

Handbook of Research on

Strategic Fit and Design in Business Ecosystems



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- printed on 2/8/2023 7:17 PM via

AN: 2235525 ; Hacıoglu, Umit.; Handbook of
Research on Strategic Fit and Design in Business Ecosystems

Account: ns335141



Handbook of Research on Strategic Fit and Design in Business Ecosystems

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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>

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Library of Congress Cataloging-in-Publication Data

Names: Hacıoğlu, Ümit, 1979- editor.

Title: Handbook of research on strategic fit and design in business ecosystems / Ümit Hacıoğlu, editor.

Description: Hershey, PA : Business Science Reference, [2020] | Includes bibliographical references and index. | Summary: "This book is a collection of innovative research that builds a futuristic view of evolving business ecosystems and a deeper understanding of business transformation processes in the new digital business era"-- Provided by publisher.

Identifiers: LCCN 2019025213 (print) | LCCN 2019025214 (ebook) | ISBN 9781799811251 (hardcover) | ISBN 9781799811275 (ebook)

Subjects: LCSH: Business planning. | Business--Technological innovations.

Classification: LCC HD30.28 .H36634 2020 (print) | LCC HD30.28 (ebook) | DDC 658.4/012--dc23

LC record available at <https://lcn.loc.gov/2019025213>

LC ebook record available at <https://lcn.loc.gov/2019025214>

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.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.



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In Lee
Western Illinois University, USA

ISSN:1935-2700
EISSN:1935-2719

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Business Science Reference • copyright 2017 • 340pp • H/C (ISBN: 9781522521044) • US \$205.00 (our price)



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Güner Gürsoy, Istanbul Okan University, Turkey

Because of the necessity of adopting the product and service to the rapidly changing needs of current customers, specialization in each supply chain has become more important. The companies from the same supply chain benefited from the collaboration in order to gain competitive advantage. This chapter first of all explains the current changes in business environment and define the new global business system and summarizes the common strategies to survive in this environment from related literature. It proposes a model of a smart supply chain management including agile organizations and mutual goal achievement of the firms and the members of the same supply chain at the end of the chapter. The aim of this chapter is providing a road map to today's and future organizations to be more competitive. It is believed that the chapter will be helpful for both professionals and academicians who have interest in strategy building process and creating competitive advantage.

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Zafer Adiguzel, Istanbul Medipol University, Turkey

Employees working for knowledge management change traditional concept of labor and become an important activator of organizational value. Therefore, in the age of technology, organizations started to give importance to “knowledge management” to reach their performance targets. Knowledge management plays a key role in organizations’ accumulation of intangible assets and the organizations use information resources of social networks to maintain their competitive advantage and increase their

level of competitiveness. Knowledge management is an important intangible asset for the organizations. Therefore, it is necessary to examine how the information and knowledge management affect organizational performance, and what are the best strategies to achieve good impact. The path to successful strategy and innovation goes through well-implemented knowledge management.

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Niliüfer Serinikli, Trakya University, Turkey

Digital transformation has caused amendments to business in terms of strategies, work models, work processes, product and services, organization culture, decision making, technological infrastructure, human resource management, and collaborations. Thanks to digital transforming, amendments in business have caused to appear new type business: digital business. In digital business, either new work model system is created, or existing work process is changed or transformed. The purpose of this study is to determine the differences between conventional businesses and digital businesses and the amendments to organizational structure and human resource management in digital processes. In the light of this purpose, examples will be given from businesses changed by digital processes.

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In the era of digitization terms such artificial intelligence (AI), internet of things (IoT) and related concepts are frequently used to describe a phenomenon that will eventually connect all things to digital networks that will lead to digital transformation of existing business and how they formulate strategies. One of the reasons behind such a paradigm shift is due to the demands of hyper-competition companies face in the global marketplace. Changing nature of the competitive landscape forces companies to re-think their strategy and align existing structures to achieve agility, flexibility, and a sustainable competitive advantage. Thus, companies need to re-think and conceptualize their overall strategies including the means to achieve sustainable competitive advantage. The trends that are shaping the Industry 4.0 will shape the way companies formulate strategies, create collaboration, and convergence of all the actors in the ecosystem to achieve agility, flexibility, and maximize efficiency.

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New Strategies for Evolution of Business Ecosystems: Platform Strategies 98

Cemal Zehir, Yildiz Technical University, Turkey

Melike Zehir, Yildiz Technical University, Turkey

Songül Zehir, Gebze Technical University, Turkey

Several industries are formed by platform business models. To achieve success and have sustainability, the platforms should follow various strategies, paying attention on several factors. In this chapter, initially, how the platforms as a business model have emerged, in which ways they are used, and their working ways have been explained, and “platforms as a new business model” has been extensively examined. Types of platform business models, general features of platforms, ways to generate income from platforms are explained in detail. How platforms could succeed and what could lead them into failure have been told. Platform leadership, prominent platform strategies, governance of platform strategies have been

extensively examined. Emerging trends and future research directions have been mentioned. For this study, a detailed literature scanning has been performed, research fields have been shared in order to fill the gaps. In the final section, the prominent parts of the study to be focused have been expressed.

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This chapter proves the mediating effect of product platform strategies on the relationship between a firm's subject, environment, and resources and the performance of new product development in the perspective of platform leadership. The author analyzed the mediating role of product platform strategy by considering CEO propensity, competition and customers, and competitiveness of retained resources. Compared to the past, in the perspective of platform leadership, the product platform strategy has a critical effect on the relationship between the business scope of a platform leader, the external relationship with complementors, and the internal organization of a platform leader impact on the performance of new product development. As a result of hierarchical regression analysis with the data of Korean high technology companies, the product platform strategy would be mediating the relationship between the antecedents such as CEO propensity, competition and customers, and competitiveness of retained resources and NPD performance.

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Marketing lives as a living organism with its competitive environment and several internal conditions. Marketing functions should adapt to the world they are bound to and develop their activities by taking into account the changes and developments in micro and macro factors. With the increase in technology and the spread of social media, transformation in marketing has become inevitable. Advances in business applications have better results about understanding customer and markets. As previous studies examine artificial intelligence concept with different contexts, there is lack of integrated study which examine marketing and artificial intelligence together. This study proposes three-steps plan for implementing AI with marketing while it includes nine scenarios from different marketing goals. Study also has suggestions for implementing AI methodologies into business processes.

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<i>Burçak Cebeci Perker, Bahcesehir University, Turkey</i>	

As its popularity increased, internet was converted to a main marketing tool for many types of businesses. However, it preserves more promising features due to offered globality and rapidness when it comes to communicate people effectively. As invested financial budgets and intellectual power are increased for global brands, which internet marketing strategies a business would succeed in international market has become a crucial inquiry. This study subjected 10 different international brands by conducting qualitative and quantitative research methods to compare efficiency of internet marketing strategies in order to correspond this question.

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This chapter presents the holistic project asset management concept (HPAMC)-based transformation projects to optimize asset/wealth creation/management in transformed enterprise system that is the result of research and development on 1) business case studies, 2) asset/wealth management, 3) business transformations, 4) applied mathematics/models, 5) software modelling, 6) business engineering, 7) financial analysis, 8) decision making systems, 9) artificial intelligence (AI), and 10) enterprise architecture.

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With its high process automation and digitalization, Industry 4.0 provides new opportunities to actualize more flexible, higher quality, speedy, cheap, and productive manufacturing and services. Containing numerous technology and paradigms, Industry 4.0 is expected to transform the industrial manufacture and society by aiming at economic, social, and environmental gains. The facts that natural resources are running out, lifecycle of the world is diminishing, and society has increasing anxiety on this situation. These have been the propulsive power for the development of Industry 4.0. By means of the technology and innovations that Industry 4.0 brings along, it is clear that it could also contribute to the recent popular and emphasized concept: sustainability. In this chapter, after giving information about the paradigms related with Industry 4.0, the theoretical frame of corporate sustainability and the effect of digital transformation on corporate sustainability have been evaluated. And then, constructing sustainable digital business models and focusing on value proposal have been discussed.

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<i>Emre Türkmen, Istanbul Technical University, Turkey</i>	
<i>Ayberk Soyer, Istanbul Technical University, Turkey</i>	

The developments in information and communication technologies in the digital age have significant and varying effects on organizations. Changes in traditional business ecosystems have created new business environments called “digital business ecosystems.” Digital transformation (DT) studies are continually being carried out in organizations to adapt to these new digital business ecosystems. Besides technological adaptation, structural changes in processes, human resources, and company culture also occur in DT process. Under these conditions, organizations need to create their strategies and road maps. In this context, it is aimed to develop a conceptual framework for examining the effects of DT on organizations by taking into account Michael E. Porter’s value chain framework and Henry Mintzberg’s typology of organizational configurations. The proposed framework is expected to make contribution to the literature in terms of adapting Porter’s value chain to the organizational structures in digital age and will be adaptable to different types of organizations.

Chapter 12

Strategic Approach to Business Intelligence and Its Impacts on Organizational Performance 289

Zafer Adiguzel, Istanbul Medipol University, Turkey

Organizational structures have changed as a result of the widespread use of information technology, as well as the development of software programs and its daily use in all departments. When such technologies became more widespread throughout every sector, enterprises began to understand its effectiveness and have established information technology department requirements in their organizations. With time, these requirements have become integrated into whole organizations, thereby increasing the importance of business intelligence. Competitors, increasing uncertainties, and risks of the sector have resulted in the further development of the concept of business intelligence to support organizations and senior management wishing to achieve a competitive advantage and make strategic decisions. In other words, analyzing data and sharing it among the departments within the organization became significantly important as senior management use this information to make strategic decisions.

Chapter 13

Mutual Relationships Between Digital Transformation and Leadership 311

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Organizations have taken various steps and transformed to adapt to digital technologies that change and evolve over the years. There is a need for leaders specialized in “digital technology and digital transformation” within the organization in order to be able to manage this transformation with appropriate decisions and strategies. There is a change in the titles given to leaders, their job descriptions, and qualifications during the process of digital transformation. The tasks of these leaders are to cooperate with other departments in the organization in a harmonious and supportive way to develop and implement innovations in the organization, to systematize the workflow processes, to quickly adapt technological innovations to the organization, and to contribute directly to its values. This chapter discusses supportive leader behaviors and types for change and transformation, supportive leaders for digital transformation, and the changing roles of leaders in digital transformation and digital leadership.

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Fintech Ecosystem and Banking: The Case of Turkey 332

Yakup Söylemez, Zonguldak Bulent Ecevit University, Turkey

In this study, Fintech platforms are compared to the traditional banking system. This comparison is based on the banking activities offered by Fintech platforms and the results of these activities. In the study, firstly, a general evaluation is made in the comparison of the Fintech platforms to the banking system and then the situation in Turkey is analyzed. It is clear that Fintech platforms have developed financial markets. Moreover, banks have the potential to adapt to the digital innovation advantage of Fintech platforms. In this study, the banking system and Fintech platforms are considered as competing institutions as well as supporting and transforming each other. Services within the scope of banking activities change as a result of digital innovations. As a result, it is clear that the financing system enters into a revolutionary process. This study contributes to the literature in terms of the analysis of the relationship between banking and Fintech, which is based on Turkish Fintech Ecosystem.

Chapter 15

Digitalization in Accounting Through Changing Technology and Accounting Engineering as an Adaptation Proposal 354

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When the historical process of accounting is looked at, it is seen that there are revolutionary turning points such as development of double-entry bookkeeping method, uniform accounting system and international accounting standards practices, and use of computer software in accounting. Technology has initiated a radical transformation process by enabling the transfer of accounting to the digital platform. Involvement of accountants in this digital change process, their adaptation, and responses must be simultaneous. Students who are receiving accounting education should also be trained in this direction so that not only accountants but also future accountants will be able to adapt to digitalization. Accounting engineering is a model developed as a solution offer at this point. In this study, the concept of digital accounting and accounting engineering which emerged through the adaptation of accounting as an information system with new technologies will be discussed.

Chapter 16

The Control of Transfer Pricing of Corporations by Blockchain Technology: Challenges and Solutions 377

Habip Demirhan, Hakkari University, Turkey

The globalization movements that had emerged in the last century have not only influenced the world's social, political, and cultural structure, but also have influenced its economic structure as well. The globalization of the world economy makes locations and economic units between countries or regions interdependent on one another. The primary driving forces of this process include technological change and multinational enterprises. Thus, intercompany transactions are important for multinational enterprises. In recent years, discussions regarding the applicability of blockchain technology, or more commonly referred to as crypto coins, for the public sector have emerged. This study therefore attempts to explain the applicability of blockchain technology in relation to transfer pricing, and it clarifies (1) how blockchain technology represents a new approach to transfer pricing, (2) how blockchain technology reduces transfer pricing evasion, and (3) how blockchain technology increases both transparency and accountability.

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Changing Labor Force Attributions and Business Culture During Industry 4.0

Chapter 17

The Impact of New Technology on Society and Workforce in Production in the Era of Industry 4.0 395

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Pelin Vardarlier, Istanbul Medipol University, Turkey

The industrial revolution, which took place in the 20th century, is the first step of similar developments in the ongoing centuries. In the first steps of this century, the use of steam machines in production is the first steps of a more serial and systematic production structure. With the advancing developments up to the industrial revolution or Industry 4.0, a structure quite different from the initial stage was formed. In the most general sense, the Industry 4.0 structure, defined as the internet of objects, emerges with a more systematic and self-functioning structure discourse in its production activities, but its effects are

not only related to production activities. As a matter of fact, the use of Industry 4.0 at the point reached, human resources, employment, social classes, communities, and so on. It is thought to be effective on the structures. In this context, in this study, the effects of the social impacts of these processes and the ways in which Industry 4.0 can create a social structure have been explained.

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Digital Era and New Methods for Employee Recruitment	412
<i>Elif Baykal, İstanbul Medipol University, Turkey</i>	

The ever-increasing digitalization in today's business processes—and incredibly fast-growing markets—have created a more competitive business environment. And, this more competitive business environment has led companies to be more demanding regarding the employee qualifications as well as the quality of tasks carried out by these employees. Moreover, this change process has rendered the traditional human resources management methods inadequate, further digitizing the field of human resources. In this study, the authors examine the handling of recruitment functions within human resources management and the digitization process. Furthermore, they discuss both the basic dynamics of the e-recruitment processes, the tools of e-recruitment, as well as its advantages and disadvantages.

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The Effects of Industry 4.0 on Labor Force Attributes and New Challenges	431
<i>Mehmet Saim Aşçı, İstanbul Medipol University, Turkey</i>	

Unmanned factories became a topic of discussion after the concept of Industry 4.0 was first introduced in the Hannover Fair in 2001, and increasing the computerization level in business life and supporting the production processes with advanced technology were determined as targets. In this regard, artificial intelligence and increased automation are expected to create new kinds of jobs in the coming years; however, a significant problem is predicted considering that these changes will invalidate a high number of job types exist today. Thus, the workforce will face a severe unemployment threat. As a result of all of this, radical changes in the work methods, along with means of seeking employment, are now considered. The qualities of the work and the workforce are being transformed along with the organization methods of the production. While on the other hand, it becomes evident that education also has to adapt to this transformation. In this study, the issues the labor might have to face during this period will be discussed, along with what could be done to solve these problems.

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The natural development of history of humanity confronts the societies with a new industrial wave making use of the opportunities of the information and communication technologies. While the concept of labor depending on muscle force that produced the emergence of modern societies withdraws from production process, the gap is filled by intelligent machinery which automatically decides by itself by employing machinery automation and internet technologies. In the new social order, people determine their own standing according to their intellectual build-up instead of muscle power. Industry 4.0 brings a lot of advantages together with the reduction of source consumption, energy productivity, production efficiency, stabilization of rising workforce expenditures, and prevention of the impact of aging societies on production. Although problems come up on the issues of setting the intelligence of machinery and

accomplishing workforce market that fits the industrial revolution, technological developments and the subsidies draw the actualization date of the process forward.

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<i>Ozge Doguc, Medipol University, Turkey</i>	

Many software automation techniques have been developed in the last decade to cut down cost, improve customer satisfaction, and reduce errors. Robotic process automation (RPA) has become increasingly popular recently. RPA offers software robots (bots) that can mimic human behavior. Attended robots work in tandem with humans and can operate while the human agent is active on the computer. On the other hand, unattended robots operate behind locked screens and are designed to execute automations that don't require any human intervention. RPA robots are equipped with artificial intelligence engines such as computer vision and machine learning, and both robot types can learn automations by recording human actions.

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Cultural Effects of Global Businesses and Multinational Businesses: Localization Versus Globalization – Middle-Point Cultural Hybridization	493
<i>Yeter Demir Uslu, Istanbul Medipol University, Turkey</i>	
<i>Yasemin Hancioğlu, Ordu University, Turkey</i>	

The concept of globalization is a process in which countries, cultures, organizational cultures, and even organizational structures converge with each other and a single standard point of view in the world emerges, and it identifies and defines the differences of the elements. This shows that the processes of globalization and localization are always in interaction. Convergence brought by globalization shows that multinational enterprises perform standard activities at the global level. However, in contrast to this convergence, with the effect of localization, hybrid organizational structures are becoming important especially in order to provide competitive advantage in the national market. While creating hybrid organizational structures, attention is paid to establish a structure that will not hinder the coordination between the host country and the home country. In this context, the definitions of globalization, localization, hybridization, and how the complexity of their interactions are reflected in business strategies are discussed from a theoretical point of view.

Section 4

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Chapter 23

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<i>Nihal Kalayci Oflaz, Istanbul Medipol University, Turkey</i>	

In the 21st century, the free movement of information became quite important with the increase of internet technology. The fact that people can exchange money or data with each other without the need for any intermediary has led to the development of a new economic area under the name of the sharing economy. One of the most important features of the sharing economy is that the parties of the economic transaction establish this relationship through a technological platform. Similarly, allowing peer-to-peer

transactions and seeing them as a reliable and public platform has made blockchain technology the focus of attention as a digital business technology in various sectors. In this study, blockchain technology, which is considered as the future technology of the sharing economy, is explained within the framework of a health sector model that deals with the partnership between the sharing economy and blockchain technology.

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Digital Transformation and Environmental Management Applications: Approaches Used for Value Creation in the White Goods Industry 545

Yasemin Hancioğlu, Ordu University, Turkey

Today, when determining competitive strategies, businesses should consider environmentally-sensitive approaches and Industry 4.0. The fact that the world is increasingly affected by environmental negativities leads businesses to adopt green thinking. Increasing the orientation of the businesses to green is possible with the concentrated roles of all business functions. In this study, it was determined how much of the Industrial 4.0 approach of the White Goods sector in Turkey was adopted. In addition to this, it is examined how much they integrate the approaches that aim to minimize the harm to the environment to their enterprises in order to create an effective management system. As a result, it can be said that environmental awareness has been formed in the leading enterprises of Turkey such as Arçelik and Vestel and that developments in the world have been followed and tried to be integrated in the name of Industry 4.0.

Chapter 25

Copyright, Patent, and Trademark: Are Females More Likely to Invest in These Strategic Assets? 570

Evrin Altuk, Trakya University, Turkey

Ali Kablan, Trakya University, Turkey

Murat Ocak, Trakya University, Turkey

Technological improvements have introduced many changes that attract not only the entire society but also companies. Companies that use technological opportunities take advantage of competition. In a rapidly changing world companies should be innovative and flexible to adapt to new technological developments. In this study, the authors investigate the relationship between firms' innovative activities in terms of patents, trademarks, and copyrights and female-dominated firms using some control variables at firm level.

Chapter 26

The Development of Servitization Concept in the Era of Industry 4.0 Through SCM Perspective 593

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Cansu Yildirim, Dokuz Eylul University, Turkey

The transition from goods-dominant logic to service-dominant logic has captured the attention of industries for decades now. Servitization is one of the concepts that enable organizations to make this transition by providing services along with their products and has become an important competitive strategy for organizations to survive in their ecosystems. Thus, in this chapter, the objective is to increase the understanding of servitization concept in the era of Industry 4.0 from supply chain management

perspective. The content analysis methodology is used to examine articles that bring together servitization and supply chain management and to find out where servitization stands with regards to Industry 4.0 applications. The findings show Industry 4.0 applications during servitization operations are yet to develop, and accordingly, the chapter concludes with further research directions in relations to servitization and Industry 4.0 applications in the frame of supply chain management.

Chapter 27

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<i>Sovik Mukherjee, St. Xavier's University, India</i>	

The chapter models a monopoly platform with buyers on one side and sellers on the other. The platform charges some combination of a fixed membership fee and a variable usage fee from both the sides and the buyers are heterogeneous in terms of the per unit benefit they derive on the transaction of the product. In this digital era of IT-based business ecosystems, the big names in the digital business market have been accused of serious tax avoidance in countries where they operate. In this backdrop, the author introduces a baseline monopoly platform model for policy making purposes, incorporating both ad valorem and specific taxes on the buyers' side of the platform alone. But the results can be similarly interpreted for the seller side as well, without any loss of generality. The chapter gives us insights as to whether there is any cross-side externality working in the presence of product differentiation in standard monopoly platform models.

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<i>Gamze Oz-Yalaman, Eskisehir Osmangazi University, Turkey</i>	

The issue of taxation is one of the key subjects that draw the attention of both policymakers and business executives. This chapter investigates the effects of taxation on the firm performance by using an extensive data set from a panel of 738 companies for 16 different countries over the years between 2000 and 2016. The results suggest that the impact of corporate tax rates on firm performance is significantly negative. The results also show that financial crisis, development levels of countries, and size of firms have a significant effect on this relationship. The results are robust in terms of combining different sets of control variables. These findings are to guide the business executives in the decision-making process, which could increase the firm performance, and the results may help to improve the implementation of fiscal policy in the field of taxation.

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Foreword

This latest book edited by Dr. Hacıoglu presents a selection of contributions from eminent authors on the important issue of Strategic Fit and Design. In the book you are about to read, recent developments in the field are summarized by 28 research articles with international contributions from Korea, India and Croatia. With the development of IT technologies and the advent of digitalization it has become ever more important for business organizations to assess the strategic fit between the innovations and their organizations goals. An improper or hasty assessment of the strategic fit may result in an investment in a technology that the organization is not yet ready for and the high expectations from the new technology will soon turn to regrets. This is why many new technologies when adapted improperly or too early eventually lead to financial losses. Blockchain, Artificial Intelligence and Big Data are some of the new buzzwords widely discussed in academic and practitioner circles. However, not enough research has been published about the successful implementation of these and similar technologies in different fields such as health care and environmental management. Also the implementation methods of the new technologies are widely varied from purchasing new hardware or software from outside vendors to using software as a service (SaaS) or platform as a service (PaaS) models. Considering all these issues in a holistic manner, this publication attempts to fill the void in the literature. The book covers a wide range of issues starting from Transformational Change and Designing New Strategies in the Digital Era to Relevant Topics and Current Issues in Business Ecosystem. All the contributions are of high scientific quality assured by the editorial process. This collection will be a valuable piece for academics and practitioners wishing to expand their understanding of strategic fit and business ecosystems.

I would like to take this opportunity to thank the editor and the many authors who have contributed with their original research papers. Business ecosystems will continue to be a major research interest for a long time and I certainly hope the editor will continue to produce excellent edited volumes in this area.

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Preface

In the last decade, the latest advances in technology and communication surrounding the business ecosystem and have been significantly transforming the traditional business operations and architecture. Artificial Intelligence, Robotic Automation technologies, Big Data, IoT, Blockchain based technologies, social media toolkits, and digital transformation are some newest hot topics blended with corporate and functional strategies today. Re-shaping a business strategy or Re-designing a business infrastructure will be less effective without the understanding of the latest requirements on an effective transformation process. The strategic fit between business operations and its strategies in the new era contributes to the enhanced performance of a business and provide a competitive superiority over traditional rivals in the market.

Notwithstanding this, advances in business informatics dramatically changed our understanding of the new business ecosystem. Nowadays, the challenging issues in this evolving business ecosystem shape the way how business operations and structures are transforming. Business strategists occupied with ongoing problems in this new ecosystem. They are subsequently seeking new ways to create a strategic fit between advanced operational activities and adaptive strategies. With a deeper understanding of the evolving business ecosystem will ensure top managers acquire the business data effectively and transform them into meaningful information, by using modern robotic technologies, software, machine learning and any other means of IT. Finally, they will develop effective business strategies in this new competitive era having control of the IT-based business ecosystem.

The strategic fit and design in the business ecosystem in today's digital era have more profound impacts on traditional investment strategies. Matching the ambitions of stockholders is essential during this transformational change. Satisfying them with new attractive financial results and return means increased future demand on equity stocks outstanding in the capital markets. As a return of this, additional financial sources through new equity financing strategies will boost the investment opportunities on the newest automation systems, R&D, marketing and promotional activities, and adoption of advanced technologies.

In light of recent advances in the business ecosystem, international scholars and business practitioners nowadays pay more attention to rising concerns and future directions for technology-based operational practices. Apart from the benefits of strategic fit and design in a new business ecosystem, there are some vital rising concerns about the possible consequences of deploying advanced technologies on business performance and culture. Using artificial intelligence, sophisticated robotic technologies, automated vehicles, self-managing supply modes, and blockchain economies may be sources of threats for human control of the business ecosystem. Are today managers capable of creating a supportive culture for their organizations in the digital era? To which extent will robot-human managers be able to manage the evo-

lution of business culture? To which extent are they able to create a strategic fit between human-robot collaboration in an evolving business ecosystem?

This novel book emphasizes the broader understanding of the evolving business ecosystem and transformational change in the light of strategic fit and design between business operations, architecture, and new technology. It is aimed to spotlight the importance of formulating a strategic fit and design in a new business ecosystem in the digital era. In this novel book, it is also targeted to develop a strategic approach to the competitive business ecosystem and effective transformational change.

This book composes of four contributory sections with 28 chapters. The first section outlines the transformational change and design for new business strategies in the digital era for a new business ecosystem. Chapters in this section spotlighted the need for re-shaping business strategy and examining the competitive strategic fit in the era of digitization. This book continues with section two outlining the Reflections of Digital Transformation on Business Ecosystem. Chapters in this section assessed the digital transformation process of business operations. The authors in this section also examined the effects of digital transformation on organizational architecture and culture. The third section builds on the changing labor force attributions and Business Culture during Industry 4.0. Chapters in this section evaluated the impact of new technology on society and the workforce in production in the era of Industry 4.0. Finally, the last section, Relevant Topics and Current Issues in Business Ecosystem, assesses the relevant topics in digital business, value creation, taxation, and blockchain ecosystem.

Chapter 1 features the new strategy and thinking in the Global business Ecosystem while assessing the value creation process through SCM during transformational change. Dr. Ensari and Dr. Gursay, in this chapter, proposed a competitive model of a smart supply chain management, including agile organizations and mutual goal achievement of the firms and the members of the same supply chain. They aimed to provide a road map to today's and future organizations to be more competitive. This chapter will be helpful for both professionals and academicians who have an interest in the strategy building process and creating a competitive advantage

Chapter 2 examines the strategic fit and develops an innovative approach to competitive strategies and knowledge management. Dr. Adiguzel at Istanbul Medipol University in this chapter also addresses the importance of examining how the information and knowledge management affect organizational performance, and what are the best strategies to achieve a good impact.

Chapter 3 draws attention to the transformational change of Business Strategies and Organizations with the digital process. Dr. Serinikli's chapter aims to determine the differences between conventional businesses and digital businesses and the amendments to organizational structure and human resource management in digital processes.

