector, led by the independent GMP+ Academy, might be an interesting development, that could be followed by other industries as well.

Another aspect to research might be the development of the GMP+ Academy, from an organizational perspective: it started as a project, then became an independent Business Unit with its own P&L responsibilities and might become an independent legal entity soon. And these different organizational entities exist in a period of three or four years, which makes it quite dynamic and can add interesting insight to the subject.

We live in a global village, where cross border trade and learning becomes more and more relevant. Issues within industries therefore become also more and more international, and an increasing number of stakeholders have interests and can play a role in the solution of these issues. Therefore, we sug-

gest that future research might be done on the use of the mix of methods, and in what way they might be combined in a more integrated model for new organization development, especially in cases where complex, industry wide challenges need to be solved with the different stakeholders.

CONCLUSION

The sectorial context plays an important role by understanding the challenges that are created, as well as in envisioning possible solutions, even in digital transformation conditions. The specific case of the International Feed Industry showed the power of feed chain globalization. The dependence on suppliers and the links between activities with diverse levels of technological intensity developed in different social-territorial conditions make the digital transformation a requisite to connect a complex sectorial system that branched all over the planet. At the same time, its globalization enlarges the potential impact of feed safety issues by the possibility of local cases of contamination becoming a global event exactly due to the network of suppliers and clients.

The sectorial characteristics then transform feed safety in an economic, political, multi-territorial, and transcultural problem, so, a shared collective issue that goes beyond competitive borders. This seems to be the ground of the collaboration: the identification of relevant shared subject(s) that unite all actors in this business sector. These issues must be important and common enough to justify the collective effort and not put in risk the competitiveness in the economic chain. Identifying this connective subject makes the exchange, creation, and dissemination of knowledge the key to a solution, which involves a learning process aimed at behavioral changes that ensure, from the bottom to the top, the safety of all stages of the production process.

This generated the necessary stimulus to consolidate collaboration for the benefit of the sector with tangible value for each organization and all chain. But also made necessary to identify a credible leadership that can bring together different actors, organizations, their skills, and interests through cyberphisical structures. These structures are created and creatable just with the use of tools offered by digital transformation.

However, if access to information is a condition for creating meaningful learning content for specific target audiences, the sectorial complexity highlights the challenge of the spread of knowledge, even when it is available. But even more, the studied case reinforces the importance of giving access to reliable, adapted, and engaged knowledge. Thus, the reason that supported GMP+ Academy development showed that the abundant existence of information alone is not enough to create this kind of knowledge. Nonetheless, the case provided some conclusions about what might be needed.

First, digitalization is the solution to make knowledge accessible and economically feasible, overcoming logistical issues in complex business chain. Also, digitalization plays another role on a different level, making it possible to create user-friendly, adaptable, multi-lingual content, that is accessible at any time and place. In other words: digitalization indeed is crucial to overcome distances and to connect actors despite barriers as geographical, social, and cultural conditions, amplifying the innovative dynamic. However, to support the collaboration that makes this specific kind of content feasible, beyond the cyberphisical tools, a trusted independent organization that works for the whole industry and has an image that fits the problem that needs to be solved is demanded. Finally, the case made evident the importance of a subject that matters but is not competitively threatening, as well as a vision on collabora-

tion to create a true marketplace, with enough supplies and demands, and a clear value proposition for organizations to become a partner, reducing collaboration risks and market uncertainties.

ACKNOWLEDGMENT

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. However, the actors wish to acknowledge the GMP+ International Academy for its contribution by allowing the use of project information in the reflection that compose this chapter

REFERENCES

Albuquerque, E. M. (2009). Catching up no século XXI: construção combinada de sistemas de inovação e de bem-estar social. In *Crescimento Econômico: estratégias e instituições*. IPEA. http://web. cedeplar. ufmg.br/ cedeplar/site/economia/seminario/2009/Liv ro_Crescimento_Econ omico.pdf

Boerenbond Belgium. (2019). *Twintig jaar na de dioxinecrisis. Voedselveiligheid blijft een werkwoord*. https://www.boerenbond.be/actualiteit/twintig-jaar-na-de-dioxinecrisis-voedselveiligheid-blijft-een-werk

Borges da Costa, S. I. R. (2018). *A dimensão territorial da política pública de C,T&I: Resultados e Benefícios do CT-Energ sobre Empresas e Grupos de Pesquisa no Estado de Pernambuco* (PhD thesis). Departamento de Ciências Geográficas, Universidade Federal de Pernambuco.

Cairncross, F. (1997). *The death of destance*. HBS Press.

Caulliraux, A. A., Bastos, D. P., Araujo, R., & Costa, S. R. (2020). Organizational optimization through the double diamond - Applying Interdisciplinarity. *Brazilian Journal of Operations & Production Management*, *17*(4), e2020917. Advance online publication. doi:10.14488/BJOPM.2020.025

Conache, M., Dima, R., & Mutu, A. (2016). Comparative Analysis of MOOC (Massive Open Online Course) Platforms. Informatica Economică, 20(2).

Etzkowitz H (2003). Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. In *Social Science Information*. Sage Publishing.

FAO. (2021). *Why is feed safety important?* https://www.fao.org/feed-safety/why-feed-safety/why-feed-safety/ar/

Foray, D., & Lundvall, B.-A. Ê. (1996). The knowledge-based economy: from the economics of knowledge to the learning economy. In OECD (Ed.), *Employment and Growth in the Knowledge-Based Economy*. OECD.

GMP+. (2020). *Annual report*. https://www.gmpplus.org/en/publications/gmp-news/corporate-annual-report-2020/

Harvey, D. (1982). *The limits to capital*. Basil Blackwell.

Harvey, D. (2002). *Condição Pós-moderna: uma pesquisa sobre as origens da mudança cultural* (Vol. 11). Loyola.

Hemant, R., & Lal, M. (2014). E-learning: Issues and Challenges. *International Journal of Computer Applications, 97*(5). https://research.ijcaonline.org/ volume97/number5/pxc3897154.pdf

Heuvelmans, K., & Vogel, S. (2017). *The European Feed Mix: Successful Ingredients for the World's Second-Largest Feed Market*. RaboResearch Food & Agribusiness. Retrieved from https://research.rabobank.com/far/en/sectors/grains-oilseeds/the_european_feed_mix.html

Hoedebecke, K. (2018). Collaborative global health E-learning: A Massive Open Online Course experience of young family doctors. *Journal of Family Medicine and Primary Care*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6259551/

Hudson, H. E. (2011). *From Rural Village to Global Village: Telecommunications for Development in the informational age*. Publishers.

IFIF. (2021). *International Feed Industry Federation Annual Report 2020/21*. https://annualreport.ifif.org/#national-regional-updates/europe-fefana

IFIF. (2021). *Feed the world: Global Feed statistics*. https://ifif.org/global-feed/statistics/

Lundvall, B. A. (1996). The Social Dimension of the Learning Economy. *Druid Working Paper, 96*(1).

Lydon, B. (2016). *Industry 4.0: Intelligent and flexible production*. InTech.

Malerba, F. (2004). *Sectoral Systems of Innovation: Concepts, Issues and Analyses of Six Major Sectors in Europe*. University Press.

Malerba, F. (2009). Sectoral Systems and Innovation and Technology Policy. *Revista Brasileira de Inovação*, *2*(2), 329-375. https://periodicos.sbu.unicamp.br/ojs/index.php/rbi/article / view/8648876 /15414>

Mazzucato, M. (2014). *O Estado empreendedor: Desmascarando o mito do setor público vs. setor privado*. Portifólio-Penguim.

Morgan, K. (2001). The Exaggerated Death of Geography: Learning, Proximity and Territorial Innovation Systems. *Journal of Economic Geography.* http://www.utoronto.ca/onris/research_review / WorkingPapers/WorkingDOCS/Working01/ Death.pdf

Morin, E. (2005). *Introdução ao pensamento complexo*. Sulina.

Negroponte, N. (1995). *Being digital*. Coronet.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company*. Oxford University Press.

Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries*. Game Changers, and Challengers.

Piotrowski, M. (2010). *Learning Management System Technologies and Software Solutions for Online Teaching: Tools and Applications What is an E-Learning Platform?* ZHAW Zurich University of Applied Sciences.

Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business.

Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. McGraw-Hill.

Rubio, J. E., & Tshipamba, N. (2010). Elements of the Public Policy of Science, Technology and Innovation. *Journal Canadian Social Science.*, *6*(6), 61–80.

Ruffoni, J. (2010). Proximidade geográfica e inovação tecnológica de firmas: uma análise para o segmento produtor de máquinas para calçados da Itália e do Brasil. Academic Press.

Santos, M. (2008). *Técnica, Espaço, Tempo: globalização e meio técnico-científico- informacional* (Vol. 5). EDUSP.

Sassen, S. (1998). *As cidades na economia mundial*. Studio Nobel.

Schumpeter, J. A. (1982). *Teoria do Desenvolvimento Econômico*. Abril Cultural.

Storper, M. (1997). Innovation as Collective Action: Products, technologies, and territories. In *The Regional World: Territorial Development in a Global Economy*. The Guilford Press.

Stoyanov, T. (2017). Knowledge transfer digital transformation. *Conference: International Conference on Education and New Learning Technologies*. https://www.researchgate.net/publication/318705373_KNOWLEDGE_TRANSFER_DIGITAL_TRANSFORMATION

Strambach, S., & Dieterich, I. (2011). *The territorial shaping of knowledge dynamics in Baden-Württemberg Inter-organizational relations in the sectoral knowledge domain of the automotive industry*. Philipps- Universität Marburg.

Surrat, C. G. (2001). *The internet and social change*. McFarland &Company.

Vertova, G. (2014). *The State and National Systems of Innovation: A Sympathetic Critique*. Working Paper No. 823. Levy Economics Institute of Bard College, University of Bergamo. www.levyinstitute.org/pubs/wp_823.pdf

Wikiwijs. (2001). *Voorbereid de klas in*. https://www.wikiwijs.nl/over-wikiwijs/

ADDITIONAL READING

Fagerberg, J., Mowery, D., & Nelson, R. (2004). *The Oxford Handbook of Innovation*. University Press.

Fazey, I., Bunse, L., Msika, J., Pinke, M., Preedy, K., Evely, A. C., Lambert, E., Hastings, E., Morris, S., & Reed, M. S. (2014). Evaluating knowledge exchange in interdisciplinary and multi-stakeholder research. *Global Environmental Change*, *25*, 204–220. doi:10.1016/j.gloenvcha.2013.12.012

Putnam, R. D., Leonardi, R., & Nanetti, R. (2005). *Comunidade e Democracia: a experiência da Itália moderna* (Vol. 4). Editora FGV.

KEY TERMS AND DEFINITIONS

Business Model Canvas: Is a model that describes the main elements for a new organization, such as the services to be offered, the target audiences, the channels that will be used to connect with the market, and the main activities that need to be performed to develop and bring the services to the market.

Institutional Elements: Values, laws, regulations, and norms of conduct, formal and informal, which guide the behavior of individuals and organizations within the innovation systems.

Micro-Learnings: Small e-learnings covering a specific topic, in about 10-15 minutes. They typically consist of an introduction, some theory and practical examples, a test or quiz and summary.

Persona: Is a constructed representation of an individual member of your target groups. Physiographic: the landscape characteristics: geomorphology, climate, soil, water situation.

Sectorial Innovation System: Set of elements (organizations and institutions) and their relationships from which technological progress is driven in a specific sector of economic activity.

Value Proposition Canvas: Its main goal is to map the daily activities of a customer, and the barriers that prevent the customer to be successful (the pains). For breaking down these barriers, solutions can be designed (gains). The model helps you to focus on actual problems, and useful solutions.

Chapter 23
The Future Is Now:
Coping With the Digital Paradigm in Higher Education

Claudia Amaral Santos
https://orcid.org/0000-0003-2630-294X
University of Aveiro, Portugal

Margarida M. Pinheiro
https://orcid.org/0000-0001-8027-2214
University of Aveiro, Portugal

ABSTRACT

Digital transformation in higher education (HE) institutions is a process that has been gradually implemented by decision-makers and educators for more than a decade, witnessing an exponential growth over the last two years. The University of Aveiro (UA), in Portugal, has been putting considerable effort in preparing staff, faculty, and students for this disruptive approach to education. This case study aims to share UA's experience in areas related to digital transformation at pedagogical, technical, managerial, and societal levels by providing data on digital capabilities, technological support, and institutional strategies. The research also intends to present findings on the balance between HEI-envisioned digital learning environments and their operationalization. The adoption of a qualitative approach through interviews to seven top decision-makers will provide relevant insights regarding UA's digital transformation model, namely by sharing the perceptions HE representatives have of higher education's future in an ever-growing digital scenario.

INTRODUCTION

Society has been hit by the digital revolution, affecting how we behave and interact, but also, and most importantly, how we absorb the world around us. We cannot imagine our lives without technology anymore, and this fact alone impacts how we teach and how we learn overwhelmingly. Higher Education

DOI: 10.4018/978-1-7998-9008-9.ch023

Institutions (HEI) have long detected the need to adapt to this distinct approach, a new ecosystem that requires profound changes, from teaching and learning, to cultural, processual and technical adjustments.

HEIs, like other organizations in the world, are no longer isolated agents and are forced to excel in their managerial, administrative and technical expertise, as accelerated changes in the macro social environment demand swift transformation at a micro institutional level. This causes a great deal of pressure on HEIs, having to respond timely to the global needs of its customers, while thriving to continuously (re) think and (re)shape the future. To many HEIs, this means a global structural change, while, to others, the transition to a digital environment has already been established at several levels: management, information systems, learning practices, organizational culture, academic entrepreneurship, skills' acquisition, or alliances with external technological stakeholders (Hashim et al., 2021; Sigalês, 2021).

This new educational concept model, however, is a hostage to how well HEIs players can master digital capabilities, since the efficient use of technology is mainly dependent on two modern survival skills: information literacy and digital literacy. There is no clear-cut evidence that university students are digitally literate, posing new challenges to the qualifications of graduates. The same applies to educators, who are required to adopt and adapt to new technologies and methodologies (Mamaeva et al., 2020). In this context, the dichotomy between humans and technology has become a touchstone and a major concern of managers and decision-makers. Education is, at its heart, a social process, thus raising the unavoidable reflection on how to balance both in the digital transformation paradigm (Garcez et al., 2021; Hashim et al., 2021; Sigalês, 2021).

At the same time, the existence of new drivers in education brings alternative mechanisms for HEIs to maintain competitive advantage, with interesting entrepreneurial opportunities. Thus, the more HEIs move to digital, the more they need to prepare and reimagine how to face this challenge. Success in this scenario demands trial and error, adjustments and readjustments, in an environment that seems to constantly promote innovation, reorganizing how we think and act. Buzzwords like big data, Internet of Things (IoT), cyber security or Artificial Intelligence (AI) became part of everyday vocabulary. Digital transformation in education is, in fact, a game-changer in physical and philosophical ways, which aim is to generate a fully-connected learning environment (Hashim et al., 2021; Mamaeva et al., 2020).

These are some of the reasons why HEIs are continuously being called to action, predicting change and not only reacting to it, enhancing their leadership and innovation capacities, and developing adequate formulas to operate in the marketplace. Their most important assignment is to create and manage learning and teaching contexts in effective and sustainable internal and external platforms, aligned with a global and groundbreaking mindset.

The purpose of this chapter is to understand which institutional strategies and practices the University of Aveiro (UA), in Portugal, is applying and planning to be executed having in mind the digital transformation framework. By taking note of the opinions of seven top-decision makers at the institution, this qualitative exploratory analysis will build on the interviewees' experience to understand which institutional strategies and practices are being applied and which are planned to be executed at different levels shortly - managerial, pedagogical and scientific, technical, and societal - in an attempt to highlight institutional concerns, accomplishments, priorities and ambitions in the quest for an inclusive, technologically savvy educational strategy.

The remaining of the chapter is organized as follows: the second section addresses the background of digital transformation in HEIs; the third section describes the methodological context of the study; the fourth section presents the main findings and discusses them based on the interview topics posed to the participants; the final section concludes the study.

BACKGROUND

In a knowledge-based society, the concept of literacy is no longer restricted to the ability to read and write. 21st Century skills encompass other literacies. Along with interpersonal, communication, creative thinking or collaboration literacies, information literacy and digital literacy are among the most relevant and discussed in recent literature. These emergent abilities are critical enablers to perform an array of activities in all contexts, namely academic, and an essential asset for lifelong learning opportunities. Using digital tools efficiently, accessing and selecting information, or evaluating the reliability of sources are examples of competences that are at the core of today's teaching and learning processes (Eshet-Alkalai, 2004; Nikou & Aavakare, 2021; Wan, 2012).

21st Century Literacies - The Survival Kit

Eshet-Alkalai (2004) defined information literacy as a set of cognitive skills used to evaluate and filter information effectively, while Wan (2012) described digital literacy as a multitude of literacies associated with the use of digital technologies, a subset of electronic technologies, including hardware and software, where to be digitally literate is "to have access to a broad range of practices and cultural resources that you are able to apply to digital tools. It is the ability to make and share meaning in different modes and formats (…) to create, collaborate and communicate effectively (…) and understand how and when digital technologies can best be used to support these processes" (Wan, 2012, p.1067). In a digital environment, the two concepts cannot be dissociated. Radovanovic et al. (2015) considered digital literacy as a form of human capital referring to knowledge and skills, including formal operational skills, information retrieval and analytical skills, content creation skills, and digital communication skills. More recently Vaskov et al. (2021) describe digital literacy as a system comprising knowledge, skills and the set of attitudes necessary to live in modern society, whereas Nikou and Aavakare (2021) state that digital literacy is used for social or educational purposes, and encompasses the identification, integration and evaluation of digital resources. All of these approaches converge to the United Nations 2020 characterization of digital literacy: "the ability to safely and appropriately manage, understand, integrate, share, evaluate, create and access information through digital devices and network technologies to participate in economic and social life" (Antoninis, 2018).

As such, digital literacy is continuously and simultaneously put into practice online and offline, a developmental skill, as Wan (2012) addresses it, progressively building on previously assimilated knowledge. Better and fine-tuned user-oriented environments with educated information consumers would depend on these abilities to evolve. A digitally literate individual adapts fast to recent technologies and easily understands new semiotic languages. In this respect, Wan (2012) intersects three dimensions in a multi-literacy conceptual framework: technical, cognitive and socio-emotional. The technical dimension means having the ability to use Information and Communication Technologies (ICT) equipment properly, not only physically but also being able to follow instructions; the cognitive dimension involves handling digital information by critically evaluating online searches and being knowledgeable regarding moral, ethical and legal aspects, as well as decoding information supported by linguistic, visual, audio, spatial, gestural and multimodal resources, generating new knowledge; the socio-emotional dimension focuses on the responsible usage of the internet, applying the same rules as in face-to-face communication, i.e. respect for others, utilizing appropriate language, avoiding ambiguity, refraining from disclosing sensitive information, and reporting abusive usage. Digital competence is therefore something transversal

and essential for social inclusion and the development of smart economies, as stated by the European Commission (European Commission, 2016).

Digital transformation, a term coined by Schmidt and Cohen (2013) to describe the unparalleled impact of digital technologies in individuals and society, pushes the educational system to set the pace with this technological revolution (Vaskov et al., 2021) and it is not only about the digitalization of the educational process, but also about its transformation, entirely (Sheremetyeva et al., 2020). Hence, the promotion of information and digital literacies is a priority for HEI and is increasingly being incorporated in curricula.

Perceptions on Teaching and Learning in a Digital Context

The digital revolution will change the way we learn, what we learn and where we learn. Volungeviciene, et al. (2020) recall previous studies on the importance of digital competences for participating in all aspects of our life, fostering social integration, professional success, and employment opportunities. Also, Blau et al. (2020) proposed a conceptual model for digital literacy in education institutions and elaborate on the added value information and communication technology (ICT) can bring to a technologically enhanced learning process. As stated, without proper integration, the whole set of tools can reveal itself to be completely inefficient.

Indeed, other scholars have pointed to this conclusion. Wan (2012) had already called attention to the fact that undergraduates' self-perceptions of digital literacy go hand-in-hand with the need to make them meaningful and purposeful. Miranda et al. (2018) underline that the perceptions of students on technological, operational and conceptual skills are vital for the whole ecosystem to work. Building on research from Eshet-Alkalai (2012), the model proposed by Blau et al. (2020) strongly encourages a steady change in pedagogical trends, such as CBLs (Challenge Based Learning and Competency Based Learning) and PBL (Project Based Learning) approaches, a trajectory that has been followed by many HEI over the past decade. Collaboration, communication, and self-regulation are the basic additional literacies of this technology-enhanced learning process. However, digital literacy can be simultaneously a facilitator or an obstacle to success, if players are not digitally savvy: "(…) adequate development of DL in academia transcends isolated technological skills to generating a deeper understanding of the digital environment by learners, enabling co-creation of content with others and intuitive adaptation of these competencies to new contexts" (Blau et al., 2020, p.2).

In addition, cognitive and social-emotional skills are now considered to be extremely relevant within a comprehensive approach to technology, helping learners to construct their path. According to Blau et al. (2020), cognitive regulation supports strategies to memorize, learn, think and solve problems, while regulation of motivation and emotions helps control feelings such as anxiety. In turn, regulation of behavior evolves around selecting the right actions to control the behavior of learners, such as time planning or designing successful learning strategies, whereas contextual regulation fosters the creation of digital environments that would facilitate the accomplishment of the learning tasks. All of these conditions operate in hypermedia environments, and the acquisition of self-regulatory competences turns out to be even more relevant in distance learning. Learners will then become significantly aware of their actions, a state known as perceived learning, permeated by cognitive, emotional, and social aspects, and the new pedagogies will provide the learner with the ability to understand, experience, feel, and enjoy interactions within a technologically-leveraged educational process. Blau et al. (2020) conclude that active learning, sharing and mutual assistance among peers, a culture of trust and openness and the development of a

sense of belonging are the touchstones of perceived learning, resulting in meaningful by-products of collaborative learning, and leading to significant psychological gains. The ability to quickly adopt and effectively use new technological tools would function as the umbrella that supports the whole process.

On the side of HEIs educators, there are also doubts about whether perceived teaching is a reality. As with students, teachers in the digital era should develop cognitive, socio-psychological, managerial, informational, collaborative, and interactive competences that would fit into a digital work environment. Constructing digital content, understanding data protection issues, identifying, and resolving technical problems or being attentive to users' physical and psychological health are among the aspects to be taken into account in a digitally enhanced teaching scenario. Although the digital literacy index of university teachers tends to be high (Vaskov et al., 2021), discomfort with digital technologies can be witnessed in older generations but also among younger teachers (Santos et al., 2021), creating an additional responsibility for HEIs in the conception, planning and implementation of efficient strategies that promote and effectively develop the set of necessary levels of digital proficiency in faculty. The acquisition of the right skill set is, for this reason, a highly important concern among HEIs.

In fact, according to the World Economic Forum, 50% of all employees will need reskilling, namely online reskilling, in two years (Whiting, 2020), meaning that the way we interact with each other and with our routines will continue to change profoundly. The list includes competences that privilege self-management, such as active learning, complex-problem solving, resilience and flexibility, reasoning and ideation, but also capabilities related to the most technological aspects of our lives, such as technology use, monitoring and control, or technology design and programming. And, once again, the most important enablers of these competences are, at individual and collective levels, information literacy and digital literacy (Nikou & Aavakare, 2021). The competencies that HEIs should convey to their public must then resonate with what the labor market expects. Practitioners and other stakeholders rely on the technical training of future employees by HEIs and have legitimate expectations regarding digital proficiency, given the disruptive global technological revolution humankind is facing right now (Armah & Westhuizen, 2019).

In addition, recent world events related to Covid-19 rightfully called attention to the fact that digital environments in HEIs are not limited to technological aspects and digital literacy. Other transversal and complementary abilities play a vital role inside and outside *campi*. Students' health, economic situation and social background are also important for the successful implementation of digital transformation in HEIs (Ahrens et al., 2021). Besides, digitally enhanced education gives room to new horizons for lifelong learning and encouraging possibilities for underserved populations (Kahn et al., 2017; Laufer et al., 2021; Zaborova, 2021) multiplying the number of potential users exponentially. These are some of the reasons why pedagogical and curricula designers are one of the most sought-after professionals in educational settings worldwide at this moment, evidencing the care HEIs have in tailoring their offer to 21st Century requirements.

If this integrative approach is not properly followed, EdTech (Educational Technology) may be over-optimistic. Literature warns us against simplicity in assessing its effectiveness, calling attention to some studies evidencing mixed feelings towards the promises of digital technology. Technology-focused education, alone, will probably fall short of the expected outcomes and claims (Laufer et al., 2021). Some clear advantages of EdTech are collaborative learning practices, intercultural awareness, language proficiency, facilitated student mobility, and diverse and insightful education experiences, combining, theoretically, global with local impact. However, students' needs, preferences and constraints are still not sufficiently assessed to provide precise models for the near future. As such, and according to Volungeviciene et al.

(2020), the learning design has to be re-conceived and the institutional approach should be based on student diversity, customized learning experiences that promote formal and informal opportunities, self-reflection, co-creation and sharing models, together with a new institutional positioning from HEIs on assessment and learning recognition.

One thing is certain: the ubiquitous nature of digital technologies offers no other alternative to HEIs. Lawton (2018), reminds us that it is still subjective to establish a starting point for the digital age in HEIs. Most probably, the invention of the World Wide Web in 1989 and the introduction of online courses by the University of Phoenix were key moments in the digital transformation history, a first step to freeing education models from time and space limitations. The digital transformation is here to stay and, as stated by Vrana and Singh (2021), has no boundaries, involving HEIs, industry, society and all sorts of information systems in unlimited combinations. This plasticity allows searching for the best solutions to specific needs, intertwining them the best way possible to generate value, while covering content and context in one virtual eco-system.

A Collective Mindset: The Framework for a Digital Future

Literature provides a great deal of research (e.g., Butler et al., 2018; Varma et al., 2021) on how digital change in HEIs should take place. How well are HEIs prepared to deal with this new state of affairs? But, really, how new is this state of affairs? Many HEIs have been anticipating the digital transformation for more than a decade and are well-positioned to take the lead. Others, due to financial constraints, strategic options, geography-related impediments, or other certainly valuable reasons, find themselves still far from an institutional 'adequate profile' to offer a competitive value proposition.

It is no wonder that the discussion around the best business model for HEIs has become a central topic for education managers. More than optimizing internal processes with technology, HEIs' leadership needs to perceive what is required to accomplish their long-term objectives in a global digital world (Abd-Rabo, 2021). Changes in the educational system, in the corporate structure, and in faculty, staff and students' competences and behavior are mandatory, since an adequate approach to the digital transformation will define the future roadmap of a sustainable education strategy (Hashim et al., 2021; Olimjonovich et al., 2021).

In this regard, Vindaca et al. (2020) most appropriately comment that digital transformation in HEIs lies on two basic pillars: the digital strategy of the institution and what each student can achieve resulting from the personalization of an educational process that relies on the potential of digital tools. And the strategy should respect the following steps: "consistency of the process, update of learning objectives, update the content of education, update of organizational forms of educational work and update the assessment of education results." (Vindaca et al., 2020, p.1034).

Hashim et al. (2021) explain in detail how digital transformation is indeed a propelling and evolving force that can be used to build HEIs' competitive advantage. The global challenges posed to education institutions are immense, from information exchange to the power of social media. The paradox between the constant change of context and long-term goals is hard to accommodate. Therefore, HEIs require appropriate decision support systems to manage their target markets' expectations. By integrating digital capabilities, HEIs boost their deliverables, with distance learning opportunities playing a central role: "The widespread globalized education has radically influenced the universities to shape their learning and development, delivery and continuous improvement mechanisms." (Hashim et al., 2021, p.1). Being prepared to adapt quickly to changes imposed by the external environment, offering education with

high quality, following the latest digital trends, transforming education into a meaningful and impactful experience to students, are enough motives to consider digital transformation as a not-to-miss momentum.

This deep transformation affects production and organizational practices, namely new models for productivity or reconsidering staff responsibilities (Vindaca et al., 2020), requiring a combination of technical and cultural changes, but also financial considerations. As the authors indicate, the digital transformation in HEIs implies increasing revenues, fostering productivity, generating value through innovative pedagogical methodologies, while building on HEIs' brand reputation. Digital transformation management practices are top topics for HEIs decision-makers, and they should be realistic, swift and scalable, coherent with the institution's value chain and positioning in the marketplace.

In this complex context, many HEIs will need to realign priorities, revise or develop an entirely new business model. Vindaca et al. (2020) share their views on the driving forces for a successful digital transformation in HEIs: student success, namely by centering services in the student, an adequate IT strategy, security both in the campus and related to information exchange, data enablement, digital integration and artificial intelligence. The set of prerequisites would support the 4 stages of the digital transformation strategy: i) connectivity, with sound partnerships and strong links between people, processes and physical infrastructures, in a smart and secure communications network; ii) the automation of processes with real-time inputs to improve performance and timely decisions; iii) to simplify procedures, resulting in cheaper and more flexible solutions; iv) and to have as ultimate goal one single platform managing this network. Other authors provide additional examples of concrete measures, apart from the adoption of new teaching and learning approaches: information materials, tools and services must be optimized; modern digital technologies must be regularly introduced; innovative and more efficient organizational solutions should be put into practice, including support of HEIs to provide the necessary infrastructural conditions to accomplish that transformation; and traditional business processes must be subject to new appraisals, involving all stakeholders. The technological element is the one influencing all the other variables in the process, directly or indirectly, and HEIs must rely on an entrepreneurial digital space dominated by AI, IoT, big data and cloud computing (Hashim et al., 2021).

It seems evident that the ongoing process of digital transformation will alter the way institutions interact. It is a cultural shift, that leads to a new digital culture (Vaskov et al., 2021), a change in actors, values and beliefs (Garcez et al., 2021; Zaborova, 2021) that must integrate, not separate. For many HEIs, this is the opportunity to make a difference, demanding wide-ranging disruptive changes. The enormous expansion of HEIs worldwide and impact in all quadrants of society makes it even more relevant. Partnerships with other universities, research organizations, industry, public and private institutions and governmental bodies turn the nodes into a cohesive net, always connected. The concept of universities as knowledge-based hubs, must be carried on with timely response to technological innovations, balancing tradition and openness (Volungeviciene et al., 2020), educating individuals in technologically advanced environments for a technologically advanced workplace.

However, according to Laufer et al. (2021) the collaboration within and between HEIs is many times lower than expected, also because institutions starting points are different. Capabilities, resources, contextual limitations, and societal circumstances are among the barriers that may hinder HEIs from moving forward as fast as they would like to. Notwithstanding, participants in the international research conducted by Laufer et al., (2021) stated that collaboration, cooperation and resource sharing were mandatory steps to assure equality in access to education, despite the digital divides that still exist across regions and countries. The authors conclude that strong HEIs' leaderships and strategic approaches based on

inclusiveness are basic conditions to a successful digital transformation, where institutional partnerships are allies of innovative pedagogical practices to accomplish a holistic and organic change.

METHODOLOGY

Based on the previous conceptual framework and to further explore the hands-on approach to the digital transformation environment UA is envisioning, a qualitative exploratory methodology was adopted. This approach is widely considered by literature in education (e.g., Marczyk et al., 2017) due to its ability to explore attitudes and opinions.

Primary data was collected through semi-structured individual interviews with seven top-decision makers at the University of Aveiro. The sample of participants (Table 1) included the Pro-rector for Curricular Innovation, the Pro-rector for Monitoring and Coordination of the Development and Installation of Information Systems, the responsible for the Information and Communication Technologies Services, a team member of the Collaborative Platform for Teaching Innovation in Higher Education, a team member of several projects centered on teaching challenges for digital learning, a member of the Pedagogical Council, and a student member of the Pedagogical Council. The sample was composed of two females and five males.

According to the ethical principles of the research, all interviews were fully explained to the participants and their informed consent was collected, including authorization for audio-recording, transcription and use of the data for scientific purposes. The interviews took place between June and July 2021 and had an average duration of one hour.

Table 1. Participants' characterization

Participant Code	Role at UA
A	Pro-rector
B	Pro-rector
C	Responsible for the Information and Communication Technologies Services
D	Team member of the Collaborative Platform for Teaching Innovation in Higher Education
E	Team member of several projects centered on teaching challenges for digital learning
F	Member of the Pedagogical Council
G	Student member of the Pedagogical Council

A content analysis was performed to identify themes and categories that emanated from the literature review. As all the interviews were carried out in Portuguese, the transcriptions in this chapter result from our free translation of each piece, guided by the intention we perceive in terms of the meaning of the sentences.

To understand which institutional strategies and practices are being applied and planned to be executed having in mind the digital transformation framework, the interviews were based on three main research questions: (i) what is the skill set UA considers essential for a 'digital future'; (ii) how is UA

addressing the balance between humans and technology in this digital environment; and (iii) is digital transformation a solitary institutional pathway? Taking these guiding questions as a starting point, we explored participants' knowledge, experience, and professional responsibility regarding the main topics of the research.

Following the narratives of the interviewees, complementary aspects were introduced (e.g., What skills does the marketplace consider as most valuable in a digital work environment?; What is the relevance of digital literacy?; How is UA preparing to offer adequate technological infrastructures to its co-workers and students?; How is UA (re)considering the role of teaching staff in a demanding digital educational model?; What initiatives are being prepared to respond to this shift in paradigm? Are institutional and business partnerships important to accomplish the digital transformation?) to further elaborate on the central topic of HEIs' adjustment to the new digital challenges.

The main findings of the exploratory qualitative methodology applied in the research are described and discussed in the next sections of this chapter.

KEY FINDINGS FROM DATA ANALYSIS

Starting with each of the open questions, the narratives flew naturally and according to the participants' experience at the institution, sharing their views on the digital transformation specificities and how UA is attempting to implement changes in its educational strategy. For this research, findings were organized following the three main topics posed to the interviewees.

Capabilities in a Digital Age

Participants in this research were unanimous in considering the transition to a digital environment as a demanding and complex task, fully accelerated by the pandemics, and involving the whole structure of UA in an unprecedented way. The need to cope with this new paradigm is strongly felt by the institution and all its players, and strategies targeted to digital transformation challenges are on the move.

Resonating with literature, it was consensual that "digital competences are obvious" (A) in a near future, since "digital literacy is at the heart of everything "(C) and "technology today is connected to everything" (F). This is so unavoidable that "the issue of digital competence and digital literacy will simply disappear" (D) as "we're all going to assume they exist and are solved" (D). In other words, the digital world cannot be contained and all players should face it as something that has to be incorporated as naturally as possible. However, "it's not so straightforward that teachers, non-teaching staff, and students are as well-prepared as expected to this transformation" (A). In fact, and even though "students (...) that will come to us in the next 10 years will get here with a digital mindset" (C), it seems that "looking at the youngest population, to our students, for example, there is some difficulty in transferring technological, digital competences from the private sphere to the professional sphere" (E), indicating that the social use of digital competences does not match demand in academic and professional contexts.

The dimension of training is also called to action, not only for students but also for academics. In fact, "when we speak about the competencies we want for the future, we are typically thinking on students, but the truth is, a considerable percentage of us, teachers, doesn't have the minimum required competencies for this" (F). And, as educators have the next generation's future on their hands, academic training in innovative and digitally targeted pedagogies is an issue that has to be addressed properly and urgently,

since "we are also that professional sector that has no training to the activity we have to perform daily" (F). Extraordinary world events, like Covid-19, boosted transformation at all levels, as "many things are happening right now that wouldn't happen any other way" (F). When HEIs manage to reach this 'new normal digital stage', the perspective on capabilities will be distinct:

[It] will no longer be a matter of digital [competencies], strictly speaking, but rather more related to other competencies. Creativity, ability to solve problems... [sometimes] we forget that for me to pick up a piece of paper and draw a schema, I have to have a series of competencies, [the same] as I have to when I want to use a computer or collaborate via a computer with other people (…) somewhere down the lane this will stop being an issue and start being a tool that we all master, that we all use. Then, some will have more competencies, more creativity, more ability to innovate and create new scenarios, than others (D).

To skill up the different audiences and stakeholders of HEIs is a difficult job, with some major obstacles that need to be overcome:

(…) what we need is that all of us (…) teachers and non-teaching staff, all people that interact with our target markets (…) understand that to speak to these new targets (...) they also have to adapt (…) but it's not easy to force them to change (…) we have to speak the same language and perceive how [our target markets] reach out to us, how they want to communicate with us (…) [this means] having an openness to innovation... we can't be stagnant about knowledge and to what's happening right now, [we must] be receptive to be able to learn more, to be capable of receiving training and listening to people who know better, to find someone who knows how things work, and be capable of transmitting that among the different generations, these innovations, these new ways of doing things (C).

Another dimension of digital transformation is time. In fact, "we are accelerating what is happening outside of us, but cannot accelerate what's happening inside of us. Students don't acquire magic skills nor become super-men because they have access to digital information. They keep having the same difficulties, taking the same time to apprehend concepts" (B). For lecturers, time is also scarce. The enormous amount of work that seems to come with a digital environment brings to light the problem of adaptation to new teaching practices and the necessary time to assimilate and process all the information that comes with them adequately, as "we need to have time for theory and practice but also time for new technologies and methodologies, and have the opportunity and time to think about them; [besides], I also need psychological time for my well-being" (G).

Digital literacy goes far beyond the ability to use the software. Elementary steps to minimize discomfort with technology can be applied, for example, in assuring that each student can bring a laptop to class, and those with financial constraints be supported institutionally. In addition to direct access to contents via digital connection, students would also acquire core competencies related to the proper working of a computer: "(…) we can see that students know how to work with Facebook and all that, but then, when a small problem appears [in the computer], they just can't solve it, because they don't know how, they don't have the theoretical knowledge on informatics to understand the machine they're operating with" (B). As such, digital competencies could be practiced in the most basic procedures. The elimination of desktops from classrooms, as participant B advocates, would foster this first-hand contact

with the 'hardware side' of digital literacy, provide training for students, and develop transversal skills such as problem-solving.

As stated by participants, "(…) we have to learn how to transfer competences among (…) different operating contexts" (E), and prepare HEIs to impact society, particularly at the learning and teaching levels: "(…) it will be common to consider technology as a tool to improve teaching and learning and, in that respect, we all need to have the necessary competences to follow [this process] as close as possible" (A), and, eventually, to find mechanics to also have time to learn and time to think.

The narratives of participants in the study indicate that UA's decision-makers are attentive to these aspects and the initial drawbacks that digital transformation can pose. As such, several initiatives are being put into practice to encourage the development of capabilities for the digital age.

One of the most impactful is Docência+, an initiative UA is particularly proud of. This intensive online training program for teaching staff, with cutting-edge content related to technological and methodological options, intends to provide initial but sound support to introduce participants to the digital education world. The initiative is "one of the clear examples where the concrete benefit of the participation of thousands of teachers who already took part in the sessions is not financial, with no effect in the career ladder (...) it's at individual accomplishment level, for the benefit of the community they interact with" (E). This invitation to participate and share, directly from the top management of the university, and prepared in partnership with other university, brings together teachers, students, and higher management bodies of the institution, contributing to the creation of an active and well-prepared community, attentive to the importance of selection, adaptation and implementation of modern, relevant and appealing teaching practices in HEIs. Since its first edition in 2019, Docência+ has witnessed a substantial increase in the number and enthusiasm of participants: "people [are] available to share what they consider to be an added value for colleagues, and [are] also (…) open to listening to colleagues who have already had different experiences" (E).

Other top-down initiatives include inter-institutional seminars on pedagogical innovation in collaboration with other universities in Portugal, providing short training programs aimed to exchange experiences among participants and the dissemination of good practices. The ECIU (European Consortium of Innovative Universities) project is an important asset to the efforts related to digital transformation, promoting transnational partnerships among HEIs at a European scale, gathering faculty, students and external stakeholders in the achievement of relevant milestones. The real-life challenges posed by many of ECIU projects resonate with modern pedagogical methodologies that are also being implemented and strongly encouraged by the institution, such as COIL (Collaborative Online International Learning), deeply connected to Internationalization at Home practices, that have gained momentum over the last few years.

Balancing Humans and Technology

To come to terms with digital transformation challenges, HEIs are urging all staff involved to accommodate new ways of teaching to capture students for new ways of learning. Technology-enhanced education formats are a fact. Extant literature indicates that students tend to be more independent and, arguably, more engaged with the pursuit of their academic path, where knowledge acquisition becomes much more dependable on personal involvement (Garcez et al., 2021; Hashim et al., 2021; Sigalês, 2021).

The diversity of experiences HEIs aim to provide to their target markets in a digital environment must be supported by technology, but "technology should be an instrument to facilitate teaching and learning (…) not the central element" (A). The key mission of HEIs can never ignore "this central ele-

ment, which is relationships among people… and that is not replaceable by technology" (A). HEIs will always be a place where people work together in the "co-construction of different processes, resolution of challenges (…) and technology is an instrument to facilitate that".

This vision of the institution places "human first, technology after, if it's useful" (B). In a certain way, people and technology are two faces of the same coin and HEIs are also believed to be privileged organizations regarding learning and adaptability. As participant B mentions, the overnight adaptation to the lockdown in 2020 demonstrated that HEIs know how to react when needed:

(…) the whole university, from the most geek teacher, fanatic for gadgets, to the teacher who doesn't have a clue of what a computer is, everybody adapted [to online teaching during the pandemics] in an incredibly short amount of time, but this was something predictable; it would be awkward for people at a university not to adapt quickly, the university would be in a bad shape, because, in theory, this is where people with more knowledge, more abilities and more resources for a quick adaptation, are (B).

However, dealing with a new challenge, may it be digital or not, implies institutional support and a period of assimilation. Problems with computers, for example, can only be solved if we understand how the hardware works: "And it's not related to the fact that I don't have digital knowledge; it has to be a mix, because there will never be anything, ever, that substitutes knowledge and wisdom" (B).

The technological and digital equipment that is being developed by specialized enterprises shows that a great diversity of material is ready to be at the disposal of HEIs: "the idea is to put this equipment on teachers' hands to experiment [and check] if students apprehended [what was conveyed] to find scalable solutions*"* (B). Also, an event such as Covid-19, "took us all to work remotely; to some of us, it was quite scary in the beginning, but that was one of the good sides of the pandemics in my opinion, because it proved that it was possible to accomplish the same things even at a distance, and instead of lowering, augmenting productivity" (D). In this context, HEIs assume the highly demanding role of "taking advantage of technology to help us teaching better and learning better. Because technology is here to help us, not to scare us" (D).

To have enough equipment and available to all seems to guide UA's strategy in this regard: "We have multiple classrooms with computers, whether for students who don't have a computer, or for classes to be lectured within this framework (...) but the university is investing in technology, for example, the internet has been improving in the campus, in the dorms… "(G).

In addition, the investment in technical resources takes into account the diversity of students' social backgrounds, as shared by one participant: "In terms of computers, when a student (…) needs a computer, the university has mechanisms to attribute a computer to that student, and there are computers in the university for everyone to use; [so, the university] is offering at least the minimum tools to achieve academic success" (G).

However, technology can be Janus-faced: on the one hand it can incentivize inclusion, but, on the other, it may cause divides among users. The proximity that derives from the use of online technology has the advantage of making people feel like part of a whole:

We can target other audiences that wouldn't be within our reach any other way (A)

[When we're] online, many of us forget or don't know that I work in another town (...) I am part of that space and this is the advantage of technology when we know how to use it, it's this proximity that allows

us to reflect, feel part of the same institution and part of the many distinct functional units of a certain context (E).

But it can also promote separation and physical distance, namely among students when dealing with academic assignments:

Our students were already showing a high tendency to separate work among them and each would go his or her own way to accomplish tasks. So, the cooperative and collaborative logic (...) was not working that well. (…) At that level, technology can work against us (...) we have to be on the watchout and use [technology] to foster competencies and not only as a tool (F).

The workload faculty has to assume to tackle all issues deriving from new digital approaches and the time-consuming initial stages of adaptation demand institutional support, as participant D states: "What we need is for teachers to be supported in this endeavor and have time to teach" (D). This additional effort does not go unnoticed by decision-makers of HEIs, both quantitatively and qualitatively. Participants in the research, as members of managerial councils within UA, recognize their satisfaction "in confirming that students are much more motivated and (…) that they learn more and acquire more skills, [reinforcing] the need to continue encouraging innovative practices (A)". As the saying goes, practice makes perfect, and the multiplicity of training offers that the UA has been preparing relies on the institutional willingness to improve staff skills.

Interviewees recognize the tremendous effort all players are doing to excel in adapting to the digital transformation. As responsible staff for key areas at UA, the interviewees shared some initiatives that are being implemented to publicly reward dedication to this ambitious goal: "(…) one of the things we're going to do is to create a prize for pedagogical excellence (…) to encourage this type of practices, so I think that incentives and recognition of different ways to put [new approaches to education] into practice are essential for this to scale up" (A). One participant, however, expressed doubts in whether this effort from teachers is something almost mandatory to keep the pace with digital educational practices, or a genuine desire for improvement: "[some things] are popping up as a reaction. Now, we are all very modern because we do a lot of stuff through teleconferencing (...) we do that because there was no other way" (F).

Some concrete steps are being implemented to ameliorate the workload of teaching staff, namely preparing online resources with a webpage dedicated to pedagogical innovation practices, where, for example, teachers can reserve a room properly equipped for digital use, and, "most importantly to us, [with information on] what methodologies can be developed there" (A). Another way of preparing the future in HEIs and providing some relief to teachers, would be to integrate experts devoted to the (re) construction of the learning and teaching contents: "[At UA we're preparing] the hiring of dedicated staff to work on this [issue], in this area, the learning designers, who will have time to be sitting next to the teachers, helping them" (A). Using these resources is perceived as important support:

(...) it is vital to eliminate the perception that [training on digital methodologies] is a burden, that it's something additional; and, to those who enjoy teaching, and I think most of us are here also because of that, it's very rewarding to see the effect this has on competencies that students acquire and that they wouldn't otherwise acquire... and in the motivation they have (…); [we should] never let teachers feel, or minimize that as much as possible, they are alone in this process. That cannot happen (A).

Likewise, students are aware of the workflow themselves and teachers have to manage it. Technology seems to have eradicated time barriers, with work constantly invading the private sphere: "[with] digital transformation (…) there is not a proper work schedule" (G). This is a problem that students recognize, as shared by their representative in the interviews:

I don't have classes only from ten to six, I have to work beyond that [time], and the teacher will clearly not lecture only from ten to six, he or she will have to prepare classes, to adapt to technology, what and how to teach the content in the next class, not only theoretically, but also regarding methodology and technology (G).

As observed by one of the participants, the lessons provided by the history of technological revolutions and paradigm shifts proposed by Perez (2004, 2010) resonate strongly with the current situation HEIs are facing. According to this author, institutions go through several, distinct and sequential stages: eruption, euphoria, collapse, reversal, recovery, and, finally, maturity, "when things are stabilized and (...) are already transparent to us" (D). The analogy between the work of Perez (2004, 2010) on the complementary adjustment of technological and social changes applies to the digital transformation in HEIs:

When we went through the pandemics, we experienced a stage of a forced eruption when suddenly we all went home, as so we were glued to a different scenario that demanded us to react, and it seems to me that we went through a euphoria period (…) suddenly we witnessed students being completely flooded by different methodologies from each teacher (...) in a very mental environment of searching all technologies and methodologies available (...) flipped classroom, for example, were something spectacular for everything (...) but this, to us, is completely unbearable, to deal with all this euphoria from everybody, where everyone is discovering new things (...) we have gone through this phase, and now we need to lower expectations of some people, having more realistic scenarios (D).

To turn technology into something transparent, that we don't even pay attention to, was one of the core ideas shared by participant D. This is a major challenge for HEIs as knowledge providers:

Today we don't even notice we have a sheet of paper in front of us (…) and we should move in this direction. To look at this technological dimension not as a goal in itself, but as something we master and know how to use, and that we will use [only] when it matches the pedagogical practices and the objectives we want to pursue, and the experiences we want to grant our students (D).

For this goal to be achieved, an organic change has to take place. Some participants observed that the balance between technology and methodology has not yet reached maturity, and this is strongly felt when students point out that "teaching remains the same" (G), leaving educators with mixed feelings towards the essence of this change: "(…) what I feel is that there was no digital transformation, only a digital transition from what happened before, to a computer" (G). Hence, the digital divide can go beyond having access or no access to the internet or computers, between rich and poor, to encompass deeper social and institutional misalignments with all that involves human interaction with technology.

Digital Transformation: A Solitary Task or a Collaborative Mission?

The digital transformation will not go back, only move forward. Either HEIs face this inevitability and turn it into an ally, or they may quickly lose track of strategic priorities (Hashim et al., 2021; Mamaeva et al., 2020). Assuming as a fundamental truth that "we do very little if we're alone in this world" (A), participants take pride in affirming that "UA is all over the world. From that point of view, with a high degree of certainty, I can say that UA is all over the world. And it's paving the way [together] with teachers, students, staff, technicians" (E). This is a reality at national and international levels, since the institution continues to actively foster a long tradition of strategic partnerships with universities and other business entities, being involved in a quite large number of common projects, namely consortiums, with a special mention to ECIU. These international partnerships are very diverse, as stated by participants:

We're involved in a brand-new Erasmus+ Project with European partners which aims precisely to improve digital competencies (and) community digital literacy" (A).

"[We participate in] inter-institutional research seminars (…) have many institutions united around one purpose, which [goal] is, once again, to share (…) 16 universities, every single one contributing with what they consider useful for the whole of the Portuguese university system (E).

[We participate in] common projects, for example, certain aspects that were already used, like centralized authentications, exchange of credentials, of qualifications, etc., [these] are projects that are being developed in a consortium, and we get funding or manage to find resources to obtain funding in the context of these applications and projects; and then we have more universal things, for example, imagine that you're visiting the London Natural History Museum with your smart phone, and suddenly you're authenticated. Eduroam, you're in. It's amazing! (C).

The multitude of partnerships is a fundamental condition to thrive in the global educational marketplace, "a network, not only national, but international (…) showing cooperation in science, research and higher education" (C). This digital inter-institutional connection is undoubtedly making a difference nationally and internationally:

(…) the university has this consortium (…), FCCN, which is a big impulse for the union of these synergies from various HEI in Portugal; for example, zoom (…) can be used here, or at the University of Porto, or in the Algarve, everywhere, that is, all of them authenticate themselves the same way we do. It was FCCN that implemented a [common] language (…). We don't even notice it, but it's fantastic having this capacity, this possibility. (...) all wi-fi systems we have here (...) the fact that I can authenticate in other services allows me to share my credentials and identify myself. So, there is a series of projects [being implemented] in consortium with other universities (C).

Even the creation of integrated Masters, for example, is being accomplished with [the University of] Minho, with [the University of] Porto (...). This printing system we have here, was implemented in collaboration with the University of Coimbra (C).

When we speak about COIL, meetings have multiplied with several institutions, even for the creation of joint projects within ECIU, discussing what each one can contribute with to come up with [adequate and common] structures to simplify procedures (E);

Eduroam originated from the need to have a common platform, to be able to authenticate, to share information. At its root, it was to facilitate scientific communication (E).

Other complementary collaborative initiatives are taking place to enhance "the digital literacy of the community" (A), entitling students and staff to be conferred with credentials, namely concerning the European Commission Framework, "on the different reference levels, similarly to what already exists for languages [where] the idea is to have more specific recommendations, because they are a bit generalized, for each one of the levels, and so this is being prepared in cooperation with partners" (A).

Micro-credentials, for example, congregate the interest of different players. Coupled with this new approach to skills' acquisition, comes a diversity of opportunities that students and staff may take advantage of. As a student representative, participant G was particularly incisive on the importance of students securing the proper skill set while studying at an HEI:

(…) micro-credentials is a huge project that is being prepared inside the ECIU community with several international universities (…) I find it quite relevant (…) in the future I can also [have the possibility to] go to Ireland, which currently I don't, but I can also have an online class from Ireland, because these relationships are being put together, this is not done alone (G).

I feel UA is not walking in this track alone and is taking advantage of the fact of being an ECIU partner to understand what is being accomplished 'outside' and trying to adapt, to create international projects (G).

UA already understood that this change has to be done by joining students and teachers (…) together with the academic association (…) ok, you are the future, [you] have a very different pathway from what probably the majority of teachers have had, your vision of society is different, so let's discuss this together, how it can be [done] (G).

If several of these joined actions are no doubt part of UA's strategic vision, others arise from funding opportunities: "Particularly in a European context, these logics of vision and technological future (...) come typically connected to projects that involve funding (...) in that case, it is as top-down as possible" (F).

Overall, participants shared a very positive impression of institutional proactivity and concern about the community's well-being: "UA is not, and has never been, a 'sole rider' (…) sharing and collaboration principles [are] actually [being applied] with other universities and HEI" (E). The ability to listen and work cooperatively is regularly emphasized by interviewees, in particular the close collaboration with other HEI, a mindset resulting from the acute conscience that we are indeed part of a global village: "(…) although we are competitors (…) there are things where it's not worth to compete for, we have to converge, because only that way can we achieve critical mass to do certain things, otherwise it's not worth it" (C).

DISCUSSION AND RECOMMENDATIONS

Predicting change and how to cope with change has always been one of the missions of HEIs. The digital transformation distinguishes itself from its predecessors for the incredible short amount of time it took to seize society on a global scale. Education today is technologically mediated and this condition has to be properly incorporated and implemented by HEI. However, no matter how technologically advanced an institution is, if its co-workers and target markets do not perceive it as useful and meaningful, it will not succeed. As such, this research contributes with interesting and insightful perspectives regarding one specific HEI in Portugal, but that can be extended to the many other education institutions currently experiencing the same challenges. Is this a mere transition to digital means and educational practices, or is this, in fact, a transformation? The entire education model is called to action, with an impact that transcends staff, educators and students. Technical, processual, managerial, societal, and cultural transformations are also generated by the digital transformation (Garcez et al., 2021; Hashim et al., 2021; Mamaeva et al., 2020; Sigalês, 2021) (Garcez et al., 2021; Mamaeva et al., 2020; Sigalês, 2021).

The results of this exploratory qualitative research indicate that, at the management level, HEIs are attentive and highly engaged with the demands of a digitally-enhanced education model. The skill set for this new approach requires time, since it depends greatly on how well players can perform with digital environments. Incredible advancements have taken place, such as universal authentication procedures, micro-credentials recognized all over the world, shared training programs, and many other promising cooperation models. Information and digital literacies will support the acquisition of better informed and adapted transversal skills, such as interpersonal and collaboration, confirming that the inter-dependency of human and technological aspects is a pre-condition for an adequate HEIs' value proposition. Lifelong learning becomes a reality, with no geographical or time barriers, and social inclusion will depend on the integration of these new capabilities. Again, digital literacy is human capital (Vaskov et al., 2021) (Radovanovic et al., 2015), including knowledge and skills, but also formal operational skills. The real issue, as participants observed, is to understand how technology can help us to accomplish the strategy, measuring its importance and role in each objective HEIs want to pursue. Technology is a tool, not an end in itself. Education is a social process, not an instrumentalized mechanism.

The contributions of participants confirmed the complexity of this transformation. The ambition of turning technology into something 'transparent', part of our daily life without even noticing it, performing as naturally as pen and paper, has been underlined by interviewees. The need to prepare and train staff, especially teaching staff, to a new way of conveying knowledge, is an ongoing process. The inside perspective on the difficulties felt by educators indicates a strong impact caused by digital but also a vigorous reaction to digital. The high level of participation in diverse training programs, the implementation of innovative pedagogical practices, the offer of physical rooms with proper facilities adapted to digital environments, are examples of concrete actions HEIs are taking to keep the pace with modern education paradigms. Many initiatives started a few years before Covid-19, a clear sign of the institutional strategy the university under analysis wants to follow. Still, a long way has yet to be paved. Educators' perceptions may not be as smooth and contented towards the digital as they appear, and testimonials from participants indicate HEIs are conscious of that fragility. The same applies to students, massively digital natives, but who, on many occasions, are not digitally savvy when it comes to applying competencies professionally and fall short in transferring them among the different contexts. Complementing this aspect is an important mission of HEIs.

Overall, participants shared a sense of belonging and sharing in a community, a genuine willingness to contribute to the institution as a whole using the benefits of digital mechanisms. New ways of teaching and new ways of learning affect us all. More student independence, more engagement, more personal involvement with knowledge transference and acquisition are thrilling challenges for HEIs. If done properly, as observed, it will augment productivity in a significant way, as was indeed the case during a lockdown. Still, technology has perils, such as separating people physically, or invading the private sphere. The increase in the workload of teaching-staff and students and the difficulty in managing time are additional challenges that need attention from HEIs. Neglecting personal well-being will eventually lead to serious consequences. To work on social and emotional skills becomes paramount, and the acquisition of self-regulatory competencies, that can be technologically leveraged, is a supplementary and vital area of concern for HEIs.

The participants in the study also called attention to the need to design learning paths compatible with expectations of the target markets and external stakeholders, namely with the recruitment of learning designers, a fundamental support to educators in defining better pedagogical practices and learning outcomes. The technological set of competencies that practitioners expect from graduates must be aligned with a digitally-mediated world, but the human set of competencies is felt by participants as equally important. The preparation of future generations requires alliances with other HEIs and with external entities. In a digitally connected world, the mission of one HEI is the mission of all. If the strategy for a digital future is implemented correctly, as one of the participants observed, HEIs will not need to search for students, they will come to the institution naturally.

FUTURE RESEARCH DIRECTIONS

The chapter demonstrates that, despite the extended research already accomplished on the topic of digital transformation in HEIs, more exploratory qualitative studies are needed to complement the complex analysis of perceptions from those who have the responsibility to decide. To better understand the organic challenges HEIs are facing, similar studies can be replicated with other HEIs in Portugal and compared to international peers, namely in other continents, with different digital contexts, and thus able to provide relevant insights for future strategic options.

CONCLUSION

The transition to a digital environment is challenging and complex. The need to cope with this new paradigm has led decision-makers to focus on strategies targeted to digital transformation challenges, defining goals and priorities that would create adequate value propositions to compete on a global scale. In this new paradigm, learning experiences are expected to be collaborative, cooperative, and interactive. As such, digital transformation address how HEIs are affected by changes based on digital technologies but also by changes caused by digital technologies in society itself.

The last two years' unparallel circumstances required swift action and acceleration of many initiatives that were already in motion in this Portuguese institution, namely related to the innovation of curricula and educational methodologies, the acquisition of digital literacy and the technological updating of infrastructures. To learn, students have to know how to work in a digital learning environment; to teach,

teachers must be familiar with digital tools and their valuable support; to get a job, future graduates are obliged to be digitally competent; to have financially viable companies, practitioners have to rely on digitally proficient workers; and to continue their mission successfully, HEIs must embrace this new digital educational model with long-term strategies, in collaboration with external stakeholders that have long been partners, but who should act from now on as full members of a global community. HEIs and society will have to think differently, acting with a collective mindset, where multi-partnerships accelerate research and promote inclusion.

This exploratory qualitative research with top-members of an HEI in Portugal provides relevant insights on the several areas that demand attention from education institutions worldwide, namely the unbalance that still exists between the goals set for a digital transformation and the feelings that its implementation, albeit incomplete, is generating among the several stakeholders, including staff, faculty, students, practitioners and society in general.

The perceptions of representatives in top-decision positions are the added value of this research. In addition to assuming roles as pro-rectors, in managing technological departments, in being members of university councils or highly active participants in innovation initiatives, participants in this study are mostly also teachers, with the challenging task of balancing their institutional role with what they experience when performing their professional activity. Yet, here lies perhaps the recipe for a successful digital transformation.

REFERENCES

Abd-Rabo, A. (2021). The digital transformation revolution. *International Journal of Humanities and Education*, *3*(4), 124–128.

Ahrens, A., Zascerinska, J., Bhati, P., Zascerinskis, M., & Aleksejeva, A. (2021). Comparative Studies of Covid-19 Impact on Students' Views on Digital Higher Education. *Society. Integration. Education. Proceedings of the International Scientific Conference*, 28–29.

Antoninis, M. (2018). *A Global Framework to Measure Digital Literacy*. UNESCO Institute for Statistics. http://uis.unesco.org/en/blog/global-framework-measure-digital-literacy

Armah, J. K., & van der Westhuizen, D. (2019). Students' expectations for the higher education digital learning environment: a case of Ghana. *Annual Conference on Mathematics, Science and Education*.

Blau, I., Shamir-Inbal, T., & Avdiel, O. (2020). How does the pedagogical design of a technology-enhanced collaborative academic course promote digital literacies, self-regulation, and perceived learning of students? *The Internet and Higher Education*, *45*, 100722. doi:10.1016/j.iheduc.2019.100722

Butler, D., Leahy, M., Twining, P., Akoh, B., Chtouki, Y., Farshadnia, S., Moore, K., Nikolov, R., Pascual, C., Sherman, B., & Valtonen, T. (2018). Education Systems in the Digital Age: The Need for Alignment. *Technology Knowledge and Learning*, *23*(3), 473–494. doi:10.100710758-018-9388-6

Eshet-Alkalai, Y. (2004). Digital literacy: A conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia*, *13*(1), 93–106. https://www.learntechlib.org/primary/p/4793/

Eshet-Alkalai, Y. (2012). Thinking in the Digital Era: A Revised Model for Digital Literacy. *Issues in Informing Science and Information Technology, 9*, 267–276.

European Commission. (2016). *DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: the Conceptual Reference Model*. JCR Publications Repository. https://publications.jrc.ec.europa.eu/repository/handle/JRC101254

Garcez, A., Silva, R., & Franco, M. (2021). Digital transformation shaping structural pillars for academic entrepreneurship: A framework proposal and research agenda. *Education and Information Technologies*.

Hashim, M. A. M., Tlemsani, I., & Matthews, R. (2021). Higher education strategy in digital transformation. *Education and Information Technologies*.

Kahn, P., Everington, L., Kelm, K., Reid, I., & Watkins, F. (2017). Understanding student engagement in online learning environments: The role of reflexivity. *Educational Technology Research and Development*, *65*(1), 203–218. doi:10.100711423-016-9484-z

Laufer, M., Leiser, A., Deacon, B., de Brichambaut, P. P., Fecher, B., Kobsda, C., & Hesse, F. (2021). Digital higher education: A divider or bridge builder? Leadership perspectives on edtech in a COVID-19 reality. *International Journal of Educational Technology in Higher Education*, *18*(51), 1–17. doi:10.118641239-021-00287-6 PMID:34778538

Lawton, W. A. (2018). Global Higher Education, Digital Age. In P. Teixeira & J. Shin (Eds.), *Encyclopedia of International Higher Education Systems and Institutions*. Springer., doi:10.1007/978-94-017-9553-1_217-1

Mamaeva, D. V., Shabaltina, L. V., Garnova, V. Y., Petrenko, E. S., & Borovsky, S. S. (2020). Digital transformation of higher educational system. *Journal of Physics: Conference Series*, *1691*(012081), 012081. Advance online publication. doi:10.1088/1742-6596/1691/1/012081

Marczyk, G., DeMatteo, D., & Festinger, D. (2017). *Essentials of Research Design and Methodology*. John Wiley & Sons Inc.

Miranda, P., Isaias, P., & Pifano, S. (2018). Digital Literacy in Higher Education: A Survey on Students' Self-assessment. *Conference on Learning and Collaboration Technologies, LCT 2018 Held as Part of HCI International 2018*.

Nikou, S., & Aavakare, M. (2021). An assessment of the interplay between literacyand digital Technology in Higher Education. *Education and Information Technologies*, *26*(4), 3893–3915. doi:10.100710639-021-10451-0

Olimjonovich, M. K., Olimjonovich, M. A., & Chorievich, X. A. (2021). Digitalization of Higher Education: Trends and their Influence on the Institute of Higher Education. *International Journal of Engineering and Information Systems*, *5*(2), 123–124.

Perez, C. (2004). Technological revolutions, paradigm shifts and socio-institutional change. In E. Reinert (Ed.), *Globalization, Economic Development and Inequality: An alternative Perspective* (pp. 217–242). Edward Elgar Publishing Ltd. doi:10.4337/9781845421625.00016

Perez, C. (2010). The advance of technology and major bubble collapses: historical regularities and lessons for today. *Engelsberg Seminar on "The Future of Capitalism Ax:Son Foundation*. https://www.carlotaperez.org/downloads/media/PEREZTechnologyandbubblesforEngelsbergseminar.pdf

Radovanovic, D., Hogan, B., & Lalic, D. (2015). *Overcoming digital divides in higher education: Digital literacy beyond Facebook*. New Media & Society.

Santos, C. C., Pedro, N. S. G., & Mattar, J. (2021). Assessment of the proficiency level in digital competences of higher education professors in Portugal. *Educação, 46*, 1–37.

Schmidt, E., & Cohen, J. (2013). *The new digital age: Reshaping the future of people, nations and business*. Vintage Books.

Sheremetyeva, E. N., Gorshkova, L. A., & N. V. Mitropolskaya-Rodionova. (2020). Digital Marketing and Digital Transformation of the University. *European Proceedings of Social and Behavioural Sciences*, 158–166. doi:10.15405/epsbs.2021.04.02.20

Sigalês, C. (2021). The Role of Digital Technologies in the New Present and Future of Higher Education. In V. van't Land, A. Corcoran, & D. Iancu (Eds.), *The Promise of Higher Education*. Springer. doi:10.1007/978-3-030-67245-4_62

Varma, R. B. R., Umesh, I. M., Nagesh, Y. N., & Kumara, S. K. S. (2021). Digital Transformation in Higher Education Institutions - An overview. *International Journal of Applied Engineering Research, 16*(4), 278–282. https://www.ripublication.com/ijaer21/ijaerv16n4_05.pdf

Vaskov, M., Isakov, A., Bilovus, V., Bulavkin, A., & Mikhaylenko, N. (2021). Digital Literacy of modern higher education teachers. *XIV International Scientific and Practical Conference "State and Prospects for the Development of Agribusiness - INTERAGROMASH 2021"*, 1–7.

Vindaca, O., Zogla, I., & Lubkina, V. (2020). Effective Digital Transformation in the Context of Higher Education. *12th International Conference on Education and New Learning Technologies*. 10.21125/edulearn.2020.0354

Volungeviciene, A., Tereseviciene, M., & Ehlers, U.-D. (2020). When is Open and Online Learning Relevant for Curriculum Change in Higher Education? Digital and Network Society Perspective. *The Electronic Journal of E- Learning, 18*(1).

Vrana, O., & Singh, R. (2021). Digitization, Digitalization, and Digital Transformation. In N. Meyendorf, N. Ida, R. Singh, & J. Vrana (Eds.), *Handbook of Nondestructive Evaluation 4.0*. Springer. doi:10.1007/978-3-030-48200-8_39-1

Wan, N. (2012). Can we teach digital natives digital literacy? *Computers & Education*, *59*(3), 1065–1078. doi:10.1016/j.compedu.2012.04.016

Whiting, K. (2020). *These are the top 10 job skills of tomorrow – and how long it takes to learn them*. World Economic Forum Organization. https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/

Zaborova, E. (2021). The impact of digital technology on the quality of higher education. *International Scientific Conference "Delivering Impact in Higher Education Learning and Teaching: Enhancing Cross-Boarder Collaborations" (DIHELT 2021)*.

ADDITIONAL READING

Anthonysamy, L., Koo, A. C., & Hew, S. H. (2020). Self-regulated learning strategies in higher education: Fostering digital literacy for sustainable lifelong learning. *Education and Information Technologies*, *25*(4), 2393–2414. doi:10.100710639-020-10201-8

Farias-Gaytan, S., Aguaded, I., & Ramirez-Montoya, M.-S. (2021). *Transformation and digital literacy: Systematic literature mapping*. Education and Information Technologies, Early Acce. doi:10.100710639-021-10624-x

Fernando, W. (2018). Show me your true colours: Scaffolding formative academic literacy assessment through an online learning platform. *Assessing Writing, 36*(SI), 63–76. doi:10.1016/j.asw.2018.03.005

Holstein, K., McLaren, B. M., & Aleven, V. (2017). Intelligent Tutors as Teachers' Aides: Exploring Teacher Needs for Real-time Analytics in Blended Classrooms. *Seventh International Learning Analytics & Knowledge Conference (LAK'17)*, 257–266. doi:10.1145/3027385.3027451

Malecka, B., Boud, D., & Carless, D. (2020). *Eliciting, processing and enacting feedback: mechanisms for embedding student feedback literacy within the curriculum*. Teaching in Higher Education. doi:10.1080/13562517.2020.1754784

Marquez-Ramos, L. (2021). *Does digitalization in higher education help to bridge the gap between academia and industry? An application to COVID-19*. Industry and Higher Education. doi:10.1177/0950422221989190

Nelson, M. J., Voithofer, R., & Cheng, S.-L. (2019). Mediating factors that influence the technology integration practices of teacher educators. *Computers & Education*, *128*, 330–344. doi:10.1016/j.compedu.2018.09.023

Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education*, *5*(1), 1519143. Advance online publication. doi:10.1080/2331186X.2018.1519143

Tsay, C. H.-H., Kofinas, A., & Luo, J. (2018). Enhancing student learning experience with technology-mediated gamification: An empirical study. *Computers & Education*, *121*, 1–17. doi:10.1016/j.compedu.2018.01.009

Wolff, C., Mikhieiva, O., & Nuseibah, A. (2021). Competences and the Digital Transformation. In J. L. A. Muñoz, J. L. Y. Blanco, & S. F. Capuz-Rizo (Eds.), *Project Management and Engineering Research, AEIPRO 2019* (pp. 221–234). Springer. doi:10.1007/978-3-030-54410-2_16

KEY TERMS AND DEFINITIONS

CBL (Challenge-Based Learning aka Case-Based Learning): Collaborative pedagogical practice in which students apply their knowledge and skills to real-world scenarios to provide feasible solutions for a specific challenge or case.

CBL (Competency-Based Learning): Pedagogical practice centered on students' learning process, namely by observation of progress in the acquisition of specific competences.

COIL (Collaborative Online International Learning): Collaborative approach based on virtual mobility experiences between two or more HEI located in different countries as a means to develop intercultural and digital skills.

Digital Literacy: Set of literacies connected to the mastery of digital technologies and tools including, among others, the ability to interpret, create and share content in different formats and modes using digital resources.

Digital Transformation: Integration of digital technologies in all areas of society, with profound impact on interpersonal, organizational, operational, economic, and cultural models.

EdTech (Educational Technology): Implementation of pedagogical practices using customized hardware and software to enhance learning experiences.

Eduroam (Education Roaming): HEI and other educational institutions' international WI-FI internet access roaming service.

FCCN (Scientific Computing Unit of the Foundation for Science and Technology): Governmental digital services provider focused on connectivity, collaboration, and IT support to HEI in Portugal.

Information Literacy: Ability to find, evaluate, select, and use information effectively.

Learning Designer: Person who supports teaching and learning experiences in terms of content, pedagogical practices, and implementation of educational deliverables.

PBL (Project-Based Learning aka Problem-Based Learning): Collaborative pedagogical practice in which students engage in real-world projects to promote active learning and skills acquisition.

Compilation of References

Aarikka-Stenroos, L., Jaakkola, E., Harrison, D., & Mäkitalo-Keinonen, T. (2017). How to manage innovation processes in extensive networks: A longitudinal study. *Industrial Marketing Management*, *67*, 88–105. doi:10.1016/j.indmarman.2017.09.014

Aarikka-Stenroos, L., & Ritala, P. (2017). Network management in the era of ecosystems: Systematic review and management framework. *Industrial Marketing Management*, *67*, 23–36. doi:10.1016/j.indmarman.2017.08.010

Abd-Rabo, A. (2021). The digital transformation revolution. *International Journal of Humanities and Education*, *3*(4), 124–128.

Abed, S. S. (2020). Social commerce adoption using TOE framework: An empirical investigation of Saudi Arabian SMEs. *International Journal of Information Management*, *53*, 102118. doi:10.1016/j.ijinfomgt.2020.102118

Ablyazov, T., Asaturova, J., & Koscheyev, V. (2018). Digital technologies: New forms and tools of business activity. In *Proceedings of the 4th International Scientific Conference: The Convergence of Digital and Physical Worlds - Technological, Economic and Social Challenges* (*vol. 44*, pp. 1-9). EDP Sciences. 10.1051hsconf/20184400004

Abubakar, M., Elrehail, H., Alatailat, M. A., & Elci, A. (2019). Knowledge management, decision-making style and organisational performance. *Journal of Innovation & Knowledge*, *4*(2), 104–114. doi:10.1016/j.jik.2017.07.003

Academy to Innovate HR. (2021). *HR 2025 competency model framework: Become a T-shaped HR professional.* https://www.aihr.com/blog/hr-competency-framework/

Accenture. (2014). *Beyond Usability: Designing for continuous customer delight*. Retrieved September 3, 2021, from Accenture Interactive website: https://www.accenture.com/us-en/~/media/accenture/conversion-assets/dotcom/documents/global/pdf/technology_7/accenture-beyond-usability-designing-continuous-customer-delight.pdf

Adamik, A., & Nowicki, M. (2018). Preparedness of companies for digital transformation and creating a competitive advantage in the age of Industry 4.0. In *Proceedings of the International Conference on Business Excellence* (Vol. 12, No. 1, pp. 10-24). 10.2478/picbe-2018-0003

Adeoye, A. O., & Elegunde, A. F. (2012). Impacts of external business environment on organisational performance in the food and beverage industry in Nigeria. *British Journal of Arts and Social Sciences*, *6*(2), 194–201.

Adgate, B. (2021). *The Impact COVID-19 Had On The Entertainment Industry In 2020.* www.forbes.com/sites/bradadgate/2021/04/13/the-impact-covid-19-had-on-the-entertainment-industry-in-2020/?sh=52bee519250f

Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management*, *43*(1), 39–58. doi:10.1177/0149206316678451

Adomavicius, G., & Tuzhilin, A. (2005). Toward the Next Generation of Recommender Systems: A Survey of the State-of-the-Art and Possible Extensions. *IEEE Transactions on Knowledge and Data Engineering*, *17*(6), 734–749. doi:10.1109/TKDE.2005.99

AFM Editorial Office. (2021, July). *China's digital transformation.* Asia Fund Managers. https://www.asiafundmanagers.com/int/china-digital-transformation/

Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010). Research commentary—The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research*, *21*(4), 796–809. doi:10.1287/isre.1100.0327

Agarwal, R., & Sambamurthy, V. (2002). Principles and models for organizing the IT function. *Management Information Systems Quarterly*, *1*(1), 1.

Agrawal, S., De Smet, A., Lacroix, S., & Reich, A. (2020). *To emerge stronger from the COVID-19 crisis, companies should start reskilling their workforces now*. https://www.mckinsey.com/~/media/mckinsey/business%20functions/organization/our%20insights/to%20emerge%20stronger%20from%20the%20covid%2019%20crisis%20companies%20should%20start%20reskilling%20their%20workforces%20now/to-emerge-stronger-from-the-covid-19-crisis.pdf?shouldIndex=false

Ahani, A., Rahim, N. Z. A., & Nilashi, M. (2017). Forecasting social CRM adoption in SMEs: A combined SEM-neural network method. *Computers in Human Behavior*, *75*, 560–578. doi:10.1016/j.chb.2017.05.032

Ahmad, A., Rahman, O., & Khan, M. N. (2017). Exploring the role of website quality and hedonism in the formation of e-satisfaction and e-loyalty: Evidence from internet users in India. *Journal of Research in Interactive Marketing*, *11*(3), 246–267. doi:10.1108/JRIM-04-2017-0022

Ahmad, S. Z., Ahmad, N., & Abu Bakar, A. R. (2018). Reflections of entrepreneurs of small and medium-sized enterprises concerning the adoption of social media and its impact on performance outcomes: Evidence from the UAE. *Telematics and Informatics*, *35*(1), 6–17. doi:10.1016/j.tele.2017.09.006

Ahmad, S. Z., Bakar, A. R. A., & Ahmad, N. (2018). Social media adoption and its impact on firm performance: The case of the UAE. *International Journal of Entrepreneurial Behaviour & Research*, *25*(1), 84–111. doi:10.1108/IJEBR-08-2017-0299

Ahrens, A., Zascerinska, J., Bhati, P., Zascerinskis, M., & Aleksejeva, A. (2021). Comparative Studies of Covid-19 Impact on Students' Views on Digital Higher Education. *Society. Integration. Education. Proceedings of the International Scientific Conference*, 28–29.

Ailawadi, K. L., Beauchamp, J. P., Donthu, N., Gauri, D. K., & Shankar, V. (2009). Communication and Promotion Decisions in Retailing: A Review and Directions for Future Research. *Journal of Retailing*, *85*(1), 42–55. doi:10.1016/j.jretai.2008.11.002

Ainin, S., Parveen, F., Moghavvemi, S., Jaafar Noor, I., & Mohd Shuib Nor, L. (2015). Factors influencing the use of social media by SMEs and its performance outcomes. *Industrial Management & Data Systems*, *115*(3), 570–588. doi:10.1108/IMDS-07-2014-0205

Al Rahbi, H. S. A. (2017). *Factors influencing social media adoption in small and medium enterprises (SMEs)*. Brunel University London.

Alaei, A. R., Becken, S., & Stantic, B. (2019). Sentiment analysis in tourism: Capitalizing on big data. *Journal of Travel Research*, *58*(2), 175–191. doi:10.1177/0047287517747753

Alam, K., Erdiaw-Kwasie, M. O., Shahiduzzaman, M., & Ryan, B. (2018). Assessing regional digital competence: Digital futures and strategic planning implications. *Journal of Rural Studies*, *60*, 60–69. doi:10.1016/j.jrurstud.2018.02.009

Alarcón María del. C., Rialp, A., & Rialp, J. (2015). The Effect of Social Media Adoption on Exporting Firms' Performance. In Entrepreneurship in International Marketing (Vol. 25, pp. 161–186). Emerald Group Publishing Limited.

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *Management Information Systems Quarterly*, *25*(1), 107–136. doi:10.2307/3250961

Al-Bakri, A. A., & Katsioloudes, M. I. (2015). The factors affecting e-commerce adoption by Jordanian SMEs. *Management Research Review*, *38*(7), 726–749. doi:10.1108/MRR-12-2013-0291

Albuquerque, E. M. (2009). Catching up no século XXI: construção combinada de sistemas de inovação e de bem-estar social. In *Crescimento Econômico: estratégias e instituições*. IPEA. http://web. cedeplar.ufmg.br/ cedeplar/site/economia/seminario/2009/Liv ro_Crescimento_Econ omico.pdf

Albusaidi, H., Udupi, P., & Dattana, V. (2016). Integrated Data Analytic Tourism Dashboard (IDATD). In *5th International Conference on Reliability, Infocom Technologies and Optimization* (pp. 497-500) IEEE.

Alexander, A., Cracknell, R., De Smet, A., Langstaff, M., Mysore, M., & Ravid, D. (2021). *What executives are saying about the future of hybrid work?* https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/what-executives-are-saying-about-the-future-of-hybrid-work

Alexander, J. (2021). *Netflix Surpasses 200 Million Subscribers, But Has More Competition Than Ever in 2021 The More Important Question is How Many Are Staying*. https://www.theverge.com/2021/1/19/22238877/netflix-200-million-subscribers-q4-earnings-bridgerton-emily-paris-cobra-kai-queens-gambit

Ali, F., & Omar, R. (2014). Determinants of Customer Experience and Resulting Satisfaction and Revisit Intentions: PLS-SEM Approach towards Malaysian Resort Hotels. *Asia-Pacific Journal of Innovation in Hospitality and Tourism*, *3*(2), 10. doi:10.760340930-014-0010-2

AliResearch, Baidu., & Bain & Company. (2021). *The development model of China's digital economy Internet with Chinese characteristics.* Bain. https://www.bain.cn/pdfs/202103300524126586.pdf

Allen, B. (2021). *A CIO's guide to making digital transformation work*. Retrieved on June 12, 2021 from https://www.ciodive.com/news/cio-digital-transformation-guide/599806

Al-Mamary, Y. H., Shamsuddin, A., & Aziati, N. (2014). The role of different types of information systems in business organizations: A review. *International Journal of Research*, *1*(7), 333–339.

Al-Mulali, U., Solarin, S. A., Andargol, A. E., & Gholipour, H. F. (2020). *Digital adoption and its impact on tourism arrivals and receipts*. Anatolia. doi:10.1080/13032917.2020.1856692

Alphanso Tech. (2020). *Disney+ OTT Platform | Explore to Know its Business Model and Much More!* https://www.alphansotech.com/explained-disney-ott-platform-explore-to-know-its-business-model-and-much-more

AlSharji, A., Ahmad Syed, Z., & Abu Bakar Abdul, R. (2018). Understanding social media adoption in SMEs: Empirical evidence from the United Arab Emirates. *Journal of Entrepreneurship in Emerging Economies*, *10*(2), 302–328. doi:10.1108/JEEE-08-2017-0058

Altman, S., & Bastian, P. (2020). *DHL Global Connectedness Index*. https://www.dhl.com/content/dam/dhl/global/dhl-spotlight/documents/pdf/spotlight-g04-gci-2020-highlights.pdf

Alvarez-Marin, A., Castillo-Vergara, M., & Geldes-González, C. (2017). Bibliometric Analysis of Augmented Reality and its Relationship with Business Administration. *Información Tecnológica*, *28*(4), 57–66. doi:10.4067/S0718-07642017000400008

Alzadjali, K., & Elbanna, A. (2019). Smart institutional intervention in the adoption of digital infrastructure: The case of government cloud computing in Oman. *Information Systems Frontiers*, *22*(2), 365–380. doi:10.100710796-019-09918-w

Amalina, N., & Jumhur, H. M. (2018). The Influence of User Experience towards User Satisfaction of E-Government Service: A Case Study of GAMPIL Application. *International Journal of Scientific and Research Publications*, *8*(3), 254–259. doi:10.29322/IJSRP.8.3.2018.p7538

Amar, M., Ariely, D., Carmon, Z., & Yang, H. (2018). How counterfeits infect genuine products: The role of moral disgust. *Journal of Consumer Psychology*, *28*(2), 329–343. doi:10.1002/jcpy.1036

Amatriain, X. (2013). Big & Personal: Data and Models behind Netflix Recommendations. *BigMine*, *13*, 1–6. doi:10.1145/2501221.2501222

Amelina, D., & Zhu, Y.-Q. (2016). Investigating effectiveness of source credibility elements on social commerce endorsement: The case of Instagram in Indonesia. *PACIS Proceedings, 232*. https://aisel.aisnet.org/pacis2016%0Ahttp://aisel.aisnet.org/pacis2016/232

Andersen, K. N., Henriksen, H. Z., Medaglia, R., Danziger, J. N., Sannarnes, M. K., & Enemærke, M. (2010). Fads and facts of e-government: A review of impacts of e-government (2003–2009). *International Journal of Public Administration*, *33*(11), 564–579. doi:10.1080/01900692.2010.517724

Andersen, P. (2007). *What is Web 2.0? Ideas, technologies and implications for education* (Vol. 1). JISC Bristol.

Anderson, C. (2004, January 10). The Long Tail. *Wired*. https://www.wired.com/2004/10/tail/

Andreessen. (2011, August 20). *Why Software Is Eating the World*. Andreessen Horowitz. https://a16z.com/2011/08/20/why-software-is-eating-the-world/

Angeline, T. (2011). Managing generational diversity at the workplace: Expectations and perceptions of different generations of employees. *African Journal of Business Management*, *5*(2), 249–255.

Ano, B., & Bent, R. (2021). Human determinants influencing the digital transformation strategy of multigenerational family businesses: A multiple-case study of five French growth-oriented family firms. *Journal of Family Business Management*.

ANP. (2020). *Anuário Estatístico ANP 2020*. http://www.anp.gov.br/arquivos/central-conteudos/anuario-estatistico/2020/anuario-2020.pdf

ANP. (2021a). *Anuário Estatístico ANP 2021*. https://www.gov.br/anp/pt-br/centrais-de-conteudo/publicacoes/anuario-estatistico/anuario-estatistico-2021#Apresentação

ANP. (2021b). *Projetos de PD&I*. https://www.gov.br/anp/pt-br/assuntos/pesquisa-desenvolvimento-e-inovacao/investimentos-em-pd-i/projetos-de-pd-i

Ansar, N., & Baloch, A. (2018). Talent and talent management: Definition and issues. *IBT Journal of Business Studies*, *14*(2), 174–186. doi:10.46745/ilma.jbs.2018.14.02.14

Antoninis, M. (2018). *A Global Framework to Measure Digital Literacy*. UNESCO Institute for Statistics. http://uis.unesco.org/en/blog/global-framework-measure-digital-literacy

Anuradha, D., & Manohar, H. L. (2011). Customer shopping experience in malls with entertainment centres in Chennai. *African Journal of Business Management*, *5*(31). Advance online publication. doi:10.5897/AJBM11.902

Aon. (2020). *Scaling the digitally-ready workforce. Aon's 2020 digital readiness report.* https://insights.humancapital.aon.com/assessing-digital-readiness/scaling-the-digitally-ready-workforce-report

Apogaeis. (2020). *Digital Transformation & the Role of a Chief Information Officer (CIO)*. Retrieved on June 15, 2021 from https://www.apogaeis.com/blog/digital-transformation-the-role-of-a-chief-information-officer-cio

Applegate, L. M., & Elam, J. J. (1992). New information systems leaders: A changing role in a changing world. *Management Information Systems Quarterly*, *16*(4), 469–490. doi:10.2307/249732

Arango, C. A., Huynh, K. P., & Sabetti, L. (2011). *How do you pay? The role of incentives at the Point-of-Sale.* Bank of Canada Working Paper. European Central Bank.

Archibald, M. M., & Clark, A. M. (2014). Twitter and nursing research: How diffusion of innovation theory can help uptake. *Journal of Advanced Nursing*, *70*(3), e3–e5. doi:10.1111/jan.12343 PMID:24450876

Ariel, Y., & Avidar, R. (2015). Information, Interactivity, and Social Media. *Atlantic Journal of Communication*, *23*(1), 19–30. doi:10.1080/15456870.2015.972404

Armah, J. K., & van der Westhuizen, D. (2019). Students' expectations for the higher education digital learning environment: a case of Ghana. *Annual Conference on Mathematics, Science and Education*.

Armstrong, C. P., & Sambamurthy, V. (1999). Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. *Information Systems Research*, *10*(4), 304–327. doi:10.1287/isre.10.4.304

Arnould, E., Price, L., & Zinkhan, G. (2004). Consumers. McGraw-Hill.

Artemenko, E. (2020, September). The roles of top management in digital transformation. *IOP Conference Series. Materials Science and Engineering*, *940*(1), 012014. doi:10.1088/1757-899X/940/1/012014

Ashrafpour, N., Niky Esfahlan, H., Aali, S., & Taghizadeh, H. (2021). The prerequisites and consequences of customers' online experience regarding the moderating role of brand congruity: evidence from an Iranian bank. *Journal of Islamic Marketing*. doi:10.1108/JIMA-09-2020-0277

Association of Small and Medium-Sized Enterprises and Crafts. (2021). https://amsp.cz/?lang=en

Attaran, M., Attaran, S., & Kirkland, D. (2020). Technology and organisational change: Harnessing the power of digital workplace. In E. C. Idemudia (Ed.), *Handbook of research on social and organisational dynamics in the digital era* (pp. 383–408). IGI Global. doi:10.4018/978-1-5225-8933-4.ch018

Atwal, G., & Williams, A. (2009). Luxury brand marketing – the experience is everything! *Journal of Brand Management*, *16*(5-6), 338–346. doi:10.1057/bm.2008.48

Auerswald, P. E. (2017). *The code economy: A forty-thousand year history*. Oxford University Press.

Auger, U. G. (1967). *Method and apparatus for coordinating restaurant operation* (U.S. Patent No. 3,310,797. Washington). U.S. Patent and Trademark Office.

Auh, S., & Menguc, B. (2005). Balancing exploration and exploitation: The moderating role of competitive intensity. *Journal of Business Research*, *58*(12), 1652–1661. doi:10.1016/j.jbusres.2004.11.007

Australian Industry and Skills Committee. (2021). *Digital skills: Overview*. https://nationalindustryinsights.aisc.net.au/national/digital-skills

Autio, E. (2017). *Digitalisation, ecosystems, entrepreneurship and policy. Perspectives into topical issues in society and ways to support political decision making. Government's analysis, assessment and research activities*. Policy Brief 20/2017. Prime Minister's Office.

Autio, E. (2021). Orchestrating ecosystems: A multi-layered framework. *Innovation*, ●●●, 1–14. doi:10.1080/14479338.2021.1919120

Autio, E., & Thomas, L. D. (2019). *Value co-creation in ecosystems: Insights and research promise from three disciplinary perspectives. In Handbook of digital innovation*. Edward Elgar.

Autio, E., & Thomas, L. D. (2020). Value co-creation in ecosystems: Insights and research promise from three disciplinary perspectives. In S. Nambisan, K. Lyytinen, & Y. Yoo (Eds.), *Handbook of Digital Innovation* (pp. 107–132). Edward Elgar Publishing. doi:10.4337/9781788119986.00017

Avery, E., Lariscy, R., Amador, E., Ickowitz, T., Primm, C., & Taylor, A. (2010). Diffusion of Social Media Among Public Relations Practitioners in Health Departments Across Various Community Population Sizes. *Journal of Public Relations Research*, *22*(3), 336–358. doi:10.1080/10627261003614427

Awa, H. O., Uko, J. P., & Ukoha, O. (2017). An empirical study of some critical adoption factors of ERP software. *International Journal of Human-Computer Interaction*, *33*(8), 609–622. doi:10.1080/10447318.2016.1265828

Ayaz, N., & Türkmen, B. M. (2018). Yenilik yönetimi uygulamaları üzerine butik otel işletmelerinde bir araştırma. *Journal of Recreation and Tourism Research*, *5*(2), 24–32.

Ayvaz-Cavdaroglu, N., Gauri, D. K., & Webster, S. (2019). Empirical evidence of revenue management in the cruise line industry. *Journal of Travel Research*, *58*(1), 104–120. doi:10.1177/0047287517737178

Babin, B. J., & Zikmund, W. G. (2016). *Exploring Marketing Research* (11th ed.). Cengage Learning.

Badran, O., & Al-Haddad, S. (2018). The Impact Of Software User Experience On Customer Satisfaction. Journal of Management Information and Decision Sciences, 21(1).

Bagozzi, R. P., Gopinath, M., & Nyer, P. U. (1999). The role of emotions in marketing. *Journal of the Academy of Marketing Science*, *27*(2), 184–206. doi:10.1177/0092070399272005

Bailie, B., & Chinn, M. (2018). Effectively harnessing data to navigate the new normal: Overcoming the barriers of digital adoption. *Proceedings of the Annual Offshore Technology Conference*, *1*, 12-21. 10.4043/28699-MS

Bain, J. S. (1956). *Barriers to new competition: Their character and consequences in manufacturing industries*. Harvard University Press. doi:10.4159/harvard.9780674188037

Bai, Y., & Bai, Q. (2016). *Sistemas marítimos de produção de petróleo: Processos, tecnologias e equipamentos offshore*. Elsevier.

Baker, J., Ashill, N., Amer, N., & Diab, E. (2018). The internet dilemma: An exploratory study of luxury firms´ usage of internet-based technologies. *Journal of Retailing and Consumer Services*, *41*, 37–47. doi:10.1016/j.jretconser.2017.11.007

Baker, J., & Singh, H. (2019). The roots of misalignment: Insights on strategy implementation from a system dynamics perspective. *The Journal of Strategic Information Systems*, *28*(4), 101576. doi:10.1016/j.jsis.2019.101576

Bakhshi, H., & Throsby, D. (2010). *Culture of Innovation: An Economic Analysis of Innovation in Arts & Cultural Organisations*. NESTA.

Bakhtieva, E. (2017). B2B digital marketing strategy: A framework for assessing digital touchpoints and increasing customer loyalty based on Austrian companies from heating, ventilation and air conditioning industry. *Oeconomia Copernicana*, *8*(3), 463–478. doi:10.24136/oc.v8i3.29

Bakri, A. A. A. (2017). The impact of social media adoption on competitive advantage in the small and medium enterprises. *International Journal of Business Innovation and Research*, *13*(2), 255–269. doi:10.1504/IJBIR.2017.083542

Bala, H., & Feng, X. (2019). Success of small and medium enterprises in Myanmar: Role of technological, organizational, and environmental factors. *Journal of Global Information Technology Management*, *22*(2), 100–119. doi:10.1080/1097198X.2019.1603511

Balaji, M. S., Khong, K. W., & Chong, A. Y. L. (2016). Determinants of negative word-of-mouth communication using social networking sites. *Information & Management*, *53*(4), 528–540. doi:10.1016/j.im.2015.12.002

Balog, M. M., & Demidova, S. E. (2021). Human capital development in the context of the Fourth Industrial Revolution. In *Proceedings of International Science and Technology Conference Series: Earth and Environmental Science* (vol. 666, pp. 1-8). IOP Publishing. 10.1088/1755-1315/666/6/062120

Barassi, V., & Treré, E. (2012). Does Web 3.0 come after Web 2.0? Deconstructing theoretical assumptions through practice. *New Media & Society*, *14*(8), 1269–1285. doi:10.1177/1461444812445878

Barbieri, L., Fabio, B., & Muzzappa, M. (2017). Virtual Museum System Evaluation through User Studies. *Journal of Cultural Heritage*, *26*, 101–108. doi:10.1016/j.culher.2017.02.005

Barbosa, B., Remondes, J., & Teixeira, S. (2018). Luxury marketing challenges and opportunities in the digital era. *International Journal of Marketing*, *Communication and New Media*, *4*, 1–5.