Chapter 4 examines the importance of the Re-Shaping business strategy in the era of digitalization. Dr. Alkan states that the changing nature of the competitive landscape forces companies to re-think their strategy and align existing structures to achieve agility, flexibility, and a sustainable competitive advantage. Thus, companies need to re-think and conceptualize their overall strategies, including the means to achieve sustainable competitive advantage. The trends that are shaping the industry 4.0 will shape the way companies formulate strategies, create collaboration and convergence of all the actors in the ecosystem to achieve agility, flexibility, and maximize efficiency.

Chapter 5 develops an institutional view on the strategy development process and examines the platform strategies while evaluating the business ecosystem. Dr. Zehir and his colleagues, in this study, explains how platforms could succeed and what could lead them into failure, have been told. Platform

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leadership, prominent platform strategies, governance of platform strategies, have been extensively examined. Emerging trends and future research directions have been mentioned.

Chapter 6 introduces the platform strategy for the new product development process while examining the mediating effect of product platform strategy in the Korean High Technology Industry. Dr. Sang-Wuk Ku's chapter proves the mediating effect of product platform strategies on the relationship between a firm's subject, environment and resources and the performance of new product development from the perspective of platform leadership. The author analyzed the mediating role of the product platform strategy by considering CEO propensity, competition and customers, and the competitiveness of retained resources. As a result of hierarchical regression analysis with the data of Korean high technology companies, the product platform strategy would be mediating the relationship between the antecedents such as CEO propensity, competition and customers, and competitiveness of retained resources and NPD performance.

Chapter 7 initially assesses the transformation of marketing with new technology. This chapter also develops a case approach to artificial intelligence. Pinarbasi and Akpinar's study proposes a three-step plan for implementing AI with marketing while it includes nine scenarios from different marketing goals. The study also has suggestions for implementing AI methodologies into business processes.

Chapter 8 develops a critical approach to the new design of digital marketing strategies for international business with a comparative analysis. Dr. Perker's study subjected ten different international brands by conducting qualitative and quantitative research methods to compare the efficiency of internet marketing strategies in order to correspond to this question.

Chapter 9 examines the business Transformation and Enterprise Architecture. Dr(s). Trad and Kalpić's chapter presents the Holistic Project Asset Management Concept (HPAMC) based transformation projects to optimize asset/wealth creation/management in transformed enterprise system that is the result of research and development on (1) business case studies; (2) asset/wealth management; (3) business transformations; (4) applied mathematics/models; (5) software modeling; (6) business engineering; (7) financial analysis; (8) decision making systems; (9) Artificial Intelligence (AI); and 10) enterprise architecture.

Chapter 10 analyses the reflections of digital transformation on corporate sustainability and builds a theoretical perspective. Dr(s). Zehir and Özgül's study draws a theoretical frame of corporate sustainability and the effect of digital transformation on corporate sustainability have been evaluated, and constructing sustainable digital business models and focusing on value proposal are also discussed.

Chapter 11 draws attention to the future directions of the digital transformation for organizations. Dr(s). Turkmen and Soyer's study aims to develop a conceptual framework for examining the effects of DT on organizations by taking into account Michael E. Porter (1985)'s 'Value Chain Framework' and Henry Mintzberg (1980)'s typology of organizational configurations. The proposed framework is expected to contribute to the literature in terms of adapting Porter's value chain to the organizational structures in the digital age and will be adaptable to different types of organizations.

Chapter 12 develops a strategic approach to business intelligence and its impacts on organizational performance. Dr. Adiguzel's chapter spotlights the organizational structures which have changed as a result of the widespread use of information technology. The author advocated that analyzing data and sharing it among the departments within the organization became significantly important as senior management use this information to make strategic decisions

Chapter 13 analyses the mutual relationships between the digital transformation and leadership. Dr. Gurkan and his colleagues' chapter discusses supportive leader behaviors and types for change and

transformation, supportive leaders for digital transformation and changing roles of leaders in digital transformation and digital leadership.

Chapter 14 introduces the Fintech Ecosystem and Banking with a case study on the Turkish Fintech Ecosystem. This study contributes to the literature in terms of the analysis of the relationship between banking and Fintech, which is based on the Turkish Fintech Ecosystem.

Chapter 15 demonstrates the practical evidence of digitalization in accounting through changing technology and accounting engineering as an adaptation proposal. In this chapter, the concept of digital accounting and accounting engineering, which emerged through the adaptation of accounting as an information system with new technologies are evaluated by Dr(s). Esmeray and Esmeray.

Chapter 16 explains the framework of the control of the transfer pricing of corporations by blockchain technology. Dr. Demirhan, in this chapter, explains the applicability of blockchain technology concerning transfer pricing, and this chapter clarifies (1) how blockchain technology represents a new approach to transfer pricing, (2) how blockchain technology reduces transfer pricing evasion, and (3) how blockchain technology increases both transparency and accountability

Chapter 17 evaluates the impact of new technology on society and the workforce in production in the era of Industry 4.0. Dr(s). Zafer and Vardarlier discuss the issues of how industry 4.0 would create a socio-economic climate demand a social organization and where people could evolve against this demand were explained in this chapter.

Chapter 18 highlights the introduces the new methods for employee recruitment in the Digital Era. Dr. Baykal's chapter discusses both the underlying dynamics of the e-recruitment processes, the tools of e-recruitment, as well as its advantages and disadvantages.

Chapter 19 evaluates the effect of Industry 4.0 on labor force attributes, and the new challenges emerge during a transformational change in the digital era. In this study, the issues the labor might have to face during this period are assessed, along with what could be done to solve these problems by Dr. Asci.

Chapter 20 Develops a critical approach to the impact of Industry 4.0 on working life. Dr. Ofluoglu states that Industry 4.0 brings many advantages together with the reduction of source consumption, energy productivity, production efficiency, stabilization of rising workforce expenditures, and prevention of the impact of aging societies on production. Although problems come up on the issues of setting the intelligence of machinery and accomplishing the workforce market that fits the industrial revolution, technological developments, and the subsidies draw the actualization date of the process forward.

Chapter 21 develops a futuristic view of Robot Process Automation (RPA). Dr. Doguc's study underlines that RPA robots are equipped with artificial intelligence engines such as computer vision and machine learning, and both robot types can learn automation by recording human actions.

Chapter 22 develops a critical approach to the cultural effects of Global business and multinational business. Dr(s). Uslu and Hancioglu explain how the complexity of interactions between globalization, localization, and cultural hybridization is reflected in business strategies are discussed from a theoretical point of view.

Chapter 23 takes a contrary view and discusses reflections of applications in the blockchain ecosystem in the sharing economy. Dr. Ofiaz's chapter develops an evaluation of the health services industry. In this study, blockchain technology, which is considered as the future technology of the sharing economy is explained within the framework of a health sector model that deals with the partnership between the sharing economy and blockchain technology.

Chapter 24 focuses on the approaches used for the value creation in the white goods industry with digital transformation and environmental management applications. Dr. Hancioglu's study highlights

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that environmental awareness has been formed in the leading enterprises of Turkey such as Arçelik and Vestel and that developments in the world have been followed and tried to be integrated into the name of Industry 4.0.

Chapter 25 questions how females more likely to invest in strategic assets, including copyright, patent, and trademarks in Turkey. In this study, Dr. Altuk and her colleagues investigate the relationship between firms' innovative activities in terms of patents, trademarks, and copyrights and female-dominated firms using some control variables at the firm level.

Chapter 26 draws a comprehensive framework of the development of the servitization concept in the era of Industry 4.0 through SCM perspective. In this chapter, the objective is to increase the understanding of the servitization concept in the era of industry 4.0 from supply chain management perspective. Dr(s). Tabaklar and Yildirim used the content analysis methodology and examined articles that bring together servitization and supply chain management and to find out where servitization stands with regards to industry 4.0 applications. The findings show that industry 4.0 applications during servitization operations are yet to develop and accordingly, the chapter concludes with further research directions in relations to servitization and industry 4.0 applications in the frame of supply chain management.

Chapter 27 questions taxation of a monopoly platform in a product differentiation set-up and develops on Salop's circular City model. Dr. Mukherjee's study gives us insights as to whether there is any cross-side externality working in the presence of product differentiation in standard monopoly platform models.

Chapter 28 assesses the effects of the corporate tax rate on firm performance. Dr. Oz-Yalaman's chapter investigates the effects of taxation on firm performance. The findings of this study are to guide the business executives in the decision-making process, which could increase the firm performance, and the results may help to improve the implementation of fiscal policy in the field of taxation.

Thanks to interdisciplinary participation between world-class scholars concerning their studies, it is now possible to mention that this book contributes to the development process of company strategic roadmap and provides a strategic toolkit for decision-makers in business entities. It is also anticipated to be one of the pioneering premier sources in this field with the contribution of scholars and researchers from different disciplines overseas. Contributors in this study formulated the new insights on the strategic fit and design issue for the transformational change in a new business ecosystem.

The authors of the chapters in this premier reference book developed new approaches to the transformation process of business organizations and examined the strategic fit and design in the evolving business ecosystem in the digital era. Finally, distinguished authors and professionals contributed to the success of existing literature with their theoretical and empirical studies in this novel book.

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Acknowledgment

In this novel book, I have many colleagues and partners to thank for their impressive contribution to this publication. First of all, I would like to praise the people at IGI-Global, development editors, who have the attitude and substance of a genius. They continually and convincingly conveyed a spirit of adventure in this research at each stage of our book development process, our Project coordinators and all IGI-Global team, without their persistent help this publication would not have been possible, and others who assisted us to make critical decisions about the structure of the book, and provided useful feedback on stylistic issues.

I would like to express my appreciation to the Editorial Advisory Board Members. The members helped in the book included, Cemal Zehir, Dursun Delen, Ekrem Tatoglu, Ekrem Tatoglu, Hasan Eken, Idil Kaya, Ihsan Isik, Martie Gillen, Michael S. Gutter, Nicholas Apergis, Ozlem Olgu, Ulas Akkucuk, Zeynep Copur. The excellent advice from these members helped us to enrich the book.

I would also like to thank all of the authors of the individual chapters for their excellent contributions.

I would particularly like to thank the Bussecon International Academy Members for their highest level of contribution in the editorial process.

The final words of thanks belong to my family and parents separately. I want to thank my wife Burcu, my son Fatih Efe, my girl Zeynep Ela as well as my parents, my father Ziya and my mother, Fatma. Their pride in this challenging accomplishment makes it even more rewarding to me.

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Section 1

Transformational Change and Designing New Strategies in the Digital Era

Chapter 1

New Strategy and Thinking in Global Business System: Creating Value Through Supply Chain Management

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ABSTRACT

Because of the necessity of adopting the product and service to the rapidly changing needs of current customers, specialization in each supply chain has become more important. The companies from the same supply chain benefited from the collaboration in order to gain competitive advantage. This chapter first of all explains the current changes in business environment and define the new global business system and summarizes the common strategies to survive in this environment from related literature. It proposes a model of a smart supply chain management including agile organizations and mutual goal achievement of the firms and the members of the same supply chain at the end of the chapter. The aim of this chapter is providing a road map to today's and future organizations to be more competitive. It is believed that the chapter will be helpful for both professionals and academicians who have interest in strategy building process and creating competitive advantage.

INTRODUCTION

Creating a better world requires teamwork, partnerships, and collaboration, as we need an entire army of companies to work together to build a better world within the next few decades. This means corporations must embrace the benefits of cooperating with one another.

Simon Mainwaring (n.d.)

DOI: 10.4018/978-1-7998-1125-1.ch001

Globalization has been accelerated since 1980s. After then, the competition between giant multinational companies (MNCs) mostly from developed countries and local companies from different countries reshaped the way of doing business. First of all, understanding of environmental conditions gained importance more, since MNCs were dealing in different environments and the environment was changing rapidly for the local ones as well. Secondly, both sides needed competitive strategies and new managerial applications in order to survive in the long run. In other way, they focused on understanding and developing their value chain, thus they were aiming to develop a defensible position with the help of the very famous cost leadership and differentiation strategies developed by Porter in 1980. Porter was explaining the value and value chain with the following words “the value a company creates is measured by the amount that buyers are willing to pay for a product or service. A business is profitable if the value it creates exceeds the cost of performing the value activities. To gain competitive advantage over its rivals, a company must either perform these activities at a lower cost or perform them in a way that leads to differentiation and a premium price” (Porter and Miller, 1985, 150).

Later on, Porter and Millar (1985) pointed out the importance of value systems and combined value chains of suppliers, who provide inputs (such as raw materials, components, and purchased services) to the company’s value chain. They also underline that “the linkages not only connect value activities inside a company but also create interdependencies between its value chain and those of its suppliers and channels. A company can create competitive advantage by optimizing or coordinating these links to the outside.”

Nowadays, at the beginning of 21st century, many things have changed in creating value for the companies with the help of disruptive technology. We have still MNCs and local companies, but they are no more experiencing conventional competition, thus we have new concepts in business literature like “born global companies”, “agile organizations” and “virtual organizations” etc. In this new era, companies searching for gaining extra value by developing their supply chain not only their value chain. Akyuz et al. (2014), emphasized the importance of collaboration, coordination and agility in supply chains, since they suggest that today’s competition is no longer between companies, it is between supply chains. In other ways, companies trying to be more competitive by vertical alliances.

The objectives of this chapter can be summarized as follows; to define the dynamics of the new global business system and explain the new trends to survival of the companies from related literature such as agility and downsizing. The most important contribution is the proposal of a model of a smart supply chain management which can be seen at the end of the chapter. This proposal provides a road map to today’s and future organizations to respond customer needs with the most appropriate and quick way.

A New Era: Dynamics of The New Global Business System

Business Life and world trade have some milestones during the history of the humankind. The mercantilist movement which affected the way of trade between nations is accepted as the first milestone. After that nations favored at least one way of international trade and they thought that international trade will be the key of national development. They started to produce more than they can consume in their home country and in order to overcome shortages of resource, this movement led to colonialism. The second milestone was industrial revolution, which took place from 18th to 19th centuries, which marked a shift to powered, special purpose machinery, factories and mass production. The third milestone was at the beginning of 20th century, the first in the history, the business life experienced scientific managerial applications with the efforts of Frederick Taylor. At that time, there were not too much competitors in the

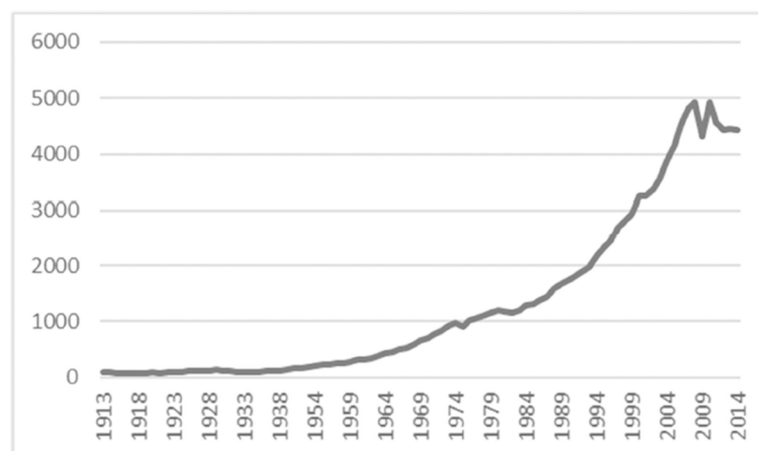
market, most market were might be considered as emerging markets. The main direction of managerial efforts was through solving the problems of productivity. The applications of Ford were become popular throughout the world with the name of Fordism. Forward vertical integration, which provides control over raw material and prevents shortages, became popular at the beginning of 20th century since most of the industries are not mature yet. For example, Henry Ford was trying to sell his unique product with a low cost and there was no specialist on their supply chain, so he decided to own each steps of the production process of cars from iron to trim operations in their early years.

After the Second World War, trade began to grow with the help of the efforts of nations for economic integration and also technological developments. The complementary efforts of two institutions IMF and WTO, in order to ensure a strong system of international trade and payments that is open to all countries, the world trade started to develop dramatically. As a result of these developments, the wave of globalization in international trade was growing faster than ever after the second world war. The Figure 1 summarizes the changes in the value of global export, the figure reveals the incremental development in the value of global export which is 2348% increase since 1950. Today, the sum of exports and imports between countries is more than 50% of the total global production value.

With the help of economic integration, tax and tariffs are abandoned and with the help of technological improvements cost of trade has been decreased such as sea freight cost decreased 87,63%, passenger air transportation cost decreased 89,53% and telecommunication cost decreased 99,03% in between 1930-2017. Technological developments have impact not only on the volumes of trade, but also on the types of exchanges that were possible and profitable (Ortiz-Ospina et al., 2018). In order to be entrepreneur, potential entrepreneurs used to have capital beside their opportunity recognition. Nowadays, many ideas are supported by not only huge capital owners, tools such as micro funding, entrepreneurs have much more opportunity to establish a business. As a result of improvements in funding and mass amount of managerial knowledge, the number of startups is increasing day by day. Whereas the number of firms in operation was 3,029 million in 1929 in the United States (Churchill, 1954), this number shifted to

Figure 1. The value of global export -Time series of value of world exports at constant prices, relative to 1913 (i.e. values correspond to world export volumes indexed at 1913=100)

Source: The Figure is prepared by the writer with the data from Ortiz- Ospina, Beltekian and Roser (2018). Trade and Globalization, <https://ourworldindata.org/trade-and-globalization>



4, 167 in 1952 and it was 5,601 in 2016 (United States Census Bureau, 2019). In developing countries, the number of enterprises has been increasing much more dramatically than the developed ones such as in Turkey the number of enterprises was 342 in 1923, 2,618 in 1950, 1,207 million in 2009 and 1,879 million in 2018 (Ministry of labor and social security, 2019). This changes in the number of competitors accelerated the competition and became the cause competition wars between both MNCs and locals.

As a result of changing environmental conditions, in today's world, the most important thing for the companies to get a competitive positioning in order to meet the rapidly changing demands of the customers and provide continuity and survival in this uncertain and competitive environment. In addition, since the customers have more alternatives, the demand for high-quality and personalized products is increasing by the customers. Customer demand customized product instead of standard products, they want faster response time and because of the tough competition product cycles are much shorter than the last years. In order to acquire competitive power, to be able to adapt quickly to change and even to be the pioneer of change, companies need to find to satisfy those needs of the customers.

To respond these new conditions, increase in the agility of organization and collaboration through supply chain are recommended and many successful companies such as Zara become popular with their rational positioning and agile organizational design. However, it is clear that today's competition will not work with the rules we know. In order to meet customer needs and adapt quickly to changing environmental conditions, there is a need to play the game with new rules. There is no doubt about agility is very important to react immediately to the customers, but it is not enough. Since the companies are not operating in a closed system, their harmony and mutual interest of with stakeholders also affect their success, thus companies and their network in the same supply chain need to be agile as well. There is no doubt, if a company has open communication channels with its suppliers and customers and moreover if it shares common goals with them, this company will understand its customers more accurately and will respond their demand more quickly. On the other hand, there are some managerial issues of operating such an agile supply chain network. Agile networks are only possible by overcoming problems on communication, power distribution, information sharing in between enterprises in the same value chain. It requires organizational adaptation and technological support to apply such a system. If this can be achieved, there is no doubt they will create a competitive supply chain together. It is the way of long-term survival or organizations. That is why common understanding in popular strategy literature can be explained with following phrase "*Today's competition is no longer in between the companies; it is in between the supply chains*". In order to understand these dynamics, the concept such as agile organizations, downsizing, supply chain collaboration and at the end value-based competition is revised in the following sections.

Agile Organizations

The Concept of Agile Organization

Agility emerged as a response to changing economic environments and rising global competition in the beginning of the 1980s. Since then, more and more markets are competing with manufacturers and service companies, which deal with intense external competition, rapid technological change, short product life cycles and customers who do not want to have products from mass production, are in favor of being agile. Agility is great managerial response to adapt to the changes in production techniques and demand for high quality and customized product (Zhang et al., 2003). Fisher (1989) stated that

“The market’s development over the past few years favors the more agile organizations that mobilize individual performance unfettered by the constraint of a top-heavy bureaucracy” in his book of Global Market Integration. In order to that, companies started to search for the opportunities which the integrate flexible technologies and knowledgeable and skilled labor.

Although there was need to agile organizations before, the concept of agility first mentioned in the report of “21st Century Manufacturing Enterprise Strategy”, published by Iacocca Institute in 1991. Since then, there are many studies on agility in the literature and many definitions have been made about agility and agile organizations. Agility is explained in different ways in different studies, some of the explanations listed below:

- Agility is the ability to prosper in a competitive environment characterized by constant and unpredictable change (Goldman et al., 1995)
- “Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace” (Naylor et al., 1999, 108).
- Manufacturing processes based on Agile Manufacturing are characterized by customer -supplier integrated process for product design, manufacturing, marketing, and support services. This needs decision-making at functional knowledge levels, stable unit costs, flexible manufacturing, easy access to integrated data, and modular production facilities (Gunesakaran, 1999,87).
- The organization’s capacity to gain competitive advantage by intelligently, rapidly and proactively seizing opportunities and reacting to threats (Meredith and Francis (2000).
- Agility is a business-wide capability that embraces organizational structures, information systems, logistics processes and, in particular, mindsets. A key characteristic of an agile organization is flexibility (Cristopher,2000,37).
- Agility is business-wide capability that embraces organizational structures, information systems and in particular, minds sets. Agility means using market knowledge and virtual corporation to exploit profitable opportunities in a volatile marketplace (Dahmardeh and Banihashemi, 2010,179)
- Agility can be defined as the successful adoption of competitive bases (speed, flexibility, innovation proactivity, quality and profitability) through the integration of reconfigurable resources and best practices in a knowledge rich environment to provide customer-driven product and services in an uncertain market setting (Yusuf et al., 2012, 532)
- Agility is a measure of responsiveness; anticipated responses to an external stimulus are illustrative of an organization’s overall flexibility (Harraf et al., 2015,675)

Yusuf et al. (2012) stated that the definitions of agility in related literature consists four common themes: *customer sensitivity, network integration, process integration, leveraging the impact of people and information.*

According to Bernardes and Hanna (2007), the terms of speed/responsiveness, flexibility and agility are used interchangeably in the related literature, therefore, it is not clear whether agility, flexibility, and responsiveness are synonyms or distinct concepts. In fact, whereas flexibility is the degree of the firm to respond to a variety of customer needs and responsiveness is the ability to respond customer orders quickly, agility is the ability to adapt unpredictable the external environmental changes and customer’s customized requirements easily, as a result responsiveness and flexibility can be counted as components of agility. Prater et al. (2001) are defined supply chain agility as the degree to which a firm’s supply chain

is agile is determined by how its sourcing, manufacturing and delivery are configured to incorporate speed and flexibility.

The Enablers of Agile Organizations

There are many reasons to transform organizations to agile organizations in today's dynamic business environment. Related literature states that agility is accomplished by integrating three resources; technology, management, workforce into a coordinated, independent system, therefore the success of agility is associated with giving response to the changes in customer needs (customer sensitivity), learning and implementing agility (Gunesakaran, 1999; Sharifi & Zang, 2000), leverage information technology, culture in organization (Felipe et al., 2017) and collaborative relationships.

Holsapple and LI (2008) stated that the success of global firms is heavily dependent on their ability to manage their collaborative relationships with their supply chain partners, so that they can be agile in arranging work to respond to changes.

Felipe et al. (2017), revealed that organizational culture is one of the drivers of success of organizational agility, and their results stress the positive influence that adhocracy, clan and hierarchy culture exert on organizational agility.

The Goals of Agile Organization

There are many reasons of the formulating agile organizations. These are can be listed as follows:

1. The response time to the needs of the customers getting shorter
2. The variety of the customer needs is increasing
3. The competition between the companies from the same industry getting harder
4. The levels of environmental turbulence are increasing

Power et al. (2001) studied 962 Australian manufacturing companies in order to identify some of the factors critical for successful agile organizations in managing their supply chain. They revealed that more agile' companies are more customer focused, applying a combination of ``soft'' and ``hard'' methodologies in order to meet changing customer requirements and using technology to promote productivity, new product development and customer satisfaction. They also see the involvement of suppliers in this process as being crucial to their ability to attain high levels of customer satisfaction.

Maskell (2001) listed the conditions that require organizations to be agile. According to Maskell, it can be understood that an organization needs to be agile:

- Quick and unpredictable change of everything,
- Market demanding high quality, special and personalized products in small numbers,
- Short planning, development and lead times of these demanded products,
- Customers want to be treated as if they were special as an individual and mass production is no longer in demand.

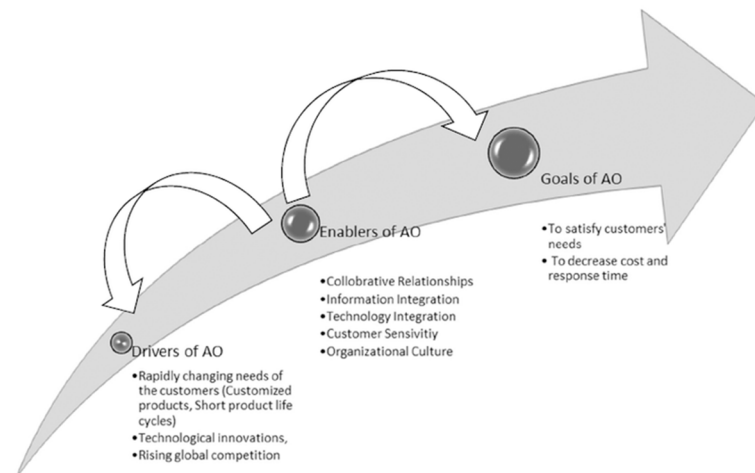
Conceptual Model for Agile Organizations

As a result of intense search in related literature, the drivers, the enablers and the goals of agile organization is summarized in Figure 2. Due to the changing need of customers such as customized products instead of standard product, technological developments and rising global competition force companies to form agile organizations. If they manage to collaborate, integrate information and technology, become more customer sensitive and adapt their organizational culture to agility, their responsiveness and flexibility in unforeseen changes will be much higher. As a result, they will satisfy their customer, decrease their cost and response time.

Downsizing

Another debate which is simultaneously developed by agility literature is downsizing. Due to rising international competition and rapid technological changes, companies downsized their organizations to their core competence and started to outsource a wide range of activities. Today the companies, which are successful in continuous search of increasing productivity and efficiency, due to the increasing global pressures and dynamic business environment, are in favor of the downsizing as a strategic choice. Downsizing is the way of focusing on core competition and leaving the other activities to the other companies in the same supply chain. Freeman and Cameron (1993) explained the term as following way “it represents a strategy implemented by managers that affects the size of the firm’s work force and the work processes used”. Cameron (1994) revealed the fact that downsizing is getting popular in business life day by day and pointed out this strategic shift after 1980s by questioning the following;

Figure 2. Conceptual model for agile organization (AO) formation



- From bigger to little organizations,
- From desirability of unending growth to stability,

- From flexible and adaptable organizations with uncommitted resources to tight coupling and no redundancy and slack resources and loose coupling,
- From consistency to conflict as an indicator of organizational effectiveness.

Writers such as Baden- Fuller and Volderba (1996) Modarres and Bahrami (1997) stated that downsizing can be successful, if companies eliminates peripheral activities and reallocate resources toward enhancement of core competencies. Furthermore, the idea behind the downsizing is lied under the stakeholder theory especially in instrumental view and resource dependency theory. Frooman (1999), explained how the type of resource relationship between the organizations and their stakeholders determines where the power lies in the exchange. For example, if an organization has relationship between a supplier because of acquiring critical resource for its survival, the stakeholder will have absolute power over the organization. This kind of relationship is called asymmetric relation which could cause administrative or financial problems in turn will affect the customers' satisfaction by service time, quality and cost problems. In this case, downsizing is common recipe to overcome this kind of problems and associated cost. Tzafrir et al. (2012), stated that MNCs mostly choose to downsize their operations in order to benefit to buy firms across the globe, thus positive stakeholder behavior is very important in the success of international downsizing. Cooper et al. (2012) discussed the antecedents and organizational of consequences downsizing in detail, by questioning is still downsizing affective or not? or another way of saying "is less still more?"