Barker, V. L. III, & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. *Management Science*, *48*(6), 782–801. doi:10.1287/mnsc.48.6.782.187

Barreiro, T., Dinis, G., & Breda, Z. (2019). Marketing de influência e influenciadores digitais: Aplicação do conceito pelas DMO em Portugal. *Marketing & Tourism Review*, *4*(1). Advance online publication. doi:10.29149/mtr.v4i1.5702

Barrio, M., Herrero, L., & Sanz, J. (2009). Measuring the Efficiency of Heritage Institutions: A Case Study of a Regional System of Museums in Spain. *Journal of Cultural Heritage*, *10*(2), 258–268. doi:10.1016/j.culher.2008.08.012

Baser, U. I., Cintamur, G. I., & Arslan, M. F. (2015). Examining The Effect of Brand Experience on Customer Satisfaction, Brand Trust, adn Brand Loyalty. *İ.İ.B. Dergisi*, *37*(2), 101–128. doi:10.14780/iibd.51125

Bassellier, G., & Benbasat, I. (2004). Business competence of information technology professionals: Conceptual development and influence on IT-business partnerships. *Management Information Systems Quarterly*, *28*(4), 673–694. doi:10.2307/25148659

Basso, A., Casarin, F., & Funari, S. (2018). How well is the museum performing? A joint use of DEA & BSC to measure the performance of museum. *Omega*, *81*, 67–84. doi:10.1016/j.omega.2017.09.010

Basso, A., & Funari, S. (2004). A Quantitative Approach to Evaluate the Relative Efficiency of Museums. *Journal of Cultural Economics*, *28*(3), 195–216. doi:10.1023/B:JCEC.0000037997.23746.f2

Battilana, J., & Casciaro, T. (2012). Change agents, networks, and institutions: A contingency theory of organisational change. *Academy of Management Journal*, *55*(2), 381–398. doi:10.5465/amj.2009.0891

Bauder, M. (2020). Mobility 4.0 in tourism - developments, effects and challenges from a destination perspective. *Zeitschrift für Tourismuswissenschaft*, *12*(1), 38–56. doi:10.1515/tw-2020-0012

Beatty, R. C., Shim, J. P., & Jones, M. C. (2001). Factors influencing corporate web site adoption: A time-based assessment. *Information & Management*, *38*(6), 337–354. doi:10.1016/S0378-7206(00)00064-1

Becerra-Fernandez, I., & Sabherwal, R. (2014). *Knowledge management systems and processes*. Routledge. doi:10.4324/9781315715117

Becker, M., & Bröcker, J.-O. (2021). *Business Model Canvas—Overview of the main advantages and disadvantages* (IUCF Working Paper No. 6/2021). ZBW - Leibniz Information Centre for Economics. http://hdl.handle.net/10419/234963

Becker, W., Schmid, O., & Botzkowski, T. (2018, January). Role of CDOs in the digital transformation of SMEs and LSEs-An empirical analysis. *Proceedings of the 51st Hawaii International Conference on System Sciences*. 10.24251/HICSS.2018.573

Beck, R., Wigand, R. T., & Konig, W. (2005). The diffusion and efficient use of electronic commerce among small and medium-sized enterprises: An international three-industry survey. *Electronic Markets*, *15*(1), 38–52. doi:10.1080/10196780500035282

Beier, M., & Früh, S. (2020). Technological, Organizational, and Environmental Factors Influencing Social Media Adoption by Hospitals in Switzerland: Cross-Sectional Study. *Journal of Medical Internet Research*, *22*(3), e16995. doi:10.2196/16995 PMID:32149718

Beigel. (n.d.). Bitpanda Review (2021 Updated). *99 Bitcoins*. Retrieved September 7, 2021, from https://99bitcoins.com/bitcoin-exchanges/bitpanda-review/

Beldad, A., de Jong, M., & Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior*, *26*(5), 857–869. doi:10.1016/j.chb.2010.03.013

Benaroch, M., & Chernobai, A. (2017). Operational IT Failures, IT Value Destruction, and Board-Level IT Governance Changes. *Management Information Systems Quarterly*, *41*(3), 729–762. doi:10.25300/MISQ/2017/41.3.04

Benbunan-Fich, R., Desouza, K. C., & Andersen, K. N. (2020). IT-enabled innovation in the public sector: Introduction to the special issue. *European Journal of Information Systems*, *29*(4), 323–328. doi:10.1080/0960085X.2020.1814989

Berger, J. (2011). Arousal increases social transmission of information. *Psychological Science*, *22*(7), 891–893. doi:10.1177/0956797611413294 PMID:21690315

Berman, S. J. (2012). Digital transformation: Opportunities to create new business models. *Strategy and Leadership*, *40*(2), 16–24. doi:10.1108/10878571211209314

Berruti, F., Nixon, G., Taglioni, G., & Whiteman, R. (2017). *Intelligent process automation: The engine at the core of the next-generation operating model.* https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/intelligent-process-automation-the-engine-at-the-core-of-the-next-generation-operating-model

Besharov, M. L., & Smith, W. K. (2014). Multiple institutional logics in organisations: Explaining their varied nature and implications. *Academy of Management Review*, *39*(3), 364–381. doi:10.5465/amr.2011.0431

Beynon-Davies, P. (2018). Characterizing Business Models for Digital Business Through Patterns. *International Journal of Electronic Commerce*, *22*(1), 98–124. doi:10.1080/10864415.2018.1396123

Bhadani, A., & Jothimani, D. (2016). Big Data: Challenges, Opportunities and Realities. In M. K. Singh & K. G. Dileep (Eds.), *Effective Big Data Management and Opportunities for Implementation* (pp. 1–24). IGI Global. doi:10.4018/978-1-5225-0182-4.ch001

Bharadi, V. A., Ranjan, V., Masiwal, N., & Verma, N. (2013). e-Restaurant: Online restaurant management system for android. *IJACSA*.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Digital business strategy: Toward a next generation of insights. *Management Information Systems Quarterly*, *37*(2), 471–482. doi:10.25300/MISQ/2013/37:2.3

BHGE. (2018) *Lead the digital transformation*. Baker Hughes a GE Company. Report presented in BHGE.com.

Bi, L. (2020). *Viewing the Digitization of Traditional Enterprises from the Transformation of Suning Internet.* http://finance.people.com.cn/n1/2020/0722/c1004-31793552.html

Bilgihan, A. (2016). Gen y customer loyalty in online shopping: An integrated model of trust, user experience and branding. *Computers in Human Behavior*, *61*, 103–113. doi:10.1016/j.chb.2016.03.014

Bilgihan, A., Kandampully, J., & Zhang, T. (2016). Towards a unified customer experience in online shopping environments. *International Journal of Quality and Service Sciences*, *8*(1), 102–119. doi:10.1108/IJQSS-07-2015-0054

Billard, B. (2021). AWS is now a bigger part of Amazon's overall success than ever. *TechRadar*. Available at: https://www.techradar.com/news/aws-is-now-a-bigger-part-of-amazons-overall-success-than-ever

Binance Research. (2021). *2021 Crypto User Index*. Author.

Bisogni, C. A., Jastran, M., Seligson, M., & Thompson, A. (2012). How People Interpret Healthy Eating: Contributions of Qualitative Research. *Journal of Nutrition Education and Behavior*, *44*(4), 282–301. doi:10.1016/j.jneb.2011.11.009 PMID:22732708

Bitner, M. J., & Hubbert, A. R. (1994). Encounter satisfaction versus overall satisfaction versus quality. *Service Quality: New Directions in Theory and Practice*, *34*(2), 72–94.

Bitpanda. (n.d.). *Bitpanda—Start investing today*. Retrieved September 9, 2021, from https://www.bitpanda.com/en

Blaike, N. (2010). *Designing social research* (2nd ed.). Polity.

Blasco Lopez, M. F., Virto, N. R., & San-Martin, S. (2019). The Cornerstones of Museum Performance. A Cross-National Analysis. *Museum Management and Curatorship*, *34*(2), 211–233. doi:10.1080/09647775.2018.1516562

Blattberg, R. C., & Deighton, J. (1991). Interactive marketing: Exploiting the age of addressability. *Sloan Management Review*, *33*(1), 5–15.

Blau, I., Shamir-Inbal, T., & Avdiel, O. (2020). How does the pedagogical design of a technology-enhanced collaborative academic course promote digital literacies, self-regulation, and perceived learning of students? *The Internet and Higher Education*, *45*, 100722. doi:10.1016/j.iheduc.2019.100722

Blaynee, J., Kreps, D. D., Kutar, D. M., & Griffiths, D. M. (2016). Collaborative HCI and UX: Longitudinal diary studies as a means of uncovering barriers to digital adoption. *Proceedings of the 30th International BCS Human-Computer Interaction Conference, HCI 2016.* 10.14236/ewic/HCI2016.72

Blažič, B. J., Cigoj, P., & Blažič, A. J. (2018). Learning digital skills for elderly people by using touch screen technology and learning games: A case study. *CSEDU 2018 - Proceedings of the 10th International Conference on Computer Supported Education, 2*, 222-229. 10.5220/0006682002220229

Blöcher, K., & Alt, R. (2020). AI and robotics in the European restaurant sector: Assessing potentials for process innovation in a high-contact service industry. *Electronic Markets*, *31*(3), 529–551. doi:10.100712525-020-00443-2

Blockchain Market Size. (2020). [Research]. marketresearchengine. https://www.marketresearchengine.com/blockchain-market

Blocker, C. P., Flint, D. J., Myers, M. B., & Slater, S. F. (2010). Proactive customer orientation and its role for creating customer value in global markets. *Journal of the Academy of Marketing Science*, *39*, 216–233.

BNAmericas. (2021). *Our ambition is to work more and more remotely*. https://www.bnamericas.com/en

Boerenbond Belgium. (2019). *Twintig jaar na de dioxinecrisis. Voedselveiligheid blijft een werkwoord*. https://www.boerenbond.be/actualiteit/twintig-jaar-na-de-dioxinecrisis-voedselveiligheid-blijft-een-werk

Bollweg, R. L., Siepermann, M., & Weber, P. (2020). Drivers and barriers of the digitalization of local owner operated retail outlets. *Journal of Small Business and Entrepreneurship*, *32*(2), 173–201. doi:10.1080/08276331.2019.1616256

Bolwijn, R., Casella, B., & Zhan, J. (2018). International Production and the digital economy. In *International business in the information and digital age*. Emerald Publishing Limited. doi:10.1108/S1745-886220180000013003

Bond, J., & Clarke, B. (2017). *House Of Creativity: Netflix Casts Big Data In Transformation Role*. https://cmo.adobe.com/articles/2017/1/no-house-of-cards-big-data-fuels-big-creativity-at-netflix-.html#gs.bidnst

Bondar, I., Komarnitskyi, I., Rusavska, V., Batchenko, L., & Honchar, L. (2021). Formation and development of digital skills in university education: A systematic approach. *Lapage Em Revista, 7*(B), 47-56. doi:10.24115/S2446-622020217Extra-B882p.47-56

Bordeaux, J. (2020). *What Is Customer Experience? (And Why It's So Important).* Retrieved September 1, 2021, from Hubspot website: https://blog.hubspot.com/service/what-is-customer-experience

Borges da Costa, S. I. R. (2018). *A dimensão territorial da política pública de C,T&I: Resultados e Benefícios do CT-Energ sobre Empresas e Grupos de Pesquisa no Estado de Pernambuco* (PhD thesis). Departamento de Ciências Geográficas, Universidade Federal de Pernambuco.

Borne, R. (2021). *Digital Transformation of the Oil and Gas Industry in an Altered Market*. https://jpt.spe.org/digital-transformation-of-the-oil-and-gas-industry-in-an-altered-market

Borowiecki, K. J., & Navarrete, T. (2017). Digitization of Heritage Collections as Indicator of Innovation. *Economics of Innovation and New Technology*, *26*(3), 227–246. doi:10.1080/10438599.2016.1164488

Borremans, A. D., Zaychenko, I. M., & Iliashenko, O. Y. (2018). Digital economy. IT strategy of the company development. In *MATEC Web of Conferences* (Vol. 170, p. 01034). EDP Sciences.

Bowen, J., & Whalen, E. (2017). Trends that are changing travel and tourism. *Worldwide Hospitality and Tourism Themes*, *9*(6), 592–602. doi:10.1108/WHATT-09-2017-0045

Bowen, P. L., Cheung, M.-Y. D., & Rohde, F. H. (2007). Enhancing IT governance practices: A model and case study of an organisation's efforts. *International Journal of Accounting Information Systems*, *8*(3), 191–221. doi:10.1016/j.accinf.2007.07.002

Boyd, D. & Crawford, K. (2015). Büyük Veri Üzerine Eleştirel Sorular: Kültürel, Teknolojik ve Bilimsel Bir Olgu Hakkında Eleştirel Sorgulamalar (B. Savcı, Trans.). *Folklor/Edebiyat Dergisi*, *21*(83), 199-215.

Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand Experience: What is It? How is it Measured? Does it Affect Loyalty? *Journal of Marketing*, *73*(3), 52–68. doi:10.1509/jmkg.73.3.052

Breck, B., Leedahl, S., & Dennis, C. (2018). Bridging the digital divide: Findings for older adults in an intergenerational cyber-seniors program. *Innovation in Aging*, *2*(suppl_1), 918–919. doi:10.1093/geroni/igy031.3417

Breuer, R., & Brettel, M. (2012). Short-and long-term effects of online advertising: Differences between new and existing customers. *Journal of Interactive Marketing*, *26*(3), 155–166. doi:10.1016/j.intmar.2011.12.001

Breuer, R., Brettel, M., & Engelen, A. (2011). Incorporating long-term effects in determining the effectiveness of different types of online advertising. *Marketing Letters*, *22*(4), 327–340. doi:10.100711002-011-9136-3

Briggs, C., Chande, A., Chen, L., Mathews, E., Mercier, P., & Wang, A. (2017). *Chinese consumers online journey from discovery to purchase. In BCG Perspectives*. Boston Consulting Group.

Brolpito, A. (2018). *Digital skills and competence, and digital and online learning.* https://www.etf.europa.eu/sites/default/files/2018-10/DSC%20and%20DOL_0.pdf

Brun, I., Rajaobelina, L., & Ricard, L. (2014). Online relationship quality: Scale development and initial testing. *International Journal of Bank Marketing*, *32*(1), 5–27. doi:10.1108/IJBM-02-2013-0022

Bryan, V. C., Musgrove, A. T., & Powers, J. R. (Eds.). (2017). *Handbook of research on human development in the digital age*. IGI Global. doi:10.4018/978-1-5225-2838-8

Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.

Brzybohatá, A. (2019). *Naučil překládat Google, teď pracuje na umělé inteligenci pro Facebook* [He learned to translate Google, now he is working on artificial intelligence for Facebook] [Personal interview]. https://www.idnes.cz/zpravy/domaci/google-facebook-microsoft-zuckerberg-translator-vedec-cech-mikolov-tomas.A181211_141650_domaci_brzy

Buhalis, D., & Leung, R. (2018). Smart hospitality—Interconnectivity and interoperability towards an ecosystem. *International Journal of Hospitality Management*, *71*, 41–50. doi:10.1016/j.ijhm.2017.11.011

Bunduchi, R., Smart, A., Charles, K., McKee, L., & Azuara-Blanco, A. (2015). When innovation fails: An institutional perspective of the (non) adoption of boundary spanning IT innovation. *Information & Management*, *52*(5), 563–576. doi:10.1016/j.im.2015.04.001

Burke, R. (2007). Hybrid Web Recommender Systems. Peter Brusilovsky. In The Adaptive Web. (pp. 377-408). Berlin: Springer-Verlag.

Burkett, D. (2017). *Digitisation and Digitalisation: What Means What?* https://workingmouse.com.au/innovation/digitisation-digitalisation-digital-transformation/

Burns, J. W., Berenschot, C. E., Calabrese, G., Kasper, C. D., & Lovell, R. (2013). *Restaurant management system and method* (U.S. Patent No. 8,620,753. Washington). U.S. Patent and Trademark Office.

Burton-Jones, A., Akhlaghpour, S., Ayre, S., Barde, P., Staib, A., & Sullivan, C. (2020). Changing the conversation on evaluating digital transformation in healthcare: Insights from an institutional analysis. *Information and Organization*, *30*(1), 100255. doi:10.1016/j.infoandorg.2019.100255

Bustamante, A., Sebastia, L., & Onaindia, E. (2020). BITOUR: A Business Intelligence Platform for Tourism Analysis. *ISPRS International Journal of Geo-Information*, *9*(11), 671. doi:10.3390/ijgi9110671

Butkiewicz, M., Madhyastha, H. V., & Sekar, V. (2011). Understanding website complexity: Measurements, metrics, and implications. *Proceedings of the 2011 ACM SIGCOMM conference on Internet measurement conference*, 313-328. 10.1145/2068816.2068846

Butler, D., Leahy, M., Twining, P., Akoh, B., Chtouki, Y., Farshadnia, S., Moore, K., Nikolov, R., Pascual, C., Sherman, B., & Valtonen, T. (2018). Education Systems in the Digital Age: The Need for Alignment. *Technology Knowledge and Learning*, *23*(3), 473–494. doi:10.100710758-018-9388-6

Buzzell. (1983). Is Vertical Integration Profitable? *Harvard Business Review*. https://hbr.org/1983/01/is-vertical-integration-profitable

Cackett, D. (2013). *İnformation Management and Big Data, A Reference Architecture.* Oracle.

Cagan, M. (2018). *INSPIRED: How to Create Tech Product Customers Love* (2nd ed.). Wiley.

Cai, X. (2018). *China's Digital Economy: Innovation Policies and Reflections.* APEC. http://mddb.apec.org/Documents/2018/EC/EC%20CONF/18_ec_conf_006.pdf

CaillaudB.JullienB. (2001). Chicken and egg: Competing matchmakers. *Available at* SSRN 278562.

Cairncross, F. (1997). *The death of destance*. HBS Press.

Caloghirou, Y., Protogerou, A., & Panagiotopoulos, P. (2016). Public procurement for innovation: A novel eGovernment services scheme in Greek local authorities. *Technological Forecasting and Social Change*, *103*, 1–10. doi:10.1016/j.techfore.2015.10.016

Calum, N. (2018). *The CIO and Digital Transformation*. Retrieved on July 15, 2021 from https://www.spencerstuart.com/research-and-insight/the-cio-and-digital-transformation

Camarero, C., & Garrido, M. J. (2014). Learning and relationship orientation: An empirical examination in European museums. *Journal of Philanthropy and Marketing*, *19*(2), 92–109.

Camarero, C., Garrido, M. J., & Vicente, E. (2011). How Cultural Organizations' Size and Funding Influence Innovation and Performance: The Case of Museums. *Journal of Cultural Economics*, *35*(4), 247–266. doi:10.100710824-011-9144-4

Caniato, F., Gelsomino, L. M., Perego, A., & Ronchi, S. (2016). Does finance solve the supply chain financing problem? *Supply Chain Management*, *21*(5), 534–549. doi:10.1108/SCM-11-2015-0436

Canton, J. (2016). *Future smart: Managing the game-changing trends that will transform your world*. Academic Press.

Cao, L., & Li, L. (2015). The Impact of Cross-Channel Integration on Retailers' Sales Growth. *Journal of Retailing*, *91*(2), 198–216. doi:10.1016/j.jretai.2014.12.005

Capallone, M. (2017). *Marketing and Customer Loyalty The Extra Step Approach*. Springer International Publishing. doi:10.1007/978-3-319-51991-3

Capitani, G. (2018). CIO's: Drivers or Followers of Digital Transformation? In *CIOs and the Digital Transformation* (pp. 69–83). Springer. doi:10.1007/978-3-319-31026-8_5

Cappelli, P., & Keller, J. R. (2017). The historical context of talent management. In D. G. Collings, K. Mellahi, & W. F. Cascio (Eds.), *The Oxford handbook of talent management* (pp. 23–42). Oxford University Press.

Carbone, L. P., & Haeckel, S. H. (1994). Engineering customer experiences. *Marketing Management*, *3*(3), 8–19.

Carman, A. (2021, March 18). *Spotify says over 13,000 artists' catalogs earned at least $50K in royalties last year*. The Verge. https://www.theverge.com/2021/3/18/22336087/spotify-loud-clear-website-launch-pay-artists-streaming-royalities

Carolis, A., Macchi, M., Negri, E., & Terzi, S. (2017). A Maturity Model for Assessing the Digital Readiness of Manufacturing Companies. In *Proceedings of the IFIP International Conference on Advances in Production Management Systems (APMS)*. Springer. 10.1007/978-3-319-66923-6_2

Carr, D. (2013). Giving Viewers What They Want. *The New York Times*. https://www.nytimes.com/2013/02/25/business/media/for-house-of-cards-using-big-data-to-guarantee-its-popularity.html

Carr, N. G. (2003). IT doesn't matter. *EDUCAUSE Review*, *38*, 24–38. PMID:12747161

Carroll, S. J., & Gillen, D. I. (1987). Are the classical management functions useful in describing managerial work? *Academy of Management Review*, *12*(1), 38–51. doi:10.2307/257992

Cassiolato, J. E., & Lastres, H. M. M. (2008). *Discussing innovation and development: Converging points between the Latin American school and the Innovation Systems perspective?* Globelics Working Paper Series. Nº2.

Cassiolato, J. E., Lastres, H. M. M., Szapiro, M., & Matos, M. (2017). Local production and innovation systems in Brazil: balance of 20 years. *Texto para Discussão - Redesist, 4*.

Cassiolato, J. E., & Lastres, H. M. M. (2005). Sistemas de inovação e desenvolvimento: As implicações de política. *São Paulo em Perspectiva*, *19*(1), 34–45. doi:10.1590/S0102-88392005000100003

Cassiolato, J. E., Matos, M. P., & Lastres, H. M. M. (2014). Innovation systems and development. In B. Currie-Alder, R. Kanbur, D. M. Malone, & R. Medhora (Eds.), *International development ideas, experience, and prospects* (pp. 566–581). Oxford University Press. doi:10.1093/acprof:oso/9780199671656.003.0034

Castagna, F., Centobelli, P., Cerchione, R., Esposito, E., Oropallo, E., & Passaro, R. (2020). Customer Knowledge Management in SMEs Facing Digital Transformation. *Sustainability*, *12*(9), 3899. https://www.mdpi.com/2071-1050/12/9/3899. doi:10.3390u12093899

Castelnovo, W., & Sorrentino, M. (2018). The digital government imperative: A context-aware perspective. *Public Management Review*, *20*(5), 709–725. doi:10.1080/14719037.2017.1305693

Caulliraux, A. A., Bastos, D. P., Araujo, R., & Costa, S. R. (2020). Organizational optimization through the double diamond - Applying Interdisciplinarity. *Brazilian Journal of Operations & Production Management*, *17*(4), e2020917. Advance online publication. doi:10.14488/BJOPM.2020.025

Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. *Journal of International Business Studies*, *46*(1), 3–16. doi:10.1057/jibs.2014.62

Cavusoglu, M. (2019). An analysis of technology applications in the restaurant industry. *Journal of Hospitality and Tourism Technology*, *10*(1), 45–72. doi:10.1108/JHTT-12-2017-0141

CCID. (2020). *China Digital Economy Development Index (DEDI)*. CCID Consulting. https://www.mtx.cn/#/report?id=684266

Cembalo, L., Caracciolo, F., Lombardi, A., Del Giudice, T., Grunert, K. G., & Cicia, G. (2016). Determinants of Individual Attitudes Toward Animal Welfare-Friendly Food Products. *Journal of Agricultural & Environmental Ethics*, *29*(2), 237–254. doi:10.100710806-015-9598-z

Cermak, R., & Smutny, Z. (2018). A framework for cultural localization of websites and for improving their commercial utilization. In S. Sarma (Ed.), *Global observations of the influence of culture on consumer buying behavior* (pp. 206–232). IGI Global. doi:10.4018/978-1-5225-2727-5.ch013

Cesaroni, F. M., & Consoli, D. (2015). Are small businesses really able to take advantage of social media? *Electronic Journal of Knowledge Management*, *13*(4), 257.

CFI. (2020). *Contact Center Satisfaction Index (Managing the Entire Customer Experience)*. Retrieved from https://cdncom.cfigroup.com/wp-content/uploads/CFI-contact-center-satisfaction-2020.pdf

Chae, H., & Ko, E. (2016). Customer social participation in the social networking services and its impact upon the customer equity of global fashion brands. *Journal of Business Research*, *69*(9), 3804–3812. doi:10.1016/j.jbusres.2015.12.072

Chaffey, D., & Ellis-Chadwick, F. (2019). *Digital Marketing: Strategy, implementation, and practice* (7th ed.). Pearson Education.

Chaffey, D., & Patron, M. (2012). From web analytics to digital marketing optimization: Increasing the commercial value of digital analytics. *Journal of Direct, Data and Digital Marketing Practice*, *14*(1), 30–45. doi:10.1057/dddmp.2012.20

Chaffey, D., & Smith, P. R. (2013). *Emarketing Excellence – Planning and Optimizing Your Digital Marketing* (4th ed.). Routledge. doi:10.4324/9780203082812

Chaffey, D., & Smith, P. R. (2017). *Digital Marketing Excellence: Planning, Optimizing and Integrating Online Marketing*. Routledge. doi:10.4324/9781315640341

Chakraborty, G., Lala, V., & Warren, D. (2002). An empirical investigation of antecedents of B2B Websites' effectiveness. *Journal of Interactive Marketing*, *16*(4), 51–72. doi:10.1002/dir.10044

Chakraborty, S., & Sengupta, K. (2013). An exploratory study on determinants of customer satisfaction of leading mobile network providers – case of Kolkata, India. *Journal of Advances in Management Research*, *10*(2), 279–298. doi:10.1108/JAMR-11-2012-0049

Chandon, J.-L., Laurent, G., & Valette-Florence, P. (2016). Pursuing the concept of luxury: Introduction to the JBR special issue on "Luxury marketing from tradition to innovation". *Journal of Business Research*, *69*(1), 299–303. doi:10.1016/j.jbusres.2015.08.001

Chaouchi, H., & Bourgeau, T. (2020). Will all jobs require programming skills in the growing digital society? In M. McDonald (Ed.), *Digital skills insights 2020* (pp. 11–26). International Telecommunication Union.

Cha, S., & Lee, S. (2021). The Effects of User Experience Factors on Satisfaction and Repurchase Intention at Online Food Market. *The Journal of Industrial Distribution & Business*, *12*(4), 7–13. doi:10.13106/jidb.2021.vol12.no4.7

Chatterjee, S., & Kumar Kar, A. (2020). Why do small and medium enterprises use social media marketing and what is the impact: Empirical insights from India. *International Journal of Information Management*, *53*, 102103. doi:10.1016/j.ijinfomgt.2020.102103

Chauhan, V., & Manhas, D. (2014). Dimensional analysis of customer experience in civil aviation sector. *Journal of Service Research*, 75–101. doi:10.1201/9781315366227-4

Chawla, R. N., & Goyal, P. (2021). Emerging trends in digital transformation: A bibliometric analysis. *Benchmarking*. Advance online publication. doi:10.1108/BIJ-01-2021-0009

Chen, J. (2021). *To protect China's network security.* People's Daily. http://paper.people.com.cn/rmrb/html/2021-11/05/nw.D110000renmrb_20211105_3-09.htm

Chen, T. (2020). *2019 Social Media Report.* WalktheChat. https://walkthechat.com/china-tech-company-report/

Chen, Y. (2021). *Develop the digital economy vigorously.* People's Daily. http://paper.people.com.cn/rmrb/html/2021-01/20/nw.D110000renmrb_20210120_2-09.htm

Chen, D. Q., Preston, D. S., & Xia, W. (2010). Antecedents and effects of CIO supply-side and demand-side leadership: A staged maturity model. *Journal of Management Information Systems*, *27*(1), 231–272. doi:10.2753/MIS0742-1222270110

Cheng. (2018). How social media is changing crisis communication strategies: Evidence from the updated literature. *Journal of Contingencies and Crisis Management*, *26*(1), 58-68.

Chen, L., & Nath, R. (2006). Nomadic culture: Cultural support for working anytime, anywhere. *Information Systems Management*, *22*(4), 56–64. doi:10.1201/1078.10580530/45520.22.4.20050901/90030.6

Chennamaneni, A. (2006). *Determinants of knowledge sharing behaviors: Developing and testing an integrated theoretical model* [Doctoral dissertation]. The University of Texas, Arlington, TX, United States.

Chen, Y. C., & Wu, J. H. (2011). IT management capability and its impact on the performance of a CIO. *Information & Management*, *48*(4-5), 145–156. doi:10.1016/j.im.2011.04.001

Chen, Y.-C., & Lee, J. (2018). Collaborative data networks for public service: Governance, management, and performance. *Public Management Review*, *20*(5), 672–690. doi:10.1080/14719037.2017.1305691

Chen, Y., & Ma, Y. (2020). *Digital Transformation: Digital Talents and China's Digital Economy Development*. China Social Sciences Press.

Chen, Y., You, F., Jianmin, W., & Schroeter, R. (2018). Measuring User Experience in Situ. *Use Emotion Data to Assess User Experience.*, *607*, 547–558. doi:10.1007/978-3-319-60492-3_52

Cheong, S. N., Chiew, W. W., & Yap, W. J. (2010). Design and development of multi-touchable e-restaurant management system. In *2010 International Conference on Science and Social Research*. IEEE. 10.1109/CSSR.2010.5773867

Chhibber, R., & Chadha, C. (2020). Adoption of localization in e-commerce: Impact of localization on emerging SMEs. *Lecture Notes in Electrical Engineering Book Series*, *612*, 419–432. doi:10.1007/978-981-15-0372-6_34

China Academy of Information and Communications Technology (CAICT) & China Media Group (CMG). (2020). *Report on The Digital Economic Development of China's Regions and Cities.* CAICT.

China Academy of Information and Communications Technology. (2019). *Data Asset Management Practice White Paper 4.0.* CAICT.

China Academy of Information and Communications Technology. (2020). *White Paper on the Development of the Digital Economy in China.* CAICT.

China Academy of Information and Communications Technology. (2021). *China Digital Economy Employment Development Research Report: New Forms, New Models, New Trends*. CAICT.

China Academy of Information and Communications Technology. (2021). *White Paper on the Development of the Digital Economy in China.* CAICT.

Chinomona, R. (2013). The Influence Of Brand Experience On Brand Satisfaction, Trust And Attachment In South Africa. International Business & Economics Research Journal, 21(10).

Chin, W. W. (1998). The Partial Least Squares Approach To Structural Equation Modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–358). Lawrence Erlbaum.

Chiu, C.-M., Hsu, M.-H., Lai, H., & Chang, C.-M. (2012). Re-examining the influence of trust on online repeat purchase intention: The moderating role of habit and its antecedents. *Decision Support Systems*, *53*(4), 835–845. doi:10.1016/j.dss.2012.05.021

Chiu, H. C., Hsieh, Y. C., & Kao, C. Y. (2005). Website quality and customer's behavioural intention: An exploratory study of the role of information asymmetry. *Total Quality Management & Business Excellence*, *16*(2), 185–197. doi:10.1080/14783360500054277

Chohan, U. W. (2021). *Decentralized Finance (DeFi): An Emergent Alternative Financial Architecture* (*SSRN* Scholarly Paper ID 3791921). Social Science Research Network. doi:10.2139/ssrn.3791921

Chong, A. Y.-L., Chan, F. T. S., & Ooi, K.-B. (2012). Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia. *Decision Support Systems*, *53*(1), 34–43. doi:10.1016/j.dss.2011.12.001

Chopra, A., Avhad, V., & Jaju, S. (2021). Influencer Marketing: An Exploratory Study to Identify Antecedents of Consumer Behavior of Millennial. *Business Perspectives and Research*, *9*(1), 77–91. doi:10.1177/2278533720923486

Chou, Y. (2014). The stalemate of cable digital switchover: A study of competition effects and deregulation. *Telecommunications Policy*, *38*(4), 393–405. doi:10.1016/j.telpol.2014.01.001

Christensen, T., & Lægreid, P. (2013). Context and Administrative Reforms: A Transformative Approach. In C. Pollitt (Ed.), *Context in Public Policy and Management* (pp. 131–156). Edward Elgar. doi:10.4337/9781781955147.00019

Christodoulides, G., Michaelidou, N., & Argyriou, E. (2012). Cross-national differences in e-WOM influence. *European Journal of Marketing*, *46*(11), 1689–1707. doi:10.1108/03090561211260040

Chung, T. L., Marcketti, S., & Fiore, A. M. (2014). Use of Social Networking Services for Marketing Art Museums. *Museum Management and Curatorship*, *29*(2), 188–205. doi:10.1080/09647775.2014.888822

Chun, M., & Mooney, J. (2009). CIO roles and responsibilities: Twenty-five years of evolution and change. *Information & Management*, *46*(6), 323–334. doi:10.1016/j.im.2009.05.005

Chu, S.-C., & Kamal, S. (2008). The Effect of Perceived Blogger Credibility and Argument Quality on Message Elaboration and Brand Attitudes. *Journal of Interactive Advertising*, *8*(2), 26–37. doi:10.1080/15252019.2008.10722140

Cinar, E., Trott, P., & Simms, C. (2019). A systematic review of barriers to public sector innovation process. *Public Management Review*, *21*(2), 264–290. doi:10.1080/14719037.2018.1473477

CISCO. (2020). *Cisco 2020 APAC SMB Digital Maturity Study.* https://www.cisco.com/c/en_in/solutions/small-business/digitalmaturity-2020.html

Clarke, A. (2020). Digital government units: What are they, and what do they mean for digital era public management renewal? *International Public Management Journal*, *23*(3), 358–379. doi:10.1080/10967494.2019.1686447

Clavijo-Olmos, S. (2018). Breaking language and cultural barriers: A key to improve stakeholder relationships of SMEs. In R. Pérez-Uribe (Ed.), *Handbook of Research on Intrapreneurship and Organizational Sustainability in SMEs* (pp. 73–94). IGI Global. doi:10.4018/978-1-5225-3543-0.ch004

Clifford, M., Perrons, R., Ali, S., & Grice, T. (2018). *Extracting Innovations: Mining, Energy, and Technological Change in the Digital Age*. Taylor & Francis Group. doi:10.1201/b22353

Clore, G. L., Gasper, K., & Garvin, E. (2001). Affect as information. In J. P. Forgas (Ed.), *Handbook of affect and social cognition* (pp. 121–144). Lawrence Erlbaum.

CNBC. (2021). *Digital ad spend grew 12% in 2020 despite hit from pandemic*. https://www.cnbc.com/2021/04/07/digital-ad-spend-grew-12percent-in-2020-despite-hit-from-pandemic.html

CNNIC. (2021). *The 47th China Statistical Report on Internet Development.* http://www.cac.gov.cn/gzzt/ztzl/zt/cnic/A0920010802index_1.htm

Cobo Martín, M. J. (2011). *SciMAT: herramienta software para el análisis de la evolución del conocimiento científico. Propuesta de una metodología de evaluación*. Universidad de Granada.

Cobo, M., Lopez-Herrera, A., Herrera-Viedma, E., & Herrera, F. (2012). SciMAT: A new science mapping analysis software tool. *Journal of the American Society for Information Science and Technology*, *63*(8), 1609–1630. doi:10.1002/asi.22688

Coleman, M., & Taylor, M. (2016). *Competition world—A global survey of recent competition and antitrust law developments with practical relevance* [Survey]. Norton Rose Fulbright. https://www.nortonrosefulbright.com/en/knowledge/publications/ 9574b9f5/what-are-the-competition-implications-of-digital-disruption

Colladon, A. F., Guardabascio, B., & Innarella, R. (2019). Using social network and semantic analysis to analyze online travel forums and forecast tourism demand. *Decision Support Systems*, *123*, 113075. doi:10.1016/j.dss.2019.113075

Collibra. (n.d.). *Collibra: Helping Organizations Become United by Data*. Retrieved September 9, 2021, from https://www.collibra.com/

Coltman, T., Tallon, P., Sharma, R., & Queiroz, M. (2015). Strategic IT alignment: Twenty-five years on. *Journal of Information Technology*, *30*(2), 91–100. doi:10.1057/jit.2014.35

Conache, M., Dima, R., & Mutu, A. (2016). Comparative Analysis of MOOC (Massive Open Online Course) Platforms. Informatica Economică, 20(2).

Connelly, C. E., & Kelloway, E. K. (2003). Predictors of employees' perceptions of knowledge sharing cultures. *Leadership and Organization Development Journal*, *24*(5), 294–301. doi:10.1108/01437730310485815

Coombs, W. T., & Laufer, D. (2018). Global crisis management–current research and future directions. *Journal of International Management*, *24*(3), 199–203. doi:10.1016/j.intman.2017.12.003

Cooper, L. A. D., Carter, A. B., Farris, A. B., Wang, F., Kong, J., Gutman, D. A., Widener, P., Pan, T. C., Cholleti, S. R., Sharma, A., Kurc, T. M., Brat, D. J., & Saltz, J. H. (2012). Digital pathology: Data-intensive frontier in medical imaging. *Proceedings of the IEEE*, *100*(4), 991–1003. doi:10.1109/JPROC.2011.2182074 PMID:25328166

Corbellini, E., & Saviolo, S. (2009). *Managing Fashion and Luxury Companies*. Etas.

Corbin, J., & Strauss, A. (2014). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). Sage Publications.

Cordella, A., & Bonina, C. M. (2012). A public value perspective for ICT enabled public sector reforms: A theoretical reflection. *Government Information Quarterly*, *29*(4), 512–520. doi:10.1016/j.giq.2012.03.004

Cormode, G., & Krishnamurthy, B. (2008). Key differences between Web 1.0 and Web 2.0. *First Monday*, *13*(3). Advance online publication. doi:10.5210/fm.v13i6.2125

Corrêa, S. C. H., Soares, J. L., Christino, J. M. M., Gosling, M. de S., & Gonçalves, C. A. (2020). The influence of YouTubers on followers' use intention. *Journal of Research in Interactive Marketing*, *14*(2), 173–194. doi:10.1108/JRIM-09-2019-0154

Cortez, R. M., & Johnston, W. J. (2020). The Coronavirus crisis in B2B settings: Crisis uniqueness and managerial implications based on social exchange theory. *Industrial Marketing Management*, *88*, 125–135. doi:10.1016/j.indmarman.2020.05.004

Corydon, B., Ganesan, V., & Lundqvist, M. (2016). *Transforming government through digitization.* https://www.mckinsey.com/industries/public-and-social-sector/our-insights/transforming-government-through-digitization

Coster, J. E., Turner, J. K., Bradbury, D., & Cantrell, A. (2017). Why do people choose emergency and urgent care services? A rapid review utilizing a systematic literature search and narrative synthesis. *Academic Emergency Medicine*, *24*(9), 1137–1149. doi:10.1111/acem.13220 PMID:28493626

Coté, M., Gerbaudo, P., & Pybus, J. (2016). Introduction. Politics of Big Data. Digital Culture & Society, 2(2), 5-15. doi:10.25969/mediarep/947

Council of Europe. (2005). *Framework Convention on the Value of Cultural Heritage for Society, Treaty Series - No. 199*. Author.

Coviello, N., Kano, L., & Liesch, P. W. (2017). Adapting the Uppsala model to a modern world: Macro-context and microfoundations. *Journal of International Business Studies*, *48*(9), 1151–1164. doi:10.105741267-017-0120-x

Cresswell, K. M., Slee, A., Coleman, J., Williams, R., Bates, D. W., & Sheikh, A. (2013). Qualitative analysis of round-table discussions on the business case and procurement challenges for hospital electronic prescribing systems. *PLoS One*, *8*(11), 1–10. doi:10.1371/journal.pone.0079394 PMID:24260213

Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (3rd ed.). Sage Publications.

Cristina, L. (2019). *What does the future CIO role look like?* Retrieved on July 12, 2021 from https://www.cio.com/article/3300761/what-does-the-future-cio-role-look-like.html

Crosby, L. A., & Johnson, S. L. (2007). Experience required: Managing each customer's experience might just be the most important ingredient in building customer loyalty. *Marketing Management*, *16*(4), 20.

Cruise Market Watch. (2021). *2021 Worldwide Cruise Line Market Share*. https://cruisemarketwatch.com/market-share/

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. Harper & Row.

Cui, Z. Y., Ouyang, T. H., Chen, J., & Li, C. X. (2019). From peripheral to core: A case study of a 3D printing firm on business ecosystems reconstruction. *Technology Analysis and Strategic Management*, *31*(12), 1381–1394. doi:10.1080/09537325.2019.1614554

Cummins, S., Peltier, J. W., & Dixon, A. (2016). Omni-channel research framework in the context of personal selling and sales management. *Journal of Research in Interactive Marketing*, *10*(1), 2–16. doi:10.1108/JRIM-12-2015-0094

Custers, B. (2016). Click Here to Consent Forever: Expiry Dates for Informed Consent. *Big Data & Society*, *3*(1), 205395171562493. doi:10.1177/2053951715624935

Cusumano, M., Yoffie, D., & Gawer, A. (2020). The Future of Platforms. *MIT Sloan Management Review*.

Czech Statistical Office. (2019). *Rozvoj digitálních dovedností* [Development of digital skills]. https://www.czso.cz/documents/10180/102150416/062023-19.pdf/a0dfeba2-c779-4779-810d-b7cbde244803?version=1.2

Dabbous, A., & Barakat, K. A. (2020). Bridging the online offline gap: Assessing the impact of brands´ social network content quality on brand awareness and purchase intention. *Journal of Retailing and Consumer Services*, *53*, 101966. doi:10.1016/j.jretconser.2019.101966

Dagnino, G. B., Levanti, G., & Destri, A. M. L. (2016). Structural dynamics and intentional governance in strategic interorganizational network evolution: A multilevel approach. *Organization Studies*, *37*(3), 349–373. doi:10.1177/0170840615625706

Dahik, A., Lovich, D., Kreafle, C., Bailey, A., Kilmann, J., Kennedy, D., Roongta, P., Schuler, F., Tomlin, L., & Wenstrup, J. (2020). *What 12,000 employees have to say about the future of remote work*. https://www.bcg.com/publications/2020/valuable-productivity-gains-covid-19

Dai, X., & Chen, J. (2019). *Digital transformation in China: on the crest of a wave.* Swiss Re Institute. https://www.swissre.com/institute/research/sigma-research/economic-insights-digital-transformation-china-economy.html

Dauriz, L., Remy, N., & Sandri, N. (2018). *Luxury shopping in the digital age*. McKinsey.

Davenport, T., & Harris, J. (2017). *Competing on analytics: Updated, with a new introduction: The new science of winning*. Harvard Business Press.

Davis, B., Lockwood, A., Alcott, P., & Pantelidis, I. (2018). *Food and beverage management*. Routledge. doi:10.4324/9781315563374

Davison, R. M., & Ou, C. X. J. (2017). Digital work in a digitally challenged organization. *Information & Management*, *54*(1), 129–137. doi:10.1016/j.im.2016.05.005

De negri, F. (2017). Por uma nova geração de políticas de inovação no Brasil. In *Políticas de apoio à inovação tecnológica no Brasil: avanços recentes, limitações e propostas de ações*. Brasília: Ipea.

Decentralized applications (dapps). (n.d.). Retrieved September 9, 2021, from https://ethereum.org

Del Vecchio, P., Malandugno, C., Passiante, G., & Sakka, G. (2021). Circular economy business model for smart tourism: The case of Ecobnb. *EuroMed Journal of Business*.

Del Vecchio, P., Ardito, L., Cerchione, R., & Raguseo, E. (2019). Big data in smart tourism: Challenges, issues and opportunities. *Current Issues in Tourism*, *22*(15), 1805–1809. doi:10.1080/13683500.2019.1612860

Del Vecchio, P., Mele, G., Ndou, V., & Secundo, G. (2018). Creating value from Social Big Data: Implications for Smart Tourism Destinations. *Information Processing & Management*, *54*(5), 847–860. doi:10.1016/j.ipm.2017.10.006

deLeon, A. J., & Chatterjee, S. C. (2017). B2B relationship calculus: Quantifying resource effects in service-dominant logic. *Journal of the Academy of Marketing Science*, *45*(3), 402–427. doi:10.100711747-015-0467-0

Deloitte. (2018). *Digital Maturity Model. Achieving digital maturity to drive growth*. Deloitte.

Demangeot, C., & Broderick, A. J. (2016). Engaging customers during a website visit: A model of website customer engagement. *International Journal of Retail & Distribution Management*, *44*(8), 814–839. doi:10.1108/IJRDM-08-2015-0124

Demiris, G., Oliver, D. P., & Washington, K. T. (2019). Defining and Analyzing the Problem. In *Behavioral Intervention Research in Hospice and Palliative Care. Building an Evidence Base*. Academic Press. doi:10.1016/B978-0-12-814449-7.00003-X

Dennis, D., & Walsh, F. (2015). Align Business Strategy with Information Technology. *Guidelines of IT Management*, *23*, 1–16.

Dery, K., Sebastian, I. M., & van der Meulen, N. (2017). The Digital Workplace is Key to Digital Innovation. *MIS Quarterly Executive*, *16*(2).

Dessaigne, E., & Pardo, C. (2020). The network orchestrator as steward: Strengthening norms as an orchestration practice. *Industrial Marketing Management*, *91*, 223–233. doi:10.1016/j.indmarman.2020.09.007

Dessart, L., & Pitardi, V. (2019). How stories generate consumer engagement: An exploratory study. *Journal of Business Research*, *104*, 183–195. doi:10.1016/j.jbusres.2019.06.045

Dethine, B., Enjolras, M., & Monticolo, D. (2020). Digitalization and SMEs' Export Management: Impacts on Resources and Capabilities. *Technology Innovation Management Review*, *10*(4), 18–34. doi:10.22215/timreview/1344

Deyalage, P. A., & Kulathunga, D. (2019). Factors Affecting Online Customer Satisfaction: The Sri Lankan Perspective. *International Journal of Business and Management*, *14*(2), 99. doi:10.5539/ijbm.v14n2p99

Diamandis, P. H. (2015). *The world in 2025: 8 predictions for the next 10 years.* Singularity University.

Digitalism, capitalism, and contemporary transformations in academic work: An evaluative study of risks and opportunities. (2020). *Arab Media and Society*, (29), 1–31.

Dilmegani, C. (2017). *What is RPA? In-depth definition & guide to RPA in 2022*. https://research.aimultiple.com/what-is-robotic-process-automation/

Ding, Y. (2019). *China's current situation and trend of e-government development.* http://echinagov.com/news/246958.htm

Dirgiatmo, Y., Abdullah, Z., & Ali, R. H. R. M. (2019). The role of entrepreneurial orientation in intervening the relationship between social media usage and performance enhancement of exporter SMEs in Indonesia. *International Journal of Trade and Global Markets*, *12*(2), 97–129. doi:10.1504/IJTGM.2019.100332

Djafarova, E., & Rushworth, C. (2017). Exploring the credibility of online celebrities' Instagram profiles in influencing the purchase decisions of young female users. *Computers in Human Behavior*, *68*, 1–7. doi:10.1016/j.chb.2016.11.009

DNV GL. (2019). *Petrobras puts people at the heart of its digital transformation*. https://www.dnv.com/oilgas/perspectives/petrobras-puts-people-at-the-heart-of-its-digital-transformation.html

Dommett, K. (2020). Roadblocks to interactive digital adoption? Elite perspectives of party practices in the United Kingdom. *Party Politics*, *26*(2), 165–175. doi:10.1177/1354068818761196

Dorr, J. A. (1985). *Restaurant management information and control method and apparatus* (U.S. Patent No. 4,530,067). U.S. Patent and Trademark Office.

Dorsey, M., Segall, D., & Temkin, B. (2020). *ROI of Customer Experience*. Retrieved from Qualtrics XM Institute website: https://www.qualtrics.com/xm-institute/roi-of-customer-experience-2020/

Dosi, G. (1982). Technological paradigms and technological trajectories: As suggested interpretation of the determinants and directions of technical change. *Research Policy*, *11*(3), 147–162. doi:10.1016/0048-7333(82)90016-6

Dosi, G. (1988). Sources, procedures and microeconomic effects of innovation. *Journal of Economic Literature*, *26*, 1120–1171.