The Changing Roles of Stakeholders

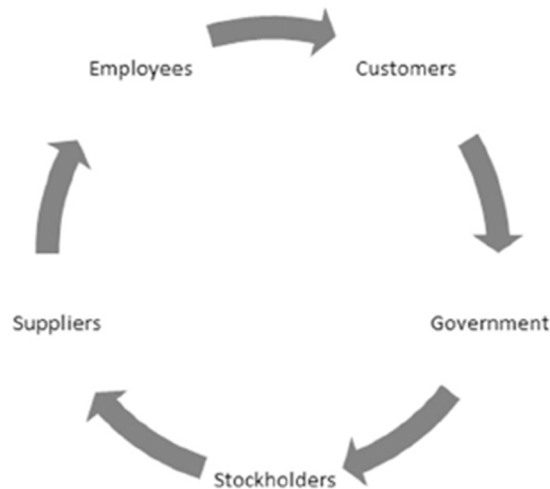
The Stakeholders Theory

According to the conventional understanding in business literature, corporations were used to seen as the property of their owners and as limited in their liability for their effects upon others. In the second half of 20th century, management and strategic management literature started to concentrate on the understanding external environment in order to be sustainable in the long run under the influence of system approach. Thus, the concept of stakeholders rather than shareholders also gained importance. The concept of stakeholder is firstly defined by Freeman (1984:46) as "any group or individual who can affect or is affected by the achievement of the organization's objective". As seen in the Figure 3, stakeholders of an organization can be listed as stockholders, suppliers, employers, customers and government. System theory and stakeholders theory propose idea of importance of pursuing each stakeholders' interest rather than only shareholders when making the managerial decisions.

Freeman (1984) draw all managerial attention to the stakeholders and claimed the idea of stakeholder interests is critical to the success of the companies with the publication of his landmark book, *Strategic Management: A Stakeholder Approach*. He argued that value creation of the companies is possible only by working for the collaborative interests of all stakeholders. Furthermore, the stakeholder commitment model, good managerial relationships with stakeholders and firm strategy affects firm financial performance at least maximizing profits (Berman et al., 1999).

Although Freeman's early work introduces most of the key themes of research on stakeholders, Donaldson and Preston (1995) made conceptual contributions to the stakeholders theory with their taxonomy of different uses or understandings of stakeholders theory. They attempt to clarify the types of different uses of stakeholder theories such as; *normative stakeholder theory*, *instrumental stakeholder theory*,

Figure 3. Stakeholders of an organization



and *descriptive stakeholder theory*. This taxonomy helped related literature to understand the relation between stakeholders and the companies and its effect to their business. Donaldson and Preston claim that the point of certain articles on stakeholder theory is different, they define the point of the descriptive view as “to describe, and sometimes explain, specific corporate characteristics and behaviors” (1995: 70); the normative view as ““interpret the function of, and offer guidance about, the ... corporation on the basis of some underlying moral or philosophical principles” (1995: 72) and instrumental view as “to identify the connections, or lack of connections, between stakeholder management and the achievement of traditional corporate objectives” (1995: 71). In order to reach conventional organizational goals, such as profit and growth, instrumental perspective is much more explanatory than other two perspectives. Many studies concentrated on to reveal the effect of the level of relations between the stakeholders and the rivalry positions of the organizations. The main issue of stakeholder researches is thus how to minimize the conflicts between the stakeholders and by the way how we can increase competitive power of the companies. Berman et al. (1999), argue that stakeholder relationships are the very basis of value added and strategic initiative. Kaler (2003) claims that good managerial practices in stakeholders’ relations could cause better financial performance. Pesch, Eide and Moorthy (2012), studied Western National Insurance Company and how their stakeholder’s engagement changes the company’s competitive position.

Furthermore, McGrath and Whitty (2017), tried to redefine the term of stakeholders and from the existing literature they depict categories of stakeholder interest relative to a single generic activity. First of all, they divided the types of stakeholders and assign different roles regarding if they are committed to the activity occurring or not. If they are committed since they have financially invested or serve the activity, it can handle by inclusion or participation of the stakeholder; if their connection with the activity is just at observer or end user level, it can be handled by consultation and risk management of the stakeholders.

An invested stakeholder is one who has some control of the activity.

This accommodates Clarkson (1994, p. 5) “bear some form of risk as a result of having invested some sort of capital, human or financial, something of value, in a firm”.

- A contributing (primary) stakeholder is one whose participation is required to sustain the activity. This is based upon Clarkson (1995, p. 106) “A primary stakeholder group is one without whose continuing participation the corporation cannot survive as a going concern”. It also aligns with Stanford Research Institute (1963) “those groups without whose support the organization would cease to exist”.
- An observer (secondary) stakeholder is one whose acceptance or compliance is required to sustain the activity.

Modeling Supply Chain or Formulating Supply Chain Strategies

Supply Chain can be defined as the network of entities, including suppliers, carriers, manufacturers, distributors, retailers and customers, through which material flows (Lummus & Vokurka, 1999). In the new global business system, supply chain mechanism become more complex day by day because of competitive pressures in each industry. Not only the final products, but also intermediate inputs exchange between companies from same or different countries. No matter, the company produces final or intermediary products, because of the intense competition in most of the markets, the supply of the quality products according to customer needs on time creates competitive advantage. Related literature offers four different supply chain strategies according to industry archetype is cost optimized or high performance. These strategies are called as “operation excellence”, “planning excellence”, “opportunity seizure” and “service excellence”. In Table 1, the industry characteristics and supply chain framework are summarized.

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Table 1. The supply chain strategies according to industry characteristics

Supply Chain Strategies	Focus	Industry Conditions	Example
Operation Excellence	Direct Supply Chain Cost Reduction	If product lifecycle is long, demand forecasting accuracy is high, utilization rates are crucial	Steel, paper
Planning Excellence	Market Mediation Cost Optimization	If demand forecasting accuracy is low	Cement
Opportunity Excellence	Market Responsiveness- High Performance	If the price volatility is high and the prices are different in different places and times	Soft commodities
Service Excellence	Service Flexibility- High Performance	Supply chain is differentiator, creating value to the customers rather than being cost center	FMCG

Source: Kampstra, R. P., Ashayeri, J., & Gattorna, J. L. (2006). Realities of supply chain collaboration. The international journal of logistics management, 17(3), 312-330.

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Supply Chain Collaboration

In addition to different supply chain strategies, nowadays the companies in the same supply chain, in a competitive market such as FMCG, work jointly in order to be benefited from specialization and operate activities with greater success than acting in isolation and the related literature focuses on the collaboration through a supply chain as well. Searching for productivity through collaboration or ownership in the same supply chain, is called *Vertical Integration*, is not a new concept. But the application is little changed according to the needs of the markets as the time passes. According to Harrigan (1984), the old concept of vertical integration which favor of 100 percent ownership is outmoded since most of the industry are mature, and there are many specialists in the supply chain of them. Similarly, Seifert and Phillip (2014) stressed that “supply chain will remain a complex and increasingly needed function that requires highly specialized people (pg.23)”. In business literature there are many different explanations for collaboration in supply chain throughout the time. In Table 2 you can find a summary of different definitions to supply chain collaboration in between 1990 to 2010s. As it can be clearly seen from the table the meaning of the supply chain collaboration has been changed from working together to fulfil customer needs to *manage a process by dealing with building trust, sharing information and making joint decisions to sustain long-term relation between parties to get mutual advantage*.

In the last three decades, most of the writers support the idea of SCC because of its benefits. Collaboration enables value creation in supply chain activities and companies get benefits from collaboration by decreasing cost, increasing quality and innovation and offering flexibility with the help of process efficiency, understanding each other’s viewpoints, sharing knowledge and resources, and achieving

Table 2. Definitions of supply chain collaboration (SCC)

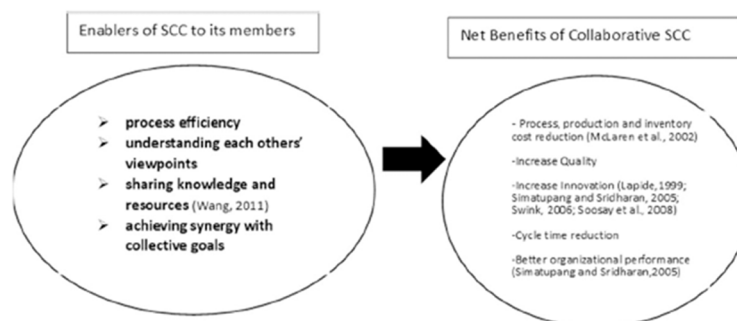
Writer/Year/pg.	Definition
Bowersox, 1990,43	SCC is the involvement of the chain members in coordinating activities that span boundaries of their organization in order to fulfill end customer need.
Simatupang and Sridharan, 2002, 19	Two or more independent companies (that) work jointly to plan and execute supply chain operations with greater success than when acting in isolation.
Sandberg, 2007,275	Collaboration is defined as a relationship characterized by openness and trust where risks, rewards and costs are shared between parties
Singh and Power, 2009,190.	Two or more chain members working together to create a competitive advantage through sharing information, making joint decisions and sharing benefits which result from greater profitability of satisfying end customer needs than acting alone.
Cao et al., 2010, 6617	A long-term partnership process where supply chain partners with common goals work closely together to achieve mutual advantages that are greater than the firms achieve individually

synergy with collective goals (Sahay, 2003; Cao & Zang, 2011). The Figure 4 reveals the antecedents and benefits of SCC to its members in the related literature.

Related literature has two different view; the supporters of the necessity of integration and the ones who opposes to vertical integration. The ones who oppose to integration underlines the possibility of conflicts because of the differences in the same chain members' goals, disagreements over domain of decisions, differences in perceptions of reality used in joint decision making (Stern & Heskett,1969). The ones who favor on collaboration in the same supply chain such as Simatupang and Sridharan (2002) who support the collaborative activities between members of a supply chain because of advantages of information sharing through same network, and they underline the advancement in internet technologies help to companies to transfer data either in real time or on demand. The levels of integration in a supply chain mechanism is classified as following;

- **Non Integration:** The firms in the supply chain are not cooperating (no ownership, no contracts etc.)
- **Quasi Integration:** The firms in the supply chain could be cooperative ventures or they might sign minority equity agreements or promise for loan guarantees or pre-purchase credits (Porter,1980)

Figure 4. What a SCC enables to it's members regarding to the related literature



New Strategy and Thinking in Global Business System

- **Tapered Integration:** The firms are backward and forward integrated but rely on outsiders for a portion of their suppliers or distribution.
- **Full Integration:** The firms in a supply chain are physically interconnected with internal transfers of each value created to the product.

There are many ways to be engaged in supply chain collaboration. Cooper et al. (1997b) elaborate on these different approaches of collaborating in the supply chain.

1. The dyadic approach: which may exist at numerous levels in the chain.
2. The second approach uses a channel integrator. “This channel leader plays the key role in setting the overall strategy for the channel and in getting the channel members involved in and committed to the strategy.”
3. The third approach uses a fourth party logistics (4PL) entity as a centralized ‘optimization tool’ to coordinate and control the channel.
4. The fourth approach, vertical integration: adopts ownership of other channel members and therefore is not considered as collaboration.

Factors Affecting the Success of Collaboration in Supply Chain

Since in the past decades, organizations are looking outside their boundaries to collaborate with supply chain partners, many writers also tried to reveal which factors companies generally take in to consideration when they went to collaboration through their supply chain. Hudnurkar et al. (2013) also published a literature summary of SCC related articles and summarized 28 factors of affecting collaboration in supply chain from 69 randomly selected articles written in between 1995 and 2011. These factors can be listed as follow;

1. Commitment
2. Trust
3. Adaptations
4. Relationship promoter of the customer
5. Stakeholders
6. Topology
7. Enabling technology
8. Level of collaboration
9. Business strategy/goal congruence
10. Process integrated process innovative supply chain policy
11. Collaborative Communications
12. Dependence and Interdependence
13. Co-operation
14. Legal Protection coordinative structures collaborative agreement
15. Government support
16. Interpersonal relationship
17. Information sharing
18. Collaborative planning

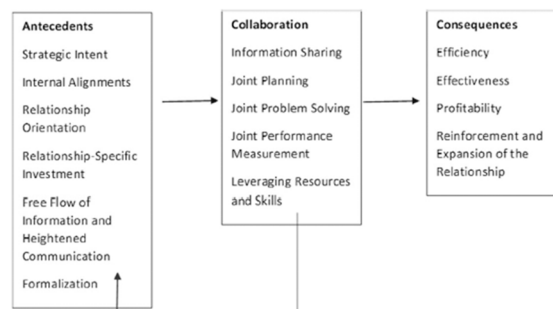
19. Incentive Alignment
20. Resource sharing, asset specificity, dedicated investments
21. Joint knowledge creation, knowledge sharing, collective learning
22. Information availability
23. Information quality
24. Behavioral uncertainty
25. Cultural difference, organizational culture
26. Management controls, integrated policies
27. Management commitment
28. Collaborative performance system

Although the understanding of SCC is the perfect solution to create competitive advantage, some companies lately suffer from the applications of SCC. As Beth et al. (2003) mentioned despite years of technological and process advancements, an agile, adaptive supply chain remains an elusive goal “(64). With SSC, it is aimed to gain competitive advantage through information, people and technology sharing on the same supply chain. At this point, the problems might arise because of the mis-management of different organizational cultures and conflict and insufficient information sharing, resources and inconsistent performance metrics (Parker and Anderson, 2002, Moberg et al., 2003). Wang (2011) and Hudnurkar et al. (2013) found that the information sharing plays a vital role in supply chain collaboration as a most important factor. “Information collaboration can bring many benefits to the partners and improve the whole performance in the supply chain, but there are many factors impact information collaboration, therefore some partners are unwilling to share information (Wang 2011, 74)”. Min et al. (2005), developed a conceptual model profiling behavior, culture and relational interactions associated with successful collaboration, which is shown in Figure 5.

Furthermore, Akyuz and Gursoy (2014), also suggested that management control and trust formation are two critical factors that affect operational and business performance of SCC. Fawcet et al. (2008), therefore, proposed a 3-step model proposal to eliminate of these problems. The first step is creating commitment and SCC understanding, second step is removing resisting forces to SCC and third step is continuously improving collaboration capability.

Figure 5. A conceptual model of supply chain collaboration

Source: Min, S., Roath, A. S., Daugherty, P. J., Genchev, S. E., Chen, H., Arndt, A. D., & Glenn Richey, R. (2005). Supply chain collaboration: what's happening? *The international journal of logistics management*, 16(2), 241.



Chain Based Competition

Because of the dynamic business environment, not only organizations forced to be, but also the supply chains which they are in forced to be agile. This situation creates the concept of chain-based competition. Toma and Bauma (1998), defined value chain collaborations as a strategic collaboration of organizations for the purpose of meeting specific market objectives over the long term and for the mutual benefit of all 'links' of the chain. Rice and Hope (2001) stated that nature of the competition is no longer will be a company against a company issue but is increasingly a supply chain against a supply chain, because of the short product life cycles and innovations in information technologies. They claim that organizations need to deliver more value by being flexible and faster (agile) and go to collaborations with their suppliers. Bauma (2001) defined supply chain-based competition as competing as part of a supply chain system that is targeted to meet the specifications of a particular market segment and retail/distribution channel instead of competing individually. Athuramaytha (2011), support SCC such as sharing information, synchronizing decisions, sharing complementary resources, and aligning incentives with partners' cost and risks to achieve joint competitive advantage and revealed that SCC has positive effect on firms as a cost reduction and operational flexibility. Akyuz and Gursoy (2010) and Cao and Zang (2013) stated that competition is no longer in between companies, it is now in between these complex networks of economic interactions in the same supply chain with the help of global dynamics of digital economy.

Cristopher (2000,39-40), summarized the characteristics of agile supply chain as market sensitivity (easily understand the need of the customers and respond to them), virtual (information based virtual chains rather than inventory based), process integration (collaborative work between buyers and sellers) and network (organizations must structure, manage the relationships with their partners in a network).

Cases of Chain Based Competition

In related literature, there are case studies of high profile firms such as Dell (Magretta & Dell, 1998), HP (Lee & Billington, 1995) and Wal-Mart (Landry, 2003; Nguyen, 2017) that have close collaborative arrangements with their trading partners. Volvo from the automotive industry, Zara from the textile and apparel industry and Dell computers are very well-known best practice examples for SCC, as they manage their agile supply chains properly, they will remain their competitive position in relevant markets. In Table 3, there is a summary of case studies from different industries as an example of SCC.

Some of the interesting facts and findings from the companies which can create competitive advantage with their value chain and agility:

- Zara produces 450 million items in a year, operating in 96 countries. Their success lies behind their capability of being agile through their supply chain; they can put a design to the shelves much faster than the industry average. In fact, the time between a design come to alive through the path of designer, manufacturer, distributor and retailer is two weeks, whereas industry average is 6 months (Tradegecko.com)
- Wall-Mart is the world's largest retailer with over 11,700 retail outlets in 28 countries. In order to manage such an operation effectively without the misalignment of interests between its suppliers, Wall Mart focused on agility, adaptability and alignment through their supply chain which is called The Triple Supply Chain (Nguyen,2017). For example, in the 1980s, Walmart began working directly with manufacturers to cut costs and more efficiently manage the supply chain, by the

Table 3. Literature review regarding cases of SCC

Writers / Year	Industry	Findings
Akkermans et al. (2004)	High -tech Electronics	Achieving the levels of transparency needed in a SCC to make OR algorithms and decision support systems work, high levels of trust are required.
Kierpiec (2006)	Air Force	The research identified that proactive sharing of information and collaborative decision making for the T-38 avoiding supply chain failures, while the F-15 supply chain was reactive, failing to collaborate or share information, resulting in a failure of the supply chain, and an increase in the MICAP rate
Kohn and Sandberg (2006)	Automotive	The paper is of an explorative character and a case study is presented, illustrating how Volvo Parts in its role as a channel captain has used the sources of power available in order to make its supply chain more efficient. The paper helps illustrate that power issues are relevant in a supply chain setting and that power can serve as a useful framework in order to get a deeper insight into supply chain relationships.
Tokatlı (2008)	Fast Fashion Retailer (Zara)	Because of the short response time to customers demand, supply chains in the fashion industry need to be more flexible and collaborative, by the way they can create competitive advantage like Zara did.
Mamillo (2014)	Beer	a high level of supply chain uncertainty does not always bring high engagement in supply chain management, as cultures with internal orientations impose limits on the execution of supply chain management practices.
Chakraborty (2014)	Healthcare Service	Value creation playing mediator role and relationship complexity playing moderator role in the relationship between SCC with firm performance.
Siqueira et al. (2015).	Automotive	Trust, a vital input for the success of collaboration, proved to be restricted, even at times showing a win-lose behavior. It might be inferred that the first step toward the establishment of a collaborative relationship was accomplished; however, many barriers are to be overcome in order to consolidate a true collaborative relationship. This occurs even with world-class companies in a rather sophisticated industrial sector such as the auto industry.
Huang et al. (2015)	Pharmaceutical	The results indicate that collaborations are common in all phases of pharmaceutical supply chain; the different strength of bargaining power among collaborative partners will impact the advantages achieved at strategic, operational and political levels.
Kučera and Hyršlová (2016)	Warehouse	The paper shows supply chain collaboration between supplier of logistic services and manufacturer of automotive parts and discusses options which can make a synergy effect in application to practice and increase innovation.
Ho et al. (2017)	Textile and Apparel	The lack of information integration and scientific management causes poor performances such as high late delivery and poor-quality percentage.
Danielsen et al. (2017)	Ship Parts Supplier	The case study also revealed that there are certain commonalities in SP Vietnam's collaborative strategies with its different customers and a broad but selective information sharing strategy using simple methods for sharing information that are not based on fully integrated systems.
Botes et al. (2017)	Petrochemical	The findings suggested that collaboration between buyers and suppliers does not directly lead to supply chain resilience, but rather enables the antecedents to supply chain resilience.

way their distribution cost decreased to 1,7% of its cost of sales while the industry average is in

between 3,5%-5%(Tradegecko.com).

- There are more than 70 articles such as Raimondi (2005), Xu-Hui (2007), Gallien (2016) which searching supply chain applications of Dell as a success story and many writers agree on the that Dell has competitive advantage with its innovative supply chain applications. Direct sales (they do not use any retailers or wholesalers), built to order (they focus on building computer only when customers order it) and supplier integration (they do not hold inventory more than 6 days, they have vendor inventory system).

As a result of the findings from the rich literature and many business applications related to the supply chain collaboration from all around the world, it can be said that, the companies forced to structure agile SCC, because of the several market requirements such as increasing demand to high product quality, product safety, differentiated products and innovation and need to lower the costs. The cases also revealed that formation of SCC is operationally very difficult, and it is not easy to manage. They addressed problems related to the structuring and the lack of coordination in the SCC. The findings of the cases also reveal the trust building and knowledge sharing as a key factor for the success of SCCs. Furthermore, as the companies manage to operate in more agile SCC, their margins are likely to increase and so their competitiveness.

A Conceptual Model for Creating Smart Supply Chain Management

With the inspiration of Lee's (2004) the triple of a supply chain which consists of agility, adaptability and alignment, it is possible to develop a conceptual model for today's organization to survive in the long run.

From the beginning of the chapter, the changing business environment has been told many times, briefly it can be summarized as competition is rough and demand is volatile in markets. In order to respond to the dynamic market conditions, companies are in a reciprocal relation between customers and their suppliers. The successful management of these relationships with the stakeholders can help to create competitive advantage as it can be seen from the cases in the related literature. These reciprocal relationship management is summarized in Figure 6.

The starting point which can guarantee the success of companies is getting right information from customers about their need on time. This is possible with establishing customer sensitive organizational culture and use of technology, in order to collect all meaningful data about the preferences of the customers. If companies manage to have clear information flow from their customers or have some intermediaries to understand customer expectations; they can respond different needs of the customers through establishing agile organizational structure, downsizing and managing agile supply chain collaborations. Agile organizational structure such as keeping small inventory or producing only if they have accurate information. Besides quick responding to the customer's needs, tracking external environmental changes and getting accurate or estimated data (such as political or economic issues) is very important in order to increase the adaptability to these changes. Companies are recommended to define all managerial problems through the supply chain due to the misalignment of interests between its suppliers; such as building trust between parties. Full access to information, the declaration of clear roles and responsibilities and sharing risk with current suppliers and constructing a flexible supply chain network in which any ineffective supplier can be taken easily from the system and replaced with an effective one will help to overcome these kind of problems, thus the supply chain will be much more agile.

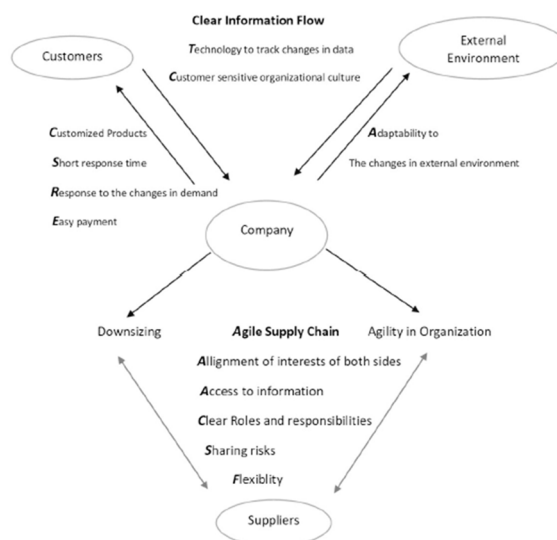
Figure 6 propose a model for the companies to response perfectly to their demand changes and it can be summarized as follows: An agile organization will have competitive advantage by serving extra value to their customers as a result of agility, adaptability and alignment within its supply chain.

CONCLUSION AND RECOMMENDATIONS

A series of political, economic and technological developments in the 20th century led to an unprecedented competitive environment in the 21st century. As a result of the globalization that gained momentum after the 1980s, local businesses were increasingly exposed to international competition, and international businesses are also looking for new strategies to keep up with new markets. As a result of all these developments, customers are faced with a lot more products and services and new options as sales channels such as digital marketing. Initially, offering customers better quality and cheaper products or services created a competitive advantage, while customer needs changed in parallel with the changing business world. Being more innovative and faster to respond to changing customer demands has become more important parameters for the sustainability of enterprises. Businesses that can respond to the changing needs of the customers in the most accurate way began to create competitive advantage. In order to achieve this, businesses need to make their operations more agile, as well as supply chains more agile.

The nature of supply chain management as well as management dynamics are changing in an increasing pace. Supply chain management inherently refers to the linear inter and intra depend partners and depend on collaboration among them. However latest trends and improvements reveal that linearity is being transformed to web of networks. In addition to that collaboration among the partners within a supply chain do require that most of managerial developments seem changing the goal function of the corporation. Collaborative partners intend to solve most of the problems with the chain based internal solutions. Among them, such as joint design, internal financing options are critical examples of compared

Figure 6. A conceptual model for creating smart supply chain management



to many issues. Internally optimized and efficient managerial solutions will contribute to the overall performance of the corporation.

The evolving nature of business as well as technology derive actually the transformation in supply chain management practices. Supply chain itself inherently reflects linearity however the supply world has evolved and became a complex network. That is why we need to rename supply chain management as smart supply network management. This both includes Industry 4.0 implications as well as the involved web of networks.

The critical function of the supply chain is collaboration and its importance has also increased tremendously. But the most important change is on the alignment of the corporate goals and the strategic positioning of the supply chain management. The goal of a firm is theoretically accepted as the wealth maximization of the shareholders. But after the developments in the dynamics of supply chain and technology the question became which shareholders? We believe that in the world of chain competitiveness the goal should be concerned on maximizing the wealth of all shareholders in the chain partner companies.

This chapter explains the current dynamic of business environment, discuss the modern strategies to adapt this environment and ensure long term survival such as creating agile organizations, downsizing, supply chain collaboration. In the final part, how is it possible to create value to the customer and competitive advantage against the competitor explained, a conceptual model creating smart supply chain management built. This model brings together all knowledge in related literature and also from best practice applications, will help interested parties both practitioners and academicians.

For future researches, it is recommended that question the new supply chain management system with the influence of technological changes to be driven by Industry 4.0 related world.

ACKNOWLEDGMENT

This chapter received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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KEY TERMS AND DEFINITIONS

Competitive Strategy: Long-term action plan that is devised to help a company gain a competitive advantage over its rival.

Downsizing: Making a company or organization smaller by shedding staff.

Globalization: The worldwide movement toward economic, financial, trade, and communications integration.

Organizational Agility: The capability of a company to rapidly change or adapt in response to changes in the market.

Stakeholder: A person, group, or organization that has interest or concern in an organization.

Supply Chain: Entire network of entities, directly or indirectly interlinked and interdependent in serving the same consumer or customer. It comprises of vendors that supply raw material, producers who convert the material into products, warehouses that store, distribution centers that deliver to the retailers, and retailers who bring the product to the ultimate user.

Value Chain: Interlinked value-adding activities that convert inputs into outputs which, in turn, add to the bottom line and help create competitive advantage. A value chain typically consists of (1) inbound distribution or logistics, (2) manufacturing operations, (3) outbound distribution or logistics, (4) marketing and selling, and (5) after-sales service. These activities are supported by (6) purchasing or procurement, (7) research and development, (8) human resource development, and (9) corporate infrastructure.

Chapter 2

Examining Strategic Fit and Innovation in Terms of Competitive Strategies and Knowledge Management

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ABSTRACT

Employees working for knowledge management change traditional concept of labor and become an important activator of organizational value. Therefore, in the age of technology, organizations started to give importance to “knowledge management” to reach their performance targets. Knowledge management plays a key role in organizations’ accumulation of intangible assets and the organizations use information resources of social networks to maintain their competitive advantage and increase their level of competitiveness. Knowledge management is an important intangible asset for the organizations. Therefore, it is necessary to examine how the information and knowledge management affect organizational performance, and what are the best strategies to achieve good impact. The path to successful strategy and innovation goes through well-implemented knowledge management.

INTRODUCTION

The concept of strategic alignment emphasis the necessity of cohesion with the organizational strategies. In today’s technology age, it is very important for organizations to focus on innovation in production or service in terms of strategic management. Basically, the organisations expect to achieve better performance after the implementation of the strategies (Lukas et al., 2001). The concept of strategic alignment has played an important role in the development of strategic management and organizational theory (Zajac, Kraatz & Bresser, 2000). At the same time, it has gained a significant place in the field of marketing in theoretical sense (Vorhies & Morgan, 2003). It is a fact that global competition is increasing every day and turns the world into a single market and therefore, concept of knowledge management becoming

DOI: 10.4018/978-1-7998-1125-1.ch002

an important competitive advantage tool for the organizations. In 2012, Peter Drucker's study indicated that the capital and labour, which are the important elements of production, will be gradually replaced by information, and the knowledge management will have the key role in the organisations.

In terms of strategic alignment, competition strategies and innovation strategies should be taken into consideration in production and service sectors. Especially in the service sector, cost management strategy is accepted as the most suitable strategy in intense competition (Enz, 2011). In a highly competitive environment, the organizations should examine the consumer demands and requirements and should generate new ideas or provide new approaches by using knowledge management in order to gain new customers and increase loyalty of existing customers and be ahead of the competitors. In the manufacturing sector, it is recommended to increase the quality and level of knowledge management in all functional activities in order to carry out successful process innovation. Moreover, if strategic alignment and innovation implemented together with competitive strategies, it is likely to reduce costs and increase market share in the service sector. In order to implement the differentiation strategy in the service sector, the organisations should find a way to differ either in innovation, technology, location, creativity, branding or employees' experience-competencies and skills. The combination of knowledge management and innovation is becoming more important in competitive strategies. Collecting the information from the market/sector, analyzing, disseminating/sharing the analyzed information within the organization and responding quickly to the demands/needs of the consumers bring success. In particular, innovation arises from the objective of meeting the demands and needs of consumers. Therefore, it is necessary to use skills and resources efficiently in order to achieve successful results from implementation of competition strategies.

In the intense competition environment, it is important to determine and implement the most appropriate business strategy for the problems faced. The researchers agree that in the case of many complex problems, the organisations should examine the problems and interrelations between them and adopt a specific point of view (Meyer, Tsui & Hinings, 1993; Rasula et al., 2012). The main reason for the determination of business strategy is to specify business relations and to understand the importance of the trust and commitment behind these relations and the alignment between each other. The business relationships of the organisation and their alignment with business strategies are important in terms of both evaluating performance and identifying the most appropriate strategies. Organizations define strategic directions or implement business strategies to compete in their sector (Varadarajan & Clark, 1994). It is necessary for the organisations to classify and identify different business strategies. Therefore, the selection of different strategies, the implementation of strategies together with innovation and knowledge management have become an indispensable element for the organizations. When we examine the types of strategies, we see that well-known researches such as Miles and Snow (1978), Mintzberg (1979) and Porter (1996) have made business strategy classifications.

Porter's theory aims to make organizations successful by taking advantage of different perspectives. For example, he explains the structure of organizations and the types of the strategy they need to implement in that sector. The importance of strategic alignment theory was first proposed by Thompson in 1967 with an aim to adapt organisational process to its environment. This means that it is possible to cope with environmental uncertainties and to achieve a competitive advantage by adapting to the external environment (Bergeron et al., 2001). The external environment has a great impact on organizational performance, both in terms of market opportunities and environmental uncertainty. Organizations have to identify and implement strategies to tackle environmental uncertainties and changes (Thompson, 2017). Organizations with a good strategic alignment are more likely to have higher organizational performance.

According to the study of Doty et al. in 1993, if an organisation aligns well with its environment, the organizational effectiveness gets to higher levels. The results of the studies confirmed that if the knowledge management and strategic orientation were implemented with strategic alignment, the organizational performance were affected positively (Chan et al., 1997). Development of strategic alignment in the field of innovation plays a key role in the gaining strategic leadership for the organisations (Boal & Hooijberg, 2000). Innovation leadership activities includes encouraging individual initiatives, giving individuals some responsibilities and implementing clear performance evaluation systems, creating an environment in which quality relationships are valued and trust is developed. Studies in the field of innovation shows if the members of the organization change in line with the strategies, it supports the intentional approach and promotes innovation leadership (Christensen, 1997; Hammer & Champy, 1994).

Innovation leadership plays an important role in supporting the capacity of organisations for learning, change and adaptation in intensely competitive environment (Beer et al., 2005). The organizations should adjust its structure, policies, resources and activities to adapt environmental conditions or to create a strategic harmony, therefore it should be attentive and sensitive to changes in the competitive environment (Weick, 1976). For this reason, strategic alignment and knowledge management should be successfully implemented in order to create added value to the organization and to protect the organization against threats from the outside environment (Ghemawat & Pisano, 2001). If an organization aims to succeed in intense competition, it must be able to adapt its structure, policies, resources and activities to the environmental conditions (Weick, 1976). Because every sector, each competitive environment has unique environmental conditions. The literature has large number of studies presenting positive effects of strategic alignment and various organizational performance factors (Siggelkow, 2002). In 2004, Tuominen, Rajala and Möller stated that there was a positive relationship between strategical alignment and innovation in the organizations in the production sector. In summary, this study aims to examine the effects of strategic alignment and innovation on feasibility and success of competition strategies, with the support of knowledge management.

DEFINITION AND IMPORTANCE OF STRATEGIC ALIGNMENT

Lederer and Mendolow (1989) define strategic alignment as co-ordination between business strategies and information systems strategies. Researchers emphasize that this coordination can only be achieved only if the information systems strategies derive from business strategies. Zviran (1990) defines strategic alignment as the adaptation of organizational objectives into information systems. Goldsmith (1991) defined the concept of strategic alignment as the development of information systems strategies and business strategies in same process and at the same time. In this way, businesses can use information systems to achieve competitive advantage. Luftman et al. (1993) describe strategic alignment as business strategies to be supported by the information systems. Reich and Benbasat (1996) refer to strategic alignment as the degree of connection between the mission, objectives and plans of the business and the mission, objectives and plans of the information systems. It is emphasized that strategic alignment cannot be achieved only through the development of the strategic plans of information systems and business together and correlatively, but also that these plans should be effectively managed and implemented (Boar, 1994). Henderson and Venkatraman (1999) defined strategic alignment not only as interrelated planning of information systems and business strategies but also integration of technology, structure, processes and skills. Likewise, Tallon et al. (2000) describe strategic alignment as the existence of information

systems applications in consistent with the business strategies, objectives and requirements. Thompson (2001) stated that strategic alignment is not a final situation and should be seen as a 'moving target'. Similarly, Jarvenpaa and Ives (1993) state that alignment should be examined as a 'result of a process'. As it can be seen, alignment is not a static result but a dynamic process. Although strategic alignment is a conceptually simple idea, it is rather complex and difficult to study the process of ensuring and maintaining strategic alignment (Sabherwal et al., 2001).

Developments in information technologies have changed the traditional role of information systems used in organizations. Information systems now play a strategic role rather than managerial support and control in organizations. Information systems are no longer seen as an investment expense, but as an important asset. In many organizations, the target of information systems investments is to create business value in two issues (McFarlan, 1984); Implement existing strategies successfully and Utilize technology to create new strategies to ensure competitive advantage.

The investment in information systems has been continuously and exponentially increasing over the last 20 years, especially in the 2000s, with the introduction of smart phones, smart technological devices, artificial intelligence and automation technologies caused significant progress. Recently, information systems expenditures have become the most important item in total capital expenditures. It is observed that if the organizations that do not give necessary importance to R & D activities, they gradually withdrawn from the market and even completely wiped out in the competitive environment. Organizations make investment in information systems to increase organizational performance. However, some of the studies also show that organisations make high investments in information systems, but they gain less in return. There is strong evidence that if information system investments are closely aligned with business strategies, investment return gets higher (Xia & King, 2002; Croteau et al., 2001). However, the strategies changes over time, and therefore, the alignment with the information systems portfolio can only be provided temporarily. The main objective of the information systems investment portfolio is to respond to the changing needs of strategies at both the business and the company level. If the business strategy of the company is different from its competitors, the information systems portfolio should be different as well. In this context, the main objective in harmonizing information systems and business strategies is to differentiate the preferences and achievements in line with the core of the strategy.

The strategic context of the enterprise is expected to be align with the information systems. This harmony is complex, versatile and always stays behind the target. The real issue is to continue moving in the right direction and to be in a more coherent situation than the competitors. Full alignment can never be reached; because the requirements of the job, the competencies of the competitors, the needs of the management and the preferences of the technology change constantly. It often takes a long time for an enterprise to establish or change its information portfolio, and it is very difficult to maintain alignment within a certain period. Therefore, non-alignment is a natural condition for businesses. The important thing is trying to direct the information technologies portfolio towards the requirements of the business. If the level of alignment is better than the competitors, it creates a competitive advantage. The alignment between strategic objectives and information systems requires planned and goal-oriented management processes in both business and information systems. Most of the time, the well-aligned information systems portfolios are not likely to happen. Each specific strategic context leads to different goals and different types of information systems choices. The level and composition of information technology is determined by the strategic context. For example, if a company that adopts a low cost leadership strategy, the information technology should be aim to provide cost control. This company will prefer minimum infrastructure and more transaction investments. If a business chooses differentiation strategy, it prefers to

invest in strategic information technologies and in a comprehensive infrastructure. The aim of this investment is to differentiate itself from its competitors as a market leader in the use of information systems.

The investments of enterprises in information systems differ in terms of both quantity and distribution. These differences result from the different perspectives of sectors, strategic goals and level of contribution to information technologies. Broadbent and Weil (1993) determine that information systems are used more intensively in the service sector than in the manufacturing sector. Strategic information technology alignment is addressed at the company level, because the products and services are part of the systems and they have to be managed as close as possible to the customers. If the strategic information technology is well-intertwined with business activities it become more difficult to imitate and make it easier for the organisation to maintain advantage (Hamel & Prahalad, 1990).

THE CONCEPT OF INNOVATION

Innovation emerged as a new concept, but actually it introduced certain standards to existing unorganized policies, brought more professional perspective and put new terms into these policies and emphasised the importance of innovation. The concept of innovation is about creating a new or improved product or service by generating a difference in some of the elements of three factors; input, process and output. In this way, companies gain competitive advantage over their competitors, increase their market share or find a new market. The innovation defined as a new perspective of a product, service or process and is also often mixed with inventing a new product. Innovation refers to a much broader concept than the invention. The notion of invention indicates an output of a physical product of a physical system which can be seen and observed by hand and concept of innovation is not covered by this definition. Actually, invention is the antithesis of innovation, which is the development or the application of the existing information in a timely and accurate manner.

The innovation process takes place in four stages in the organization, these stages are:

- Search for new ideas
- Evaluation of new ideas
- Using new ideas
- Development of innovation (Güleş & Bülbül, 2004).

There are five types of innovation:

- Introduction of new products,
- Introduction of new production methods,
- Opening new markets,
- Development of new sources of supply for raw materials and other inputs,
- Creating new market structures in an industry (Pınar et al., 2002).

The concept of innovation is about accepting and implementing a new product, process, service or opinion. In other words, adapting new opinions and behaviours into the enterprises. In the competitive environment, the innovation capacity of the enterprises is an important factor for gaining competitive advantage. Innovation provides great success and advantages to companies in long periods. "The in-

Table 1. Types of innovation

(Some innovation types related to innovation classification (Yamashina, 2000)).

Source: McDaniel, B. A. (2002). *Entrepreneurship and Innovation: An Economic Approach*. ME Sharpe. Inc., London, 3-11.

novation has very significant role in ensuring maximum productivity and profitability in competitive environments (Abrunhosa & Esa, 2008).

Innovation is an important element that every business must give attention to in today's global world. Innovation can add value to the enterprise and provide competitive advantage if implemented successfully. However, it should also be taken into consideration that it may cause financial losses and waste of time and therefore, it is an important process that should be taken seriously by the businesses. In today's business world, innovation and management of change has become quite important. Businesses should establish new products, services in order to adapt to the changes in their environment and this can only be done with innovation in the business life. Throughout the innovation process, the objectives should be defined, understood and well-expressed, the feedbacks should be well analyzed and the activities should be monitored by a control mechanism.

Today, innovation is carried out from the smallest enterprises operating in the local area to the largest enterprises operating on a global basis, and not only private enterprises, but also public institutions have started to conduct activities in the field of innovation. 'There is many definitions of innovation, however if we summarize, we can say that the innovation is a system involves large-small private or public organizations, universities and government institutions and aims to development of science and technology production within national borders. The interaction between these various organisations is very important to ensure the development of science and technology and funding and regulation of technical, commercial, legal, social and financial issues' (Metcalfé & Ramlogan, 2008).

Types of Innovation

Innovation is classified by researchers in different ways and by following elements:

- Frequency
- Customer preference
- The degree of innovation
- Organizational value
- Customer benefit

Innovation is a broad concept that includes many disciplines. It has been divided into several classifications to make it more understandable and easier to explain. Thus, an enterprise can determine the stronger and weaker aspects of proposed innovation and examine the causes for weak results and take steps to solve problems before wasting time and having financial losses. Innovation classification can be made depending on the priorities of each researcher or company. Innovation classification is generally made based on the results of innovation or its focus and its benefits to the system.

Brouwer (1991) established the types of innovation as follows:

- New products
- New production processes
- New materials and resources
- New markets
- New organization forms (Koca, 2006).

There are different opinions about the classification of innovation. In the literature, innovation is generally classified under two main headings as process and product innovations. However, there are also researchers who categorize it under gradual and radical innovation headings.

Incremental and Radical Innovations

Incremental innovation is seen as making small changes in existing organizational practices, while radical innovations lead to significant changes in the activities of the organization. The decision to use what types of innovation is depends on the priorities of the product, such as the time, cost, patent period, competition, maintenance service and product life. 'The changes made during the primary, expansion and adoption life cycles of the products are defined as radical innovations, the changes made in the further stage are seen as incremental innovations. Radical innovations, though rarely, can be realized because of imitators who implement simple, non-creative processes for the product and services' (Coskun & Weber, 2000). Radical innovations generally emerge after a research activity. Businesses may have to use new methods to generate information in their research. Incremental innovations can be expressed as making additions to make products and services to be more preferable by the customers to provide a competitive advantage. The invention of the mobile phone can be an example for radical innovation, while adding additional hardware to the mobile phone is an example of incremental innovation.

Product and Process Innovations

Product or service is a value offered to the customers and it can be said that product innovations are directly related to customer needs. 'High-level risky investments and radical product innovations play an important role in providing competitive advantage, contribute significantly to the growth and profitability of the organization' (Coskun & Weber, 2000). In product or service innovations, companies can use a technology exactly in its original form or they can use a few new technologies. Companies can innovate by making small changes in their products or by replacing the existing product completely with a new one. If the company is producing a new product completely independent of the previous product, it means they introduce a new product to the market. This gives the company a competitive advantage. 'Process innovation is the change in one or more of the steps in the production stage of the product or service. A process can be completely changed or improved in various aspects' (Rabor, 2011). Businesses can consider process innovation when their products or services needs to be updated, or when it cannot meet the needs of the target audience and provide competitive advantage. Process innovation allows additional features to be added or removed from the product or service, the products or services can be revised with an aim to make products or services to be more preferred by the customers and provide advantages in the competitive environment.

Competition is not only about selling products and making more profits. Businesses should look for the other ways to produce products and services with more added value and less cost. The process

innovation adds positive value to the enterprises in this stage. Product innovations are more observable and perceptible than process innovations. The enterprises can implement product innovations as planned. In other words, process innovations are internal developments about product production and its presentation to target audience, but the product innovations are presented externally and directly to the customers. The product innovations cause more radical changes on products or services, and therefore they are observed more clearly by the customers. In process innovation, certain features of the products or services changes and creates less awareness in the customers compare to product innovation.

CONCEPT OF KNOWLEDGE MANAGEMENT

Knowledge is the output generated from the unified and conceptualized information sets. Wisdom represents the top step of the hierarchy of knowledge and is the ability to gather, manage and use the information and produce new information and interpret. Information is useless until it becomes a meaningful thought. Adding value to the information with the help of human or computer is one of the main functions of management. Transformation of data into knowledge is done in 6 steps, collecting organizing, summarizing, analyzing, synthesizing and decision-making. Before taking decision, it is necessary to collect, organise, summarize, analyze and synthesize the information. Throughout this process, raw data gains a meaning related to the situation and relations (Akgün, Keskin & Günsel, 2009). In the literature, the concept of Knowledge Management was first introduced in 1986 by Dr. Karl Wiig. In 1989, Knowledge Management projects were started to be implemented in some consultancy firms and in 1995, Nonaka and Takeuchi published an article and in 1993, Dr. Karl Wiig published a book on Knowledge Management. By the mid-1990s, consulting firms started to provide Knowledge Management services. In the late 1990s, it was observed that the companies that adopted Knowledge Management gained significant benefits in the industry (O'Dell et al., 1998). Since the early 2000s, Knowledge Management courses have been offered at universities. Management theorists such as Peter Drucker, Peter Senge, Ikujiro Nonaka, Hirotaka Takeuchi, and Thomas Stewart have made significant contributions to the evolution of Knowledge Management concept (Dalkir, 2013). Knowledge Management changed the paradigms of managers and is one of the main issues of the 2000s, together with global competition, quality, diversity, empowerment, vitality, network organizations, teamwork and innovation (Koçel, 2007).

Beckman (1999) describes the concept of expertise as an ability to explain problems, to place them in a logic framework, to make quick, accurate, validated recommendations. Beckman (1999) explains the next stage of knowledge as a complete managerial expertise and as a collective accumulation, capability associated with each other. In the literature, it is stated that the knowledge management is about making information visible and understandable (Gorovaia & Windsperger, 2010; Keller, 2014). Open information affects the main production capabilities of the enterprise (Zack, 1999). Closed information affects the innovation (Gökmen & Hamşioğlu, 2011). For this reason, Takeuchi (2013) concluded if an organisation has both closed and open information at high level, it means it has a dynamic structure. Open information is defined by Zaim (2005) as the information in the form of mathematical diagrams, tables, figures, files, documents, audio and video recording, formulas, tariffs, instructions, which can be expressed by data such as words, sounds, symbols, abstract drawings, commands, which are not from a specific person, but from independent resources. On the other hand, literature also states that closed information can be in the minds of the people, emerge depending on the mental, social and physical skills (Celep, 2003). This information, which is defined as closed or implicit, cannot be expressed easily,

cannot be written or drawn to words because they are dependent on individuals (Dalkir, 2005). In fact, in the literature, it is stated that although implicit knowledge can be individual, it can also be collective, such as brand and business perception or business culture (Donoghue, Harris & Weitzman, 1991). In fact, the competitive advantages of the enterprises usually are gained by using closed information to visible (Ihrig & Macmillan, 2015). Zack (1999) clarifies that if an organisation holds closed information cannot open it, it can be loss of opportunity, but at the same time, open information is a consumed opportunity. In the study of Takeuchi (2013), the process of making implicit/closed information to be open is called externalization and different models have been developed by the researchers in this matter (Gökmen & Hamşioğlu, 2011). For example; Takeuchi (2013) provides different techniques for the externalization of individual and social information. Gorovaia and Windsperger (2010) propose the use of high-level transfer mechanisms based on one-to-one relationships to share the information which is difficult-to-learn. In this context, another element that influences knowledge management is whether the information is simple or complicated (Donoghue, Harris & Weitzman, 1991). The information with low complexity is generally generated with systematic activities, continuous repetition and produced with routine, formal rules. Complicated information the one that constantly changes, therefore, requires expertise, experience and determination in different fields. The ultimate aim of managing information is to improve performance at organizational level. In addition, knowledge management has other impacts on the factors such as such as better understanding of customer needs, improving innovation performance, improving quality and reducing costs, which can also increase the performance of the company (Zakaria, Amelinckx & Wilemon, 2004).

Concept of Knowledge Management in the Age of Information

Trauth (1999) states that American business world saw that the information is a resource, which can be stored, accessed and processed, and it is different from technology as it creates value, and from this point on, it transcend to Information Age. Then, the end of the twenty-first century, American society realised that use of information was providing competitive advantage, and at this stage moved towards the Knowledge Age. In order to gain competitive advantage in the competitive environment of the knowledge age, it is necessary to acquire organisational knowledge better and faster than competitors and use knowledge to acquire better and faster results, i.e. gain knowledge advantage. Bennet and Porter (2003) describe knowledge supremacy as real-time access to the information needed by commanders in order to speed up the decision process and to improve decision quality and manoeuvrability with am to effectively block the enemy's planned actions. If we define briefly the knowledge superiority, we can say that the organization has a sustainable competitive advantage against its competitors by having the knowledge to create a difference in its operational field.

Knowledge should be managed in an organization in order to obtain knowledge superiority. The aim of Knowledge Management is to increase the value creation ability of the enterprises by using information more efficiently. In other words, it is most effective way is to use the intellectual capital and information assets in order to achieve the highest efficiency in accordance with the objectives of the organization. The most important process of knowledge management is perhaps the implementing stage. If the company able to obtain information and making it usable but if it cannot implement it effectively, all of these processes can be meaningless. Application-based methods aims normal use of information. Interestingly there is very little discussion attributed to the results of effective information practices. In the literature, the method associated with the information include features such as storing, recovering, implementing,

contributing, and sharing. Effective storage and recovery mechanisms allow the organization to quickly access information. In order for the organisation to have competitive advantage, they should generate, capture and identify corporate knowledge. The effective application of knowledge allows companies to increase productivity and reduce costs. Concepts such as storing, accessing, using and sharing of information relate to the implementation of knowledge. Effective storage and access mechanisms allow the organization to quickly access information.

An important step is associating knowledge management with the business objectives of the organization. One way to do this is to develop a high-level knowledge management framework that shows the importance of information in the organization. A shared vision and values in the organization will have impact on the success of the knowledge management process. Knowledge management is also considered as a strategy that enables information to reach the right person, at the right time and to be shared and used it in line with the aims of the organization (Groff & Jones, 2012). To be effective in the competition, the companies should use their current knowledge and create new information in their chosen market positions. In order to achieve this, organizations must realize the value of new knowledge, and develop absorbent capacity to use priority information and generate new skills and new information.

COMPETITIVE ADVANTAGE

With the globalization, boundaries between the countries have been lifted and trade has become universal. Monopolistic markets have been disappearing and each company has been able to produce every product under the free market conditions and many kinds of products are offered to consumer markets. Therefore, in today's conditions, enterprises have to ensure sustainability and development under tighter and more challenging competitive environments. 'In order to be successful in the competitive environment, enterprises need to have continuous innovation and development activities and ability to use global competitive strategies effectively and efficiently' (Bulut, 2004). Businesses should be able to analyze the reasons for the innovation and development. The information obtained as a result of the analyses will clarify innovations and give meaning to them. Any significant information adds positive values to the organization. 'Knowledge is the most important production factor for businesses, especially for the enterprises that adopt the contemporary philosophy. The knowledge plays an important role in ensuring competitive advantage (Barutcugil, 2013).

Competition Analysis

The most analytical review on competition analysis was done by Michael Porter (Eren, 2005). Michael Porter suggests that there are five main factors that influence the future situation of the organisation in the competition. Therefore, these main factors should be examined separately, and the competitive strategies should be developed according to the results of this review. These factors are called the five powers and affect competition in the business world (Ülgen & Mirze, 2010);

- The threat posed by new companies that can enter the business environment
- The threat posed by substitute goods that may be an alternative to company's product
- Bargaining power of suppliers.
- Bargaining power of customers.

- The volume of competition between competitors in the market

These five competitive powers are all together determine the intensity of profitability and industry competition. Again, these five power factors may vary from sector to sector and change as a sector develops. According to Porter, if any one of these factors is strong, the company's chance of raising prices and profitability will decrease. In other words, according to Porter's analysis, the strength of competitive factors will pose a threat to the enterprise.

Threats by New Firms

New entrants can reduce profitability and increase the cost by lowering prices with their new capacity, by having strong will to obtain a market share, or having significant recourses. The threat can be low if there is a high level of entry barriers or serious retaliation against the company entering the sector (Porter, 2003). The main entry barriers can be specified as follows;

Economies of scale: As the scale of production of an enterprise expands, the average cost decreases and it is called economies of scale. In short, economies of scale can be defined as decrease in unit (average) costs as production scale increases (Özdemir, 2000). This means that the new investors in the sector will have to produce at a higher cost for a certain time.

Product differentiation: Product differentiation means that the companies in the sector have brand recognition and customer loyalty gained by the past advertisements, customer service, product differences or only being the first company in the sector. This could result in additional expense for new entrant and create an entry barrier. Product differentiation is perhaps the most important entry barrier, especially in baby care products and cosmetics (Porter, 2003).

High capital requirement: In some sectors, initial investment costs are very high. It will take time for the new investors to be able to work efficiently, so, they should be able to work at a loss for a while.

Temporary (transition) costs: The buyer who move from one supplier to another supplier may face some costs, such as re-training of staff, getting ancillary equipment, testing a new source. These costs can also be an obstacle for new entrants. If these transitional costs are high, companies that are new to the sector need to offer significant improvements in costs or performance to encourage buyers to shift from one supplier to another (Porter, 2003).

Access to distribution channels: If new entrants can easily access distribution channels in the sector, they will pose higher threats and dangers. However, if the existing companies in the sector dominate the distribution channels, this can cause obstacles for the new entrants, and either their numbers reduce or it significantly and negatively affect their decision to enter to market (Eren, 2005).

Cost disadvantages without scale: Existing companies in the sector, regardless of size and their scale economies, may have cost advantages that cannot be reached by the new entrant companies. The most critical advantages are branded product technology, convenient access to raw materials, convenient placement, state support and experience (Porter, 2003).

Policies of official institutions: Investors who want to enter the sector are required to obtain necessary permits or license certificates from the official authorities. In some sectors, the difficulty of formal procedures can be a deterrent for new entrepreneurs.

Threat of Substitute Products

In general, all companies in a sector compete with other sectors that produce substitute products. Substitute products limit the potential returns of a sector by setting an upper limit on the price. For example, businesses in the coffee industry are indirectly compete with businesses in the tea industry. The possibilities of increasing the prices of the businesses in the coffee industry are limited with the presence of the tea sector (Aktan, 2003).

The Intensity of Competition Between Competitors

In general, competitive analyses focus on the competitors and the intensity of the competition. The intensity of competition between competitors depends on the following conditions (Ulgen & Mirze, 2007):

Companies with the same abilities and capacities in the sector: If there are many enterprises with the same abilities and capacities in the sector, the competition among them will be intense. Because many companies aim to protect their market share or to gain market share from others. If there is small number of companies, every company accepts its own market share and therefore competition intensity decreases.