Dreyer, J. J., Keane, G., & Windahl, S. L. (2017). *Beyond the Castle: A Guide to Discovering Your Happily Ever After*. Zondervan.

Duan, X., Deng, H., & Corbitt, B. (2012). Evaluating the critical determinants for adopting e-market in Australian small-and-medium sized enterprises. *Management Research Review*, *35*(3/4), 289–308. doi:10.1108/01409171211210172

Dube, A., & Helkkula, A. (2015). Service experiences beyond the direct use: Indirect customer use experiences of smartphone apps. *Journal of Service Management*, *26*(2), 224–248. doi:10.1108/JOSM-11-2014-0308

Dubois, A., & Gadde, L.-E. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research*, *55*(7), 553–560. doi:10.1016/S0148-2963(00)00195-8

Duneja, R., Lasku, A., Pichai, H., & Kilefors, P. (2018). *Digitalization of government services.* Arthur D. Little. https://www.adlittle.com/en/Government_Digitalization

Durão, N., Ferreira, M. J., Pereira, C. S., & Moreira, F. (2019). Current and future state of Portuguese organizations towards digital transformation. Paper presented at the *Procedia*. *Computer Science*, *164*, 25–32. doi:10.1016/j.procs.2019.12.150

Durkin, M., McGowan, P., & McKeown, N. (2013). Exploring social media adoption in small to medium-sized enterprises in Ireland. *Journal of Small Business and Enterprise Development*, *20*(4), 716–734. doi:10.1108/JSBED-08-2012-0094

Dutot, V., & Bergeron, F. (2016). From strategic orientation to social media orientation: Improving SMEs' performance on social media. *Journal of Small Business and Enterprise Development*, *23*(4), 1165–1190. doi:10.1108/JSBED-11-2015-0160

Dziekan, V., & Proctor, N. (2018). From elsewhere to everywhere: Evolving the distributed museum into the pervasive museum. The Routledge handbook of museums, media, and communication, 177-192. doi:10.4324/9781315560168-15

Earl, M. J., & Feeny, D. F. (1994). Is your CIO adding value? *Sloan Management Review*, *35*, 11–11.

Earls, E. (2017). *The future of Epos: Convenience is king*. https://www.thecaterer.com/news/in-depth/the-future-of-epos-convenience-is-king

Echtler, F., & Wimmer, R. (2014). The interactive dining table, or pass the weather widget, please. *Proceedings of the Ninth ACM International Conference on Interactive Tabletops and Surfaces*. 10.1145/2669485.2669525

Edelman. (2019). *In brands we trust?* Retrieved from https://www.edelman.com/sites/g/files/aatuss191/files/2019-06/2019_edelman_trust_barometer_special_report_in_brands_we_trust.pdf

Eden, R., Jones, A. B., Casey, V., & Draheim, M. (2019). Digital transformation requires workforce transformation. *MIS Quarterly Executive*, *18*(1), 4. doi:10.17705/2msqe.00005

Ehrensperger, E., Erkhova, D., Yadavalli, A., & Krohmer, H. (2020). What really matters for start-ups in luxury: Entrepreneurial luxury excellence. *Journal of Research in Marketing & Entrepreneurship*, *22*(1), 37–63. doi:10.1108/JRME-03-2019-0020

Eid, R., Abdelmoety, Z., & Agag, G. (2019). Antecedents and consequences of social media marketing use: An empirical study of the UK exporting B2B SMEs. *Journal of Business and Industrial Marketing*, *35*(2), 284–305. doi:10.1108/JBIM-04-2018-0121

Eisenhardt, K. M. (1989). Building theories from case studies. *Academy of Management Review*, *14*(4), 532–550. doi:10.2307/258557

El Sawy, O. A., Kraemmergaard, P., Amsinck, H., & Vinther, A. L. (2016). How LEGO Built the Foundations and Enterprise Capabilities for Digital Leadership. *MIS Quarterly Executive*, *15*(2), 141–166.

El Sawy, O. A., Kræmmergaard, P., Amsinck, H., & Vinther, A. L. (2016). How LEGO built the foundations and enterprise capabilities for digital leadership. *MIS Quarterly Executive*, *15*(2).

Elbeltagi, I., Hamad, H., Moizer, J., & Abou-Shouk, M. A. (2016). Levels of business-to-business e-commerce adoption and competitive advantage in small and medium-sized enterprises: A comparison study between Egypt and the United States. *Journal of Global Information Technology Management*, *19*(1), 6–25. doi:10.1080/1097198X.2016.1134169

El-Gohary, H. (2012). Factors affecting E-Marketing adoption and implementation in tourism firms: An empirical investigation of Egyptian small tourism organisations. *Tourism Management*, *33*(5), 1256–1269. doi:10.1016/j.tourman.2011.10.013

Eller, R., Alford, P., Kallmunzer, A., & Peters, M. (2020). Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization. *Journal of Business Research*, *112*, 119–127. doi:10.1016/j.jbusres.2020.03.004

Empresa de Pesquisa Energética. (2020). *Energy National Plan 2050. Ministério de Minas e Energia. Empresa de Pesquisa Energética*. Brasília: MME/EPE. https://www.epe.gov.br/sites-pt/publicacoesdadosabertos/publicacoes/PublicacoesArquivos/publicacao227/topico563/Relatorio%20Final%20do%20PNE%202050.pdf

Eppel, E., & Lips, M. (2016). Unpacking the black box of successful ICT-enabled service transformation: How to join up the vertical, the horizontal and the technical. *Public Money & Management*, *36*(1), 39–46. doi:10.1080/09540962.2016.1103417

EQUINOR. (2021). *Technology, digitalisation and innovation*. https://www.equinor.com/en/what-we-do/digitalisation-in-our-dna.html

Erdogan, B. Z. (1999). Celebrity Endorsement: A Literature Review. *Journal of Marketing Management*, *15*(4), 291–314. doi:10.1362/026725799784870379

Erkollar, A., & Oberer, B. (2017). Digital marketing planning with the brand dashboard approach. *Marketing and Branding Research*, *4*(2), 192–205. doi:10.33844/mbr.2017.60336

Eshet-Alkalai, Y. (2012). Thinking in the Digital Era: A Revised Model for Digital Literacy. *Issues in Informing Science and Information Technology, 9*, 267–276.

Eshet-Alkalai, Y. (2004). Digital literacy: A conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia*, *13*(1), 93–106. https://www.learntechlib.org/primary/p/4793/

Eswaran, A. (2020). Competing in 2020: winners and losers in the digital economy. *Harvard Business Review*.

Etzkowitz H (2003). Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. In *Social Science Information*. Sage Publishing.

European Centre for the Development of Vocational Training. (2020). *Coronavirus and the European job market: How the pandemic is reshaping skills demand.* https://www.cedefop.europa.eu/en/news-and-press/news/coronavirus-and-european-job-market-how-pandemic-reshaping-skills-demand

European Centre for the Development of Vocational Training. (2021a). *Introduction and presentation by Kostas Pouliakas - Digital skills, Covid19 and automation: Evidence from latest Cedefop research.* https://www.cedefop.europa.eu/files/workshop_3_introduction_and_pouliakas.pdf

European Centre for the Development of Vocational Training. (2021b). *Digital skills: Challenges and opportunities*. https://www.cedefop.europa.eu/en/news/digital-skills-challenges-and-opportunities-during-pandemic

European Centre for the Development of Vocational Training. (2021c). *Microcredentials: are they here to stay?* https://www.cedefop.europa.eu/en/news/microcredentials-are-they-here-stay

European Centre for the Development of Vocational Training. (2021d). *Briefing note – trends, transitions and transformation.* https://www.cedefop.europa.eu/files/9157_en.pdf

European Commission. (2016). *DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: the Conceptual Reference Model*. JCR Publications Repository. https://publications.jrc.ec.europa.eu/repository/handle/JRC101254

European Commission. (2019). *Digital skills: New professions, new educational methods, new jobs*. https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60738

European Commission. (2020). *Skills for SMEs: Cybersecurity, internet of things, and big data for small and medium-sized enterprises.* https://op.europa.eu/en/publication-detail/-/publication/82aa7f66-67fd-11ea-b735-01aa75ed71a1/language-en

European Entrepreneurs CEA-PME. (2020). *DataSkills4SMEs: All data skills survey results*. https://www.dataskills4smes.eu/2020/11/03/all-dataskills-survey-results/#

European Union. (2019b). *EU policy framework on SMEs: state of play and challenges*. European Union.

Evaristo, S. R. B.; Filho, A. C. S. S. (2018). *Transformação digital: tendências e desafios para a implantação em empresas de O&G no Brasil*. Rio Oil & Gas 2018.

Evrard, Y., & Krebs, A. (2018). The authenticity of the museum experience in the digital age: The case of the Louvre. *Journal of Cultural Economics*, *42*(3), 353–363. doi:10.100710824-017-9309-x

EY Oil&Gas. (2019). *How digitalization can streamline oil and gas*. https://www.ey.com/pt_br/oil-gas/how-digitalization-can-streamline-oil-and-gas-operations

Fadnavis, R. A., & Tabhane, S. (2015). Big Data Processing Using Hadoop. *International Journal of Computer Science and Information Technologies*, *6*(1), 443–445.

FAO. (2021). *Why is feed safety important?* https://www.fao.org/feed-safety/why-feed-safety/why-feed-safety/ar/

Favoretto, C., de Sousa Mendes, G. H., Godinho Filho, M., de Oliveira, M. G., & Ganga, G. M. D. (2021). Digital transformation of business model in manufacturing companies: Challenges and research agenda. *Journal of Business and Industrial Marketing*. Advance online publication. doi:10.1108/JBIM-10-2020-0477

Fay, B., Cakim, I., Carpenter, S., Hershberger, S., O'Driscoll, S., Rabasca, E., Selvas, F., & Suckernek, W. (2009). *Influencer Handbook The Who, What, When, Where, How, and Why of Influencer Marketing*. Word of Mouth Marketing Association. http://painepublishing.com/wp-content/uploads/2015/06/Influencer-Handbook-v4-2.pdf

Fedeli, S., & Santoni, M. (2006). The Government's Choice of Bureaucratic Organisation: An Application to Italian State Museums. *Journal of Cultural Economics*, *30*(1), 41–72. doi:10.100710824-006-9005-8

Feeny, D. F., & Willcocks, L. P. (1998). Core IS capabilities for exploiting information technology. *Sloan Management Review*, *39*(3), 9–21.

Feldman, E., Reid, E. M., & Mazmanian, M. (2020). Signs of our time: Time-use as dedication, performance, identity, and power in contemporary workplaces. *The Academy of Management Annals*, *14*(2), 598–626. doi:10.5465/annals.2018.0148

Feng, C. Q., & Wang, T. (2019). Does CIO risk appetite matter? Evidence from information security breach incidents. *International Journal of Accounting Information Systems*, *32*, 59–75. doi:10.1016/j.accinf.2018.11.001

Feng, W., Duan, Y., Huang, M., Dong, L., Zhou, X., & Hu, T. (2014). A research on smart tourism service mechanism based on context awareness. *Applied Mechanics and Materials*, *519*, 752–758. doi:10.4028/www.scientific.net/AMM.519-520.752

Feng, Y., Li, G., Sun, X., & Li, J. (2019). Forecasting the number of inbound tourists with Google Trends. *Procedia Computer Science*, *162*, 628–633. doi:10.1016/j.procs.2019.12.032

Fernandez-Blanco, V., & Prieto-Rodriguez, J. (2020). Cost of Production. In R. Towse & T. Navarrete Hernandez (Eds.), *Handbook of Cultural Economics* (3rd ed.). Edward Elgar Publishing.

Fernández-Rovira, C., Álvarez Valdés, J., Molleví, G., & Nicolas-Sans, R. (2021). The digital transformation of business. Towards the datafication of the relationship with customers. *Technological Forecasting and Social Change, 162*(June), 120339. doi:10.1016/j.techfore.2020.120339

Filipov, M. (2020). Social media marketing for small and medium-sized enterprises in Kazakhstan. *Central Asian Journal of Innovations on Tourism Management and Finance*, *1*(4), 1–14.

Filippi, S., & Barattin, D. (2018). User experience (UX) evaluation based on Interaction-Related mental models. *Advances in Intelligent Systems and Computing*, *607*, 635–645. doi:10.1007/978-3-319-60492-3_60

Finkelstein Shapiro, A., & Mandelman, F. S. (2021). Digital adoption, automation, and labor markets in developing countries. *Journal of Development Economics*, *151*, 102656. Advance online publication. doi:10.1016/j.jdeveco.2021.102656

Fischer, E., & Reuber, A. R. (2011). Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior? *Journal of Business Venturing*, *26*(1), 1–18. doi:10.1016/j.jbusvent.2010.09.002

Fishenden, J., & Thompson, M. (2012). Digital government, open architecture, and innovation: Why public sector IT will never be the same again. *Journal of Public Administration: Research and Theory*, *23*(4), 977–1004. doi:10.1093/jopart/mus022

Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, *55*(2), 1.

Folea, A., & Pejkovska Kaeva, M. (2019). Analysis of the digital skills in the EU labor market. A case study of the banking sector. *European Journal of Economics and Business Studies*, *5*(2), 66–78. doi:10.26417/ejes.v5i2.p66-78

Foote, C., & Atkinson, R. (2020). *Chinese Competitiveness in the International Digital Economy.* Information Technology and Innovation Foundation.

Foray, D., & Lundvall, B.-A. Ê. (1996). The knowledge-based economy: from the economics of knowledge to the learning economy. In OECD (Ed.), *Employment and Growth in the Knowledge-Based Economy*. OECD.

Forbes. (2021). *CDC Rejects Cruise Industry Push To Resume Sailing, Sending Stocks Tumbling*. https://www.forbes.com/sites/nicholasreimann/2021/03/24/cdc-rejects-cruise-industry-push-to-resume-sailing-sending-stocks-tumbling/?sh=6bee93ce4eb1

Forlani, F., Buratti, A., & Pencarelli, T. (2018). Experiential Perspective in Management Literature: A Systematic Review. In T. Pencarelli & F. Forlani (Eds.), *The Experience Logic as a New Perspective for Marketing Management* (pp. 15–42). Springer. doi:10.1007/978-3-319-77550-0_2

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Fornerino, M., Helme-Guizon, A., & Gotteland, D. (2006). Mesurer l'immersion dans une expérience de consommation: premiers développements. *Atti Del XXII Congresso Dell'AFM*.

Forrester Consulting. (2020), *The State of Commerce Experience*. http://go.bloomreach.com/rs/243-XLW-551/images/The-State-Of-Commerce-Experience.pdf

Forsgren, M., & Hagström, P. (2001). Ignorant internationalization? Internationalization patterns for internet-related firms. *Communications & Stratégies*, *42*, 209–224.

Fosic, I., Trusic, A., & Sebalj, D. (2017). Digital Organizational Strategy - Ticket for Competitiveness on the International Market. *Strategic Management*, *22*(3), 3–10.

Foster, M. K. (2021). Design Thinking: A Creative Approach to Problem Solving. *Management Teaching Review*, *6*(2), 123–140. doi:10.1177/2379298119871468

Foung, W.-T. Y., Yeh, Y.-S., & Jaw, B.-S. (2020). Talent management model in digital age: Strategic internal entrepreneurial mechanism. In *Proceedings of the 8th International Conference on Entrepreneurship and Business Management ICEBM 2019 UNTAR* (vol. 145, pp. 202-206). Atlantis Press. 10.2991/aebmr.k.200626.037

Frey, B. S. (2003). *Arts and Economics: Analysis & Cultural Policy* (2nd ed.). Springer.

Frey, B. S., & Pommerehne, W. W. (1989). *Muses and Markets: Explorations in the Economics of theArts*. Basil Blackwell.

Frow, P., McColl-Kennedy, J. R., Payne, A., & Govind, R. (2019). Service ecosystem well-being: Conceptualisation and implications for theory and practice. *European Journal of Marketing*, *53*(12), 2657–2691. doi:10.1108/EJM-07-2018-0465

Frow, P., & Payne, A. (2007). Towards the 'perfect' customer experience. *Journal of Brand Management*, *15*(2), 89–101. doi:10.1057/palgrave.bm.2550120

Furht, B., & Escalante, A. (2010). *Handbook of Cloud Computing*. Springer. doi:10.1007/978-1-4419-6524-0

Gallardo-Gallardo, E., Dries, N., & González-Cruz, T. F. (2013). What is the meaning of 'talent' in the world of work? *Human Resource Management Review*, *23*(4), 290–300. doi:10.1016/j.hrmr.2013.05.002

Gandomi, A., & Haider, M. (2015). Byond the Hype: Big Data Concepts, Methods and Analtics. *International Journal of Information Management*, *35*(2), 137–144. doi:10.1016/j.ijinfomgt.2014.10.007

Gans, J. (2016). *The disruption dilemma*. The MIT Press. doi:10.7551/mitpress/9780262034487.001.0001

Garcez, A., Silva, R., & Franco, M. (2021). Digital transformation shaping structural pillars for academic entrepreneurship: A framework proposal and research agenda. *Education and Information Technologies*.

Garg, R., Rahman, Z., & Qureshi, M. N. (2014). Measuring customer experience in banks: Scale development and validation. *Journal of Modelling in Management*, *9*(1), 87–117. doi:10.1108/JM2-07-2012-0023

Garrido, M. J., & Camarero, C. (2014). Learning and Relationship Orientation: An Empirical Examination in European Museums. *International Journal of Nonprofit and Voluntary Sector Marketing*, *19*, 92–109.

Garrido-Moreno, A., & Lockett, N. (2016). Social media use in European hotels: Benefits and main challenges. *Tourism & Management Studies*, *12*(1), 172–179. doi:10.18089/tms.2016.12118

Gartner. (2021). *CIOs Role in Digital Transformation*. Retrieved on August 14, 2021 from https://www.gartner.com/en/information-technology/role/cio-it-executives

Gartner. (2021). *Information Technology Glossary, Big Data*. https://www.gartner.com/en/information-technology/glossary/big-data

Garzoni, A., De Turi, I., Secundo, G., & Del Vecchio, P. (2020). Fostering digital transformation of SMEs: A four levels approach. *Management Decision*, *58*(8), 543–1562. doi:10.1108/MD-07-2019-0939

Gaur, S. S., Tiwari, S. P., & Bathula, H. (2012). Ohanian's celebrity endorsers' credibility scale: Evaluation and validation in the context of an emerging economy. *International Journal of Indian Culture and Business Management*, *5*(2), 152. doi:10.1504/IJICBM.2012.045642

Gavino Monica, C., Williams Denise, E., Jacobson, D., & Smith, I. (2019). Latino entrepreneurs and social media adoption: Personal and business social network platforms. *Management Research Review*, *42*(4), 469–494. doi:10.1108/MRR-02-2018-0095

Gawer, A., & Cusumano, M. A. (2007). Strategies for Platform-Leader Wannabes. *Globalization and Japan´s Science and Technology Strategy*, 19.

Gawer, A. (2020). Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. *Long Range Planning*, *102045*. Advance online publication. doi:10.1016/j.lrp.2020.102045

Gawer, A., & Cusumano, M. (2008). How Companies Become Platform Leaders. *MIT Sloan Management Review*, *49*, 28–35.

GE Oil & Gas. (2017). *Digital Transformation in Oil & Gas*. *Annual Meeting Presentation*.

Ge, L., Yang, C., & Ge, R. (2003). *Electronic restaurant service management system* (U.S. Patent Application No. 10/104,187). U.S. Patent and Trademark Office.

Geerts, A., & Veg-Sala, N. (2011). Evidence on internet communication management strategies for luxury brands. *Global Journal of Business Research*, *5*, 81–94.

Gemino, A., MacKay, N., & Reich, B. H. (2006). Executive decisions about website adoption in small and medium-sized enterprises. *Journal of Information Technology Management*, *17*(1), 34–49.

Gentile, C., Spiller, N., & Noci, G. (2007). How to Sustain the Customer Experience. *European Management Journal*, *25*(5), 395–410. doi:10.1016/j.emj.2007.08.005

Genz, S., Bellmann, L., & Matthes, B. (2019). Do German works councils counter or foster the implementation of digital technologies? First evidence from the IAB-establishment panel. *Jahrbucher fur Nationalokonomie und Statistik*, *239*(3), 523–564. doi:10.1515/jbnst-2017-0160

Ghandour, A. (2015). Ecommerce website value model for SMEs. *International Journal of Electronic Commerce Studies*, *6*(2), 203–222. doi:10.7903/ijecs.1403

Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, *111*(8), 1238–1269. doi:10.1108/02635571111170785

Ghose, K. (2009). Internal brand equity defines customer experience. *Direct Marketing: An International Journal*, *3*(3), 177–185. doi:10.1108/17505930910985125

Gilbert, C., De Winne, S., & Sels, L. (2011). The influence of line managers and HR department on employees' affective commitment. *International Journal of Human Resource Management*, *22*(8), 1618–1637. doi:10.1080/09585192.2011.565646

Gilchrist, A., Burton-Jones, A., & Green, P. (2018). The process of social alignment and misalignment within a complex IT project. *International Journal of Project Management*, *36*(6), 845–860. doi:10.1016/j.ijproman.2018.04.004

Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. *Public Management Review*, *20*(5), 633–646. doi:10.1080/14719037.2017.1327181

Gil-Garcia, J. R., & Sayogo, D. S. (2016). Government inter-organisational information sharing initiatives: Understanding the main determinants of success. *Government Information Quarterly*, *33*(3), 572–582. doi:10.1016/j.giq.2016.01.006

Gimenez-Fernandez, E. M., Sandulli, F. D., & Bogers, M. (2020). Unpacking liabilities of newness and smallness in innovative start-ups: Investigating the differences in innovation performance between new and older small firms. *Research Policy*, *49*(10), 104049. doi:10.1016/j.respol.2020.104049

Gligor, D., Bozkurt, S., Gölgeci, I., & Maloni, M. J. (2020). Does supply chain agility create customer value and satisfaction for loyal B2B business and B2C end-customers? *International Journal of Physical Distribution & Logistics Management*, *50*(7–8), 721–743. doi:10.1108/IJPDLM-01-2020-0004

GLOBALDATA. (2018). *Brazil drives global capex for upcoming oil and gas projects*. Offshore Technology. https://www.offshore-technology.com/comment/brazil-drives-global-capex-upcoming-oil-gas-projects/

GMP+. (2020). *Annual report*. https://www.gmpplus.org/en/publications/gmp-news/corporate-annual-report-2020/

Godovykh, M., & Tasci, A. D. A. (2020). Customer experience in tourism: A review of definitions, components, and measurements. *Tourism Management Perspectives, 35*(May), 100694. doi:10.1016/j.tmp.2020.100694

Gogus, A. (2021). Shifting to digital: Adoption and diffusion. *Educational Technology Research and Development*, *69*(1), 11–16. doi:10.100711423-020-09862-6

Gomez-Uribe, C. A., & Hunt, N. (2015). The netflix recommender system: Algorithms, business value, and innovation. *ACM Transactions on Management Information Systems*, *6*(4), 1–19. Advance online publication. doi:10.1145/2843948

Gomez-Uribe, C. A., & Hunt, N. (2015, December). The Netflix Recommender System: Algorithms, Business Value, and Innovation. *ACM Trans. Manage. Inf. Syst.*, *6*(4), 13–19.

Gong, W. (2009). National culture and global diffusion of business-to-consumer e-commerce. *Cross Cultural Management*, *16*(1), 82–101. doi:10.1108/13527600910930059

Gong, Y., Yang, J., & Shi, X. (2020). Towards a comprehensive understanding of digital transformation in government: Analysis of flexibility and enterprise architecture. *Government Information Quarterly*, *37*(3), 101487. doi:10.1016/j.giq.2020.101487

Gontovnikas, M. (2020). *The (Surprisingly Complex) Impact of COVID-19 on Streaming Media*. https://auth0.com/blog/the-impact-of-covid-19-on-streaming-media/

Gopalan, R., & Narayan, B. (2010). Improving customer experience in tourism: A framework for stakeholder collaboration. *Socio-Economic Planning Sciences*, *44*(2), 100–112. doi:10.1016/j.seps.2009.11.001

Gopeh, I. O., & Umoh, M. S. (2020). +Users' perception of print media retention in a digital era. *Library Philosophy and Practice*, *2020*, 1–19.

Goran. (2021). *40 Amazing Customer Loyalty Statistics in 2021*. Retrieved January 9, 2021, from SmallBizGenius website: https://www.smallbizgenius.net/by-the-numbers/customer-loyalty-statistics/#gref

GoStudent. (n.d.). *Nachhilfe mit 96% Erfolgsquote | GoStudent*. Retrieved September 9, 2021, from https://www.gostudent.org//

Graebner, M. E., Han, S., & Ozcan, P. (2017). Single cases: The what, why, and how. In M. Raza & J. Sanjay (Eds.), *The Routledge Companion to Qualitative Research in Organization Studies* (pp. 114–134). Routledge.

Graf, M., Schlegelmilch, B. B., Mudambi, S. M., & Tallman, S. (2013). Outsourcing of customer relationship management: Implications for customer satisfaction. *Journal of Strategic Marketing*, *21*(1), 68–81. doi:10.1080/0965254X.2012.734844

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology*, *96*(5), 1029–1046. doi:10.1037/a0015141 PMID:19379034

Granados, N. (2020). *How Will Theaters And Streaming Services Coexist After The Pandemic?* https://www.forbes.com/sites/nelsongranados/2021/02/22/how-will-theaters-and-streaming-services-coexist-after-the-pandemic/?sh=716087db5106\

Granados, N., & Gupta, A. (2013). Transparency Strategy: Competing With Information In A Digital World. *Management Information Systems Quarterly*, *37*(2), 637–641.

Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, *90*, 102098. doi:10.1016/j.technovation.2019.102098

Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R., & Lounsbury, M. (2011). Institutional complexity and organisational responses. *The Academy of Management Annals*, *5*(1), 317–371. doi:10.5465/19416520.2011.590299

Greer, J. D. (2003). Evaluating the Credibility of Online Information: A Test of Source and Advertising Influence. *Mass Communication & Society*, *6*(1), 11–28. doi:10.1207/S15327825MCS0601_3

Gregory, G., Karavdic, M., & Zou, S. (2007). The effects of e-commerce drivers on export marketing strategy. *Journal of International Marketing*, *15*(2), 30–57. doi:10.1509/jimk.15.2.30

Grover, V., Jeong, S. R., Kettinger, W. J., & Lee, C. C. (1993). The chief information officer: A study of managerial roles. *Journal of Management Information Systems*, *10*(2), 107–130. doi:10.1080/07421222.1993.11518002

Gstraunthaler, T., & Piber, M. (2012). The Performance of Museums and Other Cultural Institutions. *International Studies of Management & Organization*, *42*(2), 29–42.

Gu, S. (2020). *Digital economy a new growth engine.* China Daily. http://global.chinadaily.com.cn/a/202006/05/WS5ed97e71a310a8b24115af95.html

Gu, X. (2020). *Midea's smart manufacturing transformation practice.* https://www.chuandong.com/news/news242913.html

Gualtrics. (2021). *Digital customer experience: Everything to know in 2021*. Retrieved October 8, 2021, from Qualtrics website: https://www.qualtrics.com/uk/experience-management/customer/digital-cx/?rid=ip&prevsite=en&newsite=uk&geo=DE&geomatch=uk

Guccio, C., Martorana, M., Mazza, I., Pignataro, G., & Rizzo, I. (2020). Is Innovation in ICT Valuable for the Efficiency of Italian Museums? *European Planning Studies*. Advance online publication. doi:10.1080/09654313.2020.18.65.277

Guerzoni, G. (1998). L'arte e la cultura. In *Manuale di Organizzazione Aziendale. Le tipologie aziendali*. UTET.

Gulati, R., Puranam, P., & Tushman, M. (2012). Meta-organisation design: Rethinking design in interorganizational and community contexts. *Strategic Management Journal*, *33*(6), 571–586. doi:10.1002mj.1975

Gupta, R., Kishor, N., & Verma, D. (2017). Construction and validation of a five-dimensional celebrity endorsement scale: Introducing the pater model. *British Journal of Marketing Studies*, *4*, 15–35. www.ea-journals.org

Gupta, R., Mejia, C., Gianchandani, Y. B., & Kajikawa, Y. (2021). Ambidextrous firm strategy insights from internet of things linked interfirm deals. *IEEE Transactions on Engineering Management*, 1–16. Advance online publication. doi:10.1109/TEM.2020.3041250

Gupta, Y., Agarwal, S., & Singh, P. B. (2020). To Study the Impact of Instafamous Celebrities on Consumer Buying Behavior. *Academy of Marketing Studies Journal*, *24*(1), 1528–2678.

Gürsakal, N. (2013). *Büyük Veri*. Dora.

Gutierrez-Leefmans, C., Nava-Rogel, R. M., & Trujillo-Leon, M. A. (2018). How Are Dynamic Capabilities And Digital Marketing Related? A Reflection From Literature. *Revista Eletronica De Estrategia E Negocios-Reen, 11*(3), 265-283. doi:10.19177/reen.v11e32018265-283

Haddaway, N. R. A. U. P. C. C., & McGuinness, L. A. (2021). PRISMA2020: R package and ShinyApp for producing PRISMA 2020 compliant flow diagrams (Version 0.0.2). Zenodo. doi:10.5281/zenodo.5082518

Haffke, I., Kalgovas, B. J., & Benlian, A. (2016). *The Role of the CIO and the CDO in an Organization's Digital Transformation*. Academic Press.

Hafsi, M., & Assar, S. (2020). Does enterprise architecture support customer experience improvement? Towards a conceptualization in digital transformation context. Lecture Notes in Business Information Processing. doi:10.1007/978-3-030-49418-6_28

Hagsten, E., & Kotnik, P. (2017). ICT as facilitator of internationalisation in small-and medium-sized firms. *Small Business Economics*, *48*(2), 431–446. doi:10.100711187-016-9781-2

Hagtvedt, H., & Patrick, V. M. (2009). The broad embrace of luxury: Hedonic potential as a driver of brand extendibility. *Journal of Consumer Psychology*, *19*(4), 608–618. doi:10.1016/j.jcps.2009.05.007

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. doi:10.2753/MTP1069-6679190202

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. doi:10.1108/EBR-11-2018-0203

Haleem, A., Javaid, M., & Vaishya, R. (2020). Effects of COVID-19 pandemic in daily life. *Current Medicine Research and Practice*, *10*(2), 78–79. doi:10.1016/j.cmrp.2020.03.011 PMID:32292804

Halevi, G., Moed, H., & Bar-Ilan, J. (2017). Suitability of Google Scholar as a source of scientific information and as a source of data for scientific evaluation—Review of the literature. *Journal of Informetrics*, *11*(3), 823–834. doi:10.1016/j.joi.2017.06.005

Hall, S. B., & Pasquini, S. (2020). *Can there be a fairy-tale ending for Hollywood after COVID-19?* https://www.weforum.org/agenda/2020/07/impact-coronavirus-covid-19-hollywood-global-film-industry-movie-theatres/

Hallinan, B., & Striphas, T. (2016). Recommended for you: The Netflix Prize and the production of algorithmic culture. *New Media & Society*, *18*(1), 117–137. doi:10.1177/1461444814538646

Hall, N., Schmitz, H. P., & Michael Dedmon, J. (2020). Transnational advocacy and NGOs in the digital era: New forms of networked power theory note. *International Studies Quarterly*, *64*(1), 159–167. doi:10.1093/isqqz052

Hamad, H., Elbeltagi, I., & El-Gohary, H. (2018). An empirical investigation of business-to-business e-commerce adoption and its impact on SMEs competitive advantage: The case of Egyptian manufacturing SMEs. *Strategic Change*, *27*(3), 209–229. doi:10.1002/jsc.2196

Hämäläinen, R., Nissinen, K., Mannonen, J., Lämsä, J., Leino, K., & Taajamo, M. (2021). Understanding teaching professionals' digital competence: What do PIAAC and TALIS reveal about technology-related skills, attitudes, and knowledge? *Computers in Human Behavior*, *117*, 1–15. doi:10.1016/j.chb.2020.106672

Handayani, S. F., & Er, M. (2019). Antecedent and Business Process Management Non-Technical Capabilities in Social Media Implementation for Micro, Small and Medium Enterprises: A Conceptual Model. *Procedia Computer Science*, *161*, 1114–1121. doi:10.1016/j.procs.2019.11.223

Hansen, A. M., Kraemmergaard, P., & Mathiassen, L. (2011). Rapid Adaptation in Digital Transformation: A Participatory Process for Engaging IS and Business Leaders. *MIS Quarterly Executive*, *10*(4).

Harpanahalli, J., Bhingradia, K., Jain, P., & Koti, J. (2020). Smart restaurant system using RFID technology. In *2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC)*. IEEE. 10.1109/ICCMC48092.2020.ICCMC-000162

Hart, D. (2019). *Measuring Customer Experience: 4 CX Metrics For You To Trial*. Retrieved November 10, 2021, from https://www.thepowermba.com/en/marketing/measuring-customer-experience

Harto, A. B. (2019). Implementing website design based on search engine optimization (SEO) checklist to increase web popularity. *Journal of Applied Information*. *Tongxin Jishu*, *6*(2), 87–97.

Harvard Business Review. (2017). *High-performance sourcing and procurement driving value through collaboration.* https://hbr.org/resources/pdfs/comm/scoutrfp/HighPerformanceSourcing.pdf

Harvey, D. (1982). *The limits to capital*. Basil Blackwell.

Harvey, D. (2002). *Condição Pós-moderna: uma pesquisa sobre as origens da mudança cultural* (Vol. 11). Loyola.

Hashim, M. A. M., Tlemsani, I., & Matthews, R. (2021). Higher education strategy in digital transformation. *Education and Information Technologies*.

Havens, T. (2014). Media Programming in an Era of Big Data. *Media Industries Journal*, *1*(2), 5–9. doi:10.3998/mij.15031809.0001.202

He, B. (2021). *Transformation and empowerment: the digital nature of enterprises has surfaced.* https://new.qq.com/omn/20210406/20210406A0B78M00.html

He, W. (2019). *Report on the results of the digital economy.* http://www.caict.ac.cn/pphd/zb/ict/2020/main/201912/t20191225_272511.htm

Heavin, C., & Power, D. J. (2018). Challenges for digital transformation–towards a conceptual decision support guide for managers. *Journal of Decision Systems, 27*(sup1), 38-45.

Heinze, N., & Hu, Q. (2006). The evolution of corporate web presence: A longitudinal study of large American companies. *International Journal of Information Management*, *26*(6), 313–325. doi:10.1016/j.ijinfomgt.2006.03.008

Hemant, R., & Lal, M. (2014). E-learning: Issues and Challenges. *International Journal of Computer Applications, 97*(5). https://research.ijcaonline.org/ volume97/number5/pxc3897154.pdf

Henderson, A. (2019). Logging on laggardly. A critical (self) reflection. *Cultural Studies, Critical Methodologies*, *19*(1), 27–35. doi:10.1177/1532708617746422

Henderson, A., & Bowley, R. (2010). Authentic dialogue? The role of "friendship" in a social media recruitment campaign. *Journal of Communication Management (London)*, *14*(3), 237–257. doi:10.1108/13632541011064517

Hendler, J., & Berners-Lee, T. (2010). From the semantic web to social machines: A research challenge for AI on the World Wide Web. *Artificial Intelligence*, *174*(2), 156–161. doi:10.1016/j.artint.2009.11.010

Henning, F. (2018). A theoretical framework on the determinants of organisational adoption of interoperability standards in Government Information Networks. *Government Information Quarterly*, *35*(4), S61–S67. doi:10.1016/j.giq.2015.11.008

Hensen, A. H., & Dong, J. Q. (2020). Hierarchical business value of information technology: Toward a digital innovation value chain. *Information & Management*, *57*(4), 103209. doi:10.1016/j.im.2019.103209

Hervé, A., Schmitt, C., & Baldegger, R. (2020). Internationalization and Digitalization: Applying digital technologies to the internationalization process of small and medium-sized enterprises. *Technology Innovation Management Review*, *10*(7), 28–40. doi:10.22215/timreview/1373

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2016). Options for formulating a digital transformation strategy. *MIS Quarterly Executive*, *15*(2).

Heuvelmans, K., & Vogel, S. (2017). *The European Feed Mix: Successful Ingredients for the World's Second-Largest Feed Market*. RaboResearch Food & Agribusiness. Retrieved from https://research.rabobank.com/far/en/sectors/grains-oilseeds/the_european_feed_mix.html

He, W., Wang, F.-K., Chen, Y., & Zha, S. (2017). An exploratory investigation of social media adoption by small businesses. *Information Technology Management*, *18*(2), 149–160. doi:10.100710799-015-0243-3

Hilken, T., Heller, J., Chylinski, M., Keeling, D. I., Mahr, D., & de Ruyter, K. (2018). Making omnichannel an augmented reality: The current and future state of the art. *Journal of Research in Interactive Marketing*, *12*(4), 509–523. doi:10.1108/JRIM-01-2018-0023

Hinchcliffe, D. (2020). *The CIO Outlook for 2021: Delivering Business ROI at Scale*. Retrieved on June 18, 2021 from https://www.constellationr.com/research/cio-outlook-2021-delivering-business-roi-scale

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, *28*(1), 52–61. doi:10.1016/j.infoandorg.2018.02.004

Hinterhuber, A., & Nilles, M. (2021). DIGITAL transformation, the HOLY GRAIL and the disruption of business models. *Business Horizons*. Advance online publication. doi:10.1016/j.bushor.2021.02.042

Hoberg, P., Krcmar, H., & Welz, B. (2017). *Skills for digital transformation. Research report 2017*. http://www.corporate-leaders.com/sitescene/custom/userfiles/file/Research/sapskillsfordigitaltransformation.pdf

Hoedebecke, K. (2018). Collaborative global health E-learning: A Massive Open Online Course experience of young family doctors. *Journal of Family Medicine and Primary Care*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6259551/

Hofmann, M. (2020). *Prozessoptimierung als ganzheitlicher Ansatz: Mit konkreten Praxisbeispielen für effiziente Arbeitsabläufe*. Springer Gabler.

Hofmann, P., Samp, C., & Urbach, N. (2020). Robotic process automation. *Electronic Markets*, *30*(1), 99–106. doi:10.100712525-019-00365-8

Holbrook, M. B. (2006). Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay. *Journal of Business Research*, *59*(6), 714–725. doi:10.1016/j.jbusres.2006.01.008

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *The Journal of Consumer Research*, *9*(2), 132–140. doi:10.1086/208906

Holmes, A. (2006). The Global State of Information Security 2006. *CIO*, *19*(23), 82.

Holup, A. A., Dobbs, D., Temple, A., & Hyer, K. (2014). Going digital: Adoption of electronic health records in assisted living facilities. *Journal of Applied Gerontology*, *33*(4), 494–504. doi:10.1177/0733464812454009 PMID:24781968

Homburg, C., Jozić, D., & Kuehnl, C. (2017). Customer experience management: Toward implementing an evolving marketing concept. *Journal of the Academy of Marketing Science*, *45*(3), 377–401. doi:10.100711747-015-0460-7

Horlacher, A., & Hess, T. (2016, January). What does a Chief Digital Officer do? Managerial tasks and roles of a new C-level position in the context of digital transformation. In *2016 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 5126-5135). IEEE.

Houghton, K. A., & Winklhofer, H. (2004). The effect of website and e-commerce adoption on the relationship between SMEs and their export intermediaries. *International Small Business Journal*, *22*(4), 369–388. doi:10.1177/0266242604044305

Howard, K. (2019). *Black Mirror: How Netflix Is Using Your Bandersnatch Data*. https://www.denofgeek.com/tv/black-mirror-netflix-collected-bandersnatch-data/

Hsu, P.-F., Ray, S., & Li-Hsieh, Y.-Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management, 34*(4), 474-488. doi:j.ijinfomgt.2014.04.006

Huang, P., & Huang, J. (2020). *Under the wave of digital transformation, the butterfly of Midea.* https://articles.e-works.net.cn/iot/article147709.htm

Huang, M. C., Yen, G. F., & Liu, T. C. (2014). Reexamining supply chain integration and the supplier's performance relationships under uncertainty. *Supply Chain Management*, *19*(1), 64–78. doi:10.1108/SCM-04-2013-0114

Huarng, K.-H., & Mas-Tur, A. (2016). New knowledge impacts in designing implementable innovative realities. *Journal of Business Research*, *69*(5), 1529–1533. doi:10.1016/j.jbusres.2015.10.011

Huber, T. L., Kude, T., & Dibbern, J. (2017). Governance practices in platform ecosystems: Navigating tensions between cocreated value and governance costs. *Information Systems Research*, *28*(3), 563–584. doi:10.1287/isre.2017.0701

Hubschmid-Vierheilig, E., Rohrer, M., & Mitsakis, F. (2020). Digital competence revolution and human resource development in the United Kingdom and Switzerland. In M. Loon, J. Steward & S. Nachmias (Eds.), The future of HRD. Volume I: Innovation and technology (pp. 53-91). Palgrave Macmillian. doi:10.1007/978-3-030-52410-4_3

Hudson, H. E. (2011). *From Rural Village to Global Village: Telecommunications for Development in the informational age*. Publishers.

Hueffner, E. (2020). *What is customer experience? How to deliver great CX*. Retrieved June 10, 2021, from Zendesk blog website: https://www.zendesk.com/blog/why-companies-should-invest-in-the-customer-experience/

Hu, J. (2021). Challenges and opportunities for digital economic development during the 14th Five-Year Plan period. *Governance: An International Journal of Policy, Administration and Institutions*, *4*(1), 15–18.

Hunter, G. K., & Perreault, W. D. Jr. (2006). Sales Technology Orientation, Information Effectiveness, and Sales Performance. *Journal of Personal Selling & Sales Management*, *26*(2), 95–113. doi:10.2753/PSS0885-3134260201

Hunter, P. (2019). Remote working in research: An increasing usage of flexible work arrangements can improve productivity and creativity. *EMBO Reports*, *20*(1), 1–4. doi:10.15252/embr.201847435 PMID:30530631

Hurmelinna-Laukkanen, P., & Nätti, S. (2018). Orchestrator types, roles and capabilities–A framework for innovation networks. *Industrial Marketing Management*, *74*, 65–78. doi:10.1016/j.indmarman.2017.09.020

Hütter, A., & Riedl, R. (2017) Chief Information Officer Role Effectiveness: Literature Review and Implications for Research and Practice. In Chief Information Officer Role Effectiveness. Springer Briefs in Information Systems. Springer. doi:10.1007/978-3-319-54753-4_1

Hvass, K. A., & Munar, A. M. (2012). The takeoff of social media in tourism. *Journal of Vacation Marketing*, *18*(2), 93–103. doi:10.1177/1356766711435978

IDC. (2021). *New IDC spending guide shows continued growth for digital transformation as organizations focus on strategic priorities.* https://www.idc.com/getdoc.jsp?containerId=prUS48372321

IFIF. (2021). *Feed the world: Global Feed statistics*. https://ifif.org/global-feed/statistics/

IFIF. (2021). *International Feed Industry Federation Annual Report 2020/21.* https://annualreport.ifif.org/#national-regional-updates/europe-fefana

Ilag, N. B. (2021). Tools and technology for effective remote work. *International Journal of Computers and Applications*, *174*(21), 13–16. doi:10.5120/ijca2021921109

Ilyashov, A. (2015). *Here's how luxury brands are doing social media very wrong (& the few who break the mold*. Retrieved from https://www.refinery29.com/en-us/2015/10/95018/luxury-fashion-brands-social-media

Industryweek. (2021). *Bring Digital to Life in Manufacturing*. https://ebmmanu.pathfactory.com/iw_ifs/manufacturing-ebook?partnerref=ROS

infobip. (n.d.). *Build meaningful customer relationships across any channel*. Infobip. Retrieved September 9, 2021, from https://www.infobip.com/

Insights, T. (2020). *Internet of Things (IoT) annual revenue from 2019 to 2030, by region (in billion U.S. dollars).* Statista. https://www.statista.com/statistics/1194715/iot-annual-revenue-regionally/

Institute for Global Industry, Tsinghua University. (2020). *Research report on digital transformation of Chinese enterprises.* https://finance.sina.com.cn/tech/2020-12-26/doc-iiznctke8555321.shtml

Instituto Brasileiro de Petróleo e Gás (IBP). (2019). *Padronização e digitalização da indústria de óleo e gás em debate*. https://www.ibp.org.br/noticias/padronizacao-e-digitalizacao-da-industria-de-oleo-e-gas-em-debate/

Instituto Euvaldo Lodi (IEL). (2018). *Estudo de sistema produtivo petróleo e gás. Nota técnica: Indústria 2027: riscos e oportunidades para o Brasil diante de inovações disruptivas*. Author.

Iosifidis, P. (2005). Digital switchover and the role of the new BBC services in digital television take-up. *Convergence*, *11*(3), 57–74. doi:10.1177/135485650501100305

Ire. (2021). *2020 China Enterprise Digital Transformation Path Practice Research Report.* https://www.huxiu.com/article/411052.html

Irhas, E. M., Dyah, S., & Yuni, I. (2020). Social Media Adoption in SMEs Impacted by COVID-19: The TOE Model. *The Journal of Asian Finance, Economics, and Business*, *7*(11), 915–925. doi:10.13106/jafeb.2020.vol7.no11.915

Ivančić, L., Vukšić, V. B., & Spremić, M. (2019). Mastering the Digital Transformation Process: Business Practices and Lessons Learned. *Technology Innovation Management Review*, *9*(2), 36–50. doi:10.22215/timreview/1217

Ives, B., & Olson, M. H. (1981). Manager or technician? The nature of the information systems manager's job. *Management Information Systems Quarterly*, *5*(4), 49–63. doi:10.2307/249327

Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, *39*(8), 2255–2276. doi:10.1002mj.2904

Jagannathan, S. (2021). The future of learning is here – are you ready? In S. Jagannathan (Ed.), *Reimagining digital learning for sustainable development how upskilling, data analytics, and educational technologies close the skills gap* (pp. 335–358). Routledge. doi:10.4324/9781003089698-36

Jahanmir, S. F., & Cavadas, J. (2018). Factors affecting late adoption of digital innovations. *Journal of Business Research*, *88*, 337–343. doi:10.1016/j.jbusres.2018.01.058

Jain, R., Aagja, J., & Bagdare, S. (2017). Customer experience – a review and research agenda. *Journal of Service Theory and Practice*, *27*(3), 642–662. doi:10.1108/JSTP-03-2015-0064

Jakhete, M. D., & Mankar, P. C. (2015). Implementation of smart restaurant with e-menu card. *International Journal of Computers and Applications*, *119*(21), 23–27. doi:10.5120/21361-4374

Jamie, D. (2018). *How J.P. Morgan is leading the digital revolution.* https://www.jpmorgan.com/news/how-jpmorgan-is-leading-the-digital-revolution

Jansen, D. (2017). Networks, Social Capital, and Knowledge Production. In W. M. K. U. S. B. Hollstein (Ed.), *Networked Governance: New Research Perspectives* (pp. 15–42). Springer Nature. doi:10.1007/978-3-319-50386-8_2

Janssen, J., Stoyanov, S., Ferrari, A., Punie, Y., Pannekeet, K., & Sloep, P. (2013). Experts' views on digital competence: Commonalities and differences. *Computers & Education*, *68*, 473–481. doi:10.1016/j.compedu.2013.06.008

Jarman, P. (2019). Delivering an Excellent Omni-channel Experience. *CX Today*. Retrieved from https://www.cxtoday.com/contact-centre/delivering-an-excellent-omni-channel-experience/

Jarrar, Y. (2017). *What is the role of government in the digital age?* World Economic Forum. https://www.weforum.org/agenda/2017/02/role-of-government-digital-age-data/

Jayasimha, K. R., & Srivastava, H. S. (2017). Consumer advocacy: Examining the feeling and doing following a failed service encounter. *Journal of Retailing and Consumer Services*, *34*, 201–208. doi:10.1016/j.jretconser.2016.09.016

Jean, R.-J., Daekwan, K., & Cavusgil, E. (2020). Antecedents and outcomes of digital platform risk for international new ventures´ internationalization. *Journal of World Business*, *55*(1), 101021. doi:10.1016/j.jwb.2019.101021

Jean, R., & Kim, D. (2020). Internet and SMEs' internationalization: The role of platform and website. *Journal of International Management*, *26*(1), 1–14. doi:10.1016/j.intman.2019.100690

Jenner, M. (2018). *Netfix and the Re-invention of Television*. Palgrave Macmillan. doi:10.1007/978-3-319-94316-9

Jiao, Y., Yang, J., & Xu, S. (2013). *A study of the impact of social media characteristics on customer adoption intention of social media.* Paper presented at the International Academic Workshop on Social Science (IAW-SC-13). 10.2991/iaw-sc.2013.252

Jin, S. V., Muqaddam, A., & Ryu, E. (2019). Instafamous and social media influencer marketing. *Marketing Intelligence & Planning*, *37*(5), 567–579. doi:10.1108/MIP-09-2018-0375

Johnson, J. E. (2012). Big Data + Big Analytics = Big Opportunity. *Financial Executive*, (July/August), 50–53.