Slow growth in the sector: The growth of a sector will create an important opportunity for firms. However, if the growth slows or stops, the level of conflicts between companies in the sector will increase and developing companies will try to gain their competitors' market shares. In the shrinking sectors, strong companies will give hard time to weak and moderate companies and it will increase the competition (Hitt et al., 2012).

High fixed costs and high storage costs: If fixed costs of the company is high, the company will prefer to reduce their average cost to minimum level and increase production. If the cost of storing production is high, companies will prefer to market their products instead of keeping them in the warehouse. In this case, the intensity of competition in the sector will be increased (Eren, 2005).

Standard products and differentiated products: If there are many standard goods and manufacturers in the sector, the competition will be high. Enterprises that can differentiate themselves or their products face lower competition (Ulgen & Mirze, 2007).

Increased capacity with large quantities: If the economies of scale for companies to increase their capacities, this may disrupt the supply/demand balance of the sector. This is especially the case when the capacity additions are made collectively. The sector may face the excess capacity and price reduction periods over and over again (Porter, 2003).

Bargaining Power of Customers

The third of Porter's competitive factors is the purchasing power of customers. If the customers combine their power to get lower prices or better-quality products, better service they can be a competitive danger. On the other hand, weak customers offer businesses an opportunity to raise prices and make more profits. Customers' demands from enterprises depend on their relative power compare to the business (Akin & Ekonomi, 2001).

Bargaining Power of Suppliers

Suppliers are businesses that the enterprises obtain the necessary inputs for their production. According to Porter, competition will be high in sectors with strong suppliers. Naturally, if the suppliers are strong, the supply costs will be high and this will affect the production costs and the final product cost and increase in the sales price (Porter, 2003). If suppliers have strong market power, it is not attractive enter to the market. Because, in this environment, suppliers can have competitive advantage by decreasing the quality of goods or services or by increasing the prices of the products (Azizağaoğlu & Altunışık, 2012).

Analysis of Competitors

If a business does not know about its competitors, their activities in the market and their strategies, it does not make much difference even if they know their own products and activities very well. In this respect, the organization should examine its competitors and changes in their situation continuously and systematically. The following issues are taken into consideration when analyzing the competitors in general (Dinçer, 2007):

- **Competitor Orientation:** Are competitors product-oriented or market-orientated? The orientation of competitors is very important in determining the strategy of the enterprise. If the competitors have specialized on a particular product, then the enterprise should implement a market-oriented strategy, but if the competitors are market-oriented, it would be more appropriate for the enterprise to choose a product-oriented competitive strategy.
- **Competitor's Goods and Services:** The nature, characteristics, quantity and type of goods and services produced by competitors must be identified. In addition, the life stages and market shares of these products should be determined and compared with the products of the enterprise.
- **Competitor's Production Features:** Knowing the production capacity, production quantity, product costs and efficiency ratios of competing enterprises will help to form a business strategy.
- **Growth Rates of Competitors:** The growth rates of competitors and the factors enabling growth should be examined. In particular, profit distribution, capital increase and price policies should be taken into account as they will affect the growth rate.
- **Competitive Advantages of Competitors:** The determination of competitive advantages, such as the technological or financial advantages of competitors and the price or quality of the goods will provide a clear indication of what the business will be dealing with.
- **Goals, Strategies of Competitors and Their Transformation:** Past and present objectives, strategies of competitors and their transformation and reasons behind changes should be examined. Thus, the behaviours the competitors against any development can be foreseen. In addition, the values and psychological structures of the managers in the competing companies should be analyzed.

Competition Strategies

It is very important for the companies to decide about their possible steps in order to achieve competitive advantage in a competitive environment. In this case, competitive strategies help businesses to determine their position against their competitors (Sucu, 2010). Porter introduced the most basic classification

for the enterprises to demonstrate their competitive strategies. According to Porter, enterprises should primarily examine the five strengths that play a role on their profitability (the intensity of competition, the power of customers, the strength of suppliers, substitution products and potential competitors); then they should choose one of the strategies (differentiation, cost leadership and/or focus) that will provide above average profitability. These strategies define the general competitive characteristics that enable enterprise to do better than its competitors in the market (Arıcı, 2006). Porter states that the companies have weaknesses and strengths and they can gain competitive advantage by following three strategies, which are low cost, differentiation and focus. Porter calls them generic competition strategies. The term generic refers to general competitive characteristics that will enable an enterprise to do better in the market than its competitors (Dinçer, 2007).

Cost Leadership Strategy

Cost-leadership strategy is a strategy model that predicts that the enterprise will gain an advantage over its competitors with its low-cost position in the industry by reducing the costs of the business. In order to achieve cost leadership, enterprises have to establish efficient and effective facilities, provide cost reduction using their experience and controlling costs in general (Akgemci, 2007). Having a low-cost position provides company with returns above the sector average. The low-cost position also protects company against its competitors; because lower costs mean that the company can still generate returns, even after competitors lose their profits as a result of competition. Low-cost situation protects the firm against strong buyers, provides a defence against strong suppliers, by giving the company greater flexibility to cope with the increase in input costs, provides entry barriers for new firms wishes to enter the sector, and allows company to have competitive advantage in the case of substitute products. Therefore, a low-cost position protects the company against all five competitive powers (Porter, 2003).

Differentiation Strategy

The differentiation strategy is a strategy based on the view that the product or service is considered 'unique' within the whole industry. At this point, important elements are brand image, licensed technology, special features, a strong distribution channel and other features that can be differentiated within the current industry (Türk, 2004). The companies differentiate their products with an aim to get customers to pay for the difference. This difference price is undoubtedly higher than the price of cost-leader in that sector. However, customers believe that the excess price of the product is worth paying (Çiçek, 2003).

The differentiation strategy provides above-average profit in the sector and creates a defensible position for enterprises to deal with five competitive powers. The brand loyalty makes customers to have low sensitivity to prices and this provides protection in the competition. The customer loyalty and uniqueness due to differentiation creates entry barriers to new competitors. It creates high margins for companies to overcome power of suppliers. Furthermore, it also reduces power of buyers, as they do not have enough options to compare the products and therefore they became less sensitive to prices. The companies that differentiate itself and gain customer loyalty are better protected against substitutes compared to its competitors (Porter, 2003).

Focus Strategy

The focus strategy, which is the third of the generic competition strategies, is implemented by focusing on narrower and limited market segments, which are consumer oriented. In this aspect, it is different than cost leadership and differentiation strategies, which are implemented on a broad base. In other words, focus is addressed to a part of the market, to a specific consumer group or to a part of the production line (Çetinkaya, 2006).

Effect of Knowledge Management Practices on Strategy Formulation Ability

In the literature, the conceptual and qualitative studies conducted by researchers at different periods about the relationship between knowledge management and strategy (Carneiro, 2000; Sveiby, 2001; Adamides & Karacapilidis, 2005). In addition, in the recent years, it is seen that innovation strategy is more important in relation to knowledge management and strategy than other strategies (Zhou & Li, 2012; López-Nicolás & Meroño-Cerdán, 2011). According to Adamides and Karacapilidis (2005), the formulation of a strategy is a knowledge intensive and collective process involving managers. In this context, knowledge can be considered as the main building block of strategy formulation (Marti, 2011). In the literature, it has been stated by many authors that the companies can formulate a unique strategy but they should have necessary knowledge and resources (Snyman & Kruger, 2004; Scarso & Bolisani, 2010; Ferraresi et al, 2012). Because long-term goals require future-based, significant level of knowledge and situation-based analysis (Walsh & Ungson, 1991). In addition, the level of knowledge of the human resources that will implement the strategy in the enterprise is also an important criterion for formulating strategies (Carneiro, 2000).

Sohrabi and Naghavi (2014) state that the strategy formulation for competitive advantage can be achieved by providing innovative information that provides differentiation and the solutions that can address market turbulences. Thus, the company should develop new expertise and strategic applications (Cura, 2009). However, according to Zack (1999), if the information cannot be produced, stored, shared in the company, i.e. cannot be managed properly and if they are easily imitated by competitors, they cannot provide long-term strategic advantage for enterprises. For this reason, Erkut (2009) and Zack (1999) agree that the important thing for the formulation of strategies that will provide a competitive advantage in enterprises is their abilities and intentions in managing this knowledge better than their competitors. In the literature, it has been stated that the ability to implement knowledge management will also increase their strategy formulation capabilities (Koza, 2008; Ihrig & Macmillan, 2015; Adamides & Karacapilidis, 2005). For example; Koza (2008) has clearly stated that business models and strategies can be formulated more easily by means of knowledge management applications of enterprises. Some authors state that the capacity of strategy formulation is more relevant to knowledge management than other factors. For example; Snyman and Kruger (2004) argue that there is a relationship between business performance and knowledge management practices and enterprises' goals and visions.

Solutions and Recommendations

Chandler (1962) claimed that there was causal relationship between an enterprise's strategy, organizational structure and performance, and his study become a discussion focus of many researchers in terms of context and relative importance (Harris & Ruefli, 2000). These discussions about whether the

structure determines the strategy, or the strategy affects the structure are also among the basic issues of strategic alignment studies. Chandler's work was influenced by industrial economics and positivist theory. He examined the corporate strategies of major large-scale enterprises in the American industry and observed that the businesses with diversification strategy change their organizational structures from functional to partitioned structures. Based on this, it has been concluded that the external environmental factors determine the strategy (diversification strategy) and that the strategy will affect performance as a mechanism that creates harmony between the external characteristics of an organization and its internal characteristics (organizational structure) (Amitabh & Gupta, 2010).

The other main arguments are that the strategy affects the organizational structure. Organizations generally prefer the production and sales of a single product at first and therefore they prefer low level of structures where decisions are usually made by a single manager with less complexity. However, in time, organizations that grow and expand their field of activity need to develop a new structure to meet these new managerial needs in line with new targets and strategies. If this requirement is not met, it may not provide financial gains (Amburgery & Dacin, 1994).

Another argument is the transaction cost approach of Williamson (1975). Williamson (1975) states that when there is an increase in the variety or size of enterprises, the organizational structure will loss the control and that the decisions will be taken by the upper management in extreme level. This would decrease the economic efficiency and increase the transaction costs due to internal inconsistency. However, if the structure changes from functional to multi-partioned, top executives can make effective decisions about their areas of expertise instead of daily decisions. Some researchers argue that the organizational structure affects the strategy, and they examine the subject in the framework of information gathering and processing (Engdahl et al., 2000) or in the context of managerial cognition and skills (Hall & Saias, 1980).

On the other hand, the ideas that the organizational structure limits the strategy, or the strategy determines the organizational structure can be explained with two approaches in terms of strategy formation process (Rajapakshe, 2002). The first approach is 'from external to internal and top management' process. According to this, the formation of strategy is made by top management by systematically evaluating the socio-economic environment within the framework of opportunities and threats and making an inclusive strategic choice. Therefore, in this process, lower managers only implement the strategy, and the direction of the impact is downwards. The existing organizational structure can be modified to meet external threats. The second approach is the "from internal and external management" process. Strategy formation occurs in the form of an evolutionary situation based on internal decisions and external events. The reasoning behind this approach is that management has dynamic context and stage-step perspective. As a result of the approach, the current operational and managerial mechanisms (technology and structure) of the enterprise are significantly influential in the choice of future strategy choices.

Drazin and Van de Ven (1985) describe the balance between the contextual factors of the organization (such as strategy, environment, culture, technology, size) and structural factors (such as centralization, formalization, specialization, organism, standardization) as 'alignment'. For example, Miller (1988) studied the organizational structure of the enterprises that follow the Porter's competitive strategies and examine the effects of strategic alignment in companies in the manufacturing and service sector. He classified the enterprises according to their low and high performance and tested their strategy-structure alignment according to selection and interaction approaches. According to his study, if the companies implement differentiation strategy, they have structure that allows company to employ different experts in their new product development process, cooperate with managers and experts from various departments, ensures face-to-face communication to solve a number of problems from production to pricing and to guarantee

period, they have higher level of performance. Another characteristic of this organizational structure is that its complexity and specialization level is high, and the experts has knowledge rather than senior management and they also have the authority (Mintzberg, 1979; Miller & Friesen, 1984). Priem (1992) analyzed the strategy, environment and organizational structure alignment in manufacturing enterprises and concluded that if the companies implement cost leadership strategy, they need have more mechanical structure, if they implement differentiation strategy they need more organic structure. This compliance creates positive effects on the growth and profitability ratios of the sales volume of the enterprises.

FUTURE RESEARCH DIRECTIONS

Organizational knowledge management includes obtaining information from organisation's own experiences or other and using this information to fulfil the mission of the organization. These activities are guided by technology, organizational structures, and strategies to upgrade existing knowledge or create new information. Although IT technologies provide the most practical tools for knowledge management, it should not be forgotten that knowledge management is not merely technology, but it is about the ability of organisations to create business intelligence and value (Groff & Jones, 2012). On the other hand, it can be said that the organisations have knowledge in several types, characterises, levels in their own structure. In this respect, enterprises should understand their weaknesses in terms of knowledge in order to realize their visions and reach their strategic objectives (Celep, 2003).

Organizations' information systems applications usually have "one-size for everyone" approach but it leads businesses to fail. However, the right approach is to select an information system portfolio that is appropriate to the strategic context of the business (Weill & Broadbent, 1998). Therefore, harmonization of business strategies and information systems is an important subject in the literature. Information systems aims to create business value, similar to other investments. In this context, business managers should identify the information systems strategies and manage the appropriate information systems portfolios to achieve their business goals. Alignment of information systems and strategy is a very challenging task. Both have fundamentally different characteristics. Businesses generally follow versatile strategic goals and strategies need to be constantly adapted to changes in the business environment. The development of information technology infrastructures takes time and requires technical discipline. Although the information systems infrastructure is as important as the traditional physical infrastructure such as building, facility and location, it is also more difficult to conceptualize and manage (Sabherwal et al., 2001). Investment in information systems, such as any investment, should be aligned with the strategic objectives and managed by considering the risk-return balance. Different business strategies require different Information systems portfolios with different capacities. Businesses invest in information systems with a diversified variety. Investing in information systems can have many different management goals, such as reducing costs or delivering instant information to senior executives. The information systems portfolio of a business covers all investments made by information technologies. This includes the human element providing information services.

Zack (1999) states that, in this process, environmental variables and information about the capabilities of the enterprise, provides ensures the solution for strategic decisions and allow business opportunities to be identified easily and more clearly. Thus, the administrative process-based information resources and capacities of the enterprise (Widodo, 2011), the formal or informal relations between the individuals and groups of the business, and the systematic information about the relationship of the subsystems in

the environment provide an understanding of whether the enterprise has the ability to realize the predicted visions (Dinçer, 2007). However, in order to achieve the long-term vision and objectives of the enterprise, formal planning and policies at the strategic level should be ensured by using the information at each hierarchical level to gain competitive advantage (Choi & Jong, 2010). Similarly, Bayraktar and Yıldız (2007) stated that the organisational knowledge has an important role in the process of pre- and post-planning of a strategy and in the process of dissemination of the corporate culture, perception of the external environment, correct determination of the targets, and a healthy and effective planning. In the literature it is stated that knowledge is important for defence of the company and for the preparing competition strategies as well as for adaptation to internal and external changes (Carneiro, 2000; Porter, 2008).

According to Fredrickson (1986), the structure can encourage or prevent the implementation of strategic activity by influencing the strategic decision-making process of an enterprise. Organizational structure can limit the responsibilities and communication channels and affects the members' cognitive constraints and allows them to achieve organizational rational results. This also helps management to control the decision-making environment and facilitate the processing of information. In this respect, Fredrickson highlights Bower's (1970) view that 'management chooses a specific organizational form and it not only provides a framework for its current activities, but also determines the channels for the strategic information flow'. According to Hall and Saias (1980), the organizational structure should be seen as a result of culture, values, past and future functions of the organization, success and failure stories of the organization, psychological and sociological consequences of technological developments. In cases where the strategy changes and the organizational structure remains the same, a trend towards the implementation of the old strategy can be generated due to the influence of the existing organizational structure.

In the literature, the debates about the relationship between strategy and organizational structure goes towards an understanding of 'strategy and structure are closely interlinked and interdependent to each other' (Harris & Ruefli, 2000). Engdhal et al. (2000) compare this situation to the discussion of 'a chicken and egg situation' and state that it depends on the point of view of the party that had the problem. According to Quinn (1980), one of the representatives of the learning school, the strategy is a phenomenon that is derived from existing activities and is designed before the organization's activities and guides the executives. According to the logical incrementalism approach based on experience, the strategy appears as a result of the organizational decisions and environmental factors, and thus the change in the organizational structure bring learning process in strategic change, and also, change in the strategy bring learning process in the organizational structure. therefore, both can be a source of progression.

CONCLUSION

The globalization of world, removal of borders between markets, access to many products and services easily and comfortably, presentation of wide variety of products to the market and rapidly changing continuous consumer preferences force companies looking for new technologies, to conduct new research, to use information more effectively and efficiently.' Today, intense competition among companies, technological change, socio-cultural changes, social incentives, contemporary international economic orientations and the role of multinational companies have pushed enterprises to generate innovation. In this respect, innovation has a significant impact on the emergence of a competitive environment in

economies, the formation of new markets, rapid technological progress, and the improvement of the level of consumption-standard of life (Duffy, 2001).

In the literature, the concept of strategy divided into hierarchical layers such as the common strategy (which is implemented by the groups of more than one independent enterprise), the independent strategy (implemented by an independent enterprise) and the function strategy (implemented by the functional departments of a business) (Bowman & Asch, 1996). The methods of formulation applied by enterprises differ according to the types of strategies. In today's literature, it is stated that the formulation of a quality strategy is one of the most important factors affecting the performance of the enterprise (Ferdinand, 2002; Widodo, 2011).

If the organisations have strategies that cannot be easily formulated and imitated by the competitors, they can create values and distinguish themselves to gain an advantage position and increase organisational performance (Barca, 2005). In this context, a good strategy should be formulated with realistic models by considering business opportunities, environmental threats or opportunities in order to achieve business targets (Eren, 2013). However, the formulation of the strategy is quite complicated, especially for the multinational companies, due to the different internal and external variables in the market and their strategic approaches (school) (Gupta, 2006). Therefore, it is observed that some enterprises are more skilled in formulating the strategy than other enterprises (Slater, Olson & Hult, 2006).

In all these innovation processes, businesses have to conduct their research activities based on sound and valid sources. A careless-initiated innovation process may result in losses as a reverse effect instead of benefits. Accordingly, it would be correct to divide innovation into disciplines to make it more understandable and create success. According to Peter F. Drucker's (2012) studies, innovation is natural a product of individual intelligence. Successful ones are the result of conscious, purposeful evaluation of innovation opportunities (Laudon & Laudon, 2015). Knowledge management is also considered as a strategy that enables information to reach the right person in the organization at the right time, so it can be shared and used in line with the aims of the organization (Çapar, 2005). The knowledge management is a widely accepted a business process approach since the 1990s. More practically, knowledge management is seen as the centre of development of management decisions of the product and innovation process of organizational adaptation and innovation (Earl, 2001). Knowledge management is a conscious approach to use information in the production of goods and services in order to improve the performance of organizations. Artificial intelligence is a new understanding derived from various disciplines such as knowledge-based systems, software engineering, reengineering, human resource management and organizational behaviour. In order for the organizations to achieve success, the top management of the organizations should manage the three factors, strategic alignment-knowledge management-innovation management strategically and integrate this management understanding with their competition strategy. The organizations that provide this balance will have an important step in achieving their goals by differentiating themselves from competitors in the competitive environment.

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KEY TERMS AND DEFINITIONS

Artificial Intelligence: Accepted as a branch of computer science; machines are more creative and react like a real person.

Business Strategy: It is considered as the means used to achieve the goals set by the organization. It is about how employees representing the organization must make decisions and allocate resources to achieve key objectives.

Competitive Environment: It is a dynamic external system in which an enterprise tries to compete. The more vendors of a similar product or service, the more competitive the competitive environment is.

Innovation: Developing more advanced, higher quality, more functional new products, production processes, organizations and management applications based on the existing knowledge.

Organizational Alignment: It is accepted as the process of realizing all aspects of the organization with the operational strategies along with the determined vision and mission.

Organizational Values: It is considered abstract ideas that direct organizational thinking and actions. It also represents the foundation that the organization has in establishing.

Strategic Alignment: It is the process and result of associating the structure and resources of an organization with the determined strategy and business environment.

Strategic Plan: It is the process by which an organization determines its strategy or direction and decides to allocate all of its resources to maintain that strategy.

Strategy Formulation: It is the most preferred process of an organization. Appropriate actions to achieve the set goals. This process, it is essential to the success of an organization because it provides a framework for it.

Chapter 3

Transformation of Business With Digital Processes

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ABSTRACT

Digital transformation has caused amendments to business in terms of strategies, work models, work processes, product and services, organization culture, decision making, technological infrastructure, human resource management, and collaborations. Thanks to digital transforming, amendments in business have caused to appear new type business: digital business. In digital business, either new work model system is created, or existing work process is changed or transformed. The purpose of this study is to determine the differences between conventional businesses and digital businesses and the amendments to organizational structure and human resource management in digital processes. In the light of this purpose, examples will be given from businesses changed by digital processes.

INTRODUCTION

As a result of technological developments from past to present, some innovations which are special to each field have occurred. These innovations emerge, change conceptions and initiate processes of change. This process began with the emergence of Industry 1.0 due to the use of steam power in industry. Afterwards, due to use of electrical energy in production, Industry 2.0 began, while Industry 3.0 continued with the use of programmable machines. Later, at the start of the 21st century, as result of informatics and communication developments, widespread use of the internet and developments in the software field, improvements in intelligent systems have caused the initiation of new change processes (Soylu, 2018: 45). Called Industry 4.0, this new process involves new unmanned production systems in production processes performed by establishing connections between physical and digital systems. Thus, the industrial revolution operating with mechanical systems using steam power has turned into a digital-based technological revolution including cyber physical systems, internet of things, and cloud technologies. This new process is called digital transformation and will encourage online and mobile work in business with more effective relationships between flexibility, speed, and quality, fewer mistakes, high

DOI: 10.4018/978-1-7998-1125-1.ch003

efficiency, shareholders (customers, suppliers, partners and workers) and it will provide easier cultural amendments (Görçün, 2017: 141).

Digital transformation has caused amendments to business in terms of strategies, work models, work processes, product and services, organization culture, decision-making, technological infrastructure, human resource management and collaborations. Together with amendments to business, it has also caused changes to ecosystems (Aksel, Arslan, Kızıl, Okur & Şeker, 2013: 14). While factories, suppliers and support service corporations are disorderly in the conventional process, there is an opportunity to act as a whole in the digital transformation process. Thus, thanks to the internet of things and cloud technologies, each business, factory or institution is able to communicate with others. As a result of this, a living ecosystem is created in work life. Products in this ecosystem are combined around a platform, are prepared by businesses which both support each other and also compete with each other and are transported to consumers. For example, applications in iPhones are improved by businesses apart from Apple and these are transported to consumers by using the Apple platform (Kaya, 2018).

The most significant point to be taken into consideration by digital businesses is the need for qualified personnel. Human resources will act both on structural transformation and also business strategies. For this, a wise, intelligent digital labor force, with accurate vision and special abilities and strong educational background is needed. Besides, qualified people with the ability to work with and to manage robots are needed in intelligent businesses (Sözer, 2016).

The purpose of this study is to determine the differences between conventional businesses and digital businesses and the amendments to organizational structure and human resource management in digital processes. In the light of this purpose, examples will be given from businesses changed by digital processes.

DEVELOPMENT OF DIGITALIZATION

Until 10,000 years before the Common Era, human beings hunted and foraged in order to survive. After this era, they began to engage in agriculture and animal husbandry, adapting to a settled life. This situation led to the “Agricultural Revolution” (Özkan, Al & Yavuz, 2018: 4; Serinikli, 2018: 1608). By means of the agricultural revolution, consuming societies became producing societies, the population increase speeded up, country life was adapted, developments in art and architecture occurred, the concept of private ownership emerged, and management styles developed (Serinikli, 2018: 1608). The Industrial Revolution followed the Agricultural Revolution. Important technological developments triggered Industrial Revolutions. Industrial Revolutions have led to important changes both in the structure of production and also in the structure of organizations (Slusarczyk, 2018: 235; Serinikli, 2018: 1609).

Until today, three large industrial revolutions were experienced. In terms of industry, firstly the use of steam power in factories towards the end of 18th century was the First Industrial Revolution (Industry 1.0); the use of electricity in industry and the transformation into large-scale production processes in the middle of 19th century was the Second Industrial Revolution (Industry 2.0); and later the Third Industrial Revolution (Industry 3.0) emerged with the transfer of important innovations in physics and chemistry into technology. In the early part of 21st century, the Fourth Industrial Revolution (Industry 4.0) began with the internet and digitalization which directed production, starting the use of intelligent machines and intelligent robots in production (Nart & Yıldırım, 2018: 254).

Industry 1.0

Towards to end of the 18th century, the First Industrial Revolution started with the discovery of steam engines. This firstly emerged in England, and later spread through Western Europe, North America and subsequently to the whole world (Davutoğlu, Akgül & Yıldız, 2017: 544; Serinikli, 2018: 1609). This large revolution started in England, enabled mechanical production in countries due to use of machines working with steam and waterpower such as looms and the construction of railways (Serinikli, 2018; 1609). Thus, small-scale factories were replaced by large factories with production by machines initially, which were later replaced by mass production factories (Mucuk 2005). Instead of human labor, machines were widespread, the use of mining and metals increased and developments in transportation occurred with Industry 1.0, called the First Industrial Revolution, (Serinikli, 2018: 1609). Western countries had increased welfare level and based on developments in healthcare decreases in mortality rates and increases in life-span were observed with the transition from basic good production towards manufactured goods in the labor force. The Industrial Revolution created the 'Bourgeoisie class' replacing the land holder, lord or aristocrats of the Agricultural Revolution (Aydemir, 2018: 256). The Bourgeoisie class (capitalist class) had significant potential in terms of economic, social and political aspects. Therefore, the driving power of Industry 1.0 was the capitalist class and the determinant in this period was capital accumulation. While the capitalist class accumulated capital, it led to exploitation of the working class and low labor in the face of capital (Banger, 2017: 34). Positive developments affected the economic and social structure. As a result of this, new concepts such as urbanization, poverty, child labor and unemployment began to emerge (Tozkopan & Ernur, 2018: 6).

Many basic technological factors used today are based on research and experimental approaches and requirements of the capitalist class in Industry 1.0. In this period, a managerial class who were educated, qualified, and had professional characteristics emerged. Additionally, because business functions became complex and required professionalism in this period, this led to development of new professions such as accounting, finance, law and marketing. Some of today's businesses, such as Nike, United Steel, and Shell, were founded in this period. Thus, Industry 1.0 can be expressed as a result of corporations and incorporations (Banger, 2017: 43).

Industry 2.0

At the end of the 19th century, the Second Industrial Revolution began with the discovery of electrical energy in production and with its use in factories, workshops and other production fields. As a result of this, serial and mass production started (Taş, 2018: 1821). By combining many machines, machine lines and assembly lines were created in factories. Production volume increased by means of Taylor organization and Ford production style in factories (Gül, 2018: 8). In the Industry 2.0 period, it was a matter of discovery and spread of communication devices such as telephones, telegrams, and radio along with internal combustion engines, electric motor and power ampules (Tozkoparan & Ernur, 2018: 6). In the economic field, new and strong centralized governments were established. While the first industrial revolution affected England and Europe, the second industrial revolution notably affected the U.S.A and Japan and also affected many regions and countries in the world. Instead of 'iron' which predominated in the first industrial revolution, it was replaced by steel production in the second industrial revolution. Thus, railroad transportation and trade began to speed up (Taş, 2018: 1821).

In Industry 2.0 revolution, the importance of scientific information emerged, different to Industry 1.0 revolution. As to the spread of communication technologies based on science, this led to the emergence of the next industrial revolution; the “Third Industrial Revolution” (Özkan et. al., 2018: 7).

Industry 3.0

The Third Industrial Revolution (Industry 3.0) refers to a period when production systems start to stop being analog and digital systems begin to take their place in industry (Yıldız, 2018: 547). The most important feature of this period, which is called the “Digital Era”, is the rapid developments in informatics and communication technologies. In this period, firstly computers, later laptops which are small computers, internet and mobile phones were developed and became widespread. After these developments, production moldings changed, supply chains expanded gradually, and design activities differentiated and increased in variety (Gül, 2018: 12).

The use of computers and communication technologies in production processes led to much smaller mechanical and practical products being included in daily life. Thus, the requirement for physical strength is negated and business management concepts with emphasis on consumer satisfaction emerged (Görçün, 2017: 141). Developments and progress in Industry 3.0, called the computer revolution or first digital revolution period, triggered the basis of the Industry 4.0 period called the Fourth Industrial Revolution which involves real and widespread digital transformations (Gül, 2018: 12).

Industry 4.0

Industry 4.0 is the concept that was first revealed in the Hannover exhibition organized in 2011. This exhibition can be accepted as the beginning of the Industry 4.0 period (Görçün, 2017: 141). The Fourth Industrial Revolution focuses on digitalization fundamentals. Revolution, beginning as the result of the rapid spread of mobile networks and internet, involves the development and integration of the use of machines by artificial intelligence (Özkan et. al., 2018: 7). The digitalization of production processes created a new paradigm of ‘Intelligent Production Systems’ which occur with the interaction of machines, humans and infrastructure in industry. Mechanical systems working with steam power in Industry 1.0 period were replaced by the internet of things and cyber physical systems in the Industry 4.0 period (Bağcı, 2018: 124). The essence of the period focuses on automatic machines being active on their own and production systems without the need for manpower (Görçün, 2017: 141).

With Industry 4.0, the costs for business will decrease and while this situation may lead to losses for Far East Asian countries and ever-developing markets, it will again provide a rise to prominence for developed market economies with competitive advantages (such as U.S.A, Germany and Japan) (Alçın, 2016: 22; Serinikli, 2018: 1611). In addition to decreases in costs, it will lead to a decrease in mistakes by human resources because the human factor is removed as far as possible, standardization of products, and will provide customer satisfaction and the efficient use of energy resources (Görçün, 2017: 142). It may also lead to a transparent supply chain, simplification of orders, information channels, stock optimization, personnel selection and employee training, easier determination of authority and responsibilities in business organizations, increased labor and efficiency, etc. (Özkan et. al., 2018: 10).

Basic Components Creating the Fourth Industrial Revolution

Components of Industry 4.0 are; cyber security, cyber-physical systems, cloud technologies, smart factories, internet of things, autonomic robots, big data, virtual reality, and 3-dimensional printer technologies (Akben and Avşar, 2018: 29).

Internet of Things

The internet of things is described as a global widespread network that things create between each other uniquely and objects in this network are in communication with each other with a determined protocol. According to another description, objects around the world are in contact with other devices by having access to the internet in a kind of way (Özsoylu, 2017: 50). In other words, this is the situation where a device transfers smart reader or data produced by humans to other systems (Özkan et. al., 2018: 10). Accordingly, machines and robots will be able to manage production processes in smart factories instantaneously and in case of any negative situation in the production process, machines and robots again will be able to stop production automatically. Thus, production and production processes in smart factories will be more practical (Ebso, 2015: 19; Serinikli, 2018: 1608) thanks to the internet of things (Özsoylu, 2017: 50);

- Production and production process will be practical because managers will be able to interfere with the production process in all stages by means of smart communication devices,
- The supply chain will be smarter by means of sensors and labels on things.
- Energy and infrastructure costs will decrease because all transactions will be completed by means of smart devices.
- The need for human labor will decrease in the production process of smart factories managed by machines and robots
- Income and profit levels of firms will increase

Cyber-Physical Systems

Cyber-physical systems are systems which connect the cyber world with the physical world by means of the internet. These systems make use of sensors, actuators, computer and software systems, and communication technologies in order to interact with physical reality and cyber relationships (Özkan et. al., 2018: 11). Cyber-physical systems which connect with the virtual world and real world comprise two important components. The first is the network including things and systems which are in communication with each other and with determined internet addresses on the internet. This includes accessing various contexts by means of internet connections in smart phones or making contact on different platforms with smart phones. The second component is the virtual environment that things and behaviors in the real world create by simulation in the computer environment (Demirkaya, 2017). The first means physical systems in the real world, the second refers to the cyber system in computer environments. Both systems work in parallel and coordination with each other. While the physical system continues working in real time, a virtual copy of the process works in the informatics environment as well. Before the physical system is established, production-line plant simulation can be established and studied in the computer environment (Serinikli, 2018: 1608) Thanks to these systems, changes in the production line will be able

to be implemented in a short time and failures in production will be at minimum levels. Thus, there will be increased efficiency in production (Kahraman, 2017: 88).

Big Data

Big data is the name of datasets which are too complicated and too large to be transacted with existing information systems. According to another description, it is data on a magnitude which exceeds the abilities of known data base management systems and software devices for data collection, storage, management, and analysis. Big data includes each movement done by a user on the internet. For instance, every site entered by a user during the day, every point clicked has a data hallmark. Storage of data in databases, analysis and evaluation are described as big data. Big data is an application which enables decision-making by using many different data all together (Özsoylu, 2017: 5). When big data is used correctly and goal-oriented, it will provide many important opportunities. When big data taken from different fields is interpreted with correct analysis techniques, it enables strategic decision-making by firms, better management of risks and innovation by firms. In addition to these, it will lead to increases in production quality, energy-saving, decreases in costs (Soylu, 2018: 47), increases in efficiency, development of supply methods, more effective customer relations and marketing conceptions. Thus, firms will advance within the competition wars (Özsoylu, 2017: 51).

Cloud Informatics

Cloud informatics includes one of the most important turning points of the digital transformation in information and communication technologies (Henkoğlu & Külcü, 2013:62). Cloud informatics can be described as storage, transaction and use of data on remotely located computers with access to the internet (BTİK, 2013: 2). Thanks to cloud informatics, users have the possibility to use large datasets and analysis software of firms on internet by means of computers whenever they wish, instead of remaining linked to the firm's computers or data centers. Thus, users can access all kinds of information from anywhere and by using all kinds of communication devices (Siemens, 2014: 12). The advantages of cloud informatics include low hardware costs, developed performance, developed calculation power, enabling high accessibility, unlimited storage space, being eco-friendly (electricity and saving) and not having problems based on hardware. The disadvantages of cloud informatics can be listed as the need for a stable internet connection, not working well at low speeds, slow operations of applications, and security deficiencies (BTİK, 2013: 10).

Smart Factories

Together with each industrial revolution, changes in production processes of factories occur and the role of the human factor in production has changed with automation. With Industry 4.0, advanced technology together with automation systems used in smart factories increased the need for highly qualified labor and will decrease the need for low qualified labor. The aim is to decrease mistakes in the production process considerably, to increase the speed of the production process and to decrease production costs significantly by means of robots in production processes in smart factories. In addition, they will be able to produce unique products for customers. In order to achieve this, the internet of things needs to be applied to the system perfectly and software and sensors must support communication with machines. In addition, cyber-physical systems have rather large importance in this process (Pamuk & Sosyal 2018: 47).

Stratified (Added) Production and 3D Printers

Stratified (added) production is the process generally which combines materials in order to make things from 3D model data arranged in layers instead of conventional production methods. In other words, added production is the technology which turns virtual reality in a computer into physical reality. Thanks to these technologies, flexibility of design is provided allowing production of things that are difficult or impossible to produce with conventional methods. Various physical parts can be produced simply and in a short time, prototypes can be created rapidly, the time consumed by the design process decreases, and the number of machines used in production, investment and costs decrease (Banger, 2018: 147).

Autonomic Robots

Robots are electro-mechanical technological products which can perceive situations and circumstances within the environment, and which can move according to these situations and circumstances in planned manner (Tozkoparan & Ernur, 2018: 7). Robots have begun to take more responsibilities step by step requiring high level intelligence, perception and decision processes. In addition, they have been included in processes previously completed by human labor, but which have insufficient added value activities and they have started to participate in higher added value activities as well in today's production processes (Görçün, 2017: 188). Robots can work under the control of an operator directly (EBSO, 2015: 20). In addition, they can operate in production by themselves autonomically without humans and operators by means of the internet of things, remote control systems and other advanced technological systems. Accordingly, data regarding direct or indirect demands coming from the customer can be transferred to robots automatically by means of cyber-physical systems; robots can start to produce these products without any operator intervention. Thanks to robots, production costs decrease considerably, because they can operate in dark environments so energy costs can decrease considerably, and losses occurring in production as a result of unexpected mistakes decrease. In addition, high risks work being completed by robots decreases the dangers in the workplace and provides a safer workplace (Görçün, 2017: 189).

Increased Reality

Virtual reality is a 3D simulation model which feels real for participants and enables mutual communication opportunities in a dynamic environment created by computers (Soylu, 2018: 48). As to enhanced reality, it is lively, direct or indirect physical views produced by a computer from the real world creating voice, image, graphic and GPS data. Whereas the created world in virtual reality applications is fully virtual, in enhanced reality applications (for instance, humans and anime characters participate in animation films together) the real and virtual world interact together (Banger, 2018: 157). With the help of increased reality, firms can interact with information in their environment and they can access data regarding the real world easily using artificial information and components correctly regarding their environment (Davutoğlu et. al., 2017: 554).

Cyber Security

Cyber security includes transactions which are unauthorized use of informatics, statements, destruction or changes to informatics, and protection of informatics with the prevention of detrimental access against informatics (Banger, 2017: 45). Virtual environments need remote access possibilities, to transfer data to the cloud correctly and also to increase security at maximum level in the mentioned environments

because information and especially security of data which belong to firms have great importance for both firms and industries (Siemens, 2014: 14). Cyber security provides data security is kept under control. Otherwise, devices operating regularly on the internet can lead to lost data and obstruct information security. Cyber security systems provide continued physical communication in a healthy environment by providing security to firms (Bulut & Akçacı, 2017: 57).

DIGITALIZATION

The digital concept is derived from the word *digitus*, which means finger in Latin. This word, meaning counting with fingers or touched in French, means numerical or multiple stage in Turkish. The digital concept is based on digitized logic which forms the principle of information technologies. Therefore, it is stated that digital businesses undergo changes and transformation with information technologies (www.sondevir.gaste24.com, 16-04-2019).

Digitalization is modelling of an entity in a digital platform, with unlimited copies, with all properties transmitted to the whole world in a short time (Nart & Yıldırım, 2018: 256). For instance, a tailor learning a sewing model and application of this model. This is a process that a tailor can only do by seeing and touching. As the result, applying of learnt sewing model is a manual operation. Learning by other tailors is possible with the first tailor's teaching or with analysis of the sewing model. However, a database can be created with digitalization by collected sewing models, the requested sewing model can be chosen from the database and new sewing models can be designed without any thread being used in the virtual environment. Later, these designed models can be sent to the whole world within seconds, can be used in production and can be produced as requested copy (Şeker, 2014: 5).

Digitalization expresses the interconnections of things, machines, employees and businesses with each other, it increases firm productivity in every aspect, makes operational processes easier and provides more competitive advantages. Digital transformation arising in industry allows new work models to be developed and it shapes production. Thanks to smart factories and added production techniques, production of unique products is quicker and cheaper. For instance, while New Balance uses added production technologies in their own product development processes and thanks to these technologies, they can produce specific shoes according to the foot build of professional sportsmen (Altuntaş, 2018: 9).

Businesses which perceive digital transformation only as a technology movement are vanquished by losing their competitive advantage. However, businesses which perceive digital transformation as being a part of firm's DNA gain more advantages in competition and innovation by gaining speed, performance, productivity, and creativity strength. For this reason, it is necessary for businesses to adapt to digital transformations and be part of the digital ecosystem in order to maintain their presence in markets in the near future (Göl, 2017: 38).

From education to health, from sport to industry, from communication technologies to media, digitalization is an inevitable process in all fields of life providing advantages, but it also has disadvantages. The advantages are same quality standard, high service standard, product and services safety, access to more expanded masses within shorter time, high quality standards in copy processes, and simplicity in storage and archiving (Kazan, 2017: 18). In addition, it provides a decrease in physical labor at minimum level and decreases in personnel numbers, saves time and costs, and is cheaper than analog systems (www.Dijitalles.com, 7.4.2019). The disadvantages are stealing of services by means of cyber-attacks and disruption, loss of data due to the breakdown of information technology systems, etc. (Kazan, 2017: 18).

DIGITAL BUSINESSES

A digital business is an organizational structure which creates more added value by replacing conventional firm structures, processes and functions with informatics technologies. In digital businesses, either a new work system and process is created, or an existing work process is changed or transformed (Aksel, Arslan, Kızıll, Okur ve Şeker, 2013: 53).

Digitalization of any firm means digitalization of work processes, of perception and management. For instance, transmission in a digital environment means processes managed in the computer environment with analog or manual methods in the past, now use these new possibilities provided by this environment (for instance, work intelligence) more efficiently and problems related with this environment are managed correctly (Şeker, 2014: 6).

As a new business administration type influencing the work methods of classic businesses, digital business administration is based on structure and systems such as Enterprise Resource Planning, Customer Relationship Management, Operation Management System, Supply Chain Management, and Human Resources Information Systems (Aksel et. al., 2013: 47).

Enterprise Resource Planning

Enterprise Resource Planning is the applications which collect the firm's functions (such as purchasing, production, stock management, accounting, finance, quality management, human resources, sales, logistic functions) in only one database, which can provide information flow related to each function for the whole firm with easy access to requested data. According to another description, enterprise resource planning is stated to be integrated systems of stock controls, production, supply management and accounting processes that businesses use in different sectors and in various scales (Çelebi & Bulut, 2016: 166). These systems provide easy and quick access to reliable information for firms, eliminate unnecessary data and operations, decrease costs, increase customer satisfaction, adapt easily to environmental conditions, increase productivity, and increase competitive power. In addition to these advantages, there are some disadvantages. These are setup costs of the enterprise resource planning package are very high, the setup period is long and hard, etc. (Demirhan & Aracıoğlu, 2010: 80).

Customer Relationship Management

Customer Relationship Management is an information system which aims to connect with customers effectively and to make strategic analyses by evaluating the information obtained as a result of communication. The main component of this system is analysis of customer information which is called data mining. Data mining transforms data obtained as a result of any kind of customer communication into healthy information which will be used in decision-making processes. Data and information related with changing demands, needs and expectations of customers are obtained by data mining and they can be monitored by customer relationship management (Aksel et. al., 2013: 52). Thanks to customer relationship management, businesses make changes in products and services in coordination with customer's unique needs and demands, produce according to need, increase customer satisfaction, increase product lifespan, ensure loyalty and continuity of customers, gain new customers, and ensure storage and reporting of information related to the customer's demands. Thus, competitive advantage is provided for the business (Selvi, Özbek & Erden, 2014: 112).

Operation Management System

Operation Management System is the information systems arising as a result of the most effective supply and demand. In this system, the aim is to manage each stage in the production accurately, such as supply of raw material, efficient use of production machines, and planning for employees with a role in production (Aksel et. al., 2013: 47).

Supply Chain Management

Supply Chain Management is expressed as information systems where information, products and sources are fabricated with maximum effectiveness and productivity so that the most suitable product is presented at the right time, in the right place to the customers according to their needs (Aksel et. al., 2013: 47). Supply Chain Management provides recognition of products electronically, allows carriers to be followed by satellite, decreases costs, increases customer added value significantly, communicates effectively and saves time (Yörükoğlu, Kayakutlu & Ercan, 2014: 6).

Human Resources Information Systems

Human Resources Information Systems are the information systems which include organizational management, education, performance evaluation and career planning in modern human resource applications, in addition to recruitment, personal rights and payroll from classic personnel management applications (Aksel et. al., 2013: 53).

DIGITAL HUMAN RESOURCES MANAGEMENT IN THE DIGITALIZATON PROCESS

For businesses, the most important resource is the ‘human resource’ so that they can maintain their presence in the market, be successful and obtain competitive advantages. For this reason, investments in human resources have become a more important issue gradually for businesses (Göktaş & Baysal, 2018: 1414). In a firm, all employees from the top manager to the lowest unqualified employee create the human resources. The need for efficient and accurate use of human resources in a firm increases the importance of human resources management (Öğütöğulları & Akpınar, 2016: 26).

Today, developments in information, communication and internet technologies allow human resources management functions to be completed in electronic environments. As a result of locating human resources management in electronic environments, a new concept has developed; Digital Human Resources Management (Şengül, 2016). The other factor which provides digitalization of human resources management is the inclusion of the Y generation in the business world. Y generation firms use technology intensely and force digitalization and other firms must keep pace with this generation (Penekli, 2018). Digitalization of human resources management provides increased need for qualified employees, decreased workload of employees and decreased costs. Thus, businesses gain competitive advantage.

Today, firms use communication technologies such as recruitment, performance evaluation, and education in many human resources functions. Communication technologies enable many recruitment applications such as online job postings, online interviews, and online tests. Institution or career websites

are the most important tools in recruitment applications used by firms. Firms can access potential human resources by means of human resources pages or employment sites and they can inform about human resources strategies. In light of information in websites, important information about the firm is provided to those who are looking for jobs. In addition to this, publishing of job postings on institution websites enables access to more qualified candidates and online job applications provide quicker applications for candidates (Uğur & Güner 2018).

Conception of Human Resources Management

Human resources are the human factors which exclude the firm's capital and natural resources and include all employees from workers at the lowest level to the top-level manager of business (Mucuk, 2005: 313). The more human resources are effective in a business firm, the more the business firm is effective. The more the business is effective and productive, the more it gains success. In this case, the most important factor to determine whether a firm is successful or not is human resources (Öğütöğulları & Akpınar, 2016: 27). The aim of human resources is to provide quality of life to employees and also make employees work very effectively in the business. Unlike the classic conception which perceives the human as being part of the production process, human resources adopt the opinion that happy and contented people are effective workers (Sabuncuoğlu, 2016: 4).

Effective and productive human resources management is required so that businesses can be successful and can increase in their performance levels. Human resources management, which is described as the management of human resources in a business, has become important gradually as a result of the globalization effect which leads to changes and developments (Mucuk, 2005: 314). Human Resources Management (HRM) is described as design of all human resources to be used effectively and productively in a business with a system in order to reach the firm's goal. In this respect, human resources management is focused on employment, education, and career development opportunities of people (Erdil, Alpan & Biber, 2004: 102). HRM regulates relationships of all employees in a business from their recruitment until leaving employment. HRM's aims are listed as follows (Öğütöğulları & Akpınar, 2016: 26):

- To contribute to businesses in order to reach their goals.
- To use human resources most effectively in accordance with the firm's goals.
- To provide employment for the right people in the right jobs.
- To proceed with performance evaluation according to scientific criteria.
- To promote employees according to their performance.
- To appreciate and motivate employees.
- To create objective and fair incentive mechanisms.
- To integrate employees with the organization.

Thus, HRM provides employment for people suitable to the job properties and in accordance with the business, increases the contribution of employees to the firm, decreases costs (education, selection, indemnity, etc.) and increases the competitive advantage by avoiding unnecessary costs (Erdil et. al., 2004: 102).

Human resources management pays attention to the human concept in order to achieve goals and it applies some basic functions so that it can operate most appropriately. The basic functions of Human Resources Management are:

Planning of Human Resources

This is the first stage in human resources management, planning of human resources stage involves examination of the existing human labor situation and determination of the quantity and quality of human resources that the business will need in the future. In addition, in this stage the characteristics of work done in the firm is determined separately and comprehensively, as well. Thus, both existing work and also analysis of human resources are completed (Saldamlı 2008: 242). The aim of human resources planning is to provide the numbers of the right employees with right ability in the right time at the right place (Çetin & Aslan, 2014: 53).

Performance Evaluation

To sum up, performance evaluation is measurement of employee success. Performance evaluation measures whether the firm has reached its goals or not by using prior determined methods and criteria together with the department the employee works in (Aktaş, Cesur, Özkan ve Soysal, 2015: 155). The aim of performance evaluation is to prepare an inventory of human labor planning, to determine education needs, to develop relationships between employee and management and to increase motivation (Öğütoğulları & Akpınar, 2016: 29). Performance evaluation is important for managers who wish to manage subordinates more effectively (Aktaş, et. al., 2015: 155).

Career Planning

This involves the planning and application activities ensuring development of employees in accordance with determined goals (Mucuk, 2005: 336).

Price Management

This is the actions in relation to fair and appropriate payoff for employees according to their performance and the value of work for which they are responsible (Mucuk, 2005: 338).

Selection and Recruitment

In this stage, characteristics of jobs are determined; needs, quality and positions of employees are determined; interviews, technical trials and physiological technical applications and health audit are done; the candidate's attention to the job is measured; and employee newly recruited adapt to work during an orientation period in order to integrate with the business (Öğütoğulları & Akpınar, 2016: 28).

Industrial Relationships

This relates to regulation of individual and society job relationships between the employees and employer and ensure healthy performance of these relationships (Mucuk, 2005: 343).

Education and Development

Education of human resource aims to update old abilities of employees and develop new abilities of employees. In order for existing employees to work more effectively, various education programs are regulated both within and outside the firm (Öğütoğulları & Akpınar, 2016: 29). After the recruitment period is completed for an employee who will start a new job, orientation is provided about their new duties. In the orientation period, existing personnel in the firm are introduced and adaptations to the physical location is ensured. Later, basic growth and education programs are provided to new personnel (Zaim & Polat, 2013: 40).

Work Safety and Worker Health

This includes actions about protection against hazards and risks in the work environment and especially against working accidents, and occupational diseases (Sabuncuoğlu, 2016: 6).

While completing the functions of Human Resources Management, consultancy services are provided to other departments regarding issues which are within the scope of human resources management and regulation of the functions of human resources management is ensured compatibly between different departments (Saldamlı, 2008: 241).

Digital Human Resources Management Concept

For the first time, Digital Human Resources Management (HRM) Concept began to be used at the end of 1990s when e-commerce started to become popular. Digital HRM is the use of web-based technologies in human resources management applications and strategies by firms (Uğur & Güner, 2018). According to another description, digital HRM is transmission of many duties the human resources department have in digital environments and activities which are completed in the digital environment (Şengül, 2016).

The human resources department can access personal information and make necessary changes quickly by means of the electronic environment. Digital human resources enable many human resources components to be completed quickly by means of the internet, such as job applications, e-recruitment, e-education and development, e-performance evaluation, e-charging, e-job and ability profiles and e-career methods. It minimizes the number of administrative processes and ensures time is saved. Being quick and easy, human resources systems leads to development of employee abilities and increases their performances. This is the reason why this system is preferred and used widely by businesses and firm management (Uğur & Güner, 2018).

As a result of placing human resources functions in the web environment, businesses obtain some advantages such as especially saving time, decreased bureaucracy and costs (Güler, 2006: 19). In addition, other benefits of Digital HRM can be listed as increased satisfaction of employees by providing active participation of employees and managers in applications, assisting employees with career planning, enabling personal growth, information and abilities, decreasing monotonous and routine work processes, increasing interdepartmental communication and collaboration, easing work flow by decreasing bureaucracy, informing employees about rules and the firm, creating a learning organization by making information transfer easier, increasing competitive level, increasing motivation, productivity and activity, increasing brand awareness by consumers, increasing organizational dependence, and decreasing stress

level and intention of leaving jobs. Apart from benefits by provided digital human resources, it can lead some risks especially about gender equality in the labor force (Aksel et. al., 2013:81).

Today, a candidate's educational background, experiences, successes and aims for to future are not sufficient components alone for digital human resources management. In addition to these, social media accounts such as Facebook, Twitter, and LinkedIn where businesses make character analysis of candidate for recruitment and job placement are also rather important. In this way, the suitability of a candidate for a job is determined by taking organizational culture into consideration (www.aktasholding.com, 07.05.2019).

Functions of Digital Human Resources Management

Functions of digital human resources management are listed as digital human resources planning, digital recruitment, digital performance evaluation, digital pricing, digital learning, digital career management, and digital industry relationships.

Digital Human Resources Planning

This is the collection, storage and updating stage of data related to knowledge, ability and skills of employees who work in computer and electronic environments and access these data in case of necessity. In the digital human resources planning stage, computers and electronic environments are used during stages such as prediction of human labor demand and supply, determining human resource needs, developing action plans regarding meeting human resources needs, and evaluating checking. Thanks to digital human resources management, access to data such as performance levels of employees, human labor cycle, absenteeism rates, and financial opportunities in the firm is easy and quick. In addition, it provides advantages such as saving time, decreasing costs, and prevention of calculation mistakes made by using pencil and paper (Doğan, 2011: 55).

Digital Recruitment

This is the stage the recruitments are completed by using digital technologies. Many businesses perform recruitments and job postings by using recruitment websites or human resources pages in their institutional websites. Businesses have personnel requirement announcements and job application forms on their own institutional websites and on the institutional websites of firms which do this professionally. Thus, procedures such as job interviews and application evaluations are done online. In addition to informatics technologies, job postings and job applications, it provides important contributions in terms of creating curriculum vitae stores which belong to people required by firm or who will be required. Besides, with the use of digital technologies comparisons of qualifications required by the person who will be recruited with features of candidates who applied to job can be made. For selection of appropriate candidates, various tests and selection systems are completed in electronic environments and results are compared with each other, so the most appropriate candidate can be selected more accurately (Aksel et. al., 2013: 89).

The advantages of the use of technological developments in businesses and the use of especially the internet in personnel selection include quick access to required data, saving time and costs, continuous access to current information, direct access to qualified candidates directly and correct selection of

qualified candidates (Saldamlı 2008: 239-263). Recruitment on the internet has some disadvantages. The most important disadvantage is the possibility of some problems during setup and installation of digital infrastructure and adoption to the existing system. In addition to this, because application is easy and selection opportunities are limited at first, excessive and irrelevant applications can occur and not having a human resource manager specialist in the recruitment period can be a problem in the digital recruitment stage (Aksel et. al., 2013: 89).

Digital Performance Evaluation

In this stage, necessary data are collected, analyzed, reported and saved in order to evaluate the organization and employees who work in digital environments. That is to say, digital performance management is performed online and as a whole (Aksel et. al., 2013:91). Many businesses use e-systems in order to make the performance management period easier. These systems make it easy for managers in terms of performance evaluation, writing performance evaluations and providing feedback to employees in the performance management period (Uğur & Güner, 2018). There are some disadvantages of digital performance evaluation. These are development of secondary importance of human and behavioral factors can be due to performance evaluations connected with digital environments. Depending on this, decreases in motivation and satisfaction, alienation from the organization, and increases in exhaustion can occur. Besides, it can lead some drawbacks such as violation of confidential data in digital environments and damage to privacy (Aksel et. al., 2013:91).

Digital Pricing

Digital pricing has begun to be performed on digital informatics systems with the popularity of computers. Digital pricing involves the collection, storage, transaction, analysis, use and distribution of data and information regarding businesses' pricing in the digital environment. Thanks to digital pricing, managers can design pricing programs effectively, can manage and notify using software tools based on web. With the use of internet and web browsers, employees have access to digital pricing softwares, databases and analytical tools from anywhere (workplaces or homes) as they wish. Thus, employees see wages in their accounts on the internet without going to the bank, and they have the opportunity to make transactions by means of online banking. Besides, they can see not only existing price information and also prices in the past. Thanks to digital systems, managers can also access existing price data about employees and price ranges easily. They can determine the rewards that they will give to subordinates according to performance (Doğan, 2011: 70). Digital systems allow calculation of interdepartmental price differences, prediction of price costs for future, access to both past and present-day price information and more easy monitoring of market prices (Aksel et. al., 2013:93).