Johnston, R., & Kong, X. (2011). The customer experience: A road-map for improvement. *Managing Service Quality*, *21*(1), 5–24. doi:10.1108/09604521111100225

Jones, B. (2018). *3 Principles Disney Uses to Enhance Customer Experience*. https://hbr.org/sponsored/2018/02/3-principles-disney-uses-to-enhance-customer-experience

Juell-Skielse, G., Lönn, C.-M., & Päivärinta, T. (2017). Modes of collaboration and expected benefits of inter-organisational E-government initiatives: A multi-case study. *Government Information Quarterly*, *34*(4), 578–590. doi:10.1016/j.giq.2017.10.008

Jurado, E. B., Moral, A. M., Ucles, D., & Virueld, M. (2021). Online popularity as a development factor for cooperatives in the winegrowing sector. *Journal of Business Research*, *123*, 79–85. doi:10.1016/j.jbusres.2020.09.064 PMID:33041394

Kabassi, K. (2017). Evaluating Website of Museums: State of the Art. *Journal of Cultural Heritage*, *24*, 184–196.

Kahn, P., Everington, L., Kelm, K., Reid, I., & Watkins, F. (2017). Understanding student engagement in online learning environments: The role of reflexivity. *Educational Technology Research and Development*, *65*(1), 203–218. doi:10.100711423-016-9484-z

Kamalaldin, A., Linde, L., Sjödin, D., & Parida, V. (2020). Transforming provider-customer relationships in digital servitization: A relational view on digitalization. *Industrial Marketing Management, 89*(November), 306–325. doi:10.1016/j.indmarman.2020.02.004

Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. (2017). Winning the digital war for talent. *MIT Sloan Management Review*, *58*(2), 17–19.

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, not technology, drives digital transformation. *MIT Sloan Management Review and Deloitte University Press*, *14*, 1–25.

Kang, L. (2021). *Liang Pin shop and JD.com sign strategic cooperation to explore the development model of instant consumption.* https://new.qq.com/omn/20210419/20210419A05R8D00.html

Kang, I. (2016). Web 2.0, UGC, and citizen journalism: Revisiting South Korea's OhmyNews model in the age of social media. *Telematics and Informatics*, *33*(2), 546–556. doi:10.1016/j.tele.2015.07.007

Kang, M. Y. (2020). Sustainable Profit versus Unsustainable Growth: Are Venture Capital Investments and Governmental Support Medicines or Poisons? *Sustainability*, *12*(18), 7773. doi:10.3390u12187773

Kapferer, J. N., & Bastien, V. (2012). *The luxury strategy: Break the rules of marketing to build luxury brands*. Kogan Page Publishers.

Kapferer, J. N., & Valette-Florence, P. (2019). How self-success drives luxury demand: An integrated model of luxury growth and country comparisons. *Journal of Business Research*, *102*, 273–287. doi:10.1016/j.jbusres.2019.02.002

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, *53*(1), 59–68. doi:10.1016/j.bushor.2009.09.003

Karaca, E., & Güçlü Nergiz, H. (2019). *Beş yıldızlı bir otel mutfağının bilişim sistemi kullanımının incelenmesi* [Conference Presentation]. Presented at the 4. Uluslararası Gastronomi Turizmi Araştırmaları Kongresi, Nevşehir, Turkey.

Karimi, J., & Walter, Z. (2015). The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry. *Journal of Management Information Systems*, *32*(1), 39–81. doi:10.1080/07421222.2015.1029380

Kasparova, E. (2019). Digital skills and their development in the Czech Republic. *Periodicals of Engineering and Natural Sciences*, *7*(2), 637–643. doi:10.21533/pen.v7i2.522

Kazmer, M. M., & Haythornthwaite, C. (2001). Juggling Multiple Social Worlds: Distance Students Online and Offline. *The American Behavioral Scientist*, *45*(3), 510–529. doi:10.1177/00027640121957196

Ke, E. (2016). *Why did P&G decline and never recover?* https://www.huxiu.com/article/146067.html

Keller, E., & Fay, B. (2012). Word-of-Mouth Advocacy. *Journal of Advertising Research*, *52*(4), 459–464. doi:10.2501/JAR-52-4-459-464

Kelloway, E. K., & Barling, J. (2000). Knowledge work as organisational behavior. *International Journal of Management Reviews*, *2*(3), 287–304. doi:10.1111/1468-2370.00042

Kemp, J. (2021). *Column: Hybrid working likely to be worst of both worlds.* https://www.reuters.com/article/uk-global-cities-kemp-idUSKCN2D71NF

Kemp, S. (2020). *Digital 2020: Global Digital Oweview*. https://datareportal.com/reports/digital-2020-global-digital-overview

Kemp, E., Bui, M., Krishen, A., Homer, P. M., & LaTour, M. S. (2017). Understanding the power of hope and empathy in healthcare marketing. *Journal of Consumer Marketing*, *34*(2), 85–95. doi:10.1108/JCM-04-2016-1765

Kepner-Tregoe Consulting. (2021). *Problem solving for operations.* https://blog.kepner-tregoe.com/problem-solving-for-operations/

Key, P., & Dietmar, G. W. (Eds.). (2010). *Handbook of Research on Mobile Marketing Management*. IGI Global.

Khahro, S. H., Hassan, S., Zainun, N. Y. B., & Javed, Y. (2021). Digital transformation and E-commerce in the construction industry: A prospective assessment. *Academy of Strategic Management Journal*, *20*(1), 1–8.

Khamitov, M., Grégoire, Y., & Suri, A. (2020). A systematic review of brand transgression, service failure recovery and product-harm crisis: Integration and guiding insights. *Journal of the Academy of Marketing Science*, *48*(3), 519–542. doi:10.100711747-019-00679-1

Khangura, S., Konnyu, K., Cushman, R., Grimshaw, J., & Moher, D. (2012). Evidence summaries: The evolution of a rapid review approach. *Systematic Reviews*, *1*(1), 1–9. doi:10.1186/2046-4053-1-10 PMID:22587960

Khan, I., & Rahman, Z. (2015). A review and future directions of brand experience research. *International Strategic Management Review*, *3*(1–2), 1–14. doi:10.1016/j.ism.2015.09.003

Khan, K. U., Xuehe, Z., Atlas, F., & Khan, F. (2019). The impact of dominant logic and competitive intensity on SMEs performance: A case from China. *Journal of Innovation & Knowledge*, *4*(1), 1–11. doi:10.1016/j.jik.2018.10.001

Khin, S., & Ho, T. C. F. (2019). Digital technology, digital capability and organisational performance: A mediating role of digital innovation. *International Journal of Innovation Science*, *11*(2), 177–195. doi:10.1108/IJIS-08-2018-0083

Khoros. (2019). *Getting to know your customers*. Retrieved from https://khoros.com/resources/forrester-report-getting-to-know-your-customers

Kietzmann, J. H., Silvestre, B. S., McCarthy, I. P., & Pitt, L. F. (2012). Unpacking the social media phenomenon: Towards a research agenda. *Journal of Public Affairs*, *12*(2), 109–119. doi:10.1002/pa.1412

Kim, S., & Stoel, L. (2004). Apparel retailers: Website quality dimensions and satisfaction. *Journal of Retailing and Consumer Services*, *11*(2), 109–117. doi:10.1016/S0969-6989(03)00010-9

Kingsnorth, S. (2016). *Digital Marketing Strategy: An Integrated Approach to Online Marketing*. Kogan Page Limited.

Kinicki, A. J., & Vecchio, R. P. (1994). Influences on the quality of supervisor–subordinate relations: The role of time-pressure, organizational commitment, and locus of control. *Journal of Organizational Behavior*, *15*(1), 75–82. doi:10.1002/job.4030150108

Kirrmann, S., Fahrner, H., Bach, T., Hall, M., Gläß, S., Schmucker, M., Gkika, E., Gainey, M., Baltas, D., & Heinemann, F. (2018). Digital radiation oncology [Digitale Radioonkologie]. *Der Onkologe*, *24*(5), 390–399. doi:10.100700761-018-0340-0

Kituyi, M. (2021). *'Going digital': How to build an inclusive digital economy in the wake of COVID-19.* UNCTAD. https://unctad.org/news/going-digital-how-build-inclusive-digital-economy-wake-covid-19

Klarna International. (n.d.). *Klarna International | Safe & easy-to-use payment solutions*. Retrieved September 9, 2021, from https://www.klarna.com/international/

Klaus, P., & Maklan, S. (2012). EXQ: A multiple-item scale for assessing service experience. *Journal of Service Management*, *23*(1), 5–33. https://doi.org/10.1108/09564231211208952

Klaus, P., & Maklan, S. (2013). Towards a Better Measure of Customer Experience. *International Journal of Market Research*, *55*(2), 227–246. doi:10.2501/IJMR-2013-021

Klievink, B., Bharosa, N., & Tan, Y.-H. (2016). The collaborative realisation of public values and business goals: Governance and infrastructure of public–private information platforms. *Government Information Quarterly*, *33*(1), 67–79. doi:10.1016/j.giq.2015.12.002

Klötzer, C., & Pflaum, A. (2017). *Toward the development of a maturity model for digitalization within the manufacturing industry's supply chain*. Academic Press.

Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born global firm. *Journal of International Business Studies*, *35*(2), 124–141. doi:10.1057/palgrave.jibs.8400071

Koen, P. A., Bertels, H. M. J., & Elsum, I. R. (2011). The Three Faces of Business Model Innovation: Challenges for Established Firms. *Research Technology Management*, *54*(3), 52–59. doi:10.5437/08953608X5403009

Koetz, C. (2019). Managing the customer experience: A beauty retailer deploys all tactics. *The Journal of Business Strategy*, *40*(1), 10–17. doi:10.1108/JBS-09-2017-0139

Kohli, R., Devaraj, S., & Mahmood, M. A. (2004). Understanding determinants of online consumer satisfaction: A decision process perspective. *Journal of Management Information Systems*, *21*(1), 115–136. doi:10.1080/07421222.2004.11045796

Kohtamäki, M., Parida, V., Oghazi, P., Gebauer, H., & Baines, T. (2019). Digital servitization business models in ecosystems: A theory of the firm. *Journal of Business Research*, *104*, 380–392.

Kokkinakos, P., Markaki, O., Koussouris, S., & Psarras, J. (2016). Digital Transformation: Is Public Sector Following the Enterprise 2.0 Paradigm? In A. Chugunov, R. Bolgov, Y. Kabanov, G. Kampis, & M. Wimmer (Eds.), *Digital Transformation and Global Society. DTGS 2016. Communications in Computer and Information Science, 674*. Springer. doi:10.1007/978-3-319-49700-6_11

Kolloch, M., & Dellermann, D. (2018). Digital innovation in the energy industry: The impact of controversies on the evolution of innovation ecosystems. *Technological Forecasting and Social Change*, *136*, 254–264. doi:10.1016/j.techfore.2017.03.033

Komulainen, H., & Saraniemi, S. (2019). Customer centricity in mobile banking: A customer experience perspective. *International Journal of Bank Marketing*, *37*(5), 1082–1102. doi:10.1108/IJBM-11-2017-0245

Kossowski, J., Heumuller, E., & Richter, S. (2020). Digital fitness - goal for the chief digital officer. *Proceedings - 2020 IEEE International Conference on Engineering, Technology and Innovation, ICE/ITMC 2020.* 10.1109/ICE/ITMC49519.2020.9198464

Kotler, P., & Keller, K. L. (2016). *Marketing Management* (S. Ukil, Ed.). Pearson Education Limited.

Koyuncugil, A. S., & Özgülbaş, N. (2009). Veri Madenciliği: Tıp ve Sağlık Hizmetlerinde Kullanımı ve Uygulamaları. *Bilişim Teknolojileri Dergisi*, *2*(2), 21–32.

Kozel, R., Mynářová, L., & Svobodová, H. (2011). *Moderní metody a techniky marketingového výzkumu* [Modern methods and techniques of marketing research]. Grada Publishing.

KPMG. (2020). *The future of HR in the new reality. It's time to start playing the long game*. https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/10/the-future-of-hr-in-the-new-reality.pdf

Kranzbühler, A. M., Kleijnen, M. H. P., Morgan, R. E., & Teerling, M. (2018). The Multilevel Nature of Customer Experience Research: An Integrative Review and Research Agenda. *International Journal of Management Reviews*, *20*(2), 433–456. doi:10.1111/ijmr.12140

Kretschmer, T., Leiponen, A., Schilling, M., & Vasudeva, G. (2020). Platform ecosystems as meta-organizations: Implications for platform strategies. *Strategic Management Journal*, smj.3250. Advance online publication. doi:10.1002mj.3250

Krishen, A. S., Kachen, S., Kraussman, M., & Haniff, Z. (2016). Do consumers dig it all? The interplay of digital and print formats in media. *Journal of Consumer Marketing*, *33*(7), 489–497. doi:10.1108/JCM-01-2015-1287

Kuijpers, F., & Eijdenberg, E. (2020). Economic Effects of Natural Disasters. In Showcasing Entrepreneurs' Responses to Severe Drought: Qualitative Findings from Cape Town, South Africa (pp. 131-146). Academic Press.

Kukreja, M. A. (2016). *Apache Hive: Enterprise SQL on Big Data frameworks*. doi:10.13140/RG.2.1.3387.8008

Kukulska-Hulme, A., Sharples, M., Milrad, M., Arnedillo-Sánchez, I., & Vavoula, G. (2009). Innovation in mobile learning: A European perspective. *International Journal of Mobile and Blended Learning*, *1*(1), 13–35. doi:10.4018/jmbl.2009010102

Kumar, V. (2021). *Digital transformation: implementing big data analytics*. Retrieved October 9, 2021, from Analytics Insight website: https://www.analyticsinsight.net/digital-transformation-implementing-big-data-analytics/

Kumar, B. N., & Varun, B. S. (2020). Table booking and restaurant management system using android application (Opss). *International Journal of Engineering Applied Sciences and Technology*, *4*(12), 373–378. doi:10.33564/IJEAST.2020.v04i12.065

Kumar, V., & Reinartz, W. (2016). Creating enduring customer value. *Journal of Marketing*, *80*(6), 36–68. doi:10.1509/jm.15.0414

Kwabena, G. Y., Mei, Q., Ghumro, T. H., Li, W., & Erusalkina, D. (2021). Effects of a Technological-Organizational-Environmental Factor on the Adoption of the Mobile Payment System. *The Journal of Asian Finance, Economics, and Business*, *8*(2), 329–338.

Landreville, K. D., & LaMarre, H. L. (2011). Working through political entertainment: How negative emotion and narrative engagement encourage political discussion intent in young Americans. *Communication Quarterly*, *59*(2), 200–220. doi:10.1080/01463373.2011.563441

Langley, A. (1999). Strategies for theorising from process data. *Academy of Management Review*, *24*(4), 691–710. doi:10.5465/amr.1999.2553248

Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organisation and management: Unveiling temporality, activity, and flow. *Academy of Management Journal*, *56*(1), 1–13. doi:10.5465/amj.2013.4001

Laroche, M., Habibi, M. R., & Richard, M. O. (2013). To be or not to be in social media: How brand loyalty is affected by social media? *International Journal of Information Management*, *33*(1), 76–82. doi:10.1016/j.ijinfomgt.2012.07.003

Larsson, J. (2019). *Why digitalisation matters for oil and gas*. https://www.pipelineoilandgasnews.com/interviewsfeatures/interviews/2019/may/why-digitalisation-matters-for-oil-and-gas/

Laudon, K. C., & Laudon, J. P. (2014). *Yönetim bilişim sistemleri* (U. Yozgat, Trans.). Nobel Akademik Yayıncılık. (Original work published 2012)

Laufer, M., Leiser, A., Deacon, B., de Brichambaut, P. P., Fecher, B., Kobsda, C., & Hesse, F. (2021). Digital higher education: A divider or bridge builder? Leadership perspectives on edtech in a COVID-19 reality. *International Journal of Educational Technology in Higher Education*, *18*(51), 1–17. doi:10.118641239-021-00287-6 PMID:34778538

Law, A. K. Y. (2009). *CRM adoption and its impact on organisational performance*. University of Nottingham.

Lawless Research. (2020). *COVID-19 Digital Engagement Report.* https://pages.twilio.com/rs/294-TKB-300/images/UPDATE_Aug_Twilio_COVID-19_Digital_Engagement_Report.pdf

Lawrence, E. (2015). Everything is a Recommendation Netflix, Altgenres and the Construction of Taste. *Knowledge Organization*, *42*(5), 358–364.

Lawton, W. A. (2018). Global Higher Education, Digital Age. In P. Teixeira & J. Shin (Eds.), *Encyclopedia of International Higher Education Systems and Institutions*. Springer., doi:10.1007/978-94-017-9553-1_217-1

Lazzaro, A. (2021, January 18). How to Choose a Realistic Revenue Model for Your Online Platform. *Bplans Blog*. https://articles.bplans.com/online-platform-revenue-model-options/

Lee, K., & Malerba, F. (2014). *Changes in industry leadership and catch-up by the latecomers: toward a theory of catch up cycles*. Seoul National University and CRIO Bocconi University.

Lee, K., & Malerba, F. (2016). Catch-up cycles and changes in industrial leadership: Windows of opportunity and responses of firms and countries in the evolution of sectoral systems. *Research Policy*, *46*(2), 338–351. doi:10.1016/j.respol.2016.09.006

Lee, Y. Y., Falahat, M., & Sia, B. K. (2020). Drivers of digital adoption: A multiple case analysis among low and high-tech industries in Malaysia. *Asia-Pacific Journal of Business Administration*, *13*(1), 80–97. doi:10.1108/APJBA-05-2019-0093

Lee, Y.-Y., & Falahat, M. (2019). The impact of digitalization and resources on gaining competitive advantage in international markets: Mediating role of marketing, innovation and learning capabilities. *Technology Innovation Management Review*, *9*(11), 26–39. doi:10.22215/timreview/1281

Lee, Y.-Y., Falahat, M., & Sia, B.-K. (2019). Impact of digitalization on the speed of internationalization. *International Business Research*, *12*(4), 1–11. doi:10.5539/ibr.v12n4p1

Lee, Z. W. Y., Chan, T. K. H., Chong, A. Y.-L., & Thadani, D. R. (2019). Customer engagement through omnichannel retailing: The effects of channel integration quality. *Industrial Marketing Management*, *77*, 90–101. doi:10.1016/j.indmarman.2018.12.004

Legg, S., & Hutter, M. (2006). A formal measure of machine intelligence. In *Proceedings of the 15th Annual Machine Learning Conference of Belgium and the Netherlands* (pp. 73-80). Ghent University.

Leggett, K. (2018). *2018 Customer Service Trends: How Operations Become Faster, Cheaper — And Yet, More Human.* Retrieved October 8, 2021, from Forrester website: https://www.forrester.com/report/2018-Customer-Service-Trends-How-Operations-Become-Faster-Cheaper-And-Yet-More-Human/RES142291

Legg, S., & Hutter, M. (2007). A collection of definitions of intelligence. *Frontiers in Artificial Intelligence and Applications*, *157*, 17–24.

Leidner, D. E., Beatty, R. C., & Mackay, J. M. (2008). How CIOs manage IT during economic decline: Surviving and thriving amid uncertainty. *MIS Quarterly Executive*, *2*(1), 7.

Leifer, R. (2003). *Restaurant management system* (U.S. Patent Application No. 10/195,336). U.S. Patent and Trademark Office.

Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience Throughout the Customer Journey. *Journal of Marketing*, *80*(6), 69–96. doi:10.1509/jm.15.0420

Lena Lich, A. (2020). *What Makes a Great Digital Customer Experience?* Retrieved October 8, 2021, from Bright IT GmbH website: https://www.bright.global/en/blog/what-makes-a-great-digital-customer-experience

Lenka, S., Parida, V., & Wincent, J. (2017). Digitalization capabilities as enablers of value co-creation in servitizing firms. *Psychology and Marketing*, *34*(1), 92–100. doi:10.1002/mar.20975

Lerner, J. S., Han, S., & Keltner, D. (2007). Feelings and consumer decision making: Extending the appraisal-tendency framework. *Journal of Consumer Psychology*, *17*(3), 181–187. doi:10.1016/S1057-7408(07)70027-X

Leventhal, L. (2008). The role of understanding customer expectations in aged care. *International Journal of Health Care Quality Assurance*, *21*(1), 50–59. doi:10.1108/09526860810841156 PMID:18437938

Li, D., Ding, F., & Wu, J. (2012). *Innovative Usage of Information Systems: Does CIO Role Effectiveness Matter?* Academic Press.

Li, K. (2020). *2020 Government Work Report.* http://www.gov.cn/guowuyuan/2020zfgzbg.htm

Liang, C., & Zhu, Y. (2019). Midea's sample: How traditional manufacturing is transforming into digital. *China's Industry and Information Technology*, *9*(16), 38–43.

Liberec Economic Forum. (2021). https://lef.tul.cz

Liberec Economic Forum. (2021). *Lidi v Digi*. https://www.youtube.com/watch?v=jEVNdp_Sql0

Libert, B., & Beck, M. (2017, January 13). 7 Essential Steps For Digital Transformation. *Forbes*. https://www.forbes.com/sites/barrylibert/2017/01/13/7-essential-steps-for-digital-transformation/

Lidwina, A. (2020). *Video Streaming Competition in Indonesia*. https://katadata.co.id/ariayudhistira/infografik/5f3c7825c56e5/persaingan-streaming-video-di-indonesia

Liebowitz, S. J., & Margolis, S. E. (1994). Network Externality: An Uncommon Tragedy. *The Journal of Economic Perspectives*, *8*(2), 133–150. doi:10.1257/jep.8.2.133

Lin, Y. (2020). *2020 Lenovo Innovation and Technology Conference.* https://baijiahao.baidu.com/s?id=1681882529705790456&wfr=spider&for=pc

LinkedIn. (2021). *Workplace learning report 2021: Skills building in the new world of work.* https://learning.linkedin.com/resources/workplace-learning-report

Linnenluecke, M. K., Marrone, M., & Singh, A. K. (2020). Conducting systematic literature reviews and bibliometric analyses. *Australian Journal of Management*, *45*(2), 175–194. doi:10.1177/0312896219877678

Lin, Q., & Wei, W. (2020). Design and Research of Intelligent All-area-advancing Tourism Cloud Platform in the Era of Big Data. *Journal of Physics*, *1575*(1), 12145.

Lippell, H. (2016). Big Data in the Media and Entertaintment Sectors. In New Horizons for a Data-Driven Econımy: A Roadmap for Usage and Exploitation of Big Data in Europe (pp. 245-263). SpringerOpen.

Litto, F. (2018). Brazil. *Adnan Qayyum Olaf Zawacki-Richter Editors*, *25*, 29–43. doi:10.1007/978-981-13-0298-5_4

Liu, Y. (2021). How Do Family Firms Respond Strategically to the Digital Transformation Trend? In *Academy of Management Annual Meeting Proceedings*. Academy of Management. 10.5465/AMBPP.2021.14879abstract

Liu, S., Perry, P., & Gadzinski, G. (2019). The implications of digital marketing on WeChat for luxury fashion brands in China. *Journal of Brand Management*, *26*(4), 395–409. doi:10.105741262-018-0140-2

Li, W. Z., Liu, K. C., Belitski, M., Ghobadian, A., & O'Regan, N. (2016). e-Leadership through strategic alignment: An empirical study of small- and medium-sized enterprises in the digital age. *Journal of Information Technology*, *31*(2), 185–206. doi:10.1057/jit.2016.10

Liyanage, V., Ekanayake, A., Premasiri, H., Munasinghe, P., & Thelijjagoda, S. (2018). *Foody-smart restaurant management and ordering system. In 2018 IEEE Region 10 Humanitarian Technology Conference (R10-HTC)*. IEEE.

Llave, O. V., & Messenger, J. (2018). Working anytime, anywhere: The effects on the world of work. *Occupational and Environmental Medicine*, *75*(2), 219–220. doi:10.1136/oemed-2018-ICOHabstracts.623

LMC. (2021). *Vývoj na pracovním trhu: Hlavní data, změny a trendy* [Labour market developments: Main data, changes and trends]. https://hrforum.cz/wp-content/uploads/2021/09/LMC_Toma%CC%81s%CC%8C-Dombrovsky%CC%81.pdf

Lobato, R. (2019). *Netflix Nations The Geography of Digital Distribution*. New York University Press.

Löbler, H. (2013). Service-dominant networks: An evolution from the service-dominant logic perspective. *Journal of Service Management*, *24*(4), 420–434. doi:10.1108/JOSM-01-2013-0019

Lobzhanidze, G. (2019). *Customer Experience Vs. Product: What's More Important?* Retrieved September 8, 2021, from Qminder website: https://www.c.com/customer-experience-vs-product/

Loonam, J., McDonagh, J., Kumar, V., & O'Regan, N. (2014). Top managers & information systems: 'Crossing the Rubicon'! *Strategic Change*, *23*(3-4), 205–224. doi:10.1002/jsc.1971

Loran, M. (2005). Use of Websites to Increase Access and Develop Audiences in Museums: Experiences in British National Museums. *E-journal of the Humanities and Philology Studies of the UOC*, *7*, 23–29.

Lou, C., & Yuan, S. (2019). Influencer Marketing: How Message Value and Credibility Affect Consumer Trust of Branded Content on Social Media. *Journal of Interactive Advertising*, *19*(1), 58–73. doi:10.1080/15252019.2018.1533501

Loureiro, S. (2015). The role of website quality on attitude and intentions to visit and recommend island destination. *International Journal of Tourism Research*, *17*(6), 545–554. doi:10.1002/jtr.2022

Louw, C., & Nieuwenhuizen, C. (2020). Digitalization strategies for SMEs: A cost vs. skill approach for website development. *African Journal of Science, Technology, Innovation and Development*, *12*(2), 195–202. doi:10.1080/20421338.2019.1625591

Lu, Z. (2021). *Analysis of market size and employment structure in China's digital economy industry in 2021.* https://ecoapp.qianzhan.com/detials/210519-39518452.html

Luftman, J., Lyytinen, K., & Zvi, T. B. (2017). Enhancing the measurement of information technology (IT) business alignment and its influence on company performance. *Journal of Information Technology*, *32*(1), 26–46. doi:10.1057/jit.2015.23

Lunar. (n.d.). *Lunar: Your other bank*. Retrieved September 9, 2021, from https://lunar.app/en/

Luna-Reyes, L. F., & Gil-Garcia, J. R. (2014). Digital government transformation and internet portals: The co-evolution of technology, organisations, and institutions. *Government Information Quarterly*, *31*(4), 545–555. doi:10.1016/j.giq.2014.08.001

Lundvall, B. A. (1996). The Social Dimension of the Learning Economy. *Druid Working Paper, 96*(1).

Lundvall, B. A. (2007). *Innovation System Research: where it came from and where it might go*. Globelics Working Paper Series.

Lundvall, B. A. (1992). *National Systems of Innovation*. Pinter Publishers.

Lundvall, B. A., & Johnson, B. (2016). The learning economy. In B. A. Lundvall (Ed.), *Org.) The learning economy and the economics of hope*. Anthem Press. doi:10.26530/OAPEN_626406

Luo, H. (2019). *"Suning Experience" on the Digital Road of Retail Enterprises.* https://news.tom.com/201912/4571197208.html

Luo, M. M., Chen, J.-S., Ching, R. K. H., & Liu, C.-C. (2011). An examination of the effects of virtual experiential marketing on online customer intentions and loyalty. *Service Industries Journal*, *31*(13), 2163–2191. doi:10.1080/02642069.2010.503885

Luppicini, R. (2021). Education for a digital world: Current challenges and future possibilities. In R. Luppicini & A. K. Haghi (Eds.), *Education for a digital world: Present realities and future possibilities* (pp. 197–206). Apple Academic Press.

Lu, Q., Mihalik, B. J., Heere, B., Meng, F., & Fairchild, A. (2019). Media effect on resident attitudes toward an Olympic bid. *Tourism Management Perspectives*, *29*, 66–75. doi:10.1016/j.tmp.2018.10.009

Lusch, R. F., & Nambisan, S. (2015). Service Innovation: A Service-Dominant Logic Perspective. *Management Information Systems Quarterly*, *39*(1), 155–175. doi:10.25300/MISQ/2015/39.1.07

Lydon, B. (2016). *Industry 4.0: Intelligent and flexible production*. InTech.

MacInnis, D. J., & De Mello, G. E. (2005). The concept of hope and its relevance to product evaluation and choice. *Journal of Marketing*, *69*(1), 1–14. doi:10.1509/jmkg.69.1.1.55513

MacKenzie, J. (2021). *Hybrid working after Covid-19: Home is where the work is*. https://a.uk.practicallaw.thomsonreuters.com/w-031-0840?transitionType=Default&contextData=%28sc.Default%29

Maddodi, S., & Prasad, K. K. (2019). Netflix Bigdata Analytics - The Emergence of Data Driven Recommendation. *International Journal of Case Studies in Business, IT, and Education*, *3*(2), 41–51. doi:10.47992/IJCSBE.2581.6942.0050

Maduku, D. K., Mpinganjira, M., & Duh, H. (2016). Understanding mobile marketing adoption intention by South African SMEs: A multi-perspective framework. *International Journal of Information Management*, *36*(5), 711–723. doi:10.1016/j.ijinfomgt.2016.04.018

Magnusson, J., Koutsikouri, D., & Päivärinta, T. (2020). Efficiency creep and shadow innovation: Enacting ambidextrous IT Governance in the public sector. *European Journal of Information Systems*, *29*(4), 1–21. doi:10.1080/0960085X.2020.1740617

Mahajan, G. (2020). What Is Customer Value and How Can You Create It? Journal of Creating Value, 6(1), 119–121. doi:10.1177/2394964320903557

Maheshsvari, A. (2019). *Digital transformation: Building intelligent enterprises*. John Willey & Sons Inc.

Mahrous, A. A., & Hassan, S. S. (2017). Achieving Superior Customer Experience: An Investigation of Multichannel Choices in the Travel and Tourism Industry of an Emerging Market. *Journal of Travel Research*, *56*(8), 1049–1064. doi:10.1177/0047287516677166

Makarem, S. C., & Jae, H. (2016). Consumer boycott behavior: An exploratory analysis of twitter feeds. *The Journal of Consumer Affairs*, *50*(1), 193–223. doi:10.1111/joca.12080

Makkonen, H., & Komulainen, H. (2018). Explicating the market dimension in the study of digital innovation: A management framework for digital innovation. *Technology Analysis and Strategic Management*, *30*(9), 1015–1028. doi:10.1080/09537325.2018.1433823

Makrides, A., Vrontis, D., & Christofi, M. (2020). The gold rush of digital marketing: Assessing prospects of building brand awareness overseas. *Business Perspectives and Research*, *8*(1), 4–20. doi:10.1177/2278533719860016

Malerba, F. (2003) Sectoral systems and innovation and technology policy. *Revista Brasileira de Inovação, 2*(2).

Malerba, F. (2009). Sectoral Systems and Innovation and Technology Policy. *Revista Brasileira de Inovação*, *2*(2), 329-375. https://periodicos.sbu.unicamp.br/ojs/index.php/rbi/article / view/8648876 /15414>

Malerba, F. (2004). *Sectoral Systems of Innovation: Concepts, Issues and Analyses of Six Major Sectors in Europe*. University Press.

Malerba, F. (2004). Sectoral Systems: How and why innovation differs across sectors. In *The Oxford Handbook of Innovation*. Oxford University Press.

Malerba, F., & Nelson, R. R. (2011). Learning and catching up in different sectoral systems: Evidence from six industries. *Industrial and Corporate Change*, *20*(6), 1645–1675. doi:10.1093/icc/dtr062

Mamaeva, D. V., Shabaltina, L. V., Garnova, V. Y., Petrenko, E. S., & Borovsky, S. S. (2020). Digital transformation of higher educational system. *Journal of Physics: Conference Series*, *1691*(012081), 012081. Advance online publication. doi:10.1088/1742-6596/1691/1/012081

Mammadli, G. (2021). The Role Of Brand Trust in The Impact Of Social Media Influencers On Purchase Intention. SSRN *Electronic Journal*. doi:10.2139/ssrn.3834011

Mamun Abdullah, A. (2018). Diffusion of innovation among Malaysian manufacturing SMEs. *European Journal of Innovation Management*, *21*(1), 113–141. doi:10.1108/EJIM-02-2017-0017

Mandal, D., McQueen, R. J., Dillon, S., & Rastrick, K. (2017). The influence of small enterprise owner personality traits on Facebook use. *Small Enterprise Research*, *24*(2), 120–131. doi:10.1080/13215906.2017.1338194

Mangold, W. G., & Faulds, D. J. (2009). Social media: The new hybrid element of the promotion mix. *Business Horizons*, *52*(4), 357–365. doi:10.1016/j.bushor.2009.03.002

Manning, H. (2016). Customer Experience Drives Revenue Growth. *Forrester*. Retrieved from https://lumwp.azureedge.net/cdn/wp-content/uploads/2019/12/16-06-21-customer_experience_drives_revenue_growth_2016

Mansour, H. (2021). How successful countries are in promoting digital transactions during COVID-19. *Journal of Economic Studies (Glasgow, Scotland)*. Advance online publication. doi:10.1108/JES-10-2020-0489

Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R., & Sanghvi, S. (2017). *What the future of work will mean for jobs, skills, and wages: Jobs lost, jobs gained.* McKinskey Global Institute. https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages

Marczyk, G., DeMatteo, D., & Festinger, D. (2017). *Essentials of Research Design and Methodology*. John Wiley & Sons Inc.

Marine-Roig, E., & Clave, S. A. (2015). Tourism analytics with massive user-generated content: A case study of Barcelona. *Journal of Destination Marketing & Management*, *4*(3), 162–172. doi:10.1016/j.jdmm.2015.06.004

Mariscal, J., Mayne, G., Aneja, U., & Sorgner, A. (2019). Bridging the gender digital gap. *Economics*, *13*(1), 20190009. Advance online publication. doi:10.5018/economics-ejournal.ja.2019-9

Marketsandresearch. (2021). *Global Cloud Video Streaming Market 2021*. https://www.marketsandresearch.biz/report/203422/global-cloud-video-streaming-market-2021-by-company-regions-type-and-application-forecast-to-2026

Martin-Consuegra, D., Diaz, E., Gomez, M., & Molina, A. (2019). Examining consumer luxury brand-related behavior intentions in a social media context: The moderating role of hedonic and utilitarian motivations. *Physiology & Behavior*, *200*, 104–110. doi:10.1016/j.physbeh.2018.03.028 PMID:29604320

Martínez-Morán, P. C., Fernández.-Rico Urgoiti, J. M., Díez, F., & Solabarrieta, J. (2021). The digital transformation of the talent management process: A Spanish business case. *Sustainability*, *13*(4), 1–16. doi:10.3390u13042264

Martin, J., Mortimer, G., & Andrews, L. (2015). Re-examining online customer experience to include purchase frequency and perceived risk. *Journal of Retailing and Consumer Services*, *25*, 81–95. doi:10.1016/j.jretconser.2015.03.008

Martin, L. M., & Matlay, H. (2003). Innovative use of the internet in established small firms: The impact of knowledge management and organisational learning in accessing new opportunities. *Qualitative Market Research*, *6*(1), 18–26. doi:10.1108/13522750310457348

Martins, M. A. J., & Riyanto, S. A. (2020). The Effect of User Experience on Customer Satisfaction on Netflix Streaming Services in Indonesia. *International Journal of Innovative Science and Research Technology, 5*(7).

Matos, M. V. M. (2020). *Desenvolvimento tecnológico e indústria petrolífera brasileira: redes e estratégias do Sistema Produtivo Submarino. Tese (Doutorado em Políticas Públicas, Estratégias e Desenvolvimento) – Pós-graduação em Políticas Públicas, Estratégias e Desenvolvimento, Instituto de Economia*. UFRJ.

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. doi:10.100712599-015-0401-5

Matuzeviciute, K., Butkus, M., & Karaliute, A. (2017). Do technological innovations affect unemployment? Some empirical evidence from European countries. *Economies*, *5*(4), 48. doi:10.3390/economies5040048

Ma, X., Sun, J., Zhang, G., Ma, M., & Gong, J. (2018). Enhanced Expression and Interaction of Paper Tourism Maps Based on Augmented Reality for Emergency Response. *Proceedings of The 2018 2nd International Conference On Big Data And Internet of Things*, 105-109. 10.1145/3289430.3289442

Mayfield, A. (2008). *what is social media?* Academic Press.

Mazurchenko, A., Zelenka, M., & Maršíková, K. (2020). Influence of technological changes on digital competences in organisations. In *Proceedings of the 28th Interdisciplinary Information management Talks IDIMT-2020* (*vol. 49*, pp. 41-48). Trauner Verlag.

Mazurchenko, A., & Zelenka, M. (2021, July 31). (in press). Employees' digital competency development in the construction and automotive industrial sectors. *Central European Business Review.* Advance online publication. doi:10.18267/j.cebr.284

Mazzucato, M. (2014). *O Estado empreendedor: Desmascarando o mito do setor público vs. setor privado*. Portifólio-Penguim.

McCann, M., & Barlow, A. (2015). Use and measurement of social media for SMEs. *Journal of Small Business and Enterprise Development*, *22*(2), 273–287. doi:10.1108/JSBED-08-2012-0096

McCarthy, K., & Jinnett, K. (2001). *A New Framework for Building Participation in the Arts*. RAND.

McCarthy, P., Sammon, D., & Alhassan, I. (2021). Digital Transformation Leadership Characteristics: A Literature Analysis. *Journal of Decision Systems*, 1–30. doi:10.1080/12460125.2021.1908934

McConnell Freeman, E. (2011). *Restaurant industry sustainability: Barriers and solutions to sustainable practice indicators* [Unpublished master degree thesis]. Arizona State University.

McKinsey. (2018). *Unlocking success in digital transformations*. Retrieved on June 21, 2021 from https://. mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations

McMahon, R. (2020). Co-developing digital inclusion policy and programming with indigenous partners: Interventions from Canada. *Internet Policy Review*, *9*(2), 1–26. doi:10.14763/2020.2.1478

McMaster, B. (2008). *Supporting Excellence in the Art*. Department for Culture, Media, and Sport.

McMillan, S. J., & Hwang, J.-S. (2002). Measures of Perceived Interactivity: An Exploration of the Role of Direction of Communication, User Control, and Time in Shaping Perceptions of Interactivity. *Journal of Advertising*, *31*(3), 29–42. doi:10.1080/00913367.2002.10673674

Melumad, S., Inman, J. J., & Pham, M. T. (2019). Selectively emotional: How smartphone use changes user-generated content. *JMR, Journal of Marketing Research*, *56*(2), 259–275. doi:10.1177/0022243718815429

Memis Kocaman, E. (2021). Operational effects of using restaurant management system: An assessment according to business features. *International Journal of Gastronomy and Food Science*, *25*, 1–8.

Memis Kocaman, E., & Kocaman, M. (2014). Yiyecek ve içecek işletmelerinde otomasyon sistemleri kullanımının yönetim sürecine etkileri. *Standard*, *53*(625), 28–33.

Memis Kocaman, E., & Kocaman, M. (2019). Restaurant management system (RMS) and digital conversion: A descriptive study for the new era. In *Global Trends, Practices, and Challenges in Contemporary Tourism and Hospitality Management*. IGI Global. doi:10.4018/978-1-5225-8494-0.ch004

Mendes, A. P. A., Romeiro, R. A. P., & Costa, R. C. (2012). Mercado e aspectos técnicos dos sistemas submarinos de produção de petróleo e gás natural. In *BNDES Setorial 35* (pp. 155–188). BNDES.

Mendes, A. P. A., Teixeira, C. A. N., Rocio, M. A. R., & Oliveira, L. A. S. (2017). Panoramas Setorias 2030: Petróleo e Gás. In *Panoramas setoriais 2030: desafios e oportunidades para o Brasil*. BNDES.

Menz, M., Kunisch, S., Birkinshaw, J., Collis, D. J., Foss, N. J., Hoskisson, R. E., & Prescott, J. E. (2021). Corporate Strategy and the Theory of the Firm in the Digital Age. *Journal of Management Studies*, *58*(7), 1695–1720. doi:10.1111/joms.12760

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, *36*(4), 101385. doi:10.1016/j.giq.2019.06.002

Meske, C., & Stieglitz, S. (2013). *Adoption and Use of Social Media in Small and Medium-Sized Enterprises.* Paper presented at the Practice-Driven Research on Enterprise Transformation, Berlin, Germany.

Meyer, C., & Schwager, A. (2007). Understanding Customer Experience. Harvard.

Michael, K., & Miller, K. W. (2013). Big Data: New Opportunities and New Challenges (guest editors' introduction). *Computer*, *46*(6), 22–24. doi:10.1109/MC.2013.196

Microsoft News Center. (2021). *Microsoft releases findings and considerations from one year of remote work in Work Trend Index.* https://news.microsoft.com/2021/03/22/microsoft-releases-findings-and-considerations-from-one-year-of-remote-work-in-work-trend-index/

Microsoft. (2021). *The Next Great Disruption Is Hybrid Work – Are We Ready*? *2021 Work Trend Index: Annual Report.* https://ms-worklab.azureedge.net/files/reports/hybridWork/pdf/2021_Microsoft_WTI_Report_March.pdf

Middleton. (2015). *Five ways digital technologies are lowering barriers to entry* [Blog]. Digitally Cognizant. https://digitally.cognizant.com/five-ways-digital-technologies-are-lowering-barriers-to-entry

Mikolov, T. (2020). Why is defining artificial intelligence important? *Journal of Artificial General Intelligence*, *11*(2), 50–51. doi:10.2478/jagi-2020-0003

Mikos, L. (2016). Digital Media Platforms and the Use of TV Content: Binge Watching and Video-on-Demand in Germany. *Media and Communication*, *4*(3), 154–161. doi:10.17645/mac.v4i3.542

Miles, C. (2013). Persuasion, marketing communication, and the metaphor of magic. *European Journal of Marketing*, *47*(11/12), 2002–2019. doi:10.1108/EJM-11-2011-0632

Milla, A. C., & Dos-Santos, L. J. M. (2019). Social media preferences, interrelations between the social media characteristics and culture: A view of Arab nations. *Asian Social Science*, *15*(6), 71–77. doi:10.5539/ass.v15n6p71

Miller, K. (2021). *Adapting to hybrid working: Top tips for business making the long-term shift to hybrid working.* https://www.ngi.org.uk/wp-content/uploads/2021/03/CBI-Adapting-to-Hybrid-Working-a-practical-guide.pdf

Milwood, P., Marchiori, E., & Zach, F. (2013). A Comparison of Social Media Adoption and Use in Different Countries: The Case of the United States and Switzerland. *Journal of Travel & Tourism Marketing*, *30*(1-2), 165–168. doi:10.1080/10548408.2013.751287

Min, B., Kwon, S., Park, G., Jeong, D., & Lee, H. (2020). Current Status and Prospects of Artificial Intelligence in the Oil and Gas Exploration and Production Business. *Journal of the Korean Society of Mineral and Energy Resources Engineers*, 295-308. doi:10.32390/ksmer.2020.57.3.295

Minghetti, V., Moretti, A., & Micelli, S. (2001). Reeingineering the museum's role in the tourism value chain: Towards an IT business model. *Journal of Information Technology and Tourism*, *4*(1), 131–143.

Mintzberg, H. (1971). Managerial Work: Analysis from Observation. *Management Science*, *18*(2), B97–B110.

Miranda, P., Isaias, P., & Pifano, S. (2018). Digital Literacy in Higher Education: A Survey on Students' Self-assessment. *Conference on Learning and Collaboration Technologies, LCT 2018 Held as Part of HCI International 2018*.

Mishra, M. S., & Sharma, R. W. (2019). Brand crisis-sentiment analysis of user-generated comments about@ Maggi on Facebook. *Corporate Reputation Review*, *22*(2), 48–60. doi:10.105741299-018-0057-4

Mithas, S., Tafti, A., & Mitchell, W. (2013). How A Firm'S Competitive Environment And Digital Strategic Posture Influence Digital Business Strategy. *Management Information Systems Quarterly*, *37*(2), 511–536. doi:10.25300/MISQ/2013/37.2.09

Miura, Y. (2018). China's Digital Economy—Assessing Its Scale, Development Stage, Competitiveness, and Risk Factors. *Pacific Business and Industries, 18*(70). https://www.jri.co.jp/MediaLibrary/file/english/periodical/rim/2018/70.pdf

Mohsin, A., & Lockyer, T. (2010). Customer perceptions of service quality in luxury hotels in New Delhi, India: An exploratory study. *International Journal of Contemporary Hospitality Management*, *22*(2), 160–173. doi:10.1108/09596111011018160

Mohtaramzadeh, M., Ramayah, T., & Jun-Hwa, C. (2018). B2B e-commerce adoption in Iranian manufacturing companies: Analyzing the moderating role of organizational culture. *International Journal of Human-Computer Interaction*, *34*(7), 621–639. doi:10.1080/10447318.2017.1385212

Mo, J., & Ren, F. (2021). Analysis on the Countermeasures of Optimizing Urban Tourism Public Service System under the Background of Smart City. *Complexity*, *2021*, 1–13. doi:10.1155/2021/6642404

Mokhtarzadeh, N. G., Mahdiraji, H. A., Beheshti, M., & Zavadskas, E. K. (2018). A novel hybrid approach for technology selection in the information technology industry. *Technologies*, *6*(1), 34. doi:10.3390/technologies6010034

Möller, K., & Halinen, A. (2017). Managing business and innovation networks—From strategic nets to business fields and ecosystems. *Industrial Marketing Management*, *67*, 5–22. doi:10.1016/j.indmarman.2017.09.018

Monteiro, A. R., & Leite, C. (2021). Digital literacies in higher education: Skills, uses, opportunities and obstacles to digital transformation. *Revista De Educación a Distancia*, *21*(6), 1–20. doi:10.6018/red.438721

Morakanyane, R., Grace, A. A., & O'Reilly, P. (2017). Conceptualizing Digital Transformation in Business Organizations: A Systematic Review of Literature. In *BLED 2017 Proceedings*. University of Maribor Press. doi:10.18690/978-961-286-043-1.30

Moreira, A. C., da Silva, P. M. F., & Ferreira Moutinho, V. M. (2017). The Effects of Brand Experiences on Quality, Satisfaction and Loyalty: An Empirical Study in the Telecommunications Multiple-play Service Market. *Innovar (Universidad Nacional de Colombia)*, *27*(64), 23–38. doi:10.15446/innovar.v27n64.62366

Morgan, B. (2019). *50 Stats That Prove The Value Of Customer Experience*. Retrieved from forbes website: https://www.forbes.com/sites/blakemorgan/2019/09/24/50-stats-that-prove-the-value-of-customer-experience/?sh=cd7bee24ef22

Morgan, B. (2019). Companies that Failed at Digital Transformation and What We Can Learn from Them. *Forbes*. https://www.forbes.com/sites/blakemorgan/2019/09/30/companies-that-failed-at-digital-transformation-and-what-we-can-learn-from-them/?sh=7ebc359b603c

Morgan, K. (2001). The Exaggerated Death of Geography: Learning, Proximity and Territorial Innovation Systems. *Journal of Economic Geography*. http://www.utoronto.ca/onris/research_review /WorkingPapers/WorkingDOCS/Working01/ Death.pdf

Morgan, R. M., & Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing*, *58*(3), 20–38. doi:10.1177/002224299405800302

Morgan-Thomas, A., & Veloutsou, C. (2013). Beyond technology acceptance: Brand relationships and online brand experience. *Journal of Business Research*, *66*(1), 21–27. doi:10.1016/j.jbusres.2011.07.019

Morin, E. (2005). *Introdução ao pensamento complexo*. Sulina.

Morningconsult and The Hollywood Reporter. (2020). *National Tracking Poll*. https://morningconsult.com/wpcontent/uploads/2020/03/2003101_crosstabs_HOLLYWOOD_Adults_v1_AUTO.pdf

Morris, J. W. (2015). Curation by Code: Infomediaries and the Data Mining of Taste. *European Journal of Cultural Studies*, *18*(4-5), 446–463. doi:10.1177/1367549415577387

Morton, F. (2020). Influencer marketing: An exploratory study on the motivations of young adults to follow social media influencers. *Journal of Digital and Social Media Marketing*, *8*(2), 156–165.

Moschella, D., & Atkinson, R. (2020). *Competing with China: A Strategic Framework*. https://itif.org/publications/2020/08/31/competing-china-strategic-framework

Muafi, Grabara, J., Sudiyarto, & Siswanti, Y. (2019). Business strategy, organizational structure, work processes: Are the alignment? *Quality - Access to Success*, *20*, 399–404.

Muhammad, F. M. (2018). Instagram Effects as Social Media toward Adolescence and Young Adult Users. *Uses and Gratification Approach.*, *165*(January), 204–206. doi:10.2991/iccsr-18.2018.44

Mulcahy, S. (2020). *State of the Connected Customer*. Retrieved from https://c1.sfdcstatic.com/content/dam/web/en_us/www/documents/research/salesforce-state-of-the-connected-customer-4th-ed.pdf

Muzyka, D., De Koning, A., & Churchill, N. (1995). On transformation and adaptation: Building the entrepreneurial corporation. *European Management Journal*, *13*(4), 346–362. doi:10.1016/0263-2373(95)00029-K

Nabila, M. (2020). *Menengok Sederet Aplikasi Hiburan Terpopuler Selama Pandemi* [Take a Look at the Most Popular Entertainment Apps During the Pandemic]. https://dailysocial.id/post/menengok-sederet-aplikasi-hiburan-terpopuler-selama-pandemi

Nadeau, J., Rutter, R., & Lettice, F. (2020). Social media responses and brand personality in product and moral harm crises: Why waste a good crisis? *Journal of Marketing Management*, *36*(11-12), 1031–1054. doi:10.1080/0267257X.2020.1764080

Nambisan, S. (2018). Architecture vs. ecosystem perspectives: Reflections on digital innovation. *Information and Organization*, *28*(2), 104–106. doi:10.1016/j.infoandorg.2018.04.003

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773. doi:10.1016/j.respol.2019.03.018

Nam, H., & Kannan, P. K. (2020). Digital environment in global markets: Cross-cultural implications for evolving customer journeys. *Journal of International Marketing*, *28*(1), 28–47. doi:10.1177/1069031X19898767

Nampoothiri, N. J., & Artuso, F. (2021). Civil society's response to coronavirus disease 2019: Patterns from two hundred case studies of the emergent agency. *Journal of Creative Communications*, *16*(2), 203–212. Advance online publication. doi:10.1177/09732586211015057

Nandan, S. (2005). An exploration of the brand identity–brand image linkage: A communications perspective. *Journal of Brand Management*, *12*(4), 264–278. doi:10.1057/palgrave.bm.2540222

Nas, D. (2019). *How technology is changing customer expectations*. Retrieved November 10, 2021, from The Startup website: https://medium.com/swlh/how-technology-is-changing-customer-expectations-fef52fd709c5

Nasution, M. D. T. P., Rafiki, A., Lubis, A., & Rossanty, Y. (2021). Entrepreneurial orientation, knowledge management, dynamic capabilities towards e-commerce adoption of SMEs in Indonesia. *Journal of Science and Technology Policy Management*, *12*(2), 256–282. doi:10.1108/JSTPM-03-2020-0060

National Electric Light Association. (1918). *Beware. National Electric Light Association Bulletin: 5th Issue*. National Electric Light Association.

Nauta, G.J., van den Heubel, W., & Teunisse, S. (2017). D.*4 Report on ENUMERATE Core Survey 4*. Europeana DSI 2-Assess to Digital Resources of European Heritage.

Navarrete, T. (2013). Museums. In R. Towse & C. Handke (Eds.), *Handbook on the Digital Creative Economy* (pp. 330–343). Edward Elgar Publishing.

Naveen Reddy, K. P., Harichandana, U., Alekhya, T., & Rajesh, S. M. (2019). A study of Robotic Process Automation among Artificial Intelligence. *International Journal of Scientific and Research Publications*, *9*(2), 392–397. doi:10.29322/IJSRP.9.02.2019.p8651

Ndiege, J. R. A. (2019). Social media technology for the strategic positioning of small and medium-sized enterprises: Empirical evidence from Kenya. *The Electronic Journal on Information Systems in Developing Countries*, *85*(2), e12069. doi:10.1002/isd2.12069

Negrea, A., Ciobanu, G., Dobrea, C., & Burcea, S. (2019). Priority aspects in the evolution of the digital economy for building new development policies. *Quality - Access to Success*, *20*(S2), 416–421.

Negroponte, N. (1995). *Being digital*. Coronet.

Nelsen. (2015). *Digital formats are among the most trusted advertising sources despite slow growth*. Retrieved October 10, 2021, from Nelsen website: https://www.nielsen.com/us/en/insights/article/2015/digital-formats-are-among-the-most-trusted-advertising-sources-despite-slow-growth/

Nemeskéri, Z., Zádori, I., Tibold, A., & Szécsi, G. (2020). HRD for an ageing workforce. In M. Loon, J. Steward & S. Nachmias (Eds.), The future of HRD. Volume II: Change, disruption and action (pp. 177-198). Palgrave Macmillian. doi:10.1007/978-3-030-52459-3_7

Newman, D. (2020). *4 Actionable Customer Experience Statistics For 2020*. Retrieved from Forbes website: https://www.forbes.com/sites/danielnewman/2020/06/23/4-actionable-customer-experience-statistics-for-2020/?sh=595492541a84

Newman, K. (2014). *13 tips for planning and hosting successful roundtables.* https://www.eventmanagerblog.com/organising-successful-roundtables

Nicoletti, G., von Rueden, C., & Andrews, D. (2020). Digital technology diffusion: A matter of capabilities, incentives, or both? *European Economic Review*, *128*, 103513. Advance online publication. doi:10.1016/j.euroecorev.2020.103513

Nikou, S., & Aavakare, M. (2021). An assessment of the interplay between literacyand digital Technology in Higher Education. *Education and Information Technologies*, *26*(4), 3893–3915. doi:10.100710639-021-10451-0

Nisar, T. M., Prabhakar, G., & Strakova, L. (2019). Social media information benefits, knowledge management and smart organizations. *Journal of Business Research*, *94*, 264–272. doi:10.1016/j.jbusres.2018.05.005

Nischak, F., Hanelt, A., & Kolbe, L. M. (2017). Unraveling the Interaction of Information Systems and Ecosystems-A Comprehensive Classification of Literature. ICIS.

Nobre, H., & Silva, D. (2014). Social Network Marketing Strategy and SME Strategy Benefits. *Journal of Transnational Management*, *19*(2), 138–151. doi:10.1080/15475778.2014.904658

Nograšek, J., & Vintar, M. (2014). E-government and organisational transformation of government: Black box revisited? *Government Information Quarterly*, *31*(1), 108–118. doi:10.1016/j.giq.2013.07.006

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company*. Oxford University Press.

Noonan, M. (2017). *Competency Models - What are they anyhow and what's the big deal?* https://stccg.com/wp-content/uploads/2017/08/Competency-Models.pdf

Noort, G. V., Voorveld, H. A. M., & Reijmersdal, E. A. V. (2012). Interactivity in brand web sites: Cognitive, affective, and behavioral responses explained by consumers' online flow experience. *Journal of Interactive Marketing*, *26*(4), 223–234. doi:10.1016/j.intmar.2011.11.002

North, D. (1993). *Economic Performance through Time.* https://www.nobelprize.org/prizes/economic-sciences/1993/north/lecture/

North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press. doi:10.1017/CBO9780511808678.017

Noshi, C. I., Assem, A. I., & Schubert, J. J. (2018). The Role of Big Data Analytics in Exploration and Production: A Review of Benefits and Applications. *SPE International Heavy Oil Conference and Exhibition*. 10.2118/193776-MS

Nugraha, R., Kusumawardani, K. A., & Octavianie, V. (2018). The influence of celebrity endorsement in instagram towards customer behavior and purchase intention in healthy food diet business. *Journal of Management Studies*, *3*(2), 1–24.

Nunan, D., & Di Domenico, M. (2019). Older consumers, digital marketing, and public policy: A review and research agenda. *Journal of Public Policy & Marketing*, *38*(4), 469–483. doi:10.1177/0743915619858939

Nwankpa, J.K., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. In *ICIS 2016 Proceedings*. Association for Information Systems

Nwankpa, J. K., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. *Proceedings of International Conference on Information Systems 2016*.

O'Dea, S. (2021). *Number of smartphone users from 2016 to 2021* [Graph]. Statista. https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

Oberländer, M., Beinicke, A., & Bipp, T. (2020). Digital competences: A review of the literature and applications in the workplace. *Computers & Education*, *146*, 1–13. doi:10.1016/j.compedu.2019.103752

Obschonka, M., Fisch, C., & Boyd, R. (2017). Using digital footprints in entrepreneurship research: A Twitter-based personality analysis of superstar entrepreneurs and managers. *Journal of Business Venturing Insights*, *8*, 13–23. doi:10.1016/j.jbvi.2017.05.005

Ocloo, C. E., Xuhua, H., Akaba, S., Shi, J., & Worwui-Brown, D. K. (2020). The determinant factors of business to business (B2B) e-commerce adoption in small-and medium-sized manufacturing enterprises. *Journal of Global Information Technology Management*, *23*(3), 191–216. doi:10.1080/1097198X.2020.1792229

Odoo. (n.d.). *Open Source ERP and CRM | Odoo*. Odoo S.A. Retrieved September 7, 2021, from https://www.odoo.com/

Odoom, R., Anning-Dorson, T., & Acheampong, G. (2017). Antecedents of social media usage and performance benefits in small- and medium-sized enterprises (SMEs). *Journal of Enterprise Information Management*, *30*(3), 383–399. doi:10.1108/JEIM-04-2016-0088

OECD. (2019). *Digital Government in Chile – A Strategy to Enable Digital Transformation*. OECD.

OECD. (2019). *OECD Digital for SMEs Global Initiative. Concept Note*. OECD.

Ofcom. (2020). *Annual study of the nation's media habits*. https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/brits-spend-a-third-of-2020-watching-tv-and-video

OFFSHORE. (2021). *OTC 2021: Offshore industry must fully embrace digital transition, says Amazon official*. https://www.offshore-mag.com/special-reports/article/14208861/otc-2021-offshore-industry-must-fully-embrace-digital-transition-says-amazon-official

Ohanian, R. (1990). Construction and Validation of a Scale to Measure Celebrity Endorsers' Perceived Expertise, Trustworthiness, and Attractiveness. *Journal of Advertising*, *19*(3), 39–52. doi:10.1080/00913367.1990.10673191

Ojala, A., Evers, N., & Rialp, A. (2018). Extending the international new venture phenomenon to digital platform providers: A longitudinal case study. *Journal of World Business*, *53*(5), 725–739. doi:10.1016/j.jwb.2018.05.001

Okonkwo, U. (2009). Sustaining the luxury brand on the internet. *Journal of Brand Management*, *16*(5-6), 302–310. doi:10.1057/bm.2009.2

Olanrewaju, A.-S. T., Hossain, M. A., Whiteside, N., & Mercieca, P. (2020). Social media and entrepreneurship research: A literature review. *International Journal of Information Management*, *50*, 90–110. doi:10.1016/j.ijinfomgt.2019.05.011

Olimjonovich, M. K., Olimjonovich, M. A., & Chorievich, X. A. (2021). Digitalization of Higher Education: Trends and their Influence on the Institute of Higher Education. *International Journal of Engineering and Information Systems*, *5*(2), 123–124.

Oliveira, T., & Martins, M. (2011). Understanding the determinant factors of Internet business solutions adoption: The case of Portuguese firms. *Applied Economics Letters*, *18*(18), 1769–1775. doi:10.1080/13504851.2011.564116

Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. McGraw-Hill.

Olorundare, J. K., Ahiauzu, C. N., Thompson, A. F., Olorundare, A. O., Ekanoye, O. E., Akinbo, A., & Ayorinde, A. (2020). Impact of COVID-19 Contagion on Digital Transformation and Economy. *American Journal of Science, Engineering and Technology*, *5*(4), 158–166.

Olvera-Lobo, M. D., & Castillo-Rodríguez, C. (2018). Dissemination of Spanish SME information through web 2.0 tools. *Journal of Transnational Management*, *23*(4), 178–197. doi:10.1080/15475778.2018.1509422

Omnicore Agency. (2021, August 11). YouTube by the Numbers (2021): Stats, Demographics & Fun Facts. *Omnicore*. https://www.omnicoreagency.com/youtube-statistics/

Oppl, S., & Stary, C. (2020). Game-playing as an effective learning resource for elderly people: Encouraging experiential adoption of touchscreen technologies. *Universal Access in the Information Society*, *19*(2), 295–310. doi:10.100710209-018-0638

Organisation for Economic Co-operation and Development. (2019). *Pisa 2021 creative thinking framework (third draft)*. https://www.oecd.org/pisa/publications/PISA-2021-creative-thinking-framework.pdf

Orr, D., Weller, M., & Farrow, R. (2019). How is digitalization affecting the flexibility and openness of higher education provision? Results of a global survey using a new conceptual model. *Journal of Interactive Media in Education, 2019*(1). doi:10.5334/jime.523

Osarenkhoe, A., & Fjellström, D. (2021). The Oxymoron of Digitalization: A Resource-Based Perspective. *Journal of Information Technology Research*, *14*(4), 1–17. doi:10.4018/JITR.20211001.oa1

Osborne, S. P., Radnor, Z., Kinder, T., & Vidal, I. (2015). The SERVICE framework: A public-service-dominant approach to sustainable public services. *British Journal of Management*, *26*(3), 424–438. doi:10.1111/1467-8551.12094

Osei, B. A., Ragavan, N. A., & Mensah, H. K. (2020). Prospects of the fourth industrial revolution for the hospitality industry: A literature review. *Journal of Hospitality and Tourism Technology*, *11*(3), 479–494. doi:10.1108/JHTT-08-2019-0107

Osenton, T. (2003). *Customer Share Marketing: How The World's Great From Customer Loyalty*. Prentice Hall.

Osmundsen, K., Iden, J., & Bygstad, B. (2018). Digital Transformation: Drivers, Success Factors, and Implications. In *MCIS 2018 Proceedings*. Association for Information Systems.

Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries*. Game Changers, and Challengers.

Osterwalder, A., Pigneur, Y., & Clark, T. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Wiley.

Osur, L. (2016). *Netflix and the Development of the Internet Television Network* (Dissertations). Syracuse University. https://surface.syr.edu/etd/448

Ouyang, R., & Meng, H. (2018). *Charting the Path of Digital Economy in China.* http://www.chinatoday.com.cn/ctenglish/2018/tpxw/201812/t20181207_800150937.html

Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. *Journal of International Business Studies*, *25*(1), 45–64. doi:10.1057/palgrave.jibs.8490193

Özbayoğlu, M. (2017). Derin Öğrenme ile Büyük ve Açık Veri Analizi. In Ş. Sağıroğlu & O. Koç (Eds.), *Büyük Veri ve Açık Veri: Temel Kavramlar* (pp. 115–131). Grafiker.

Öztürk, A. (2006). *Restoran işletmelerinde siparişlerin elektronik ortamda alınmasının işletme performansı üzerine etkileri ve Afyonkarahisar Özdilek A.Ş.'de bir uygulama* [Yayımlanmamış yüksek lisans tezi]. Afyon Kocatepe Üniversitesi.

Padhana, R., & Prabheeshb, K. P. (2021). The economics of COVID-19 pandemic: A survey. *Economic Analysis and Policy*, *70*, 220–237. doi:10.1016/j.eap.2021.02.012

Padilla-Meléndez, A., & del Águila-Obra, A. R. (2013). Web and Social Media Usage by Museums: Online Value Creation. *International Journal of Information Management*, *33*(5), 892–898.

Padwal, R., & Wood, P. W. (2021). Digital health approaches for the assessment and optimization of hypertension care provision. *The Canadian Journal of Cardiology*, *37*(5), 711–721. doi:10.1016/j.cjca.2020.12.009 PMID:33340672

Pagani, M., & Pardo, C. (2017). The impact of digital technology on relationships in a business network. *Industrial Marketing Management*, *67*, 185–192. doi:10.1016/j.indmarman.2017.08.009

Pajares, E., Moral, A., Jurado, E., & Virueal, J. (2015). Efficiency and exports: Evidence from Southern European companies. *Journal of Business Research*, *68*(7), 1506–1511. doi:10.1016/j.jbusres.2015.01.042

Pallant, J. (2005). *SPSS Survival manual: A step by step guide to data analysis using SPSS*. Allen and Unwin Inc.

Pan, H. (2021). *Improve the effectiveness of digital government services and promote digital economic development.* http://www.echinagov.com/viewpoint/292628.htm

Panahi, S., Watson, J., & Partridge, H. (2014). Social media and physicians: Exploring the benefits and challenges. *Health Informatics Journal*, *22*(2), 99–112. doi:10.1177/1460458214540907 PMID:25038200

Pandey, S., & Chawla, D. (2018). Online customer experience (OCE) in clothing e-retail: Exploring OCE dimensions and their impact on satisfaction and loyalty – Does gender matter? *International Journal of Retail & Distribution Management*, *46*(3), 323–346. doi:10.1108/IJRDM-01-2017-0005

Pantano, E., & Timmermans, H. (2014). What is smart for retailing? *Procedia Environmental Sciences*, *22*, 101–107. doi:10.1016/j.proenv.2014.11.010

Papa, A., Santoro, G., Tirabeni, L., & Monge, F. (2018). Social media as tool for facilitating knowledge creation and innovation in small and medium enterprises. *Baltic Journal of Management*, *13*(3), 329–344. doi:10.1108/BJM-04-2017-0125

Parliamentary Office of Science and Technology. (2021). *Developing essential digital skills.* https://researchbriefings.files.parliament.uk/documents/POST-PN-0643/POST-PN-0643.pdf

Parsons, B. (2020). *Coronavirus: COVID-19's impact on the film industry*. https://theboar.org/2020/03/coronavirus-covid-19s-impact-on-the-film-industry/

Pateli, A., Mylonas, N., & Spyrou, A. (2020). Organizational adoption of social media in the hospitality industry: An integrated approach based on DIT and TOE frameworks. *Sustainability*, *12*(17), 7132. doi:10.3390u12177132

Patrick, A. S. (2002). Building trustworthy software agents. *IEEE Internet Computing*, *6*(6), 46–53. doi:10.1109/MIC.2002.1067736

Paulikas, J. (2018). The factors determining employees' positive attitude to innovations: a case of Klaipėda public transport companies. *Organizacijų vadyba: sisteminiai tyrimai*, (79), 85-102.

Pavlasek, P. (2020). Competency-based automotive/mobility engineering education: Implementation of creative project in modular model. In *Proceedings of the IEEE* (pp. 1–6). Institute of Electrical and Electronics Engineers. 10.1109/ELEKTRO49696.2020.9130344

Pei, X.-L., Guo, J.-N., Wu, T.-J., Zhou, W.-X., & Yeh, S.-P. (2020). Does the Effect of Customer Experience on Customer Satisfaction Create a Sustainable Competitive Advantage? A Comparative Study of Different Shopping Situations. *Sustainability*, *12*(18), 7436. doi:10.3390u12187436

Pelletier, C., & Cloutier, L. M. (2019). Conceptualising digital transformation in SMEs: An ecosystemic perspective. *Journal of Small Business and Enterprise Development*, *26*(6/7), 855–876. doi:10.1108/JSBED-05-2019-0144

Pentina, I., Amialchuk, A., & Taylor, D. G. (2011). Exploring effects of online shopping experiences on browser satisfaction and e-tail performance. *International Journal of Retail & Distribution Management*, *39*(10), 742–758. doi:10.1108/09590551111162248

People Management Forum. (2021). *HR v novém normálu* [HR in the new normal]. https://konference.hrforum.cz/wp-content/uploads/2021/09/brozura_2021_FINAL.pdf

People's Daily. (2020). *Digital economy: powerful new engine for China's development.* http://english.scio.gov.cn/chinavoices/2020-07/10/content_76257735.htm

Peppard, J., Edwards, C., & Lambert, R. (2011). Clarifying the Ambiguous Role of the CIO. *MIS Quarterly Executive*, *10*(1).

Pereira, D. (2021). *Netflix Business Model*. https://businessmodelanalyst.com/netflix-business-model/

Pereira, C. S., Durão, N., Fonseca, D., Ferreira, M. J., & Moreira, F. (2020). An educational approach for present and future of digital transformation in Portuguese organizations. *Applied Sciences (Switzerland)*, *10*(3), 757. Advance online publication. doi:10.3390/app10030757

Perez, C. (2010). The advance of technology and major bubble collapses: historical regularities and lessons for today. *Engelsberg Seminar on "The Future of Capitalism Ax:Son Foundation*. https://www.carlotaperez.org/downloads/media/PEREZTechnologyandbubblesforEngelsbergseminar.pdf

Perez, C. (2004). Technological revolutions, paradigm shifts and socio-institutional change. In E. Reinert (Ed.), *Globalization, Economic Development and Inequality: An alternative Perspective* (pp. 217–242). Edward Elgar Publishing Ltd. doi:10.4337/9781845421625.00016

Perez, C., & Soete, L. (1988). Catching-up in technology: entry barriers and windows of opportunity. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical Change and Economic Theory* (pp. 458–479). Pinter Publishers.

Pérez-González, D., Trigueros-Preciado, S., & Popa, S. (2017). Social Media Technologies' Use for the Competitive Information and Knowledge Sharing, and Its Effects on Industrial SMEs' Innovation. *Information Systems Management*, *34*(3), 291–301. doi:10.1080/10580530.2017.1330007

Pérez-Sanagustín, M., Parra, D., Verdugo, R., García-Galleguillos, G., & Nussbaum, M. (2016). Using QR Codes to Increase User Engagement in Museum-Like Spaces. *Computers in Human Behavior*, *60*, 73–85.

Perks, H., Kowalkowski, C., Witell, L., & Gustafsson, A. (2017). Network orchestration for value platform development. *Industrial Marketing Management*, *67*, 106–121. doi:10.1016/j.indmarman.2017.08.002

Perry, M. K. (1989). Vertical integration: Determinants and effects. In *Handbook of Industrial Organization* (Vol. 1, pp. 183–255). Elsevier., doi:10.1016/S1573-448X(89)01007-1

Petersen. (2019). *Digital Economy: How is digitalization changing global competitiveness and economic prosperity?* GED. https://ged-project.de/digitization-and-innovation/digital-economy-how-is-digitalization-changing-global-competitiveness-and-economic-prosperity/

Petersen, B., Welch, L., & Liesch, P. (2002). The Internet and foreign market expansion by firms. *Management International Review*, *42*(2), 207–221.

PETROBRAS. (2020). *Petrobras Day*. https://api.mziq.com/mzfilemanager/v2/d/25fdf098-34f5-4608-b7fa-17d60b2de47d/174ab356-7f22-96e7-6828-94b10fcb3349?origin=1

Philip Chen, C. L., & Zhang, C.-Y. (2014). Data-intensive Applications, Challenges, Techniques and Technologies: A Survey on Big Data. *Information Sciences*, *275*, 314–347. doi:10.1016/j.ins.2014.01.015

Picazo-Vela, S., Gutiérrez-Martínez, I., Duhamel, F., Luna, D. E., & Luna-Reyes, L. F. (2018). Value of inter-organizational collaboration in digital government projects. *Public Management Review*, *20*(5), 691–708. doi:10.1080/14719037.2017.1305702

Piccinini, E., Hanelt, A., Gregory, R., & Kolbe, L. (2015). *Transforming industrial business: The impact of digital transformation on automotive organizations*. Academic Press

Pilemalm, S., Lindgren, I., & Ramsell, E. (2016). Emerging forms of inter-organisational and cross-sector collaborations in e-government initiatives: Implications for participative development of information systems. *Transforming Government: People*. *Process and Policy*, *10*(4), 605–636.

Pilková, A., Holienka, M., Rehák, J., Kovačičová, Z., Komorník, J., Mitková, Ľ., Mikuš, J., Letovanec, M., Smoroňová, T., & Kliáček, P. (2017). *Inkluzivita podnikania na Slovensku: stav a vývojové tendencie* [Inclusive entrepreneurship in Slovakia: state and development trends]. Univerzita Komenského v Bratislave.

Pillai, R., & Sivathanu, B. (2020). Adoption of AI-based chatbots for hospitality and tourism. *International Journal of Contemporary Hospitality Management*, *32*(10), 3199–3226. doi:10.1108/IJCHM-04-2020-0259

Pine, B. J., & Gilmore, J. H. (1998, July). Welcome to the experience economy. *Harvard Business Review,* 97–105.

Pine, J. B. II, & Gilmore, J. H. (2020). *The Experience Economy: Competing for Customer, Time, Attention and Money*. Harvard Business Review Press.

Piotrowski, M. (2010). *Learning Management System Technologies and Software Solutions for Online Teaching: Tools and Applications What is an E-Learning Platform?* ZHAW Zurich University of Applied Sciences.

Pleo. (n.d.). *Smarter spending for your business*. Pleo. Retrieved September 9, 2021, from https://www.pleo.io/en

Plothe, T., & Buck, M. A. (2019). *Netflix at the Nexus Content, Practice, and Production in the Age of Streaming Television*. Peter Lang Publishing, Inc., doi:10.3726/b14725

Plutchik, R. (1980). A general psychoevolutionary theory of emotion. In *Theories of Emotion* (pp. 3–33). Academic Press. doi:10.1016/B978-0-12-558701-3.50007-7

Pool, J. K., Arabzad, S. M., Asadi, A., & Ansari, M. R. (2015). RFID acceptance in SMEs using TOE framework: An empirical investigation on Iranian SMEs. *International Journal of Logistics Systems and Management*, *21*(3), 335–347. doi:10.1504/IJLSM.2015.069731

Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, *92*(11), 64–88.

Postmus, S. (2018). *Recommender System Techniques Applied to Netflix Movie Data.* Research Paper Business Analytics.

Poushter, J., Bishop, C., & Chwe, H. (2018). *Social media use continues to rise in developing countries but plateaus across developed ones.* Pew Research Center.

Pratt, M. G. (2009). From the editors: For the lack of a boilerplate: Tips on writing up (and reviewing) qualitative research. American Society of Nephrology.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models. *Behavior Research Methods*, *40*(3), 879–891. doi:10.3758/BRM.40.3.879 PMID:18697684

Preston, D., & Karahanna, E. (2009). How to develop a shared vision: The key to IS strategic alignment. *MIS Quarterly Executive*, *8*(1).

Pritchard, A. (1969). Statiscal bibliography or Bibliometrics. *The Journal of Documentation*, *25*(4), 348–349.

Priyadarsini & Verma. (2021). *Digital transformation trends and priorities within China utilities.* https://www.idc.com/getdoc.jsp?containerId=AP46517821

Proctor, J. (2019). *Digital Transformation vs. Business Process Reengineering (BPR)*. Retrieved on July 10, 2021 from https://www.inteqgroup.com/blog/digital-transformation-vs-business-process-reengineering

Proctor, T. (2020). Creative problem-solving techniques, paradigm shift and team performance. *Team Performance Management*, *26*(7/8), 451–466. doi:10.1108/TPM-06-2020-0049

Profeta, A., Balling, R., & Roosen, J. (2012). The relevance of origin information at the point of sale. *Food Quality and Preference*, *26*(1), 1–11. doi:10.1016/j.foodqual.2012.03.001

Przytuła, S., Strzelec, G., & Krysińska-Kościańska, K. (2020). Re-vision of future trends in human resource management (HRM) after Covid-19. *Journal of Intercultural Management*, *12*(4), 70–90. doi:10.2478/joim-2020-0052

Purdy, J., Ansari, S., & Gray, B. (2019). Are logics enough? Framing as an alternative tool for understanding institutional meaning making. *Journal of Management Inquiry*, *28*(4), 409–419. doi:10.1177/1056492617724233

Purnama, C., & Subroto, W. T. (2016). Competition intensity, uncertainty environmental on the use of information technology and its impact on business performance small and medium enterprises (SMEs). *International Review of Management and Marketing*, *6*(4).

Puspitasari, I., & Jie, F. (2020). Making the information technology-business alignment works: A framework of IT-based competitive strategy. *International Journal of Business Information Systems*, *34*(1), 59–82. doi:10.1504/IJBIS.2020.106796

Puthiyamadam, T., & Reyes, J. (2018). Experience is everything: Here's how to get it right. *PwC*. doi:10.1057/9780230554719_13

PwC. (2021). *PwC's June 2021 Global Consumer Insights Pulse Survey.* https://www.pwc.com/gx/en/consumer-markets/consumer-insights-survey/2021/gcis-june-2021.pdf

PwCanalysis. (2017). *Will robots really steal our jobs?* PwC. https://www.pwc.co.uk/economics

Qalati, S. A., Ostic, D., Shuibin, G., & Mingyue, F. (2021). A mediated–moderated model for social media adoption and small and medium-sized enterprise performance in emerging countries. *Managerial and Decision Economics*. doi:10.1002/mde.3422

Qalati, S. A., Yuan, L. W., Khan, M. A. S., & Anwar, F. (2021). A mediated model on the adoption of social media and SMEs' performance in developing countries. *Technology in Society*, *64*, 101513. doi:10.1016/j.techsoc.2020.101513

Quach, S., Barari, M., Moudrý, D. V., & Quach, K. (2020). Service integration in omnichannel retailing and its impact on customer experience. *Journal of Retailing and Consumer Services*, 102267. doi:10.1016/j.jretconser.2020.102267

Quach, S., & Thaichon, P. (2017). From connoisseur luxury to mass luxury: Value co-creation and co-destruction in the online environment. *Journal of Business Research*, *81*, 163–172. doi:10.1016/j.jbusres.2017.06.015

Quico, C. (2019). Television Reshaped by Big Data: Impacts and Implications for Netflix-Like Platforms in the Age of Dataism. *International Journal of Film and Media Arts*, *4*(1), 48–55. doi:10.24140/ijfma.v4.n1.04

Qurratu'Aini, H., & Hapsari, A. (2019). Interests influence of digital marketing product sales in exports by SMEs in Bandung. *Global Business and Management Research*, *11*(1), 217–225.

Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*, *30*(8), 1143–1160. https://doi.org/10.1108/JMTM-01-2018-0020

Radovanovic, D., Hogan, B., & Lalic, D. (2015). *Overcoming digital divides in higher education: Digital literacy beyond Facebook*. New Media & Society.

Rahayu, R., & Day, J. (2015). Determinant factors of e-commerce adoption by SMEs in developing country: Evidence from Indonesia. *Procedia: Social and Behavioral Sciences*, *195*, 142–150. doi:10.1016/j.sbspro.2015.06.423

Rahman, Z. (2006). Customer experience management— A case study of an Indian bank. *Journal of Database Marketing & Customer Strategy Management*, *13*(3), 203–221. https://doi.org/10.1057/palgrave.dbm.3240298

Raimundo, R., & Rosário, A. (2021). Blockchain system in the Higher Education, European Journal of Investigation in Health, *Psychology and Education*, *11*(1), 276-293. doi:10.3390/ejihpe1101002

Rai, V., Shinde, S., Mhatre, B., & Mahadik, P. (2014). Restaurant management system. *International Journal of Research in Information Technology*, *2*(3), 284–288.

Rajala, S. A. (2012). Beyond 2020: Preparing engineers for the future. *Proceedings of the IEEE*, *100*(Special Centennial Issue), 1376–1383. doi:10.1109/JPROC.2012.2190169

Rajaobelina, L., Brun, I., Prom Tep, S., & Arcand, M. (2018). Towards a better understanding of mobile banking: The impact of customer experience on trust and commitment. *Journal of Financial Services Marketing*, *23*(3–4), 141–152. https://doi.org/10.1057/s41264-018-0051-z

Rajesh, M., Satya Prabha, G., & Vara Prasad Rao, P. V. (2015). e-Restaurant: Online restaurant management system for android. *International Journal & Magazine of Engineering, Technology*, *Management and Research*, *2*, 574–579.

Ramadan, Z., & Nsouli, N. Z. (2021). Luxury fashion start-up brands´ digital strategies with female Gen Y in the Middle East. *Journal of Fashion Marketing and Management*. Advance online publication. doi:10.1108/JFMM-10-2020-0222

Ramayah, T., Ling, N. S., Taghizadeh, S., & Rahman, S. (2016). Factors influencing SMEs website continuance intention in Malaysia. *Telematics and Informatics*, *33*(1), 150–164. doi:10.1016/j.tele.2015.06.007

Rangaswamy, A., & Van Bruggen, G. H. (2005). Opportunities and challenges in multichannel marketing: An introduction to the special issue. *Journal of Interactive Marketing*, *19*(2), 5–11. https://doi.org/10.1002/dir.20037

Raymond, L. (2001). Determinants of web site implementation in small businesses. *Internet Research*, *11*(5), 411–423. doi:10.1108/10662240110410363

Raymond, L., Bergeron, F., & Blili, S. (2005). The assimilation of e-business in manufacturing SMEs: Determinants and effects on growth and internationalization. *Electronic Markets*, *15*(2), 106–118. doi:10.1080/10196780500083761

Reeves, M. (2002). *Measuring the Economic and Social Impact of the Arts: A Review*. The Arts Council of England.

Regulation (EU). (2016). *2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC* (General Data Protection Regulation) (Text with EEA relevance). https://data.europa.eu/eli/reg/2016/679/oj

Reichheld, F. F. (2011). *The Ultimate Question 2.0 (How Net Promoter Companies Thrive in a Customer-Driven World)*. HBR Press.

Rellie, J. (2004). One Site Fits All: Balancing Priorities at Tate Online. In D. Bearman & J. Trant (Eds.), *Museums and the Web*. Archives and Museums Informatics.

Rialti, R., Marzi, G., Ciappei, C., & Busso, D. (2019). Big data and dynamic capabilities: A bibliometric analysis and systematic literature review. *Management Decision*, *57*(8), 2052–2068. doi:10.1108/MD-07-2018-0821

Riasanow, T., Jäntgen, L., Hermes, S., Böhm, M., & Krcmar, H. (2021). Core, intertwined, and ecosystem-specific clusters in platform ecosystems: Analyzing similarities in the digital transformation of the automotive, blockchain, financial, insurance and IIoT industry. *Electronic Markets*, *31*(1), 89–104. doi:10.100712525-020-00407-6

Richins, M. L. (1983). Negative Word-of-Mouth by Dissatisfied Consumers: A Pilot Study. *Journal of Marketing*, *47*(1), 68–78. https://doi.org/10.1177/002224298304700107

Rickards, T., Smaje, K., & Sohoni, V. (2015). *'Transformer in chief': The new chief digital officer*. Academic Press.

Rienda, L., Ruiz-Fernández, L., & Carey, L. (2020). Analysing trademark and social media in the fashion industry: Tools that impact performance and internationalization for SMEs. *Journal of Fashion Marketing and Management*, *25*(1), 117–132. doi:10.1108/JFMM-03-2020-0035

Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses* (1st ed.). Crown Business.

Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business.

Rietveld, J., & Schilling, M. A. (2021). Platform Competition: A Systematic and Interdisciplinary Review of the Literature. *Journal of Management*, *47*(6), 1528–1563. doi:10.1177/0149206320969791

Ringle, C. M., Wende, S., & Will, A. (2005). *Smart PLS 2* (2.0). PLS. http://www.smartpls.com

Riofrío-Valdivieso, A., Quinga-Socasi, F., Bustamante-Orellana, C., & Andrade-Chamorro, E. (2019). RFID and wireless based system for restaurant industry. In *The International Conference on Advances in Emerging Trends and Technologies*. Springer.

Ritter, T., & Pedersen, C. L. (2020). Analyzing the impact of the coronavirus crisis on business models. *Industrial Marketing Management*, *88*, 214–224. doi:10.1016/j.indmarman.2020.05.014

Rivera-Trigueros, I., & Olvera-Lobo, M. D. (2021). Internet presence and multilingual dissemination in corporate websites: A portrait of Spanish healthcare SMEs. *Journal of Global Information Management*, *29*(6), 1–17. doi:10.4018/JGIM.20211101.oa24

Rivza, B., Kruzmetra, M., Gudele, I., & Foris, D. (2019). Digitalization as an essential growth factor contributing in SME development (experience of Latvia and Romania). *Agronomy Research (Tartu)*, *17*, 261–270.

Rızaoğlu, B., & Hançer, M. (2005). *Menü ve yönetim*. Detay Yayıncılık.

Robert, J.-M. (2014). Defining and Structuring the Dimensions of User Experience with Interactive Products. LNAI, 8532.

Robson, M. (2002). *Problem-solving in groups*. Gower Publishing.

Rogers, E. M. (1962). Diffusion of innovations. New York: Free Press.

Rogers, E. (1995). *Diffusion of Innovations*. Free Press.

Rohlik. (n.d.). *Online supermarket Rohlik.cz—Nejrychlejší doručení ve městě*. Rohlik.cz. Retrieved September 9, 2021, from https://www.rohlik.cz/vitejte

Rosário, A. (2021). Research-Based Guidelines for Marketing Information Systems. *International Journal of Business Strategy and Automation*, *2*(1), 1–16. doi:10.4018/IJBSA.20210101.oa1

Rosário, A., & Cruz, R. (2019). Determinants of Innovation in Digital Marketing, Innovation Policy and Trends in the Digital Age. *Journal of Reviews on Global Economics*, *8*, 1722–1731. doi:10.6000/1929-7092.2019.08.154

Rosário, A., Fernandes, F., Raimundo, R., & Cruz, R. (2021). Determinants of Nascent Entrepreneurship Development. In A. Carrizo Moreira & J. G. Dantas (Eds.), *Handbook of Research on Nascent Entrepreneurship and Creating New Ventures* (pp. 172–193). IGI Global. doi:10.4018/978-1-7998-4826-4.ch008

Rose, J., Persson, J. S., Heeager, L. T., & Irani, Z. (2015). Managing e-Government: Value positions and relationships. *Information Systems Journal*, *25*(5), 531–571. doi:10.1111/isj.12052

Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. McGraw-Hill.

Rose, S., Clark, M., Samouel, P., & Hair, N. (2012). Online Customer Experience in e-Retailing: An empirical model of Antecedents and Outcomes. *Journal of Retailing*, *88*(2), 308–322. https://doi.org/10.1016/j.jretai.2012.03.001

Rose, S., Hair, N., & Clark, M. (2011). Online Customer Experience: A Review of the Business-to-Consumer Online Purchase Context. *International Journal of Management Reviews*, *13*(1), 24–39. https://doi.org/10.1111/j.1468-2370.2010.00280.x

Ross, J., Sebastian, I., Beath, C., Scantlebury, S., Mocker, M., Fonstad, N., ... Moloney, K. (2016). *Designing digital organizations*. Academic Press.

Ross, J. W., & Feeny, D. F. (1999). *The Evolving Role of the CIO, CISR, WP No. 308*. Sloan School of Management.

Ross, J. W., & Weill, P. (2002). Six IT decisions your IT people shouldn't make. *Harvard Business Review*, *80*(11), 84–95. PMID:12422792

Roth, R. (2017). User Interface and User Experience (UI/UX) Design. *Geographic Information Science & Technology Body of Knowledge, 2017*(Q2). doi:10.22224/gistbok/2017.2.5

Roto, V., Bragge, J., Lu, Y., & Pacauskas, D. (2021). Mapping experience research across disciplines: Who, where, when. *Quality and User Experience*, *6*(1), 7. Advance online publication. doi:10.100741233-021-00047-4

Rouhiainen, L. (2018). *Inteligencia Artificial*. Alienta Editorial.

Rowland-Campbell, A. (2017). *Who represents the human in the digital age?* https://www.thinknpc.org/resource-hub/who-represents-the-human-in-the-digital-age/

Roy, S. (2018). Effects of customer experience across service types, customer types and time. *Journal of Services Marketing*, *32*(4), 400–413. https://doi.org/10.1108/JSM-11-2016-0406

Rubio, J. E., & Tshipamba, N. (2010). Elements of the Public Policy of Science, Technology and Innovation. *Journal Canadian Social Science.*, *6*(6), 61–80.

Ruco, A. (2021). *Disrupt-canvas*. https://github.com/alexruco/disrupt-canvas

Ruffoni, J. (2010). Proximidade geográfica e inovação tecnológica de firmas: uma análise para o segmento produtor de máquinas para calçados da Itália e do Brasil. Academic Press.

Russom, P. (2011). *Big Data Analytics*. TDWI Research.

Russo-Spena, T., Tregua, M., & Bifulco, F. (2017). Searching through the jungle of innovation conceptualisations: System, network and ecosystem perspectives. *Journal of Service Theory and Practice*, *27*(5), 977–1005. doi:10.1108/JSTP-10-2015-0224

Rybchak, Z., & Basystiuk, O. (2017). Analysis of Methods and Means of Text Mining. Econtechmod. *An International Quarterly Journal*, *6*(2), 73–78.

Rystad. (2019). *Subsea Market set to surge in the next five years*. Free Report Subsea.

Ryu, J. S., & Fortenberry, S. (2017). Understanding young consumers' personal-level cultural orientation and shopping intentions: Implications for small-town retailers. *Journal of Small Business Strategy*, *27*(3), 1–8.

Saban, K. A., & Rau, S. E. (2005). The functionality of websites as export marketing channels for small and medium enterprises. *Electronic Markets*, *15*(2), 128–135. doi:10.1080/10196780500083803

Sadeh, G. (2019). *How Netflix Uses Big Data to Create Content and Enhance User Experience*. https://www.clickz.com/how-netflix-uses-big-data-content/

Saeed, H., Shouman, A., Elfar, M., Shabka, M., Majumdar, S., & Horng-Lung, C. (2016). Near-field communication sensors and cloud-based smart restaurant management system. In *2016 IEEE 3rd World Forum on Internet of Things (WF-IoT)*. IEEE. 10.1109/WF-IoT.2016.7845440

Saeed, S. (2019). Digital business adoption and customer segmentation: An exploratory study of the expatriate community in Saudi Arabia. *ICIC Express Letters*, *13*(2), 133–139. doi:10.24507/icicel.13.02.133

Saha, V., & Goyal, P. (2019). How Co-creation drives the success of public service initiatives? A case-study based analysis. *Journal of Nonprofit & Public Sector Marketing*, 1–21.

Sahilli Birdir, S., & Yıldız Kale, E. (2015). Restoran işletmelerinde yenilik uygulamaları: Mersin ve Adana örneği. *Seyahat ve Otel İşletmeciliği Dergisi*, *11*(3), 57–72.

Sako, M. (2021). From remote work to working from anywhere. *Communications of the ACM*, *64*(4), 20–22. doi:10.1145/3451223

Salehzadeh, R., & Pool, J. K. (2017). Brand attitude and perceived value and purchase intention toward global luxury brands. *Journal of International Consumer Marketing*, *29*(2), 74–82. doi:10.1080/08961530.2016.1236311

Salvetti, F., & Bertagni, B. (2020). Leadership 5.0: An Agile Mindset for a Digital Future. *Int. J. Adv. Corp. Learn*, *13*(2), 57–66. doi:10.3991/ijac.v13i2.17033

Sá, M. J., Santos, A. I., Serpa, S., & Miguel Ferreira, C. (2021). Digitainability—Digital competences post-Covid-19 for a sustainable society. *Sustainability*, *13*(17), 1–22. doi:10.3390u13179564

Samara, D., Magnisalis, I., & Peristeras, V. (2020). Artificial intelligence and big data in tourism: A systematic literature review. *Journal of Hospitality and Tourism Technology*, *11*(2), 343–367. doi:10.1108/JHTT-12-2018-0118

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *Management Information Systems Quarterly*, *27*(2), 237–263. doi:10.2307/30036530

Samek Lodovici, M., Ferrari, E., Paladino, E., Pesce, F., Fracassetti, P., Aram, E., & Hadjivassiliou, K. (2021). *The impact of teleworking and digital work on workers and society. Special focus on surveillance and monitoring, as well as on mental health of workers.* https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662904/IPOL_STU(2021)662904_EN.pdf

Samson, R. (2020). *The business strategy of Netflix*. https://www.profolus.com/topics/the-business-strategy-of-netflix/

Sand, F. V., Frison, A. K., Zotz, P., Riener, A., & Holl, K. (2017). *User Experience is Brand Experience The Psychology Behind Successful Digital Products and Services*. Springer. doi:10.1007/978-3-030-29868-5

Sangaran, G., & Jeetesh, K. (2015). The effects of job satisfaction towards employee turnover in the hotel industry: A case study of hotels in Kuala Lumpur City Center. *Journal of Tourism & Hospitality (Los Angeles, Calif.)*, *4*(1), 1–5.