Digital Learning; In the education field, digital learning provides more effective internet, computer networks and communication to employees and businesses in distance education systems. Electronic learning processes in businesses have two types; online and offline. Online learning (web-based learning) is learning by using institutional network structure with the internet. As for offline learning (computer-based learning), this refers to learning using CD-ROM and computer. Thanks to digital learning, unlike the conventional education, individual training can be given to firm employees with digital technologies. Thus; the requirements for time, place and a class environment are removed (Aksel et. al., 2013: 95).

Digital Career Management

The aim of digital career management is to provide qualified human resources in a business through long years. Thanks to the internet, employees who receive career consultancy service can be connected with each other online. By means of e-career management, businesses can perform career management effectively for their own employees with both the web page of the firm and with internet sites established for this aim (Celep & Findıklı, 2018: 67).

Digital Industrial Relations

Digital industry relations are software which assist managers so that they can decide about problems in the industrial relationships field. Relationships of businesses with employees, sharing of information, and correspondence are performed electronically with the internet. Questionnaires made for employees, communications with industrial unions and representatives, expectations, complaints, amendment demands of employees regarding work and the firm, and notifications to be made for employees are performed in digital environments. Besides, rules regarding work and the workplace, submission of regulations and instructions to employees, management of indemnity to be paid effectively, and monitoring seniority situations and disciplinary punishments are performed in digital environments (Doğan, 2011: 70).

WORK PROCESSES IN DIGITAL BUSINESSES

Conventional businesses provide products and services by communicating with customers directly (with consumers, wholesalers, and suppliers). As for digital businesses, they provide product and service placement by communicating with the end consumer, wholesaler, supplier and other shareholders by means of websites, virtual payment options, virtual catalogues, e-mail transfers, online assistance, and chat channels. These channels provide increased activity and substance to communications between the firm's customers and shareholders and this leads to amendments. This amendment decreases mutual dependence, removes the uncertain relationships between the business and its shareholders, and decreases costs (Aksel et. al., 2013: 54).

Work processes of digital businesses are classified in 9 groups in terms of communications with customers and shareholders. These groups are (Aksel et. al., 2013: 55);

1. **Digital Business-End Consumer Relationship:** This is the relationship where a digital business provides a product or service to the end user or consumer by means of various digital communication channels (websites, virtual payment options, e-mail transfers, and online assistance and chat channels) directly.
2. **Digital Business-Business Relationship:** This is the relationship where a digital business provides products or services to other businesses by means of various digital communication channels.
3. **Digital Business -Government:** This involves provision of products or services to public institutions with the help of various communication channels that a digital business has.
4. **Government-Digital Business:** This is provision of products or services to businesses by public institutions with the help of e-government applications.

5. **End Consumer-End Consumer:** This is the relationship occurring as a result of interactions that a digital business creates among customers by means of virtual environments.
6. **End Consumer-Digital Business:** This is the relationship where a digital business purchases products or services from customers by means of virtual environments.
7. **Government-End User:** This is provision of products or services to an end user by public institutions with the help of e-government applications.
8. **Government-Government:** This is the relationship where public institutions provide products or services to other public institutions by means of e-government applications.
9. **Digital Business -Employee:** This is the relationship where digital businesses provide products and services for its own employees by means of digital communication channels.

DIGITAL TRANSFORMATION APPLICATIONS

Digital transformation in industry encourages production and enables development of new working models. Thanks to digital technologies, businesses can make unique products more quickly and with less cost. In addition, competencies of employees can develop thanks to digital technologies (Tusiad, 2017: 22). Examples of successful business adapting to digital transformation in the world are listed as follows;

- **Netflix:** The largest cinema broadcast company in the world without any cinema screens Netflix was established in 1997 in the U.S.A. The company is a film and series production and distribution business. It is a broadcast service that provides various series, films and documentaries to be watched on customers' devices connected with internet (Kişi, 2018: 396). Netflix's global growth has a big impact on the company's success. By 2017 it was operating in over 190 countries, and today had 73 million subscribers with 130 million from the U.S.A. Netflix produces original content in 17 different markets. Importantly, Netflix provides content production not only for local-to-local, but also for local-to-global. For instance; six months, after being introduced to Poland and Turkey in 2016, Netflix added the local languages to its user interface, subtitles, and dubbing (Brennan, 2018).
- **Skype:** This is the biggest telephone company in the world without having any telecom infrastructure. Skype is a software application which enables voice calls to be made on the Internet for users, as well as instant messaging, file transfer and video conferencing (www.history-computer.com, 13.04.2019). Skype was created in 2003 as a company founded by Niklas Zennström and Janus Friis. Like standard telephones, Skype has features available, such as voice mail and call forwarding. It has also video-adding rather than standard telephones (www.itbusiness.ca, 13.04.2019).
- **Facebook:** This is the biggest media company in the world without creating any content. Facebook was established in 2004 in the U.S.A. It is one of the most used social platforms in the world which provides communication, sharing of photos or videos and obtaining information from societies (Kişi, 2018: 396). Facebook provides features in the work environment to employees such as flexible working hours, ability to wear informal clothing, work comfort and benefits of digital technologies (www.yeniisfikirleri.net/facebook-ofisi, 14.04.2019).
- **Alibaba.com:** This is the largest market in the world without having any stock. The company was established in 1999 in China. Alibaba.com is an online platform where export and import transactions are made between companies. On this platform, buyers and sellers from all around the world

find each other and all sorts of trade including raw materials, semi-products and final products is made. On this platform, not only firms in commercial operation but also software, consultancy and service providers, distributors and agents are included (www.itkib.org.tr, 13.04.2019).

The company transacts sales in the form of B2B (sale from firm to firm). According to the company's work system, commercial operations are made in the large amounts (wholesale) between businesses. Cloud informatics is used and internet infrastructure service is provided by the company (<https://webrazzi.com>, 13.04.2019).

In a company with supplier application features like Alibaba, orders can be managed easily. Offers can be sent for Request for Quotation (RFQ), and demonstrations of products can be given by social network sites. With Trade manager (Instantaneous message system), people who are members of a company can online chat with each other. In the Alibaba group, 90 offices in China and 19 offices outside of China appeal to over 190 countries and regions. There are total 60,000 employees in the offices (www.itkib.org.tr/files/downloads, 13.04.2019).

- **Uber:** This is the biggest taxi company in the world without having any taxi. Uber allows passengers to find a transportation vehicle, call and determine price and route services. Users load the application to phones and share location information. The advantages of Uber compared to conventional taxis are quotation before booking, single-touch search, following the drivers on a map, payment options apart from cash, and feedback options (Kişi, 2018: 396).
- **IKEA:** IKEA's digital strategy is based on providing innovative and highly valuable experiences for both online and offline customers. In 2017, IKEA launched the IKEA Place application which is an enhanced reality tool that allows users to visualize how furniture will look in their own home. IKEA has also begun to offer products to be outfitted in smart homes such as speakers and smart plugs (Marr, 2018).
- **Bosch:** The company was established in Germany in 1886. In the first years, Bosch was busy with delicate mechanical and electronic engineering works such as telephone systems and electrical bell installation. In 1898, the first Bosch office was established in London and later, sales offices were established rapidly in European countries. During the next years, Bosch offices were established in large areas of the world. Bosch developed micro mechanical sensors like working sensual organs used for measuring acceleration, rotation, pressure and voice in order to be used in automobiles in 1990s. These sensors perform data transcription in electronic control units. For instance, it provides information about when an air bag is to be opened precisely during an accident. In 2005, Bosch also started to produce sensors such as smart phones or play consoles for consumer electronics. From the 1990s to the present, Bosch released digital applications with various scopes to the market (<https://www.bosch.com.tr/sirketimiz/tarihce>, 13.04.2019.). Today Bosch's applications include;
 - Smart home and office tools
 - Advanced industrial constructions
 - Logistic and smart systems

It provides safer, more practical and more ergonomic homes and offices. For instance, sensors placed in homes or offices inform about weather forecasting by connecting to the internet; in case of rain they

close to windows automatically. Besides activities such as closing windows, operation of heaters and cooking can be started by means of a smart phone while outside home (EBSO, 2015: 34).

FUTURE RESEARCH DIRECTIONS

The limitation of the current study is that it reviews ventures which are successful in digital transformation. In future studies, businesses which attempt to complete their digital transformation and are unsuccessful can be analyzed. Additionally, the reasons for these firms being unsuccessful in the digital transformation process can be analyzed.

CONCLUSION

Digital transformation is seen in every sector and in every field of life. Businesses make efforts in order to manage digital transformations. For instance, Google, Facebook, Uber, Alibaba and Bosch are successful companies in terms of digital transformation. However, every businesses in all countries will not be completely successful in digital transformation. Businesses should comply with digital transformations in order not to fall behind competitors and to compete with them. For this, qualified human resources should be employed that are able to adapt to digital transformation.

Human resources will act on both structural transformation and also business strategies. For this, a digital labor force which is wise, intelligent, has correct vision and special abilities, with strong educational background is needed. Qualified people with the ability to work with and to manage robots in intelligent businesses are required, with Z and Alpha generations human resources of future already involved with digital labor.

In the digital transformation process, the systems, machines, devices, and counters will be able to make production in small scale locations, rather than in factories, by using new technologies. Together with new technology, there is also the possibility to establish small ateliers and small businesses. Thanks to these environments, the micro factory concept has begun to gain popularity by changing work models. In this new period, micro factories can be thought of as an alternative to provide job opportunities for employees who may predict they will be unemployed.

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KEY TERMS AND DEFINITIONS

Digital Businesses: The businesses as a result of the transfer of the traditional businesses structures and processes to digital platforms.

Digital Human Resources: The execution of basic functions of human resources management on a digital platform.

Digitalization: The changes and transformation in the world as a result of information and communication technologies.

Digitalization Technology: The tools and means which accelerate digitalization (internet of things, cyber-physical systems, cloud technologies, smart factories, autonomic robots, big data and three-dimensional printer technologies).

Industry 2.0: The period which is marked by the beginning of the digital era.

Industry 3.0: The period which is marked by the beginning of digitalization with the use of digital systems in industry.

Industry 4.0: The period which is marked by the growing, production, emphasis on flexibility, quality, productivity, relationships with shareholders, speed, customer satisfaction and the reduction of manpower, human-driven errors, and costs.

Chapter 4

Re-Shaping Business Strategy in the Era of Digitization

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ABSTRACT

In the era of digitization terms such artificial intelligence (AI), internet of things (IoT) and related concepts are frequently used to describe a phenomenon that will eventually connect all things to digital networks that will lead to digital transformation of existing business and how they formulate strategies. One of the reasons behind such a paradigm shift is due to the demands of hyper-competition companies face in the global marketplace. Changing nature of the competitive landscape forces companies to re-think their strategy and align existing structures to achieve agility, flexibility, and a sustainable competitive advantage. Thus, companies need to re-think and conceptualize their overall strategies including the means to achieve sustainable competitive advantage. The trends that are shaping the Industry 4.0 will shape the way companies formulate strategies, create collaboration, and convergence of all the actors in the ecosystem to achieve agility, flexibility, and maximize efficiency.

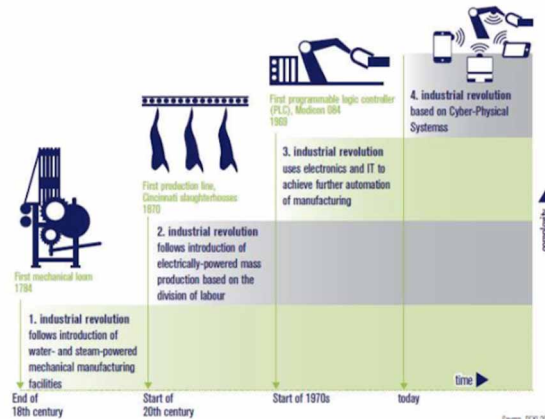
INTRODUCTION

As Davenport and Mahidhar (2018) indicate, the widespread usage of AI and related technologies rapidly change the way of thinking of the existing perspective on the business strategy formulation. The anticipated future of business world unprecedentedly evolving rapidly around processing extensive data. The circumstances led a new paradigm shift, also referred to as the fourth industrial revolution, era of digitization, in which companies face challenges never experienced before.

Concepts such as artificial intelligence, internet of things, big data and cloud, and many more are transforming the existing resources and capabilities that help companies achieving its' sustainable and competitive strategy. Changing customer expectations, products that are enabled by data, a new form of horizontal integration and operation models that is suitable to the digital world are few challenges of the digitization era. According to a recent survey conducted by Forbes (2018), approximately 700 execu-

DOI: 10.4018/978-1-7998-1125-1.ch004

Figure 1. The four industrial revolutions (Kagermann et al., 2013)



tives and 60 percent of the enterprises currently utilizing artificial technology enabled technologies to transform or expand their current business processes. Moreover, 63 percent of the companies already have built strong relationships with the existing customers as a result of their sufficient investment in the necessary technologies and reform their existing capabilities.

Smoothing operational flow including monitoring the performance of existing product lines and predicting required maintenance, forecasting consumer purchasing behavior with analytic systems such as machine learning and natural language processing algorithms namely are few benefits of adoption of AI-related technologies. Additionally, the creation of a new organizational ecosystem, achieving agility, flexibility, and greater efficiency are the perks of technologies of the fourth industrial revolution.

The objectives of this chapter start with defining paradigm shifts occurred in industrial revolutions throughout history. The chapter then will depict the current technological advancements that shape the modern business context and how it shapes business strategy accordingly.

BACKGROUND

Historical Perspective on Industrial Revolutions

The industrial revolution, a term firstly coined by British historian Arnold Toynbee to describe Britain's economic development between the years of 1760 to 1840. The term represents a change from an agricultural and handicraft economy to an economy that is dominated by industry (Landes, 2003). The industrial revolution, in modern society, has been used by various historians to describe periods of technological shifts that have a high impact on society. Even though there is an uncertainty pertaining a consensus on the beginning and the ending of each industrial revolution in this study we will define the shifts parallel to the definition by German Research Center for Artificial Intelligence that is depicted by Kagermann et al. (2013).

The diagram represents each industrial revolution. Each industrial revolutions are systematic by nature; however, it is hard to ascertain the underlying cause, effect and even parts of each phenomenon. The first industrial revolution refers to the period when the substitution of steam power to human and

animal labor occurred by the late 18th century. Subsequently, the technological advancement of steam and coal power utilization in manufacturing has led to the creation of factories. A revolution that has begun in Britain in the textile industry spread to other industry and resulted in a spur in productivity (Freeman & Soete, 1997). The prominent technical advances of the first industrial revolution started with the invention of the Newcomen atmospheric engine in 1712. The engine was the first mechanic tool utilized in the manufacturing process to achieve efficiency throughout Europe and mainly Britain. A later design invented by James Watt, known as Watt Steam that was sturdy and not affected by environmental constraints such as floods and droughts and doubled the fuel efficiency (Landes, 2003). The utilization of machinery spread to a variety of sectors including agriculture and textile (Hobsbawm, 2003). As Hobsbawm stated in his famous work (2003) defines A phenomenon of 1789-1848 revolution as the revolution of the bourgeois and a consequence of dual conflict occurred between the nations France and Great Britain.

The first industrial revolution as Morris (the second machine age) indicated “was the biggest and the fastest transformation of human history.” The steam transformed almost every venue of life, resulting construction of railroads making it possible to mass transportation, with factories led to mass production and allowed to overcome the constraints of muscle power and led to the construction of the “modern society”. The second Industrial Revolution, like the first one, is characterized by an energy source mainly electricity (Freeman & Soete, 1997). The technical advancements affected various industries such as steel and chemical resulted in the development of mass production systems, with the aid of an assembly line, yield a production leap. Even though during the second revolution more specialized machines were developed, the economic conditions of the era were more volatile due to the Great Depression and two world wars (Hobsbawm, 2003). From the mid-19th-century industrialization spread throughout Europe and the United States resulted in an increase in the number of factories. The consequence of such rapid growth in industrialization led to the increased competition. Eventually, circumstances have led to over-capacity which yielded a concentration movement, and the situation has helped in the creation of larger corporations. The industries, where the formation of trusts activities visibly traced were a railroad, steel, oil industries and automobile industry (Hobsbawm, 2003; Jensen, 1993). The expansion in size of such corporations highlighted the necessity of scientific knowledge and investment in the creation of the earliest structure of research and development (R&D) departments (Freeman & Soete, 1997). A large quantity of production of the same products resulted in a decline in prices. The demography also affected by the changes that occurred in the second industrial revolution. With mass production, there was a growing need for unskilled labor. Some countries such as the United States offered certain advantages to attract the workforce from abroad. Since the migration of the workforce was free until the World-War I and the post-war period, the population in urban areas where factories have established the population grew at a fast pace. The world population, which was 1,65 billion in the early 20th century, has expanded to 3 billion by 1960s (Roser & Ortiz-Ospina, 2017). With the second industrial revolution, the corporations became as powerful as the governments. Income grew steadily allowing an increase in the standard of living of people, especially after the Second World War. Lastly, durable consumer goods were easily affordable to a large portion of the population.

The third industrial revolution depicted by Kagermann et al. (2013) started in the late 1960s. The primary difference of the third industrial revolution is that this was the first revolution based on the utilization of electronics and information systems rather than a change in energy source in manufacturing. Even though the United States can be at the forefront of such a revolution, Asia has become one of the dominant players as well. Technological advances of the era such as significant investments in

computers, chips, and Internet by governments for national security, became available for the use of businesses (Freeman & Soete, 1997). With the expansion of electronics and information technology (IT) based technologies in the manufacturing process, a particular set of technologies were introduced such as computer integrated manufacturing (CIM), computer-aided design (CAD), computer-aided manufacturing (CAM), flexible manufacturing systems (FMS) and so on (Klingenberg, 2017). The economic environment was turbulent especially with the OPEC crises in the 1970s resulted in a decrease in demand and a rise in inflation rates. The consequence of resource dependency has led corporations to emphasize their efforts in increasing efficiency and reduction in costs. At the time many corporations an even government incur a substantial debt (Klingenberg, 2017). Therefore, the strategic approach of the managerial perspective became a necessity to overcome the obstacles that are caused by changes in the external environment. The focus on cost-saving strategies has led to a new movement of “outsourcing,” resulting in the relocation of manufacturing activities to underdeveloped or emerging nations, specifically to Asia (Porter, 1994). A phenomenon of globalization speeded the diffusion of information technology with the growing need for communication. The benefit of outsourcing helped companies to reduce their costs and gain access to higher performance. With outsourcing companies can able to compete in an international arena and able to expand its offerings into the markets where previously they could not (Hitt, Black & Porter, 2009). However, there are obstacles to outsourcing. One of the crucial problems with the creation of alliances is the changes in the culture. Besides, implementation of such IT technologies to emerging economy brings out specific difficulties such as Dell faced when implementing its operations in India. Lack of knowledge, organizational constraints can be faced when a company goes overseas when opting for outsourcing.

Besides, the transfer of know-how to emerging economies especially to Asian countries transformed the market structure and made the countries as one of the dominant players in the globalized business world. The demography also changed since the 1970s. The world population almost doubled within the years of the 1970s until 2016, reaching 7.5 billion of which nearly 3 billion reside in the Asian continent (Roser & Ortiz-Ospina, 2017). The third industrial revolution however did not yield expected result especially in terms of diffusion of computer-related technologies. The consequences occurred partly due to the shortage of skilled labor and high costs associated with the implementation of information technologies. The companies need a vast amount of investment in new equipment to implement such technologies in their processes. Therefore, it is possible to postulate that the expected outcomes of the third industrial revolution were relatively moderate in comparison to previous ones (Freeman & Soete, 2008).

The Fourth Industrial Revolution “Industry 4.0”

The term Industry 4.0. or the fourth industrial revolution announced at the Hannover Fair in 2011 for the first time referring full automation in manufacturing that eventually will revolutionize global value chain (Schwab, 2016). The original project was related to the collaboration of associations including Bitkom and ZVEI in order to identify appropriate technology with this collaboration between the various player in the platform called “Platform Industrie 4.0”. Platform Industrie 4.0 describes the Industry 4.0. as “the revolution of an industry with a new level of organization related to value chain including the entire life cycle of a product” (Platform Industrie 4.0., 2015). In other words, the aim of this collaboration is to the creation of “smart factory” technology that enables a detailed conceptual framework and clear strategy to promote advanced manufacturing (Albert, 2015). However, the term applies to many industries including but not limited to health care and education.

The revolution of the new industry basis its fundamentals upon the power of the internet and web-enabled software applications that can process streams of extensive data. In other words, the main driver of Industry 4.0 is the Cyber-Physical System (CPS) that connects the physical and cybernetic systems (Lee et al., 2015). With the “smart factories” the connection between physical and virtual systems intricate to one another at a global scale leading the creation of new operating models and full scale of customization (Schwab, 2016). Similar to previous industrial revolutions described earlier, the fourth industrial revolution diffusing at a wider span. As Schwab (2016) indicates the second industrial revolution which led by the utilization of electricity in manufacturing, has been experienced by an only 17th percentage of the world’s population due to lack of infrastructures. The third revolution also shares a similar fate. The third industrial revolution due to lack of investment in information technologies by local governments, 4 billion people today lack access to the Internet. However, one thing remains as an absolute that the spread of such technologies is at a faster speed when compared to the first industrial revolution which took nearly 120 years to spread from Europe to other parts of the world. Thus, the fourth industrial revolution is more distinctive by nature, the velocity scope and impact has no historical precedent (Brynjolfsson & McAfee, 2014).

Strategic Management and Related Concepts

The term strategy comes from the Greek word “strategos” that means generalship in command or the art of the general (Streiner, 1997). The etymological root of the word comes from the combination of “army” and “lead,” and the word stratego specifically means to a plan to destroy one’s rival through effective utilization of resources (Bracker, 1980). Since ancient times, the word strategy has been commonly used by military and political theorists including Machiavelli, Hegel, Kant, and Liddell Hart. In organizations, the word strategy started to be mentioned only after World War II. The usage of strategy in business referred to as the skill of utilizing organizational resources to win out the competition and creation of a unified system of organizing. In 1954, Peter Drucker had mentioned the term strategy as an analytical tool to determine one’s position (resources) and emphasized the notion of change if necessary to the external conditions. Alfred Chandler, a business historian, also used the term strategy in a specific business context for the first time. Chandler (1962) used the term strategy as the tenacity of achieving an organization’s long-term goals and objectives by taking necessary actions and allocation of resources to execute the predetermined goals. Chandler with his work on Strategy and Structure, emphasized the importance of “adaptation” to survival. The adaption mentioned herein is utmost important especially when an organization faced with a critical change such as market maturity that makes the current strategy less favorable and profitable.

The primary paradigm in strategic management emphasized the notion of competitive forces a concept introduced by Michael Porter. The competitive forces perspective underlines the importance of strategy formulation in accordance with the company’s external environment. The company’s environment is the industry or industries that the company competes in. Thus, according to the five forces aspect, the industry structure configures the competitive rules of the strategic game along with the available strategies to implement. Five industry forces defined as entry barriers, the threat of substitution, bargaining power of suppliers and buyers and rivalry exist among the companies determine the profitability of an industry. The methodology can be utilized to assist an organization to figure out its position in an industry that can defend itself against competitive forces or influence the forces if possible (Porter, 1994).

Shapiro (1989) in his article denoted a new perspective on business strategy. He introduced game theory tools into strategy formulation in a business context. Shapiro's idea was to reveal how a company can influence the behavior and actions of a rival company and eventually the business environment (Shapiro, 1989). A company according to Shapiro can influence the market conditions and the actions of a rivalry by investing in R&D, advertising and expanding its current capacity (Gilbert & Newberry, 1982; Schmalensee, 1983). The resource-based view, on the other hand, focuses on the internal set of skills and capability of a firm. The perspective emphasizes the importance of firm-related factors in determining the performance. According to the resource-based view, each company is considered as unique concerning its resources. Each company possesses certain assets and competencies such as tacit knowledge and reputation that are not easily imitable by the rivalry (Dierickx & Cool, 1989). D'Aveni, who conducted numerous studies on business strategy, emphasizes the hyper-competitive environment in which companies compete in. According to D'Aveni, a company should carefully examine four areas which he refers to as (1) price and benefits, (2) timing and know-how, (3) strongholds and (4) Deep-pockets. (D'Aveni, 1994). Every aspect of strategic management brings a differentiated understanding that makes the field more exciting. It is clearly seen from the existing literature that numerous articles have written on the concept until this day.

Strategic management concepts and techniques have been utilized by many large corporations along with start-ups today. The increasing competition and volatile business context have caused companies and managers to think more strategically than ever before (Gluck, Kaufman & Walleck, 1982). Strategic management is related to a set of managerial decisions and actions in deciding the long-term performance of an organization (Wheelen, 2015). The process includes environmental analysis including internal and external, strategy formulation, implementation, evaluation and auditing/controlling of the outcome. With the impact of globalization, disruptive innovation and sustainability challenges, more companies are faced with external ambiguity. Thus, a careful examination of the trends and adaptability are crucial towards survival for modern organizations. In the following section, we will discuss the basic model of strategic management including environmental analysis, strategy formulation and implementation and evaluation and control.

MAIN FOCUS OF THE CHAPTER

Technologies of the Fourth Industrial Revolution

The term of Industry 4.0. Firstly, announced in a high-tech strategy project in 2012 called "Action Plan High Tech Strategy 2020" by the German government which aims the automation of manufacturing (Friedmann et al., 2010). As stated above the leading technology of Industry 4.0 is the convergence of physical and cyber systems. From this standpoint, one can see that CPS are utilized in a variety of sectors (Hellinger & Seeger, 2011). In manufacturing, the with the CPS companies have become more flexible. The research conducted by World Economic Forum (2016) critical technologies of the fourth industrial revolution is clustered into three categorizations that are mainly physical, digital and biological (Schwab, 2016). Physical, technological advancements are driverless (autonomous) vehicles, 3D printing, advanced robotics, and smart materials.

Autonomous vehicles such as drones, trucks, and cars have the capabilities that allow companies to achieve resource sufficiency and flexibility. For instance, drones are utilized in the aviation industry to

eliminate flight collisions since the sensors on drones are capable of sensing their environment. Also, in agriculture drones with data analytics are utilized in fertilization and irrigation to achieve efficiency (Schwab, 2016). Additive manufacturing also named as 3D printing has been utilized in a variety of sectors including medical and energy sectors. Advanced robotics is another physical, technological advancement of the fourth industrial revolution that has been widely used across the sectors such as agriculture and healthcare. Robots with emerging technological breakthrough have become more adaptive and functional. The sensors enable robots to analyze and respond to their environment and allow them to conduct various tasks such as household errands. Lastly, smart materials such as nanomaterials will eventually allow the expansion of the circular economy that will enable growth (Meyerson, 2018).

Internet of Things

One of the digital technological advancement of industry 4.0 is called “Internet of Things (IoT).” IoT can also be referred to as modern wireless telecommunication system. The basic premise that lies under the concept is that we are surrounded by a variety of objects such as radio frequency identification (RFID) sensors and cell phones that can collaborate through different addressing schemes (Atzori et al., 2010). RFID tags that comprise of the unique identifier can be utilized to objects even including human and animals. The RFID readers stimulate the tag transmission via a radio frequency signal that able to locate the appropriate IDs in the environment. Thus, FID systems can be utilized to monitor the objects in real-time even though the object can be at a location at out of sight. Due to its wide span of benefits related to RFID systems, they can be used in a variety of sectors such as logistics, e-health, and security (Atzori et al., 2010).