Santos, C. C., Pedro, N. S. G., & Mattar, J. (2021). Assessment of the proficiency level in digital competences of higher education professors in Portugal. *Educação, 46*, 1–37.

Santos, M. (2008). *Técnica, Espaço, Tempo: globalização e meio técnico-científico- informacional* (Vol. 5). EDUSP.

Sanwal. (2020, June 10). *50 Startup Unicorn Companies in 2020*. CB Insights Research. https://www.cbinsights.com/research/report/future-unicorn-startups-billion-dollar-companies/

Sari, R. P. (2020). *Prevent Corona, CGV in Jakarta Temporarily Closed Starting March 23, 2020*. https://www.kompas.com/hype/read/2020/03/21/160619066/cegah-corona-cgv-di-jakarta-tutup-sementara-mulai-23-maret-2020

Sarstedt, M., Henseler, J., & Ringle, C. M. (2011). Multigroup Analysis in Partial Least Squares (PLS) Path Modeling: Alternative Methods and Empirical Results. doi:10.1108/S1474-7979(2011)0000022012

Sarstedt, M., Hair, J. F. Jr, Cheah, J. H., Becker, J. M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal*, *27*(3), 197–211. doi:10.1016/j.ausmj.2019.05.003

Sassen, S. (1998). *As cidades na economia mundial*. Studio Nobel.

Satell, G. (2016, September 2). Platforms Are Eating The World. *Forbes*. https://www.forbes.com/sites/gregsatell/2016/09/02/platforms-are-eating-the-world-3/

Saxena, D. (2021). Big Data for Digital Transformation of Public Services. In Disruptive Technology and Digital Transformation for Business and Government (pp. 250-266). IGI Global. doi:10.4018/978-1-7998-8583-2.ch013

Saxena, D., & McDonagh, J. (2022). Communication breakdowns during business process change projects–Insights from a sociotechnical case study. *International Journal of Project Management*. doi:10.1016/j.ijproman.2021.11.011

Saxena, D., & McDonagh, J. (2019). Evaluating ERP Implementations: The Case for a Lifecycle-based Interpretive Approach. *Electronic Journal of Information Systems Evaluation*, *22*(1), 29–37.

Saxena, D., Muzellec, L., & Trabucchi, D. (2020). BlaBlaCar: Value creation on a digital platform. *Journal of Information Technology Teaching Cases*, *10*(2), 119–126. doi:10.1177/2043886919885940

SBA. (2020). Vznik a zánik MSP na Slovensku v roku 2019 [Formation and discontinuation of SMEs in Slovakia in 2019]. Bratislava 2020.

Scarpi, D. (2012). Work and Fun on the Internet: The Effects of Utilitarianism and Hedonism Online. *Journal of Interactive Marketing*, *26*(1), 53–67. doi:10.1016/j.intmar.2011.08.001

Schalk, R., Timmerman, V., & Van Den Heuvel, S. (2013). How strategic considerations influence decision making on e-HRM applications. *Human Recourse Management Review*, *23*(1), 84–92. doi:10.1016/j.hrmr.2012.06.008

Schmidt, E., & Cohen, J. (2013). *The new digital age: Reshaping the future of people, nations and business*. Vintage Books.

Schmitt, B. (1999). Experiential Marketing. *Journal of Marketing Management*, *15*(1–3), 53–67. https://doi.org/10.1362/026725799784870496

Schmitt, C., & Baldegger, R. (2020). Editorial: Digitalization and internationalization. *Technology Innovation Management Review*, *10*(4), 3–4. doi:10.22215/timreview/1342

Schneider, S. (2019, February 24). *How blockchain is eating the world*. https://medium.com/hackernoon/how-blockchain-is-eating-the-world-82ca87d26429

Schnoor, A. (2020). *The Secret of Disney's Brand: How the company has become a marketing empire*. https://bettermarketing.pub/the-secret-of-disneys-brand-a1e4432cf6fd

Schönberger, V. M., & Cukier, K. (2013). *Büyük Veri: Yaşama Çalışma ve Düşünme Şeklimizi Dönüştürecek Bir Devrim* (B. Erol, Trans.). Paloma.

SchultzC. M. (2021). *The future of HR*. https://www.intechopen.com/online-first/75587

Schumpeter, J. A. (1982). *Teoria do Desenvolvimento Econômico*. Abril Cultural.

Schwandt. (2020). *Digital Economy Compass 2020.* Statista. https://www.statista.com/study/83121/digital-economy-compass/

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., & Fonstad, N. O. (2020). How big old companies navigate digital transformation. In *Strategic Information Management* (pp. 133–150). Routledge. doi:10.4324/9780429286797-6

Senecal, S., & Nantel, J. (2004). The influence of online product recommendations on consumers' online choices. *Journal of Retailing*, *80*(2), 159–169. doi:10.1016/j.jretai.2004.04.001

Sen, S. (2020). *Digital HR strategy: Achieving sustainable transformation in the digital age*. Kogan Page.

Senyo, P. K., Liu, K., & Effah, J. (2019). Digital business ecosystem: Literature review and a framework for future research. *International Journal of Information Management*, *47*, 52–64.

Serra Cantallops, A., & Salvi, F. (2014). New consumer behavior: A review of research on eWOM and hotels. *International Journal of Hospitality Management*, *36*, 41–51. https://doi.org/10.1016/j.ijhm.2013.08.007

Šestáková, M. (2019). The Human Factor in Industry 4.0 and Some of Its Intergenerational Implications. *Proceedings of the 4th International Workshop on Knowledge Management 2019*.

Setia, P., Setia, P., Venkatesh, V., & Joglekar, S. (2013). Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance. *Management Information Systems Quarterly*, *37*(2), 565–590. doi:10.25300/MISQ/2013/37.2.11

Shadbolt, N., O'Hara, K., De Roure, D., & Hall, W. (2019). *The theory and practice of social machines*. Springer. doi:10.1007/978-3-030-10889-2

Shank, G. (2006). *Qualitative Research: A Personal Skills Approach* (2nd ed.). Pearson.

Shao, L., & Zhang, Y. (2012). Study on the Key Technology and Application of Smart Tourist Public Service System. *Proceedings Of The 8th Euro-Asia Conference on Environment and Csr: Tourism, Mice, Hospitality Management And Education Session*, 8-15.

Sharif, M. H. M., Troshani, I., & Davidson, R. (2015). Public sector adoption of social media. *Journal of Computer Information Systems*, *55*(4), 53–61. doi:10.1080/08874417.2015.11645787

Shekhar Kumar, R., Dash, S., & Chandra Purwar, P. (2013). The nature and antecedents of brand equity and its dimensions. *Marketing Intelligence & Planning*, *31*(2), 141–159. https://doi.org/10.1108/02634501311312044

Shen, X.-L., Li, Y.-J., Sun, Y., & Wang, N. (2018). Channel integration quality, perceived fluency and omnichannel service usage: The moderating roles of internal and external usage experience. *Decision Support Systems*, *109*, 61–73. https://doi.org/10.1016/j.dss.2018.01.006

Sheremetyeva, E. N., Gorshkova, L. A., & N. V. Mitropolskaya-Rodionova. (2020). Digital Marketing and Digital Transformation of the University. *European Proceedings of Social and Behavioural Sciences*, 158–166. doi:10.15405/epsbs.2021.04.02.20

Shipilov, A., & Gawer, A. (2020). Integrating research on interorganizational networks and ecosystems. *The Academy of Management Annals*, *14*(1), 92–121. doi:10.5465/annals.2018.0121

Shi, S., Wang, Y., Chen, X., & Zhang, Q. (2020). Conceptualization of omnichannel customer experience and its impact on shopping intention: A mixed-method approach. *International Journal of Information Management*, *50*, 325–336. https://doi.org/10.1016/j.ijinfomgt.2019.09.001

Shneor, R. & Flåten, B. (2008). The Internet-enabled internationalization process: A focus on stages and sequences. *Journal of e-Business, 8*(1,2), 44-53.

Shneor, R. (2012). Influences of culture, geography and infrastructure on website localization decisions. *Cross Cultural Management*, *19*(3), 352–374. doi:10.1108/13527601211247099

Sia, S. K., Soh, C., & Weill, P. (2016). How DBS Bank Pursued a Digital Business Strategy. *MIS Quarterly Executive*, *15*(2), 105–121.

Sibanda, M., & Ramrathan, D. (2017). Influence of information technology on organization strategy. *Foundations of Management*, *9*(1), 191–202. doi:10.1515/fman-2017-0015

Siebel, T. M. (2019). *Digital Transformation*. Rosetta Books.

Sigalês, C. (2021). The Role of Digital Technologies in the New Present and Future of Higher Education. In V. van't Land, A. Corcoran, & D. Iancu (Eds.), *The Promise of Higher Education*. Springer. doi:10.1007/978-3-030-67245-4_62

Silva, M. J. de B., Farias, S. A., de, & Grigg, M. K. (2020). Online Engagement and the Role of Digital Influencers in Product Endorsement on Instagram. *Journal of Relationship Marketing*, *19*(2), 133–163. doi:10.1080/15332667.2019.1664872

Silverman, D. (2013). *Doing qualitative research: A practical handbook*. Sage.

Simmonds, H., & Gazley, A. (2018). Service ecotones: The complex boundary zones of service (eco) systems. *Journal of Service Theory and Practice*, *28*(3), 384–404. doi:10.1108/JSTP-08-2017-0136

Simmonds, H., Gazley, A., Kaartemo, V., Renton, M., & Hooper, V. (2021). Mechanisms of service ecosystem emergence: Exploring the case of public sector digital transformation. *Journal of Business Research*, *137*, 100–115. doi:10.1016/j.jbusres.2021.08.008

Simmons, G., Armstrong, G. A., & Durkin, M. G. (2008). A conceptualization of the determinants of small business website adoption: Setting the research agenda. *International Small Business Journal*, *26*(3), 351–389. doi:10.1177/0266242608088743

Simmons, G., Armstrong, G. A., & Durkin, M. G. (2011). An exploration of small business website optimization: Enablers, influencers and an assessment approach. *International Small Business Journal*, *29*(5), 534–561. doi:10.1177/0266242610369945

Şimşek, G. (2010). Otomasyon uygulamaları. In M. Sarıışık, Ş. Çavuş & K. Karamustafa (Eds.), Profesyonel restoran yönetimi ve ilkeler uygulamalar ve örnek olaylar (pp. 299-312). Detay Yayıncılık.

Singh, A., Gupta, R., & Kumar, A. (2020). A strategic focus on adoption of mobile taxi application-a move towards digital India. *International Journal of Advanced Science and Technology, 29*(5), 352-364.

Singh, N., & Baack, D. (2004). Web Site adaptation: A cross-cultural comparison of US and Mexican web sites. *Journal of Computer-Mediated Communication*, *9*(4), 946. doi:10.1111/j.1083-6101.2004.tb00298.x

Singh, N., & Boughton, P. D. (2005). Measuring Website Globalization: A Cross-Sectional Country and Industry Level Analysis. *Journal of Website Promotion*, *1*(3), 3–20. doi:10.1300/J238v01n03_02

Singh, N., Toy, D. R., & Wright, L. K. (2009). A diagnostic framework for measuring website localization. *Thunderbird International Business Review*, *51*(3), 281–295. doi:10.1002/tie.20265

Sin, K. Y., & Sin, M. C. (2020). Factors influencing e-commerce adoption: Evaluation using structural equation modelling (SEM). *International Journal of Business and Society*, *21*(3), 1192–1202.

Sinkovics, R. R., & Penz, E. (2005). Empowerment of SME websites: Development of a web-empowerment scale and preliminary evidence. *Journal of International Entrepreneurship*, *3*(4), 303–315. doi:10.100710843-006-7858-8

Siqueira, J. R. (2018). *Gerenciamento de Integridade de Sistemas Submarinos de Produção de Petróleo & Gás.* Apresentação SPetro.

Sirisomboonsuk, P., Gu, V. C., Cao, R. Q., & Burns, J. R. (2018). Relationships between project governance and information technology governance and their impact on project performance. *International Journal of Project Management*, *36*(2), 287–300. doi:10.1016/j.ijproman.2017.10.003

Situmorang, S. H. (2020). Middle Class Millennial Experiences in the Digital Market. In *Handbook of Research on Innovation and Development of E-Commerce and E-Business in ASEAN*. IGI Global. doi:10.4018/978-1-7998-4984-1

Situmorang, S. H., Rini, E. S., &Lubis, A. N. (2019). Brand Experience Analysis – How It Relates to Brand Personality, Value, Satisfaction, and Loyalty in TV Brands? *International Journal of Civil Engineering and Technology*, *10*, 852–866.

Sjodin, D. R., Parida, V., Leksell, M., & Petrovic, A. (2018). Smart Factory Implementation and Process Innovation: A Preliminary Maturity Model for Leveraging Digitalization in Manufacturing Moving to smart factories presents specific challenges that can be addressed through a structured approach focused on people, processes, and technologies. *Research Technology Management*, *61*(5), 22–31. doi:10.1080/08956308.2018.1471277

Skare, M., & Riberio Soriano, D. (2021). How globalization is changing digital technology adoption: An international perspective. *Journal of Innovation and Knowledge.* doi:10.1016/j.jik.2021.04.001

Smith, R. (2018). *42% of global e-commerce is happening in China.* World Economic Forum. https://www.weforum.org/agenda/2018/04/42-of-global-e-commerce-is-happening-in-china-heres-why/

Smith, A. K., & Bolton, R. N. (2002). The effect of customers' emotional responses to service failures on their recovery effort evaluations and satisfaction judgments. *Journal of the Academy of Marketing Science*, *30*(1), 5–23. doi:10.1177/03079450094298

Soete, L., Verspagen, B., & Weel, B. T. (2010). Systems of Innovation. In H. B. Hall (Ed.), *Rosenberg, N. (Org.) Handbook of Economics of innovation* (Vol. 2). Elsevier.

Solis, B. (2014). *The 2014 state of digital transformation.* https://www.briansolis.com/2014/07/2014-state-digital-transformation/

Solomon, M. G., & Chapple, M. (2004). *Information security illuminated*. Jones & Bartlett Publishers.

Soni, P. (2021). Web-store image dimensions and online retail customer loyalty: Investigating mediators and moderators. *American Journal of Business*, *36*(1), 20–34. doi:10.1108/AJB-08-2020-0133

Sopadjieva, E., Utpal, M. D., & Benjamin, B. (2017). *A Study of 46,000 Shoppers Shows That Omnichannel Retailing Works.* Retrieved March 9, 2021, from Harvard Business Review website: https://hbr.org/2017/01/a-study-of-46000-shoppers-shows-that-omnichannel-retailing-works

Sostero, M., Milasi, S., Hurley, J., Fernández-Macías, E., & Bisello, M. (2020). *Teleworkability and the Covid-19 crisis: a new digital divide? A Joint European Commission–Eurofound Report*. https://ec.europa.eu/jrc/sites/default/files/jrc121193.pdf

Soto-Acosta, P., Popa, S., & Palacios-Marqués, D. (2016). E-business, organizational innovation and firm performance in manufacturing SMEs: An empirical study in Spain. *Technological and Economic Development of Economy*, *22*(6), 885–904. doi:10.3846/20294913.2015.1074126

Sousa, M. J., & Rocha, A. (2019). Digital learning: Developing skills for digital transformation of organisations. *Future Generation Computer Systems*, *91*, 327–334. doi:10.1016/j.future.2018.08.048

Sovie, D., Curran, J., Schoelwer, M., & Björnsjö, A. (2017). *Dynamic digital consumers: Ever-changing expectations and technology intrigue*. Academic Press.

Sowa, P., Pędziński, B., Krzyżak, M., Maślach, D., Wójcik, S., & Szpak, A. (2016). The computer-assisted web interview method as used in the national study of ICT use in primary healthcare in Poland – reflections on a case study. *Studies in Logic*. *Grammar and Rhetoric*, *43*(1), 137–146. doi:10.1515lgr-2015-0046

Spanish Foundation for Science and Technology. (2021). *Bases De Datos Web Of Science*. https://www.recursoscientificos.fecyt.es/licencias/productos-contratados/wos

Spurdle, A. (2020). *3 steps to effective multi-channel marketing for retailers*. Retrieved July 10, 2021, from Americas HQ website: https://www.tagww.com/ams/article/3-steps-to-effective-multi-channel-marketing-for-retailers/

Sridhar, P., & Dharmaji, N. (2013). A Comparative Study on How Big Data is Scaling. *International Journal of Enhanced Research in Science Technology and Engineering*, *2*(8), 87–96.

Srivastava, M., & Gosain, A. (2020). Impact of service failure attributions on dissatisfaction: Revisiting attribution theory. *Journal of Management Research*, *20*(2), 99–112.

Srivastava, M., & Kaul, D. (2014). Social interaction, convenience and customer satisfaction: The mediating effect of customer experience. *Journal of Retailing and Consumer Services*, *21*(6), 1028–1037. https://doi.org/10.1016/j.jretconser.2014.04.007

Srivastava, M., & Kaul, D. (2016). Exploring the link between customer experience-loyalty-consumer spend. *Journal of Retailing and Consumer Services*, *31*, 277–286. https://doi.org/10.1016/j.jretconser.2016.04.009

Srnicek, N. (2017). *Platform Capitalism*. John Wiley & Sons.

St. James, Y., Handelman, J. M., & Taylor, S. F. (2011). Magical thinking and consumer coping. *The Journal of Consumer Research*, *38*(4), 632–649. doi:10.1086/660163

Stackpole, T. (2021, June 4). Inside IKEA's Digital Transformation. *Harvard Business Review*. https://hbr.org/2021/06/inside-ikeas-digital-transformation

Stake, R. E. (1995). *The Art of Case Study Research*. Sage Publications.

Stein, A., & Ramaseshan, B. (2016). Towards the identification of customer experience touch point elements. *Journal of Retailing and Consumer Services*, *30*, 8–19. https://doi.org/10.1016/j.jretconser.2015.12.001

Stolbov, M., & Shchepeleva, M. (2020). What predicts the legal status of cryptocurrencies? *Economic Analysis and Policy*, *67*, 273–291. doi:10.1016/j.eap.2020.07.011

Storper, M. (1997). Innovation as Collective Action: Products, technologies, and territories. In *The Regional World: Territorial Development in a Global Economy*. The Guilford Press.

Story, V., O'Malley, L., & Hart, S. (2011). Roles, role performance, and radical innovation competences. *Industrial Marketing Management*, *40*(6), 952–966. doi:10.1016/j.indmarman.2011.06.025

Stoyanov, T. (2017). Knowledge transfer digital transformation. *Conference: International Conference on Education and New Learning Technologies*. https://www.researchgate.net/publication/318705373_KNOWLEDGE_TRANSFER_DIGITAL_TRANSFORMATION

Straker, K., & Wrigley, C. (2016). Emotionally engaging customers in the digital age: The case study of "Burberry love". *Journal of Fashion Marketing and Management*, *20*(3), 276–299. doi:10.1108/JFMM-10-2015-0077

Strambach, S., & Dieterich, I. (2011). *The territorial shaping of knowledge dynamics in Baden-Württemberg Inter-organizational relations in the sectoral knowledge domain of the automotive industry*. Philipps- Universität Marburg.

Strohbach, M., Daubert, J., Ravkin, H., & Lischka, M. (2016). Big Data Storage. In New Horizons for a Data-Driven Econıмy: A Roadmap for Usage and Exploitation of Big Data in Europe (pp. 119-143). SpringerOpen. doi:10.1007/978-3-319-21569-3_7

Sumiyana, S., & Susilo, G. F. (2021). Beneficial explanation for SME's e-commerce adoption: The sequential stages of organizational, industrial and national readiness. *Economia e Sociologia*, *14*(2), 252–273. doi:10.14254/2071-789X.2021/14-2/14

Surrat, C. G. (2001). *The internet and social change*. McFarland &Company.

Svobodová, L., Hedvicakova, M., & Kuznetsova, A. (2020). *Education needs in the context of migration and industry 4.0 in selected EU countries.* doi:10.1007/978-3-030-38778-5_12

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, *77*(2), 203–220. doi:10.1016/S0022-4359(01)00041-0

Sweor. (2021). *27 Eye-Opening Website Statistics: Is Your Website Costing You Clients?* Retrieved from https://www.sweor.com/firstimpressions

Sylaiou, S., & Papaioannou, G. (2019) ICT in the Promotion of Arts and Cultural Heritage Education in Museums. In Strategic Innovative Marketing and Tourism. Springer.

Szymanski, D. M., & Hise, R. T. (2000). E-satisfaction: An initial examination. *Journal of Retailing*, *76*(3), 309–322. doi:10.1016/S0022-4359(00)00035-X

Tafesse, W. (2016a). An experiential model of consumer engagement in social media. *Journal of Product and Brand Management*, *25*(5), 424–434. https://doi.org/10.1108/JPBM-05-2015-0879

Tafesse, W. (2016b). Conceptualization of Brand Experience in an Event Marketing Context. *Journal of Promotion Management*, *22*(1), 34–48. https://doi.org/10.1080/10496491.2015.1107007

Taillard, M., Peters, L. D., Pels, J., & Mele, C. (2016). The role of shared intentions in the emergence of service ecosystems. *Journal of Business Research*, *69*(8), 2972–2980. doi:10.1016/j.jbusres.2016.02.030

Tajudeen, F. P., Jaafar, N. I., & Sulaiman, A. (2017). Role of social media on information accessibility. *Pacific Asia Journal of the Association for Information Systems, 8*(4).

Tajudeen, F. P., Jaafar, N. I., & Ainin, S. (2018). Understanding the impact of social media usage among organizations. *Information & Management*, *55*(3), 308–321. doi:10.1016/j.im.2017.08.004

Tajvidi, R., & Karami, A. (2021). The effect of social media on firm performance. *Computers in Human Behavior*, *115*, 105174. doi:10.1016/j.chb.2017.09.026

Tang, R. (2021). "New Economy" regulation in the new stage of development: Ideas, means and models. *Governance: An International Journal of Policy, Administration and Institutions*, *4*(1), 19–23.

Tassabehji, R., Hackney, R., & Popovič, A. (2016). Emergent digital era governance: Enacting the role of the 'institutional entrepreneur'in transformational change. *Government Information Quarterly*, *33*(2), 223–236. doi:10.1016/j.giq.2016.04.003

Tata, A., Martinez, D. L., Garcia, D., Oesch, A., & Brusoni, S. (2017). The psycholinguistics of entrepreneurship. *Journal of Business Venturing Insights*, *7*, 38–44. doi:10.1016/j.jbvi.2017.02.001

Technology Review Insights, M. I. T. (2020). *CIOs are uniquely poised to lead digital transformation*. Retrieved on August 12, 2021 from https://www.technologyreview.com/2020/04/01/974969/cios-are-uniquely-poised-to-lead-digital-transformation

Tedder, D. (2016). *The Four Characteristics of Digital Transformation that Deliver Spectacular Results.* https://www.institutefordigitaltransformation.org/four-characteristics-digital-transformation/

Teltscher, S. (2020). Introduction. In M. McDonald (Ed.), *Digital skills insights 2020* (pp. 1–9). International Telecommunication Union.

Tencent. (2021). *Digital Transformation Index Report 2021.* https://new.qq.com/omn/20211106/20211106A0804E00.html

Terzi, R., Sağıroğlu, Ş., & Demirezen, M. U. (2017). Büyük Veri ve Açık Veri: Temel Kavramlar. In Ş. Sağıroğlu & O. Koç (Eds.), *Büyük Veri ve Açık Veri Analitiği: Yöntemler ve Uygulamalar* (pp. 13–31). Grafiker.

Thakur, R. (2019). The moderating role of customer engagement experiences in customer satisfaction–loyalty relationship. *European Journal of Marketing*, *53*(7), 1278–1310. https://doi.org/10.1108/EJM-11-2017-0895

The Economist Intelligent Unit. (2019). *Benchmarking competencies for digital performance: An EIU study of digital-competency hurdles and solutions.* https://digitalcompetency.economist.com/wp-content/uploads/2019/04/Benchmarking-competencies-for-digital-performance-full-report.pdf

The Fletcher School. (2018). *UN E-Government Survey 2018.* https://www.un.org/development/desa/publications/2018-un-e-government-survey.html

The Motion Picture Association. (2020). *Theme Report 2020.* https://www.motionpictures.org/wp-content/uploads/2021/03/MPA-2020-THEME-Report.pdf

The Wall Street Journal. (2021), *Travel and Tourism Brands Boost Marketing and TailorMessages*. https://www.wsj.com/articles/travel-and-tourism-brands-boost-marketing-and-tailor-messages-11618830000

Theti, R., Vadel, D., Haning, M., & Tellier, E. F. (2020). Digital innovation in subsea integrity management. *APPEA Journal*, *60*(1), 215. doi:10.1071/AJ19123

Thomas, L. D., & Autio, E. (2020). Innovation ecosystems in management: An organising typology. In M. A. Hitt & R. J. Aldag (Eds.), *Oxford Encyclopedia of Business and Management*. Oxford University Press. doi:10.1093/acrefore/9780190224851.013.203

Thornton, G. C., & Cleveland, J. N. (1990). Developing managerial talent through simulation. *The American Psychologist*, *45*(2), 190–199. doi:10.1037/0003-066X.45.2.190

Thorpe, M., & Gordon, J. (2012). Online learning in the workplace: A hybrid model of participation in networked, professional learning. *Australasian Journal of Educational Technology*, *28*(8), 1267–1282. doi:10.14742/ajet.763

Throsby, D. (2001). *Economics and Culture*. Cambridge University Press.

Throsby, D. (2010). *The Economics of Cultural Policy*. Cambridge University Press.

Tian, H. (2011). *Volumetric heat capacity enhancement in ultrathin fluorocarbon polymers for capacitive thermal management*. University of Illinois at Urbana-Champaign. Retrieved from http://hdl.handle.net/2142/24118

Tiwana, A., Konsynski, B., & Bush, A. (2010). Platform evolution: Coevolution of platform architecture, governance, and environmental dynamics (research commentary). *Information Systems Research*, *21*(4), 675–687. doi:10.1287/isre.1100.0323

Tiwana, A., Konsynski, B., & Venkatraman, N. (2013). Information technology and organisational governance: The IT governance cube. *Journal of Management Information Systems*, *30*(3), 7–12. doi:10.2753/MIS0742-1222300301

Toker, A., Seraj, M., Kuscu, A., Yavuz, R., Koch, S., & Bisson, C. (2016). Social media adoption: A process-based approach. *Journal of Organizational Computing and Electronic Commerce*, *26*(4), 344–363. doi:10.1080/10919392.2016.1228361

Tønnessen, Ø., Dhir, A., & Flåten, B.-T. (2021). Digital knowledge sharing and creative performance: Work from home during the Covid-19 pandemic. *Technological Forecasting and Social Change*, *170*, 1–13. doi:10.1016/j.techfore.2021.120866 PMID:35068596

Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). *Processes of technological innovation*. Lexington books.

Torres, P., Augusto, M., & Matos, M. (2019). Antecedents and outcomes of digital influencer endorsement: An exploratory study. *Psychology and Marketing*, *36*(12), 1267–1276. doi:10.1002/mar.21274

Toufaily, E., & Pons, F. (2017). Impact of customers' assessment of website attributes on e-relationship in the securities brokerage industry: A multichannel perspective. *Journal of Retailing and Consumer Services*, *34*, 58–69. https://doi.org/10.1016/j.jretconser.2016.09.011

Tran, J., Hol, A., Nguyen, Q. V., & Simoff, S. (2017). Fine dining restaurant framework development and surver. *Proceedings of the 14th International Joint Conference on e-Business and Telecommunications*. 10.5220/0006417800830090

Triantafillidou, A., & Siomkos, G. (2018). The impact of Facebook experience on consumers' behavioral Brand engagement. *Journal of Research in Interactive Marketing*, *12*(2), 164–192. https://doi.org/10.1108/JRIM-03-2017-0016

Tricco, A. C., Antony, J., Zarin, W., Strifler, L., Ghassemi, M., Ivory, J., Perrier, L., Hutton, B., Moher, D., & Straus, S. E. (2015). A scoping review of rapid review methods. *BMC Medicine*, *13*(1), 1–15. doi:10.118612916-015-0465-6 PMID:26377409

Tripp, T., & Vaszary, M. (2006). *Restaurant management using network with customer-operated computing devices* (U.S. Patent Application No. 11/024,105). U.S. Patent and Trademark Office.

Tsujimoto, M., Kajikawa, Y., Tomita, J., & Matsumoto, Y. (2018). A review of the ecosystem concept—Towards coherent ecosystem design. *Technological Forecasting and Social Change*, *136*, 49–58. doi:10.1016/j.techfore.2017.06.032

Tumbas, S., Berente, N., & vom Brocke, J. (2017). Three types of Chief Digital Officers and the reasons organizations adopt the role. *MIS Quarterly Executive*, *16*(2).

Turlacu, L., Chivu, R., Stoica, I., Orzan, G., & Herrezeel, T. (2018). Digital (R) evolution: From 2.0 to 4.0. Perspective and challenges for the Romanian market. *Proceedings of the 32nd International Business Information Management Association Conference, IBIMA 2018 - Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth*, 6684-6693.

Tyler, B. B., & Steensma, H. K. (1998). The effects of executives' experiences and perceptions on their assessment of potential technological alliances. *Strategic Management Journal*, *19*(10), 939–965. doi:10.1002/(SICI)1097-0266(199810)19:10<939::AID-SMJ978>3.0.CO;2-Z

Ulas, D. (2019). Digital Transformation Process and SMEs. *Procedia Computer Science*, *158*, 662–671. doi:10.1016/j.procs.2019.09.101

UN Department of Economic and Social Affairs. (2018). *Gearing e-government to support transformation towards sustainable and resilient societies*. U. Nations.

UN. (2017). *The impact of the new technological (AI) revolution on the labor market and income distribution.* http://www.199it.com/archives/658527.html

Ünal, F. (2015). *Büyük Veri ve Semantik*. Abaküs.

UNCTAD. (2010). *Creative Economy Report*. UNDP-UNCTAD. http://archive.unctad.org/en/docs/ditctab20103_en.pdf

UNESCO. (1954). *Convention on the Protection of Cultural Property during Armed Conflicts*. Hague.

Urbinati, A., Manelli, L., Frattini, F., & Bogers, M. L. (2021). The digital transformation of the innovation process: Orchestration mechanisms and future research directions. *Innovation*, 1–21. doi:10.1080/14479338.2021.1963736

Uyarra, E., Edler, J., Garcia-Estevez, J., Georghiou, L., & Yeow, J. (2014). Barriers to innovation through public procurement: A supplier perspective. *Technovation*, *34*(10), 631–645. doi:10.1016/j.technovation.2014.04.003

Valdebenito, J., & Quelopana, A. (2019). *Conceptual Model for Software as a Service (SaaS) Enterprise Resource Planning (ERP) Systems Adoption in Small and Medium Sized Enterprises (SMEs) Using the Technology-Organization-Environment (T-O-E) Framework*. Paper presented at the Information Technology and Systems, Cham.

Valkokari, K., Seppänen, M., Mäntylä, M., & Jylhä-Ollila, S. (2017). Orchestrating innovation ecosystems: A qualitative analysis of ecosystem positioning strategies. *Technology Innovation Management Review*, *7*(3), 12–24. doi:10.22215/timreview/1061

van der Veen, R., & Song, H. (2010). Exploratory Study of the Measurement Scales for the Perceived Image and Advertising Effectiveness of Celebrity Endorsers in a Tourism Context. *Journal of Travel & Tourism Marketing*, *27*(5), 460–473. doi:10.1080/10548408.2010.499059

Van Laar, E., Van Deursen, A. J. A. M., Van Dijk, J. A. G. M., & De Haan, J. (2020). Determinants of 21st-century skills and 21st-century digital skills for workers: A systematic literature review. *SAGE Open*, *10*(1), 1–14. doi:10.1177/2158244019900176

van Meerkerk, I., & Edelenbos, J. (2018). Facilitating conditions for boundary-spanning behaviour in governance networks. *Public Management Review*, *20*(4), 503–524. doi:10.1080/14719037.2017.1302248

Varadarajan, P. R., & Yadav, M. S. (2002). Marketing strategy and the Internet: An organising framework. *Academy of Marketing Science*, *30*(4), 296–313. doi:10.1177/009207002236907

Varma, R. B. R., Umesh, I. M., Nagesh, Y. N., & Kumara, S. K. S. (2021). Digital Transformation in Higher Education Institutions - An overview. *International Journal of Applied Engineering Research, 16*(4), 278–282. https://www.ripublication.com/ijaer21/ijaerv16n4_05.pdf

Vaskov, M., Isakov, A., Bilovus, V., Bulavkin, A., & Mikhaylenko, N. (2021). Digital Literacy of modern higher education teachers. *XIV International Scientific and Practical Conference "State and Prospects for the Development of Agribusiness - INTERAGROMASH 2021"*, 1–7.

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2019). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*.

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2015). From Multi-Channel Retailing to Omni-Channel Retailing. *Journal of Retailing*, *91*(2), 174–181. https://doi.org/10.1016/j.jretai.2015.02.005

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies. *Journal of Retailing*, *85*(1), 31–41. https://doi.org/10.1016/j.jretai.2008.11.001

Vertova, G. (2014). *The State and National Systems of Innovation: A Sympathetic Critique*. Working Paper No. 823. Levy Economics Institute of Bard College, University of Bergamo. www.levyinstitute.org/pubs/wp_823.pdf

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. doi:10.1016/j.jsis.2019.01.003

Vico, D. G., Woerndl, W., & Bader, R. (2011). A study on proactive delivery of restaurant recommendations for android smartphones. ACM RecSys workshop on personalization in mobile applications.

Vigneron, F., & Johnson, L. W. (2004). Measuring perceptions of brand luxury. *Journal of Brand Management*, *11*(6), 484–506. doi:10.1057/palgrave.bm.2540194

Vindaca, O., Zogla, I., & Lubkina, V. (2020). Effective Digital Transformation in the Context of Higher Education. *12th International Conference on Education and New Learning Technologies*. 10.21125/edulearn.2020.0354

Vodafone. (2020). *SME Digitalisation - charting a course towards resilience and recovery.* Vodafone Public Policy Paper. Vodafone.

Volungeviciene, A., Tereseviciene, M., & Ehlers, U.-D. (2020). When is Open and Online Learning Relevant for Curriculum Change in Higher Education? Digital and Network Society Perspective. *The Electronic Journal of E- Learning, 18*(1).

Voorveld, H. A. M., Neijens, P. C., & Smit, E. G. (2009). Consumers' responses to brand web sites: An interdisciplinary review. *Internet Research*, *19*(5), 335–365. doi:10.1108/10662240920998887

Vrana, O., & Singh, R. (2021). Digitization, Digitalization, and Digital Transformation. In N. Meyendorf, N. Ida, R. Singh, & J. Vrana (Eds.), *Handbook of Nondestructive Evaluation 4.0*. Springer. doi:10.1007/978-3-030-48200-8_39-1

Vrontis, D., Makrides, A., Christofi, M., & Thrassou, A. (2021). Social media influencer marketing: A systematic review, integrative framework and future research agenda. *International Journal of Consumer Studies*, *45*(4), 617–644. doi:10.1111/ijcs.12647

Vysoká škola manažmentu v Trenčíne. Ministry of Investments, Regional Development and Informatization of the Slovak Republic. (2019). *Digital transformation strategy of Slovakia 2030*. Author.

Wajrock, S., Antille, N., Rytz, A., Pineau, N., & Hager, C. (2008). Partitioning methods outperform hierarchical methods for clustering consumers in preference mapping. *Food Quality and Preference*, *19*(7), 662–669. doi:10.1016/j.foodqual.2008.06.002

Walker, J. H., Saffu, K., & Mazurek, M. (2016). An empirical study of factors influencing e-commerce adoption/non-adoption in Slovakian SMEs. *Journal of Internet Commerce*, *15*(3), 189–213. doi:10.1080/15332861.2016.1191049

Walker, R. (2015). *From Big Data to Big Profits Success with Data and Analytics*. Oxford University Press. doi:10.1093/acprof:oso/9780199378326.001.0001

Walker, T., Esmene, S., Colebrooke, L., Leyshon, C., & Leyshon, M. (2021). Digital possibilities and social mission in the voluntary sector: The case of a community transport organization in the UK. *Voluntary Sector Review*, *11*(1), 59–77. doi:10.1332/204080520X15787076882640

Walkme Team. (2020). *The only digital transformation definition you need.* https://blog.walkme.com/digital-transformation-definition/?t=21&camp=adoption-blog

Walsh, C., Saxena, D., & Muzellec, L. (2020). AirBnB: Managing trust and safety on a platform business. *Irish Journal of Management*, *39*(2), 126–134. doi:10.2478/ijm-2020-0004

Walter, U., Edvardsson, B., & Öström, Å. (2010). Drivers of customers' service experiences: A study in the restaurant industry. *Managing Service Quality*, *20*(3), 236–258. https://doi.org/10.1108/09604521011041961

Wan, F. (2020). *Crisis under the "broken kettle sinking boat": traditional enterprises urgently need to inject new kinetic energy.* https://m.hexun.com/news/2020-05-21/201397125.html

Wang, F., & Li, C. (2020). *Digital Transformation in China: Opportunities for Growth.* https://www.prophet.com/2020/10/digital-transformation-in-china-opportunities-for-growth/

Wang, C., Medaglia, R., & Zheng, L. (2018). Towards a typology of adaptive governance in the digital government context: The role of decision-making and accountability. *Government Information Quarterly*, *35*(2), 306–322. doi:10.1016/j.giq.2017.08.003

Wang, F. (2020). Digital marketing capabilities in international firms: A relational perspective. *International Marketing Review*, *37*(3), 559–577. doi:10.1108/IMR-04-2018-0128

Wang, P. (2019). On defining Artificial Intelligence. *Journal of Artificial General Intelligence*, *10*(2), 1–37. doi:10.2478/jagi-2019-0002

Wang, R., Luo, J., & Huang, S. (2020). Developing an artificial intelligence framework for online destination image photos identification. *Journal of Destination Marketing & Management*, *18*, 100512. doi:10.1016/j.jdmm.2020.100512

Wang, W. Y. C., Pauleen, D. J., & Zhang, T. (2016). How social media applications affect B2B communication and improve business performance in SMEs. *Industrial Marketing Management*, *54*, 4–14. doi:10.1016/j.indmarman.2015.12.004

Wang, Y. S., Wu, S. C., Lin, H. H., & Wang, Y. Y. (2011). The relationship of service failure severity, service recovery justice and perceived switching costs with customer loyalty in the context of e-tailing. *International Journal of Information Management*, *31*(4), 350–359. doi:10.1016/j.ijinfomgt.2010.09.001

Wang, Y.-M., Wang, Y.-S., & Yang, Y.-F. (2010). Understanding the determinants of RFID adoption in the manufacturing industry. *Technological Forecasting and Social Change*, *77*(5), 803–815. doi:10.1016/j.techfore.2010.03.006

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert Systems with Applications*, *39*(10), 8899–8908. doi:10.1016/j.eswa.2012.02.017

Wan, N. (2012). Can we teach digital natives digital literacy? *Computers & Education*, *59*(3), 1065–1078. doi:10.1016/j.compedu.2012.04.016

Waqas, M., Hamzah, Z. L. B., & Salleh, N. A. M. (2020). Customer experience: a systematic literature review and consumer culture theory-based conceptualisation. *Management Review Quarterly*. doi:10.1007/s11301-020-00182-w

Wareham, J., Fox, P. B., & Cano Giner, J. L. (2014). Technology ecosystem governance. *Organization Science*, *25*(4), 1195–1215. doi:10.1287/orsc.2014.0895

Warlina, L., Siddiq, F. F., & Valentina, T. (2019). Designing website for online business in the agricultural sector. *Journal of Physics*, *1402*(6), 66080.

Weerakkody, V., Omar, A., El-Haddadeh, R., & Al-Busaidy, M. (2016). Digitally-enabled service transformation in the public sector: The lure of institutional pressure and strategic response towards change. *Government Information Quarterly*, *33*(4), 658–668. doi:10.1016/j.giq.2016.06.006

Weil, H. B., Sabhlok, V. P., & Cooney, C. L. (2014). The dynamics of innovation ecosystems: A case study of the US biofuel market. *Energy Strategy Reviews, 3*, 88-99.

Weill, P. (2004). Don't just lead, govern: How top-performing firms govern IT. *MIS Quarterly Executive*, *3*(1), 1–17.

Weill, P., & Woerner, S. L. (2018). Is your company ready for a digital future? *MIT Sloan Management Review*, *59*(2), 21–25.

Wei, R., Geiger, S., & Vize, R. (2019). A platform approach in solution business: How platform openness can be used to control solution networks. *Industrial Marketing Management*, *83*, 251–265. doi:10.1016/j.indmarman.2019.04.010

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, *22*(1), 102–129. doi:10.17705/1jais.00655

Westbrook, R. A. (1987). Product/Consumption-Based Affective Responses and Postpurchase Processes. *JMR, Journal of Marketing Research*, *24*(3), 258–270. https://doi.org/10.1177/002224378702400302

Westcott, K., Arbanas, J., Downs, K., Arkenberg, C., & Jarvis, D. (2021). *Digital media trends, 15th edition: Courting the consumer in a world of choice.* https://www2.deloitte.com/us/en/insights/industry/technology/digital-media-trends-consumption-habits-survey/summary.html

Westerman, G., & Bonnet, D. (2015). Revamping your business through digital transformation. *MIT Sloan Management Review*, *56*(3), 10.

Wheatley, D., Hardill, I., & Buglass, S. (Eds.). (2021). *Handbook of research on remote work and worker well-being in the post-Covid era*. IGI Global. doi:10.4018/978-1-7998-6754-8

Wheaton, M. G., Prikhidko, A., & Messner, G. R. (2021). Is fear of COVID-19 contagious? The effects of emotion contagion and social media use on anxiety in response to the coronavirus pandemic. *Frontiers in Psychology*, *11*, 3594. doi:10.3389/fpsyg.2020.567379 PMID:33469434

Wheeler, S. (2019). *Digital learning in organisations: Help your workforce capitalise on technology*. Kogan Page.

Whiting, K. (2020). *These are the top 10 job skills of tomorrow – and how long it takes to learn them*. World Economic Forum Organization. https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/

Widjaja, G. (2021). Understanding the trend of digitization of tax services in Indonesia: Review of publication systematic. *Annals of the Romanian Society for Cell Biology*, *25*(4), 3004–3012.

Wikiwijs. (2001). *Voorbereid de klas in*. https://www.wikiwijs.nl/over-wikiwijs/

Williams, B. J., Bottoms, D., & Treanor, D. (2017). Future-proofing pathology: The case for clinical adoption of digital pathology. *Journal of Clinical Pathology*, *70*(12), 1010–1018. doi:10.1136/jclinpath-2017-204644 PMID:28780514

Williams, C. H., Schallmo, D., Lang, K., & Boardman, L. (2019). Digital Maturity Modelsfor Small and Medium-sized Enterprises: A Systematic Literature Review. In *Proceedings of the ISPIM Innovation Conference–Celebrating Innovation: 500 Years Since daVinci*. ISPIM.

Williams, C. K., & Karahanna, E. (2013). Causal Explanation in the Coordinating Process: A Critical Realist Case Study of Federated IT Governance Structures. *Management Information Systems Quarterly*, *37*(3), 933–964. doi:10.25300/MISQ/2013/37.3.12

Williams, W., & Simmonds, D. M. (2010). A case study in the design of a restaurant management system. *Proceedings of International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS)*.

Wilson, M. S., Weatherall, A., & Butler, C. (2004). A Rhetorical Approach to Discussions about Health and Vegetarianism. *Journal of Health Psychology*, *9*(4), 567–581. doi:10.1177/1359105304044040 PMID:15231057

Winterich, K. P., Mittal, V., & Morales, A. C. (2014). Protect thyself: How affective selfprotection increases self-interested, unethical behavior. *Organizational Behavior and Human Decision Processes*, *125*(2), 151–161. doi:10.1016/j.obhdp.2014.07.004

Winter, S., Berente, N., Howison, J., & Butler, B. (2014). Beyond the organisational 'container': Conceptualising 21st century sociotechnical work. *Information and Organization*, *24*(4), 250–269. doi:10.1016/j.infoandorg.2014.10.003

Wirtz, J., & Lovelock, C. (2016). *Service Marketing: People, Technology, Strategy* (K. Samsudin, Ed., 8th ed.). World Scientific Publishing Co. Inc. doi:10.1142/y0001

Witell, L., Kowalkowski, C., Perks, H., Raddats, C., Schwabe, M., Benedettini, O., & Burton, J. (2020). Characterizing customer experience management in business markets. *Journal of Business Research*, *116*, 420–430. doi:10.1016/j.jbusres.2019.08.050

Witt, F. H., Linowski, D., & Singh, V. P. (2020). *Digital Transformation in China*. Globalization in Crisis – Challenges of International Management. doi:10.13140/RG.2.2.33639.60321/1

Woetzel, J., Seong, J., Wang, K., Manyika, J., Chui, M., & Wong, W. (2017). *China's digital economy A leading global force*. McKinsey Global Institute. https://www.mckinsey.com/featured-insights/china/chinas-digital-economy-a-leading-global-force

Woetzel, J., Seong, J., Wang, K., Manyika, J., Chui, M., & Wong, W. (2017). *Digital China: Powering the economy to global competitiveness.* McKinsey Global Institute. https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness

Wolf, J. D. (1967). *Business order control system and apparatus* (U.S. Patent No. 3,304,416). U.S. Patent and Trademark Office.

Wolff, C., Omar, A., & Shildibekov, Y. (2019). How will we build competences for managing the digital transformation? In *Proceedings of the IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications IDAACS* (vol. 2, pp. 1122-1129). Institute of Electrical and Electronics Engineers. 10.1109/IDAACS.2019.8924432

Wong, L.-W., Leong, L.-Y., Hew, J.-J., Tan, G. W.-H., & Ooi, K.-B. (2020). Time to seize the digital evolution: Adoption of blockchain in operations and supply chain management among Malaysian SMEs. *International Journal of Information Management*, *52*, 101997. doi:10.1016/j.ijinfomgt.2019.08.005

Woodard, C. J., Ramasubbu, N., Tschang, F. T., & Sambamurthy, V. (2013). Design Capital And Design Moves: The Logic Of Digital Business Strategy. *Management Information Systems Quarterly*, *37*(2), 537–564. doi:10.25300/MISQ/2013/37.2.10

World Bank. (2001). *Cultural Heritage and Development. A Framework for Action in the Middle East and North Africa*. World Bank.

World Economic Forum. (2016). *Demystifying Digital and Securing $100 Trillion of Value for Society and Industry by 2025.* http://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/wef-digital-transformation-2016-exec-summary.pdf

World Economic Forum. (2021). Retrieved from https://www.weforum.org/platforms/shaping-the-future-of-digital-economy-and-newvalue-creation

Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organisational performance: Insights from a matched survey of business and IT managers. *Management Information Systems Quarterly*, *39*(2), 497–518. doi:10.25300/MISQ/2015/39.2.10

Xian, Z., & Fesenmaier, D. R. (2016). Big Data Analytics, Tourism Design and Smart Tourism. *Analytics in Smart Tourism Design*, 299-307.

Xiao, M., Wang, R., & Chan-Olmsted, S. (2018). Factors affecting YouTube influencer marketing credibility: A heuristic-systematic model. *Journal of Media Business Studies*, *15*(3), 188–213. doi:10.1080/16522354.2018.1501146

Xinhua. (2021). *Xi Jinping's speech at the first phase of the 16th G20 Summit.* http://www.gov.cn/xinwen/2021-10/30/content_5647892.htm

Xu, C. (2011). The Fundamental Institutions of China's Reforms and Development. *Journal of Economic Literature*, *49*(4), 1076–1151. doi:10.1257/jel.49.4.1076

Xu, H., Tang, B., & Song, W. (2009). Wireless food ordering system based on web services. In *Proceedings of Second International Conference on Intelligent Computation Technology and Automation*. IEEE.

Xuhua, H., Elikem, O. C., & Akaba, S. (2019). Effects of business-to-business e-commerce adoption on competitive advantage of small and medium-sized manufacturing enterprises. *Economia e Sociologia*, *12*(1), 80–99. doi:10.14254/2071-789X.2019/12-1/4

Yakhlef, A. (2015). Customer experience within retail environments. *Marketing Theory*, *15*(4), 545–564. https://doi.org/10.1177/1470593115569016

Yang. (2019). *China to invest over 1t yuan in 5G tech by 2025.* China Daily. http://global.chinadaily.com.cn/a/201907/31/WS5d413bcca310d83056402035.html

Yang, H.-L., & Wu, T. C. T. (2006). Knowledge sharing in an organisation - Share or not? In *Proceedings of the International Conference on Computing & Informatics* (pp.1-7). Institute of Electrical and Electronic Engineers.

Yang, H., & Yang, J. (2019). The effects of transformational leadership, competitive intensity and technological innovation on performance. *Technology Analysis and Strategic Management*, *31*(3), 292–305. doi:10.1080/09537325.2018.1498475

Yang, T.-M., & Maxwell, T. A. (2011). Information-sharing in public organisations: A literature review of interpersonal, intra-organizational and inter-organisational success factors. *Government Information Quarterly*, *28*(2), 164–175. doi:10.1016/j.giq.2010.06.008

Yaqub, M. Z., Srećković, M., Cliquet, G., Hendrikse, G., & Windsperger, J. (2020). Network innovation versus innovation through networks. *Industrial Marketing Management*, *90*, 79–89. doi:10.1016/j.indmarman.2020.07.001

Ye, B. H., Barreda, A., Okumus, F., & Nusair, K. (2019). Website interactivity and brand development of online travel agencies in China: The moderating role of age. *Journal of Business Research*, *99*, 382–389. doi:10.1016/j.jbusres.2017.09.046

Yeow, A., Soh, C., & Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *The Journal of Strategic Information Systems*, *27*(1), 43–58. doi:10.1016/j.jsis.2017.09.001

Ying & QiuWen, Z. (2011). Research on the multimedia order system in catering services. *Advanced Materials Research, 217*, 1141-1146.

Yin, R. (2013). How to do Better Case Studies. In L. Bickman & D. Rog (Eds.), *The SAGE Handbook of Applied Social Research Methods* (pp. 254–282). SAGE Publications.

Yin, R. K. (1981). The case study as a serious research strategy. *Science Communication*, *3*(1), 97–114.

Yi, Y. Q., Gu, M., & Wei, Z. L. (2017). Bottom-up learning, strategic flexibility and strategic change. *Journal of Organizational Change Management*, *30*(2), 161–183. doi:10.1108/JOCM-12-2015-0241

Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, *52*(1), 1–14. doi:10.1016/S0148-2963(99)00098-3

Yoo, Y., Boland, R. J. Jr, Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, *23*(5), 1398–1408. doi:10.1287/orsc.1120.0771

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary—the new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, *21*(4), 724–735. doi:10.1287/isre.1100.0322

Yu, D. (2021). *Disney+ Hotstar pulls in 2.5m subscribers in Indonesia, surpassing Netflix*. https://www.techinasia.com/disney-hotstar-achieves-25m-subscribers-indonesia-surpass-netflix

Yu, X. (2021). *Accelerate digital development and promote the construction of digital China.* http://www.echinagov.com/viewpoint/293922.htm

Yucel, S. (2018). Estimating the benefits, drawbacks and risk of digital transformation strategy. In *Proceedings of IEEE International Conference on Computational Science and Computational Intelligence* (vol. 2, pp. 233-238). Institute of Electrical and Electronics Engineers. 10.1109/CSCI46756.2018.00051

Yüksel, A., & Yüksel, F. (2003). Measurement of tourist satisfaction with restaurant services: A segment-based approach. *Journal of Vacation Marketing*, *9*(1), 52–68. doi:10.1177/135676670200900104

Yusra, Y. (2019). *"Video Streaming" Platform Competition in Indonesia.* https://dailysocial.id/post/persaingan-platform-video-streaming-di-indonesia

Zaborova, E. (2021). The impact of digital technology on the quality of higher education. *International Scientific Conference "Delivering Impact in Higher Education Learning and Teaching: Enhancing Cross-Boarder Collaborations" (DIHELT 2021).*

Zahidi, S., Ratcheva, V., Hingel, G., & Brown, S. (2020). *The future of jobs report 2020.* https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

Zahra, S. A. (2018). Entrepreneurial risk taking in family firms: The wellspring of the regenerative capability. *Family Business Review*, *31*(2), 216–226. doi:10.1177/0894486518776871

Zaichkowsky, J. L. (1985). Measuring the Involvement Construct. *The Journal of Consumer Research*, *12*(3), 341. doi:10.1086/208520

Zaichkowsky, J. L. (1994). The Personal Involvement Inventory: Reduction, Revision, and Application to Advertising. *Journal of Advertising*, *23*(4), 59–70. doi:10.1080/00913367.1943.10673459

Zeisl, Y. (2021). *Risks and Opportunities of the Digital Transformation for Businesses.* Global Risk Intel. https://www.globalriskintel.com/insights/risks-and-opportunities-digital-transformation-businesses

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2017). *Services Marketing Integrating Customer Focus Across the Firm* (7th ed.). McGraw-Hill Education.

Zhang, J. (2020). *Digital economy becoming key driver of China's growth*. http://www.chinadaily.com.cn/a/202007/03/WS5efeee75a3108348172571b9.html

Zhang, L., & Chen, S. (2019). *China's Digital Economy: Opportunities and Risks*. IMF Working Paper No. 19/16.

Zhang, W. (2020). *Digital Economy Era: Re-examining the Economic Foundation of Antitrust Policy.* https://finance.sina.com.cn/china/gncj/2020-11-05/doc-iiznezxs0160564.shtml

Zhang, N., & Bao, H. (2010, January). Research on e-learning with digital technology in distance education. In *2010 International Conference on e-Education, e-Business, e-Management and e-Learning* (pp. 299-302). IEEE. 10.1109/IC4E.2010.126

Zhao, X., Liu, J. S., & Deng, K. (2013). Assumptions behind intercoder reliability indices. *Annals of the International Communication Association*, *36*(1), 419–480. doi:10.1080/23808985.2013.11679142

Zhu, W., & Hu, M. (2021). Digital economy key for nation's development. *China Daily Global, 4*(4), 3.

Zhu, C., Cheng, G., & Wang, K. (2017). Big Data Analytics for Program Popularity Prediction in Broadcast TV Industries. *IEEE Access: Practical Innovations, Open Solutions*, *5*, 24593–24601. doi:10.1109/ACCESS.2017.2767104

Zhu, K., Kraemer, K. L., Xu, S., & Dedrick, J. (2004). Information technology payoff in e-business environments: An international perspective on value creation of e-business in the financial services industry. *Journal of Management Information Systems*, *21*(1), 17–54. doi:10.1080/07421222.2004.11045797

Zhu, K., Kraemer, K., & Xu, S. (2003). Electronic business adoption by European firms: A cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, *12*(4), 251–268. doi:10.1057/palgrave.ejis.3000475

Zhu, Y. (2014). A platform for changing legacy application to multi-tenant model. *International Journal of Multimedia and Ubiquitous Engineering*, *9*(8), 407–418. doi:10.14257/ijmue.2014.9.8.38

Zubiaga, M., Izkara, J. L., Gandini, A., Alonso, I., & Saralegui, U. (2019). Towards Smarter Management of Overtourism in Historic Centres Through Visitor-Flow Monitoring. *Sustainability*, *11*(24), 7254. doi:10.3390u11247254

Zuboff, S. (2015). Big Other: Surveillance Capitalism and Prospects of an Information Civilization. *Journal of Information Technology*, *2015*(30), 75–89. doi:10.1057/jit.2015.5

About the Contributors

Belem Barbosa is Assistant Professor at the University of Porto, Portugal. She received her PhD in Business and Management Studies – specialization in Marketing and Strategy from the University of Porto. Her research interests lie primarily in the area of internet marketing and consumer behavior.

Sandra Filipe has a PhD in Marketing, a MSc in Management (specialisation in Marketing and Strategy) both from the ISCTE Business School - University Institute of Lisbon (ISCTE –IUL), and a degree in Management from the Faculty of Economics, University of Coimbra (FEUC). She is an Assistant Professor at the Institute of Accounting and Administration, University of Aveiro (ISCA-UA), teaching undergraduate and post graduate courses of management, research methodologies, marketing plans, and other marketing themes. She is a member of the research unit on Competitiveness, Governance and Public Policies (GOVCOPP). Her main research interests are marketing research, digital marketing, corporate social responsibility, relational marketing, and consumer behaviour. She has published in several academic journals.

Claudia Amaral Santos has a PhD in Linguistics/Terminology from the University of Aveiro (UA) and NOVA Social School of Sciences and Humanities (NOVA-FCSH She has been an Adjunct Professor at the Aveiro Institute of Accounting and Administration (ISCA-UA) since 2001 where she lectures all English subjects in first cycle degrees and specialization courses. She also coordinates the Languages and Social Sciences team and International Mobility programs in her Department. Claudia Amaral Santos is a member of the research unit on Governance, Competitiveness and Public Policy (GOVCOPP) and a collaborator of the research unit on Languages, Literatures and Cultures (CLLC) at the University of Aveiro. She participates regularly in several international projects and her main research interests are focused on education and internationalization, tourism, consumer behaviour, innovation, and sustainability.

* * *

Jiyoon An Ph.D. is an Assistant Professor of Marketing at Fayetteville State University, NC, USA, has taught various marketing analytics courses to undergraduate, graduate, and executive students at the higher education institutions in USA including Texas Tech University, Nichols College, and University of Rhode Island. South Korea native Jiyoon An earned a bachelor's degree in business from Seoul National University and master's degrees in France from EDHEC Business School and in the United States from Texas Tech University. She received her Ph.D. from the University of Rhode Island, where she has researched topics relating to technology, data analytics, and consumer behavior.

Edar Añaña is a Doctor in Management by the Federal University of Rio Grande do Sul (2008) (http://www.lume.ufrgs.br/handle/10183/15017), with internship at the Institute of Tourism and Leisure at the University of Economics and Administration of Vienna-Austria (Wirtschaftsuniversität Wien); Doctorate from the University of Porto (Portugal), by public recognition of the Doctorate title granted by UFRGS, under the terms of Decree-Law No. 66/2018 of Portuguese Republic; Master in Business Administration from the Federal University of Rio Grande do Sul (2001); and Bachelor in Business Administration from the University of Campanha Region (1986). Currently is Associate Professor in the Department of Business Administration at the Federal University of Pelotas (Brazil), Professor at Master in Business Administration at FURG (Brazil) and Guest Professor at PPGTH / UNIVALI (Brazil).

Sunamita Borges Da Costa is a Ph.D. in Geography and innovation and Master in Environment and development with an emphasis on management and public policies. Professor with sixteen years of work at multiple educational levels. Supervisor and researcher on themes related to social sciences in a transdisciplinary approach and using quantitative and qualitative methods. Researcher of Human Geography, with a wide interest in the conditions of inequalities, dissymmetry, and imbalances promoted by the widespread diffusion of the current scientific-technological paradigm at a global level.

Marta Carneiro was born in 1999 in a small city in Portugal called Vila Nova de Famalicão. She later studied Economics at the School of Economics and Management of University of Porto, finishing her degree with a school prize awarding the most 7 talented students of the academic year. Currently she is working in a Digital Marketing firm as a Digital Strategy Analyst and is taking a Master Degree in Management at the School of Economics and Management of University of Porto.

Ana M. Castillo-Clavero has been Director of Cooperation of the UMA (1999-2004) and organised 24 doctoral and postgraduate programmes in Latin America. She has coordinated the projects Erasmus+ KA202, OER-Crafts (2015-2017) "Example of good practices", the ARTCademy project (2018-2020) and currently the Fair Food project (2020-22), dedicated to the promoting traditional, healthy and sustainable food. For 14 year she has directed the official MBA of the UMA and the research group Organisation and HR in the knowledge society. He teaches business management, strategy, HR, management of intangibles and new forms of business, specialising in corporate social responsibility and ethical and responsible behaviour. He has published articles, books, various study manuals and popular books in his speciality.

Raghu Nandan Chawla is a research scholar at Birla Institute of Technology & Science (BITS) Pilani, India. He has been associated with many renowned IT and consulting organizations and has successfully delivered many projects under various IT leadership and consulting roles for over 14 years. He received his Post Graduate Diploma in Management for Working Executives from the Indian Institute of Management (IIM), Lucknow. His research interests include Digital Transformation and Information Technology Strategy.

Jaroslav Demel graduated in Foreign Trade Economics at the University of Economics in Prague, graduating in 1988. In that year, he joined Skloexport Liberec, which began his almost twenty-year career in international trade and industry of glassware, crystalware, jewellery and decorative products. He went through Czech and foreign companies (Rudolfinia, Jablonex, Ornela) and various managerial positions and ended his corporate career as the commercial director of Preciosa Lighting. Since 2008

he has been working in the academic sphere at the Faculty of Economics of the Technical University in Liberec, where he also received his doctorate (Ph.D.) in 2014. For 13 years, he has been working as the Vice-Dean for External Relations. He specializes in international trade, international business and, in recent years, in the field of innovation in the international environment. He publishes, teaches courses and led or leads several projects in the mentioned specializations. He is a co-founder of the Student Business Club - an initiative to support creativity and entrepreneurship at the Technical University of Liberec.

Mingyue Fan is PhD in Management Sciences; Master in Statistics. She is current Full-Time Associate Professor and researcher at the School of Management of Jiangsu University in Zhenjiang China. She is professional in areas of Information Management. She also has skills in e-commerce, and entrepreneurship. Her lines of research are: online-learning, social media, data quality, internet information quality, information credibility and cross-border e-commerce.

Daniela Federici got a degree in Economics at the La Sapienza University of Rome. She earned a PhD in International Economics from Graduate Institute of International Studies and Development Studies (Geneva). Currently she is Full Professor of international economics at the Department of Economics and Law, University of Cassino and Southern Lazio. She has been research visiting at Cornell University, Columbia University, Lubin School of Business (Berlin), Kobe University and Stanford University. She has published in international peer-reviewed journals such as Macroeconomic Dynamics, Economic Modelling, Economics of Innovation and New Technology, Studies in Higher Education, Journal of Economic Dynamics and Control, International Journal of Digital Culture and Electronic Tourism. Her current research interests include ICT and growth, international trade, firm internationalization strategies, economic performance of cultural institutions, education and human capital.

Cristina Maria Norte Gomes is a graduate of the University of Aveiro and holds a Bachelor's Degree in Languages and Business Relations. She is currently attending the Master's program in Management at the University of Porto. Miss Cristina seeks to conclude her studies as a master's degree student with the objective to work in an international company. She aspires to work in the area of Human Resources where she has acquired professional experience in a prior professional internship.

Praveen Goyal is an Associate Professor with the Department of Management, Birla Institute of Technology & Science (BITS), Pilani. He has published papers in various journals of international repute like Management Decision; Journal of Non-profit and Public Sector Marketing; Benchmarking: An International Journal; Journal of Consumer Behavior, Journal of Modelling in Management; Sustainable Production and Consumption among others. He is the recipient of the 'Emerald Literati Network Awards for Excellence 2016. He has been a Guest Editor for a special issue on Evidence-based Processes in Business and Systems in the International Journal of Business and Systems Research, and "Evidence-based management practices in accounting and finance", in the International Journal of Management Practice.

Marian Holienka is an associate professor at Department of Strategy and Entrepreneurship, Comenius University in Bratislava, Faculty of Management. His research and teaching is focused on entrepreneurship, entrepreneurship education and training, entrepreneurial environments and ecosystems, and SMEs and their management. He is the country coordinator for Slovakia in the international research project GUESSS, a coordinator of an international Erasmus+ Strategic Partnership project ENDURANCE, a

member of the GEM national team for Slovakia, and a member of the DIGICROSSGEN research project supported by the Slovak research and development agency. He is a (co)author of dozens of scientific publications related to entrepreneurship, including several monographs, a university textbook, and 10 research papersin indexed journals. He is a holder of the "European Entrepreneurship Educators Program Fellow" and "CONEEECT - Connecting European Entrepreneurship Educators" certificates. He completed two foreign research internships in Croatia and Austria. He teaches several entrepreneurship-related subjects, including an intergenerational course.

Chaitra Katti works as an independent researcher in the domain of Marketing and Strategy. Her main research interests are in digital marketing, customer experience, consumer emotions and ethical consumption.

Johannes Lodders has a background in Business Administration and Innovation, and has a recent Master's degree in Media and Innovation (2018). As an independent consultant and project manager, governments and organisations frequently ask him to supervise sector-wide innovations, whereby various stakeholders work together to set up new organizations and develop innovative services. He is also a business coach for students and starting entrepreneurs. Until now, he has worked on almost 50 projects during his 25 year career. For more details, see: https://nl.linkedin.com/in/hanslodders.

Laura Marques is a Management Graduate, currently pursuing a Master's degree in Marketing at the Faculty of Economics of the University of Porto, Portugal. She seeks to work in the Brand Management field, specializing in Luxury Brand Management and Digitalization.

Kateřina Maršíková works as an associated professor at the Department of Business Administration, Faculty of Economics, Technical University of Liberec (EF TUL), Czech Republic and as a Career Counsellor for students and employees in the Career Centre of TUL. Her specialisation is in human resource management (both as an academic and practitioner). She is a lecturer of Human resource (HR) management, management and other courses at the Faculty of Economics, both in Czech and English language at EF TUL. She gained her experience also by managing human resources as a project manager of several large HR projects (including the international Erasmus+ KA2 project related to HRM in small and medium sized enterprises or Ministry of Education projects). She has also been working on knowledge management in the international project (Norwegian funds) with NTNU University. She has been publishing in human resources for more than 20 years and cooperates intensively on human resources issues with corporations.

Andrés Martínez-Leiva is a graduate on Business Management + Economics Bachelor's Degree at Málaga University. Experience working and managing European Commission Funded Projects with international partners on innovation, business, and smart city solutions. The most recent professional experience is on auditing firm's accounting at Deloitte.

Manuel Victor Martins De Matos is an Economist and Doctorate in Public Policy, Strategy and Development at Economy Institute of Federal University of Rio de Janeiro

Anastasiia Mazurchenko is a fourth-year Ph.D. student at the Faculty of Economics of the Technical University of Liberec (TUL) whose field of study is concentrated on the impact of digital transformation on human resource management and digital competence development from the point of view of both employers and employees in the national and international context. She teaches such courses as Human Resource Management and Business Administration both in Czech and English. The author deals with deeper research of the topic in the framework of participation in the following projects as TAČR TJ02000206 Developing the skills necessary for digital business transformation, SMEs HRM Attraction, Retention and Performance Enhancement Network (SHARPEN), SGS-2020-1025 Digital competence in business practice, SGS-2020-1007 Knowledge transfer in an agile environment and SGS-2021-1001 Digital readiness of current employees.

Emel Memis Kocaman obtained her PhD degree from Gazi University in 2009. She became an Assistant Professor in 2010, an Associate Professor in 2017. She is working Zile Dinçerler School of Tourism and Hotel Management at the Department of Gastronomy an Culinary Arts, University of Tokat Gaziosmanpaşa (Turkey) from 2009 todate. Her teaching and research focus on the areas of gastronomy, gastronomy tourism, traditional foods, menu, food & beverage management, nutrition, food safety.

Juraj Mikuš, PhD, is an assistant professor at the Department of Strategy and Entrepreneurship at Comenius University, Faculty of Management (FM CU). He focuses mainly on the field of entrepreneurship, namely inclusive and social entrepreneurship, and related topics, especially measuring and evaluating the social impact. He is a member of the research team of the Global Entrepreneurship Monitor project,a member of the DIGICROSSGEN research project supported by the Slovak research and development agency. As a co-author, he published 2 scientific monographs and several articles in foreign proceedings and domestic scientific journals. At FM CU he teaches courses such as Entrepreneurship, Development of Entrepreneurial Thinking, Value-Based Management and Business Risks of Small and Medium-Sized Companies, both in Slovak and English language.

Dragana Ostic is assistant professor at Jiangsu University, China. Her area of interest includes digital marketing, e-commerce, and academic collaboration.

Yasemin Özkent is an assistant professor of Selcuk Unvertsity, Department of Radio, Television, and Cinema, Faculty of Communication. She is an interdisciplinary scholar who teaches radio, television, new media, TV Dramas, and digital media platforms.

Valentino Parisi is Assistant Professor of Public Finance at the University of Cassino and Southern Lazio, Italy, where he currently teaches Public economics and Issues in international taxation. Previously he was teaching assistant at the University of Rome Tor Vergata. He studied at the University of Rome, La Sapienza. His research interests mainly concern the effects of corporate taxation on investment and financing choices, the design of tax reforms, microsimulation models, entrepreneurship, education. He has published in international journals such as Economic modelling, Studies in higher education, COGENT Economics and finance, and participated in EU-funded projects under the 5th Framework Programme. He has been visiting professor at the University of Madrid, University of Aveiro, University of the Azores, Nisantasi University in Istanbul, University of Riga, Pace University in New York, the Gabelli School of Business of Fordham University (New York).

Anna Pilková, Professor of Management at Comenius University in Bratislava, Faculty of Management since September 2009. Before she worked at top managerial positions at commercial bank in Slovakia and as associate professor at University of Economics in Bratislava. At present she chairs Department of the Strategy and Entrepreneurship at the Faculty of Management of Comenius University in Bratislava. She runs courses on entrepreneurship, strategic and risk managements at bachelor, master and doctoral levels. Professor Pilková is a national team leader for Global Entrepreneurship Monitor since 2011. She also leads and participate in the other international and national projects on entrepreneurship in which she has conducted research on entrepreneurial activities, entrepreneurship inclusivity (including women, senior , youth and migrants), restart, start-up promotion at HEI institutions, the banking regulation and strategic management in commercial banking in developing countries. Her team research results on entrepreneurship are also part of OECD publications and are used by the Slovak government agencies and ministries involved in entrepreneurship policies and programs formulation. Her research and case studies have been published in 10 scientific monographies, tens articles in journals, books and proceeding from domestic and foreign conferences.

Margarida M. Pinheiro, PhD, is Professor at the University of Aveiro (Institute of Accounting and Administration, ISCA-UA) and a Full Researcher at the Research Centre Didactics and Technology in Education of Trainers (CIDTFF), on the Policies, Evaluation and Quality research group. She is currently member of the School Council and was a member of the Scientific Council and President of the Pedagogical Council of ISCA-UA. Margarida has been publishing in the areas of learning and teaching methodologies, quality of education, knowledge construction and internationalization of universities. She serves on the Editorial Board of the Journal of Higher Education Pedagogies. She is a passionate researcher engaged in education at the Higher Education level.

Sikandar Ali Qalati is a motivated Assistant professor with excellent educational credentials and hands-on experience in activities/event management, education, and research field. Skilled at performing quality control and managing several projects, while meeting deadlines under pressure. Creates, develops, and fine-tunes various experimental study designs. Demonstrate excellent problem-solving skills with a keen eye for details; collaborate with faculty and students across different departments to conduct interdisciplinary research. Superb facilitator thrives in making maximum use of managerial, interpersonal, communication, presentation, and persuasive abilities, to conduct training programs and organize high-end professional courses.

Hugo Ribeiro has an MSc in Marketing from the University of Aveiro and is currently a Doctoral student in marketing and strategy in a consortium formed by the University of Aveiro, Minho, and Beira Interior. He currently performs marketing research manager functions at one of the largest telecommunications operators in Portugal, focusing on researching the customer experience, satisfaction, loyalty, quality of service, and, of course, customer churn. His research interests are mainly in the areas of customer experience and customer journey.

Albérico Travassos Rosário, Ph.D. Marketing and Strategy of the Universities of Aveiro (UA), Minho (UM) and Beira Interior (UBI). With affiliation to the GOVCOPP research center of the University of Aveiro. Master in Marketing and Degree in Marketing, Advertising and Public Relations, degree from ISLA Campus Lisbon-European University | Laureate International Universities. Has the title of

Marketing Specialist and teaches with the category of Assistant Professor at IADE-Faculty of Design, Technology and Communication of the European University and as a visiting Associate Professor at the Santarém Higher School of Management and Technology (ESGTS) of the Polytechnic Institute of Santarém. He taught at IPAM-School of Marketing | Laureate International Universities, ISLA- Higher Institute of Management and Administration of Santarém (ISLA-Santarém), was Director of the Commercial Management Course, Director of the Professional Technical Course (TeSP) of Sales and Commercial Management, Chairman of the Pedagogical Council and Member of the Technical Council and ISLA-Santarém Scientific Researcher. He is also a marketing and strategy consultant for SMEs.

Gitte Rosenbaum has both a Master´s degree and a PhD from the University of Southern Denmark (2016), where she has been employed for approximately 15 years. Her specialist area is the internationalization of female-owned entrepreneurial ventures, and her work has appeared in numerous book chapters and such journals as Journal of Small Business & Enterprise Development and International Journal of Gender & Entrepreneurship.

Alexandre Ruco is an MBA in Marketing with a background in Strategic Planning, Software Development and Digital Marketing. Lecturer on FGV, São Paulo, in Business Management Specitalization Course. Author of "Sentiment Analysis Using Web-Based Platforms on Virtual Education During the 2020 Lockdown". Coordinator of the project that gave origin to the Dirtupt!Canvas github.com/alexruco/disrupt-canvas.

Petra Rydvalová works as an associate professor at the Department of Business Administration and Management, Faculty of Economics, Technical University of Liberec in the Czech Republic. Within her professional life, she deals with topics of specific forms of business, such as small and medium-sized enterprises, start-ups, spin-offs, family business, social entrepreneurship and the related management of innovation projects. These topics are guaranteed both at the level of individual subjects and also within the overall concept as a guarantor of the bachelor's study program Business Economics at the Faculty of Economics of the Technical University in Liberec. This is also related to research and publishing activities and the management of bachelor's, master's and doctoral students at the university. In the field of research activities, she coordinated several innovative projects. Recently, for example, it was a research project "An empirical study of the existence of clusters and their effect on the performance of member enterprises" (grant No. GA 18-01144S).

Michael Sampat is an independent researcher working in several interdisciplinary capacities. Current projects include books on business geography and mass media psychological conditioning.

Eva M. Sánchez-Teba is assistant professor in the Department of Economy and Business Administration at the University of Malaga, Spain. She received her PhD in Economics and Business Management from University of Málaga in 2016. Her current research interests include, residents' attitudes towards tourism, corporate social responsibility, smart cities and corporate governance. Her research has been published in peer review journals such as Corporate Social Responsibility and Environmental Management, Social Sciences, Sustainability and European Journal of Family Business, among others.

Deepak Saxena in an Assistant Professor at the Department of Management at Birla Institute of Technology & Science Pilani (India). Prior to this, he worked as a Research Fellow at Trinity College Dublin and as an Assistant Lecturer at Dublin Institute of Technology. He has published with the journals such as Australasian Journal of Information Systems, Journal of Information Science, Irish Journal of Management, Electronic Journal of Business Research Methods, and Electronic Journal of Information Systems Evaluation.

Hamish Simmonds is a member of the Strategy, AI and Transformation group at Deloitte, Melbourne, Australia and an adjunct academic in the Research School of Management at the Australian National University. His research appears in a number of academic journals and is currently focused on the strategy, transformation and value creation of ecosystem models for business and social impact.

Syafrizal Helmi Situmorang is a Lecturer from the Faculty of Economics and Business, Universitas Sumatera Utara, Indonesia. Field of expertise and research interest in the area of Marketing, Branding, and Digital Business.

Büşra Meltem Türkmen undergraduated from Gaziosmanpaşa University Zile Dinçerler School of Tourism and Hotel Management, Department of Food and Beverage Management in 2016. She obtained her master's degree at Karabuk University, Institute of Social Sciences, Department of Tourism Management in the Spring of 2019. She is currently continuing her doctorate education at Balıkesir University, Institute of Social Sciences, Department of Gastronomy and Culinary Arts. She currently works as a research assistant at Istanbul Medipol University, Department of Gastronomy and Culinary Arts.

Muchen Yu is an independent researcher. Her research interests include digitalization and Chinese business.

Poshan (Sam) Yu is a Lecturer in Accounting and Finance in the International Cooperative Education Program of Soochow University (China). He is also an External Professor of FinTech and Finance at SKEMA Business School (China), a Visiting Professor at Krirk University (Thailand) and a Visiting Researcher at the Australian Studies Centre of Shanghai University (China). Sam leads FasterCapital (Dubai, UAE) as a Regional Partner (China) and serves as a Startup Mentor for AIC RAISE (Coimbatore, India). His research interests include financial technology, regulatory technology, public-private partnerships, mergers and acquisitions, private equity, venture capital, start-ups, intellectual property, art finance, and China's "One Belt One Road" policy.

Index

A

adaptation 1, 184, 186, 240, 337, 353, 355, 468, 475, 507, 513-516
Agile Methodologies 54, 67
ANALYSIS OF BIG DATA 77, 80
animal food 292, 294
Animal Welfare 292, 296-297, 300, 302-303, 307
Application Program Interface (API) 56, 67
Artificial Intelligence (AI) 1-2, 6, 14, 17, 24, 26, 35, 41, 51, 115, 123, 139, 141-144, 147, 149, 151, 155-156, 160-163, 169, 178-180, 248, 358, 382, 420, 426, 428, 431, 440, 449-451, 460, 473, 505, 510
automation system 258

B

Barrier for Digital Transformation 133
bibliometric analysis 1-2, 5-6, 10, 19, 24, 49, 182
Big Data 1-6, 10-14, 16, 18-23, 25-26, 35, 49, 77-83, 86-93, 115, 130, 169, 172, 180, 187, 205, 215, 226, 257, 288, 358, 360, 370-371, 383, 399, 422, 424, 426, 428, 431, 437-438, 440-441, 449, 451, 460, 505, 510
blockchain 44, 49, 63-64, 66-67, 180, 186, 330, 358, 360, 383, 399, 428, 431, 440-441
brand awareness 275-276, 293, 311, 320, 323, 340-341, 343, 348-349, 355, 466, 471, 473, 476-478
brand experience 214, 217, 219, 223, 227, 230, 233-234, 236-237, 240, 244-246, 248-251, 253-254
brand image 37-38, 45, 290, 333, 336, 340-341, 344, 347, 355, 475
Brand Transgression 276, 289, 291
business model 25, 44, 51, 53-55, 61, 64-67, 108, 177, 183, 189, 228, 247, 249, 252, 277, 358, 438, 481, 488, 491, 493-495, 498, 501, 503, 509-510
Business Model Canvas 53, 55, 64, 488, 491, 493, 498, 503
business strategy 49, 53, 67, 169, 172, 177-178, 182-183, 191-194, 198, 200, 202-203, 205-208, 218, 226, 235, 253, 353, 362, 457
business value 90, 178, 184, 189, 208, 241, 250

C

carnivorous 297, 300-301, 303, 307
census data 94
Chief Information Officer (CIO) 165-166, 170-171, 181, 184, 189, 391-392
China Digitalization 411
CIO Role 165, 167, 170, 177, 180, 182, 185, 189
Circular-Economy 61, 67
Civil Society Organizations (CSOs) 42, 51
cloud computing 3, 11, 20, 25, 35, 43, 68, 115-116, 180, 201, 205, 273, 327, 360, 387, 395, 398, 402, 409-410, 426, 441, 451, 510
co-creation 19, 28, 40, 44-45, 170, 185-186, 189, 205, 215, 402, 416, 466, 478, 507, 509
Collaborative Online International Learning (COIL) 514, 526
commits 55, 67, 467
competence development 113, 117-119
Competency-Based Learning (CBL) 526
Compound Aggregate Growth Rate (CAGR) 479
consumption 3, 22, 40, 67, 80, 86, 88, 95, 106, 212-213, 225, 234, 245-246, 292, 294-298, 302, 416-419, 427-428, 434, 444, 463, 482
Covid-19 41-42, 48, 51, 113-121, 123, 126-129, 136, 141, 148-149, 152-153, 158-159, 161-164, 213, 233-235, 249, 251-252, 278, 285, 290-291, 327, 358, 426, 431, 434-435, 508, 513, 515, 520, 522-523, 525
Covid-19 pandemic 51, 113-121, 123, 126-128, 136, 141, 148, 158-159, 163-164, 233, 235, 251, 278, 435
Creative Destruction 54, 67
crisis management 42, 275-277, 279, 286-288, 291
critical thinking 128, 155, 158, 164

Crypto Native 67
cultural heritage 94-96, 99-100, 105-109
cultural organizations 94-97, 99, 104-107
customer engagement 72, 210, 213, 220, 227, 230, 249, 306, 350
customer experience 35, 44, 115, 204-205, 210-232, 234, 236, 241, 245-249, 251-252, 254
customer loyalty 89, 206, 216, 219, 224-225, 236-237, 244-250, 252-254, 474
Customer Reach 332
Customer Relationship Management (CRM) 58, 169, 225, 479
Customer retention 220, 349, 467
customer satisfaction 83, 87, 93, 210, 218-219, 221-225, 228, 230, 233-234, 236-237, 241, 244-247, 249-250, 252, 254, 257, 264-265, 269, 273, 311, 323, 335, 337
customer trust 218, 343, 349
customer value 211, 225, 233-234, 236-238, 244-251, 254, 423, 432

D

Decentralized Applications 63-64, 67
developing countries 34, 47, 308, 311-314, 318-320, 322-323, 328-329, 443
digital adoption 27-30, 33, 35-48
digital business 35, 49, 60, 68, 166, 169, 172, 175, 177-178, 180, 182, 189, 191-193, 198, 200, 203, 205-208, 220, 248, 292, 348, 362, 425-426, 436
digital business strategy 172, 182, 191-193, 198, 203, 205-208, 362
digital capabilities 172, 360, 381, 425, 504-505, 509
digital culture 36, 59, 90, 128, 133, 175, 180, 510
Digital Customer Experience 210, 213, 225, 227
Digital Disruption 53-54, 58, 65, 185, 192-193, 198, 202, 205-206
digital government 382, 384, 400-401, 403-406, 408-409, 422-423, 436, 438
digital leadership 164, 177, 183, 192, 200-201, 203, 206
digital literacy 116, 123, 128, 152, 164, 429-430, 504-508, 512-514, 518-526
digital marketing 49-50, 146, 153, 198, 205-206, 251, 294, 332, 344, 346, 348-350, 352, 355, 366, 424, 462-467, 470-479, 524
Digital Marketing Strategy 206, 251, 462, 466
digital media platforms 77-78, 82-83, 86-89, 91-92
Digital Menu 260, 273
digital platforms 57, 65-66, 77, 79, 82-83, 86, 88, 152, 192, 205, 208, 210, 222, 360, 463-468, 475-476
digital revolution 4, 53, 95, 201, 434, 504, 507
digital skills 43, 45-46, 113-117, 119-120, 123-127, 129-133, 135-137, 141, 174, 179, 360, 377, 428, 430, 438, 526
digital strategy 60, 123, 171, 175, 177, 180, 191-192, 195, 198-203, 205, 207, 286, 332, 361, 462, 470, 473, 476, 509
digital talent 60, 428, 430-431
digital technology 27-28, 36, 44-45, 49-50, 78, 100, 102, 104, 116, 120, 131, 137, 183, 189, 192, 199, 208, 213, 224, 359, 381, 411-412, 423, 425, 427, 431, 438, 449, 479, 508, 523, 525
digital trade 411, 415, 428
digital transformation 14, 16, 20-21, 27, 35-36, 45-51, 53, 59, 65-66, 77, 113-124, 126-128, 130-133, 139, 141-142, 145, 152, 157-158, 161, 165-170, 174-175, 178, 180-189, 191-194, 201, 203-205, 208-211, 213, 215-216, 220-222, 224-226, 231-232, 275-277, 279, 286-287, 313, 322-323, 325, 329-330, 355, 357-363, 366-368, 370-371, 373-387, 390-391, 396-398, 400-401, 403-409, 411-413, 416-418, 420-426, 428-440, 442, 444-445, 447-452, 455-459, 465, 480-485, 487, 499, 502, 504-505, 507-514, 516-518, 520-526
Digital Transformation Leadership 167-168, 174, 185, 189
Disintermediation 59, 67
disruption 53-54, 58, 61-62, 64-65, 131, 162, 169, 184-185, 192-193, 198, 202, 204-206, 286, 291, 392, 429, 437, 457
dynamic capabilities 49, 65, 185, 198, 200, 202, 205-208, 352, 362, 398

E

e-commerce 35-36, 47, 69, 73, 83, 123, 205, 253, 286, 315-316, 318, 320, 326, 329, 332-334, 337, 342-343, 347, 349-354, 366, 411-412, 415, 417, 426, 431, 436, 463, 468, 474
E-Commerce Services 318, 411
economic growth 204, 358, 411, 414, 419, 482
economic performance 94-95, 100, 105, 421, 435, 438
Ecosystem Alignment 382, 385
ecosystems 63, 65, 95, 164, 186, 201, 206-207, 378, 382-383, 385-386, 389, 395, 398, 400-402, 404-408, 434
Educational Technology/EdTech 47, 163, 508, 523, 526
Eduroam/Education Roaming 518-519, 526
e-learning 42-43, 45, 50, 136, 481, 494-495, 498, 501-502
electronic health records (EHR) 35, 41, 45, 51
Emerging Industry 438

emotion 151, 250, 277-279, 282-283, 285, 287, 289-291, 467
employee training 114-115, 134
entrepreneurship 49, 95, 140, 161, 164, 198, 205, 324, 328, 330, 353-355, 357-361, 363, 378-381, 406, 477, 505, 523
European Centre for the Development of Vocational Training 113-114, 116, 118, 126-127, 129-130, 133

F

Feed Industry 480-481, 484, 486-491, 494-495, 499, 501
fintech 57-58, 62, 67, 69, 179, 360
flexible work 130, 139, 141, 146, 153
food and beverage businesses 256-259, 261, 263-265, 267, 269, 273-274

G

Gen Y 51, 250, 469, 478
Gen Z 52, 237
generations 43, 45-46, 95, 207, 307, 357, 359-361, 363, 372-378, 381, 508, 513, 521

H

healthy food 292, 294, 296, 302, 305, 307
hierarchical clustering 277, 280, 282, 287, 291
Higher Education 49, 122, 131, 261, 266, 268, 458, 504, 511, 518, 522-525
Hybrid Cloud 395, 409
hybrid world of work 128, 139-140, 143, 149-150, 153-154, 159, 164

I

ICT Common Capability Contracts 409
ICT infrastructure 36, 398, 409
ICT services 97, 99, 105, 109, 409
industrial policy 461
Industry Digitization 438
influence marketing 292-294
influencers 292-298, 300-303, 305-307, 353, 466
information literacy 505-506, 508, 526
information system 52, 168, 259, 266, 273
Information Technology 11, 25, 41, 92, 108, 140, 146, 153, 168, 170, 173, 181, 183-188, 206-208, 211, 222, 259, 271, 313, 317, 327, 329-330, 350-352, 354, 368, 379, 381-382, 403, 407-408, 423, 428, 430, 434-435, 523
Infrastructure as a service (IaaS) 409
Initial Public Offering (IPO) 67
Innovation Policy 49, 461
Innovation System 439-440, 442-444, 455, 459, 503
Instagram 12, 57, 292-293, 295, 302, 304-307, 309, 313, 324, 472-474
Instagrammer 307
Institutional Elements 503
Integrity Management 439, 450, 454, 460-461
intelligence production 440, 442, 449, 451
intergenerational cooperation 357, 359, 362-363, 373, 376-378
intergenerational entrepreneurship 359-361, 381
international markets 27, 34-36, 332-334, 341, 346-347, 349, 462, 464, 468, 470, 478
international new ventures 462, 464, 467, 477-478
internationalization strategy 347
Internet of Things (IoT) 25, 35, 41, 47, 52, 116, 130, 146, 153, 168, 201, 257, 272, 274, 358, 419, 428, 434, 438, 440-442, 450-451, 505
Internet Plus 438
INV 464, 468-469, 473, 475, 479
involvement 105, 164, 171-172, 178, 292, 294, 296-297, 300-303, 306-307, 319, 361, 370, 377, 392, 442, 474, 514, 521
IT leadership 165, 167, 173, 177

K

Key Performance Indicators (KPI) 466, 479
knowledge exchange 385, 451, 480-481, 483, 488, 502

L

leadership 119, 123-124, 145, 153, 160, 164-168, 173-174, 176-177, 180-183, 185, 187-189, 191-192, 198-201, 203, 205-206, 208, 277, 286, 330, 385-386, 391-392, 396, 400, 424, 443, 459, 499, 505, 509, 523
Learning Designer 526
luxury bedding 462, 469-470, 473, 475

M

marketing communication 284, 289, 336, 345
marketing strategy 206, 238, 247, 251, 275, 291, 293-294, 328, 351, 354, 462, 466
Mass Customization 77, 85-86, 93
Menu Planning 258, 264, 274
micro-learnings 494-495, 498, 503

Multichannel marketing 217, 229, 232

N

Netflix 63, 78, 82-83, 85-87, 89-93, 234-238, 240-242, 246-248, 250-254
Netflix Series 93
new normal 46, 127, 139, 141, 143, 158-159, 162, 164, 287, 513
new organization development 480, 499
non-carnivorous 300-302, 307

O

obstacles 59, 119, 131, 401, 483-484, 513
oil industry 439-440, 446-447, 449-450, 454, 457
oil operator 440, 453, 461
omnichannel 72, 210, 216-217, 221-222, 225, 227-229, 231-232, 416
Omnichannel marketing 232
organizational transformation 188, 191, 408
original content 78, 86, 89, 93, 235, 247
Owner-Manager 381

P

partnership 27, 176, 235, 247, 392, 394, 401, 409, 428, 452, 454-455, 471, 514
persona 490, 503
Personal Digital Assistant (PDA) 257, 259, 274
platforms 36, 53, 55-57, 59-60, 63-66, 77-79, 81-84, 86-89, 91-92, 97, 114, 126, 140, 152, 166, 169, 174-175, 192, 200, 205, 208, 210, 213, 217, 219, 222, 234, 247, 285, 309, 311-312, 323, 326, 343, 360, 364, 369, 382, 385, 389, 395-396, 399-400, 405, 411, 418, 424-425, 438, 440, 450, 453, 463-468, 471-472, 474-476, 479, 481, 484, 500, 505
Point-of-Sales (POS) System 274
Private Cloud 410
probit 101, 103-104, 109
Product Harm 277, 291
Project/Problem-Based Learning (PBL) 526
Public cloud 396, 399, 410
public sector 22, 36, 48, 186, 382-384, 386-387, 391, 396-397, 400, 402-403, 405-408

R

RACE 462, 464, 466-467, 471, 476, 479
recommender system 77, 83-86, 90-91, 93, 250
restaurant management 256-260, 265-274
restaurant management system 256, 258-260, 265-267, 270-274
Restaurant Technology 256
round table discussion 139-140, 143, 146-147, 152-153, 155-156, 159
routine work 139-140, 143, 150, 155, 157, 164, 168

S

sales 38, 44, 58, 100, 170, 211, 216, 220, 222-224, 226, 231, 234, 256-258, 263-264, 266-268, 276, 311, 313, 320-321, 323, 332-333, 335-338, 340-345, 347-349, 352, 366, 370, 418, 425, 463-465, 467, 474, 476, 495
Scientific Computing Unit of the Foundation for Science and Technology (FCCN) 526
SciMAT 1, 5-7, 10-13, 15-25
search engine optimization 345-347, 351, 355, 466, 473
Search Engine Results Page (SERP) 355
Sectorial Innovation System 503
Sectorial Knowledge Needs 480
sentiment analysis 81, 275, 277, 279-280, 283-284, 286-288, 291
service failure 253, 276, 289-291
service industry 24, 180, 233, 257, 420, 426
skills gaps 113-115, 119, 134
Small and Medium Sized Businesses 381
small and medium-sized enterprises 119, 130, 147, 160, 164, 308, 324, 326, 328, 350-351, 358, 379-381, 423
smart management 1, 165-167, 170, 396, 411
social media 3, 17, 20, 35-36, 38, 42, 77-78, 80-81, 83, 85, 97-98, 100, 103-104, 108, 137, 166, 168, 180, 205, 211, 213, 215, 219-220, 222, 230, 234-235, 275-279, 285-286, 288, 290-291, 293-295, 297, 303, 305-309, 311-312, 314, 319-320, 323-330, 348, 350, 352, 355, 366, 406, 428, 433, 467, 471-473, 477-478, 509
Software-as-a-Service (SaaS) 410
stock control 258, 264, 274
Strategic Management 47, 53, 55, 65, 96, 195, 203, 206-207, 251, 330, 404-405
Streaming Services Business 255
subsea 439-442, 445-453, 455-456, 460-461
subsea engineering 440, 449, 461
subsea production system 439
systematic literature review 26, 29, 49, 118, 132, 193, 198, 203, 205, 208, 231, 359-360, 362, 380-381

T

Talent in the Digital Era 164
techno-economic development 439, 443, 449, 455-457
Technological Trend 134
Technology Acceptance Model (TAM) 28, 52
Telecommuting 411
tourism 1-6, 10-19, 21-26, 46, 96, 108, 218, 223, 225, 227, 270-272, 275, 277, 285, 288, 290, 304-306, 326-328, 352
tourist satisfaction 1, 272
Trends in Managing People 139

U

Underwater Vehicle 461
unicorn 56-62, 66-67
User Experience 55, 92, 168, 233-234, 236-237, 240-241, 244, 246-250, 252-253, 255, 354-355
User Generated Content 309-310

V

value creation 15, 34-35, 45, 54, 81, 94, 105, 108, 164, 187, 192, 205, 207-209, 276, 286, 354, 366, 385, 389, 400, 430
Value Proposition Canvas 488, 491, 498, 503
venture capital 59, 61, 65, 67, 463
Virtual World 164

W

Web 2.0 309-310, 325-328, 354-355
Website Reach 355
website strategy 332-333, 338, 348-349
Whole Slide Image (WSI) 41, 52
WOM 38, 44, 210, 218-219, 221-222
word-of-mouth 3, 38, 46, 218-219, 226, 229, 307