Blockchain

Another digital advancement of the fourth industrial revolution is known as the blockchain system. A blockchain is a technology that interconnects a network of computers; in other words, a peer-to-peer model that decentralizes information in a secure protocol. The method allows an individual to create trust and to eliminate the intermediaries, which eventually results in increasing efficiency. The term “blockchain” was introduced by Nakamoto, a pseudonymous author who is behind Bitcoin. Blockchain system allows a user to solve the double-spending problem. Bitcoin that is digital money does not have a central bank to solve any financial dispute can arise between the parties, as known as nodes in the network. In a conventional banking system, banks and various financial institution serve a mediator role in case of emergence of any financial dispute. The bank and the mediators have the authority to reverse the transaction that created the dispute. However, the reversal of any transaction has a high cost due to increased fees and time-consuming. Bitcoin, on the other hand, is aimed to solve the issues by creating a system based upon cryptographic proof (Nakamoto, 2008). Bitcoin transactions are grouped in “blocks” that shares a time stamp. The nodes (miners) are responsible for linking each block in a chronological order to create a “chain.” As a result, the blockchain technology designed to deliver an auditable transaction and minimizing the centralization as in traditional business processes. (Greenspan,2015).

Artificial Intelligence (AI)

Another popular concept associated with the fourth industrial revolution is artificial intelligence (AI). Artificial intelligence is not a new concept. The term has been around since 1956, where it has been firstly mentioned at the Dartmouth Conference. AI described as numerous tools and technologies that can be combined to sense, understand and perform with the abilities to learn through experience and adapt (Akerkar,2018). The intelligence of an individual can be stated as one's ability to understand, perceive the objective world; gain experience and attain knowledge via learning ability; apply such experience into decision making and problem-solving. Additionally, the ability of linguistic abstraction, creation of innovation and rationalization of complex environments and ability to predict and ability to develop insight. AI, thus able to implement such abilities since it refers to a machine's capacity similar to human intelligence (Akerkar,2018). Agrawal (2016) depicts that the prediction capacity of AI technologies will change the overall business strategy will speed up the already fast-paced business environment.

As Davenport and Ronanki (2018) indicated the results collected from their research, AI technologies will radically transform the business within a short period of expected timeline. The authors define three categorizations of AI technology usage in the current business world. These are cognitive automation, cognitive insight, and cognitive embeddedness. The categorization also known as cognitive projects are currently utilized in different aspects of various companies. Robotics and cognitive automation is a relatively older concept that was initially introduced with the utilization of e-mails and call center systems. Also, customer relationship management and reconciliation of charge services in reading legal and contractual documents via specialized programs are considered within this categorization. 38% of the firms participated in the study declared the use of cognitive insight their current business processed. Cognitive insight refers to the usage of algorithms to detect a specific pattern in the large volume of data and interpret underlying meaning. It is widely used for prediction of behavioral patterns of consumers, identifying financial fraud, analyzing safety issues concerned with the manufacturing process and automation of novel targets of digital ads and providing actuary firms with detail models. Lastly, cognitive engagement is related to converging employees and consumers via chatbots, intelligent agents that counted for the least common type of cognitive technology usage by companies participated in the study. As stated, there are certain advantages of AI technologies. First of all, AI can be utilized in the decision-making process since technology can discover a pattern in a vast amount of data. Therefore, it allows a user to recognize unique information within an optimal time to respond to the environmental conditions. Also, new business models and value creation can be driven by implementing AI technologies since innovation through the detection of new patterns in available data.

Augmented Reality

Another term associated with the fourth industrial revolution is augmented reality. Augmented reality (AR) refers to the technology that widens the physical world by adding digital information to the device. AR, unlike virtual reality, does not replace the real world with a virtual one. Instead, the technology adds a layer to the existing environment such as sounds, videos, and graphics (thinkmobiles, 2019). Even though the concept is at its infancy, it is projected that the investment in AR technology will reach \$60 billion in 2020 (Porter & Heppelmann, 2018). AR is related to a set of technologies overlies the digital data, images, and controls into the physical world with the utilization of screens, wearables, tablet, and smartphones. AR technologies will increase the interface exist among the physical world and the digital

world and aims to enhance the user's ability to understand the information and anticipated future events. Also, augmented reality will be able to train the user with real-time expert guidance and creates interaction between the user and the product via natural user interfaces such as voice commands and gestures (Porter & Heppelmann, 2018). Aside from the stated benefits of AR technologies, they are also vital in determining the corporate strategy especially from the point of a value chain. Porter & Heppelmann (2018) defines the AR technologies in a broader perspective. Authors describe the benefits of AR technologies as the products themselves and by improving the business across the value chain.

There are four types of AR exist in the contemporary market. These are markerless, marker-based, projection based and superimposition-based AR technologies. Markerless AR also referred to as location-based augmented reality is a technology that uses GPS to provide the user a data based on the user's exact location. Example of such technology can be traced in smartphones such as providing the user with the maps, directions, and nearby businesses. Application of such form also includes advertisement pop-ups and navigation aid. Marker-based AR, also known as image recognition, the device works with a camera and a visual object such as a QR code. The device can also be utilized in 3D models where the position of an object is captured, and then the marker initiates animations such examples can be found in magazines. Project-based AR (PBAR) used in project development such as hybrid assembling and modeling/sketching in engineering. The benefit of PBAR in comparison to a head-mounted AR (the technology is attached to user's head) they are detached from the user, so it is more user-friendly (Stork, Bimber & de Amicis, 2002). Lastly, superimposition-based AR replaces the real (physical) view with fully or partially augmented one. The example of such technology can be seen in the IKEA Catalog app where a user can posit virtual products from the catalog in their homes.

Impact of The Technologies Related the Fourth Industrial Revolution

Boston Consulting Group (BCG) reports that with the shifts in the fourth industrial revolution the change in manufacturing will yield to changes in the economy and the workforce that will change the competition at last. The consulting group believes that technological advancement with the revolution also reshape the relation exist between the stakeholders along with the interaction between human and machine. According to the BCG, there are nine triggers of the last industrial revolution. These are additive manufacturing, cloud systems, the internet of things, horizontal and vertical system integration, simulation, autonomous robots, big data analytics, augmented reality and cybersecurity. The consulting group emphasizes the importance of cohesiveness of stakeholders and the utilization of data analytics in reshaping their business models and operations.

The technologies of the fourth industrial revolution have a tremendous impact on society, economy and culture in a similar vein as the previous industrial revolutions described above. The impact on the economy is primarily a concern, which creates a dichotomy among economists. To some, the advancement of the digitalization impact on productivity has reached its maturity. On the other hand, some economists state that innovation goes hand in hand with technology. Therefore, with the unlimited digitalization opportunities in productivity has not reached its full potential. Schwab (2016) argues that the impact on the economy is twofold. He has an optimistic view and suggests that economists should reconsider the economic indicators that have been utilized in assessing a nation's growth pattern. Secondly, he comments that with the rapid advancement in technology, especially in renewable energy sources will help society. People will be able to consume more at lower prices and consumption will be more sustainable.

Kagermann et al. (2015) highlight the costs that are associated with an investment in such technologies mainly referred to as substitution, infrastructure, and education. The investment in new technologies will require suitable economic conditions. Governments along with the private sector need to have an optimistic view and able to see the advancements that will be obtained with such investments. D'Aveni (1994) mentioned that the need to innovate continuously had caused hyper-competition in the marketplace. Companies need to innovate constantly to achieve competitive advantage creating a fierce race in the rivalry (D'Aveni et al., 2010).

Thus, a solution comes with collaboration in the sense of horizontal integration. Collaboration is vital in the creation of innovative design, development and delivering products and services (Chesbrough, 2006). Thus, the digital landscape disrupting the marketplace, changing the existing business models where various companies form strategic partnerships to add value (Jacobides & Hitt, 2005). There is a substantial effect of the fourth industrial revolution on the society as well. Even though the World's population increasing; on the contrary the working age population in industrial countries has been declining since 2011 (Frey & Osborne, 2016). Aging can be considered as an economic challenge since it can result in a shortage of labor and rising wages. Therefore, as the working-age population declines, the technology revolution has gained more importance. Schwab (2016) stated that "we need to work smarter rather than harder" to emphasize the importance of efficiency with the utilization of technologies. Since, A life span of an individual expected to reach up to 100, we need to reconsider the issues related work-age population, retirement policies along with life planning of citizens (UK Office of National Statistics, 2013) in the new digital era.

Basic Model of Strategic Management

The model depicted by Wheelen et al. (2015) holds a dynamic perspective that is both rational and prescriptive. The first stage in the model of environmental analysis includes two particular analysis. Both internal (resources) and external environment scanning as the first step in the creation of a business strategy. After careful examination of the trends in the external environment and thorough analysis of the company's competencies and resources, then strategies including alternatives are formulated. After a thorough evaluation of alternative strategies, then the best alternative strategy can be implemented. The last step of the model is the evaluation and control function that refers to an evaluation of the outcome of the implemented strategy. The company then tries to identify any discrepancies exist between the expected and the actual outcome of the implemented strategy then moves backward to the environmental scanning phase to examine a possible alternative to achieve the desired result.

Environmental scanning step of the strategic management model includes monitoring and evaluation of the information flow both from external environment conditions such as political-legal, an economic, socio-cultural, environmental, technological environment that a company competes in. Task environment of the business also examined since institutions including government, local communities, suppliers and vendors, competitors and creditors have a direct impact on the business. Variables such as GDP trends, technological advancements, laws, and regulation pertaining to tax, environmental protection along with shifts in demographics need to be monitored. Strategy formulation phase includes the mission, objectives, policies, and strategies of an organization that are developed for the purpose of attaining long-term plans. In this phase possible corporate (growth, stability, and retrenchment), competitive, cooperative and functional strategies are formulated with the purpose maximizing the productivity of the resources. At last, best alternative strategies are implemented and then monitored to reveal the actual results If

necessary then the organization will take any corrective action if there is an inconsistency exist between the desired state the actual performance results.

Analysis of External and Internal Environment in Strategic Management

One of the central concepts of strategic management begins with analyzing the industry that a company currently positions itself. Relevant stakeholders within the industry such as suppliers and buyers have particular importance since the maneuvers of each stakeholder can have a substantial effect on the company. In the 1980s Michael Porter introduced the concept of industry analysis, to examine the intensity of the competition exist in each industry (Peng et al., 2009). According to Porter, the extensive and careful examination of the trends included in the industry analysis can provide foresight in determining the potential profit gain that is measured by long-run return on the invested capital.

The forces depicted by Porter include bargaining power of buyers, the threat of new entrants, bargaining power of suppliers, rivalry among existing firms, the threat of substitute products and services, and relative power of other stakeholders. According to the model, the strength of each force intensity affects the potential profit gain and market share of companies. The first model introduced by Porter included five forces, and after that, he added the power of institutions such as government and local communities to his existing model to show how institutions can also influence strategic decisions. Such perspective is also supported by the works of Cheng as well in his famous depiction of strategic management model named as “strategy tripod.”

The second approach to organizational analysis in the strategic management process is called a resource-based approach. Barney (1991) described firm resources as all the assets including physical that refers to the company’s plant and equipment; human include experience, relationships and intelligence of the workforce and organizational capital resources that includes companies formal and informal planning, coordinating and controlling system. Also, company resources include an informal relationship that exists among groups within the company and with its stakeholders, and intangible assets including patents and copyrights, its culture and reputation. Capability is the term known as the company’s ability to utilize such resources efficiently and effectively. Since some of the resources as described can be a critical factor attaining a competitive advantage, a thorough understanding of a firms competency becomes vital. Competitive advantage merely is described as a company’s competence in implementing a value creating strategy that is not imitable by its competitors (Barney, 1991). Barney(1991) proposed that in order to achieve a sustainable competitive advantage an organization should analyze its resources based on a specific categorical analysis called VRIO analysis. The purpose of the theoretical model of VRIO framework begins determining the attributes of the company starting with (1) value that a company has that neutralize any potential threat in its environment, (2) rareness of the company’s current value offerings, (3) possibility of imitability (4) organization in the sense of the company’s strength to exploit such resources. The link that exists between the resources and sustained competitive advantage can be difficult to explain since duplication of a successful company’s strategy through imitation is not possible due to tacit knowledge e that a company possess.

Value-Chain analysis is another method in assessing a firm’s resources and its capabilities in exploiting such resources efficiently and effectively to achieve a competitive advantage. A value-chain is a process of analyzing a set of value-added activities of an organization including the production and marketing of a product/service, procurement, and supply chain. In a value chain analysis, one of the prominent factors is called a center of gravity (Wheelen, 2015). Center of gravity also can be referred

to as a core competence is a value-added process that a company posits itself in which it has the most significant expertise and capabilities. After analysis of core competence, the company then moves either vertical or horizontal to exploit potential growth venues, as known as vertical and horizontal integration. Porter (1985) categorized activities in a value chain analysis as primary and support activities. Here the systematic examination of each activity can yield a better understanding of the corporations value driven activities so the company understanding its strength and weaknesses. Primary functions of the Porter (1985) model include inbound and outbound logistics, operation, marketing, and service functions. Support activities include procurement, technology development, human resource department and company's infrastructure.

Strategic Management in the Digital Era

In the era of speed and agility, organizations are faced with radical changes in the way they conduct their operations and strategy making the process. The changes are fundamental, and it requires reshaping the existing abilities to create core competence in the race of sustainability. In 1965 Gordon Moore argued that the capacity of microprocessors (or the industry itself) would enhance its capacity at an exponential pace, and individuals will pay less to acquire such technology. Moore's "law" is instead a statement where Moore's observation concerning the chip manufacturing industry has made a substantial economic, technological and societal changes.

Today, we are surrounded by GPUs (graphics processing unit) where immense data can be stored, processed and analyzed. Thus, a change is needed especially on how to manage, design and operate organizations in the digital era. The chapter will use the model depicted by Wheelen et al. and try to integrate the technological advancement of Industry 4.0 to conceptualize the strategic management re-process. We will provide examples from the industry to support our claim on the necessity of restructuring the organizations so to adapt to the needs of the technological breakthrough. However, the vantage point of this chapter focused on environment scanning phase and specific functional strategies such as strategies of human resources, logistics including procurement, financial, and production.

This chapter will base its structure mostly on the notion of how industry 4.0 and related concepts such as artificial intelligence, internet of things will reshape on how to conduct both internal and external analysis in the strategic management process. The emphasis is given to the environment scanning phase is due to specific reasons. Firstly, the possibility of forecasting related to such change is less obscure since individual pioneers in the industry already taken the first mover advantage by implementing AI technologies into its primary functions. The general purpose here is to unfold the means that the concepts related to the fourth industrial revolution are utilized in formulating strategies in organizations.

Artificial Intelligence and Strategic Management

There is a vast amount interest on artificial intelligence and concepts such as big data and cloud systems. The immense growth in the neural network technologies are the outcomes of certain factors. Firstly, there is substantial growth in AI-based education. Today, reputable institutions and ivy league schools are offering courses including C-Level executive programs in AI, machine learning and data mining. A recent report conducted by MIT Sloan Management Review respondents of the research believed that AI would considerably affect the company's offerings.

Figure 2 indicates that significant impact of AI technologies will revolutionize the technology, media and telecom industries within five years. Consumer, financial services along with healthcare industry follows the trend (Ransbotham et al., 2017). According to the report, the respondents claimed that business functions such as customer service, marketing, information technology, supply chain management, finance/accounting, operations, and manufacturing would have a significant impact with AI.

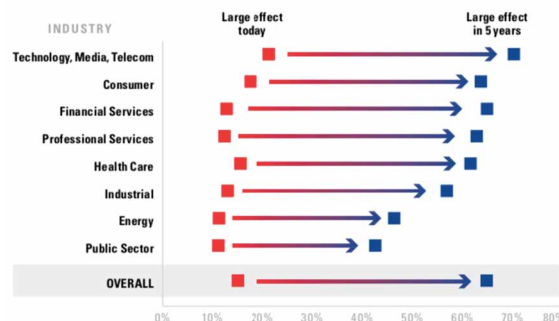
The strategic management process with AI enabled technologies will be assessed from the internal scanning aspect since access to data containing mass information regarding individuals personal information along with specific political and economic trends cannot be feasible. Besides, laws are protecting the rights of an individual in terms of their privacy and companies can face regulatory action if such act is conducted without the consent. Therefore, the chapter will assess the usage of AI enable technologies from the internal analysis including how AI will reshape the companies existing resources, capabilities, structure and culture.

AI-Enabled Technology in Strategy Building

Resources, as explained, are the assets, skills, competencies, and knowledge that an organization possesses. AI can help companies to rethink of their competencies and capabilities since it can detect fraud, enhance customer experience, automate work processes and assist with predictive analytics (Matskevich, 2018). VRIO analysis is a tool to explore the distinctive competencies of a business. Here, AI-driven technology in core competencies can substantially enhance productivity and effectiveness (Maria,2019). Types of AI in business include chatbots, digital assistants and machine learning including natural language processing (NLP) (Pwc, 2017). Each form of AI provides efficiency and accuracy that helps to formulate strategies. The crucial standpoint is that a company need to asses it “center of gravity” to implement available AI technologies. A proposed model of AI governance framework provided by Personal Data Protection commission Singapore (PDPC) depicted three decision-making models with AI technologies, presented the report at the World Economic Forum 2019. The first category called “Human-in-the-loop” refers to the decision-making process where an individual (human) supervises and has complete control over decisions where AI only provides recommendations (PDPC, 2018). Decisions in this model cannot be implemented without the affirmative actions of a human (PDPC, 2019). The underlying reason behind the human-in-the-loop model is that artificial intelligence is “artificial”. Therefore, the machine

Figure 2. AI impact on Industry (MIT Sloan)

Source: S. Ransbotham, D. Kiron, P. Gerbert, and M. Reeves, “Reshaping Business With Artificial Intelligence,” MIT Sloan Management Review and The Boston Consulting Group, September 2017.



needs supervised learning (active learning) since they are composed of algorithms programmed by a software engineer (Bridgewater, 2016). For instance, CrowdFlower, a data annotation platform, trains AI-based system such as IBM Watson. Since programs need human input, human-in-the-loop systems require human oversight. Variety of industries can benefit from the human-in-the-loop model. For example, the diagnostic process in the healthcare industry with AI enabled technologies now can detect or diagnose complex cases (PwC, 2017). The Mayo Clinic company adapted a machine learning program (AI system) where the abnormalities associated with brain tumors can be detected quickly and reliably (Matthews, 2017).

Another type of decision-making process model introduced in the report is “human-out-of-the-loop”. It refers to the full automation process of AI technology to execute the decision-making process. In other words, AI has the authority to make decisions in full automation. A machine learning model adapted to forecast demand in the aviation industry including air safety, and schedule are examples of “human-out-of-the-loop” decision-making the process. Last decision-making model presented in the report is called “human-over-the-loop.” Human-over-the-loop stands for a decision-making model in which humanity has control over choosing possible scenarios. A good example is a GPS navigation system where an individual/human has the choice to pick either route, with the option of altering parameters. Human-in-the-loop system will “augment” the strength of the human decision-making process. The system is vital since the accuracy of predictions and the risks associated with the decisions are increasing every day. Therefore, implementing or choosing to implement a human-in-the-loop system especially becomes vital in specific industries such as healthcare. AI can change the business models creating collaboration among providers, pharmaceutical companies and payers. In this perspective, Discovery Health insurance company know racks the diet and fitness activities of its users and promote a healthy behavior with the incentives they offer (McKinsey Global Institute, 2017).

The success of the implementation of AI-enabled technologies depends on whether it is embedded in the organizations’ strategy. However, since it requires a substantial amount of investment a company may choose using AI driven technologies on a case-based approach can deliver better results (McKinsey, 2017). The AI adoption in companies includes robotic process automation or machine learning applications in support or primary functions. An organization should evaluate the process of AI adoption at a scale and then expand its implementation to the other functions, so they can attain the highest value to achieve effectiveness and productivity. The first step in the implementation of AI-enabled technologies as a resource that will reshape the company’s current strategies companies should consider the data they possess. Since the majority of the data that companies currently have are labeled as “flat data” these should be converted into a “relational data.” In other words, data collected from sensors, social networks, and machine learning algorithms should be stored parallel to the requirements of each organization distinctively. For example, in the retail sector, data accumulated from transaction history, shopping patterns, including online viewing patterns, facial recognition analysis can help companies to forecast consumer expectations. The success can be achieved only when such data accumulated from various resources are cross-referenced to become meaningful so the company can benefit from the data (Burke, 2017). Companies should recognize the importance of the distinctive data since it becomes crucial in the creation of a competitive edge when the company chooses to implement enabled product/service offerings.

Due to rapid growth in accumulated data from a variety of sources companies need to boost its computing capabilities. With that second step of the strategy re-building in the digital era companies are faced with a unique eco-system including translators and data scientists (McKinsey, 2016). Translator role includes bridging the gap exist among the data scientists and management. Data scientist role on

the other hand related to development, deployment and training the necessary AI enabled technologies for firm-specific. However, finding a human capital for especially data scientist roles are severely scarce since there are only 235,000 out of 150 million workers in the U.S. alone. The ratio illustrates the challenge (McKinsey, 2016). Therefore, the creation of an ecosystem with collaboration between a variety of industries, creating network alliances between suppliers and other stakeholders are essential. Governments also play a significant role in AI adoption. Implementing a data ecosystem, helping traditional industries to expand AI adoption by providing tax benefits and subsidy resources, investment in AI related education and ensuring the training programs are aligned with the educational programs are one of the top priorities of governments in AI adoption process. Besides, the government should prepare a framework of ethical and legal standards on the utilization of AI technologies. Once the company decides to implement the AI technologies and pursue a test and learn approach, it can start with small steps and then gradually increase the development of such technologies into different functions as well. Last substantial portion of the strategy reformulation with AI enabled technologies requires a cultural alignment. In order to benefit the most out of AI-based technologies, the human capital and the culture should be reexamined. Human-machine interaction is a new concept, and it has two opposing views. Some employees might be against the implementation of such technology out of fear of losing their jobs. Thus, trust is a key role in achieving successful adoption of AI into the business and individuals need time to adapt to the rapid paradigm shift. Human resources, one of the primary supporting function in an organization, has a vital role in this transition. Training programs should be aligned with the needs of the current workforce. Also, the managerial team primarily C-Suite should communicate and support in AI-adoption process (McKinsey, 2017).

Examples of AI-Enabled Technology Adoption

As we stated, the AI-adoption is preferably on case base than implemented at a broad spectrum. Therefore, we will provide examples of how AI related technologies are utilized in various companies to achieve a competitive edge. We will define AI adoption at each function listed in the value chain analysis including supporting and primary activities. In marketing and sales function, Chatbots, a combination of AI-enabled technologies and natural language processing, can help companies to deliver efficient customer service. Gartner (2011) reported that 85% of the consumers would manage their interactions on chatbots rather than speaking to another human being by 2020. Early adopter Sephora, the global retailer, utilizes AI enabled chatbot system called Kik, provides users with the most relevant product offerings, thus increasing customer loyalty. Campbell's, one of the leading company in the food processing industry, collaborated with Alexa to reshape its marketing strategy. Campbell's VP of digital marketing Pritchard believes that with Alexa skills, an AI-powered assistant, revenues will grow since the company is now operating on voice commerce as well (O'Brien, 2018).

Technology development processes also known as research and development function can also benefit from AI systems. AI enabled technologies can enhance and accelerate the development process. Machine learning systems especially deep learning will provide a paradigm shift in R&D (Cockburn, Henderson & Stern, 2017). For example, Citrine Informatics, AI-enable platform, helps companies when the company lacks sufficient data in the product development process. With AI, companies can optimize their repair frequency and optimize their design process. Also, with the 3D printing technology companies can leverage the benefits of the manufacturing process. 3D offers companies the privilege of customization at low cost and speed (Schwab, 2016). Recent Accenture report (2017) indicates that

in manufacturing AI-based technology such as IoT will yield an addition 3.8 trillion gross value added (GVA) by the year of 2035 in the sector (Purdy & Daugherty, 2017). With IoT in manufacturing companies can connect and communicate its physical systems such as assembly lines to its digital systems. The array of possibilities related to AI technologies in manufacturing industry varies from delivering real-time maintenance of equipment to virtual design. With this breakthrough of smart technologies, the companies can take advantage of manufacturing improved and customized offerings and smart supply chain systems (Forbes, 2018).

Chatbots or digital assistants (Siri, Alexa, Cortana, etc.) can also be utilized in procurement functions (Gebbert et al., 2018). Conversational commerce started by Messina (2015) can change the way of doing business. The digital assistant can be used for more than just B2C transactions and with digital procurement systems can be implemented. Chatbots as an admin can play a vital role in assessing the internal demands of the organization and augment the current eProcurement solutions by identifying the needs through conversation and analyzing the purchasing history and real-time availability of the products (Malaverne, 2018). The other support functions as Human Resources can benefit from AI-based technologies. Talent recruiting and acquisition can be executed more efficiently with AI. Hilton, one of the pioneers of the sector as an early adopter, implemented AI-based technology called HIREVUE in 2014 to source, screen and interview candidates. The company achieved higher efficiency in the hiring process by 85% (Meister, 2019).

AI enabled technologies will augment the strength of human capital rather than replace in the strategic management process. In today's business world business are becoming more of flexible systems were learning and doing happens simultaneously. Therefore, strategies can be formulated with AI technology since it brings accuracy and dexterity. One way that AI supported strategic management starts with an environmental analysis where a vast amount of data accumulated to define especially the customers' needs. However, a crucial step here is to convert a flat data into a relational one to formulate strategy accurately. Another crucial factor is the importance of leadership that supports AI adoption. Leaders of the 4th industrial revolution need to educate themselves with the basic concepts of AI and build an intuitive understanding of the potentials that a company can gain.

FURTHER RESEARCH DISCUSSIONS AND RECOMMENDATIONS

The technological advancements related to the fourth industrial revolution have entered into the business world. Today's AI-based algorithms and related technologies enable companies to analyze and predict with remarkable accuracy and redefine the product offerings and services. The data can provide a substantial insight to guide in discovering such a value proposition. Respondents participated in recent McKinsey Research in collaboration with Boston Consulting Group (2017) indicated high expectation with the AI and related technology adoption such as the creation of strategic opportunity, reduce cost and sustaining a competitive edge. Besides, 69% of respondents expect that such adoption will occur throughout the business ecosystem, including suppliers and related partners.

The numerous advantages of AI-enabled technologies include but not limited to increase speed and efficiency, better processes. Additionally, such technology-enabled customer relationship tools provide management to better analyze the shifts in consumer expectations, revenue management, and so on. Although there is a variety of benefits with the adoption of AI-related technologies, particular challenges are associated with the new transition. The first challenge companies face a lack of AI talent in

the existing labor pool. As indicated earlier, only 235,000 data scientist are currently available out of a total of 150 million workers in the U.S. The ratio depicted is challenging. Universities and other related institutions should collaborate to minimize the current gap that exists in AI talent. Also, AI-related education should be funded by various institutions, including governments, and maybe local municipalities to increase funds given to AI-related research programs. Universities and educational institutions should implement courses to strengthen innovation and digital skills of the students and change the curriculum accordingly to the needs of the fourth industrial revolution.

Additionally, building a robust data ecosystem is another challenge that business face when choosing to adapt to AI enabled technologies. Scaling-up, in other words, the broader adoption of AI within industries is crucial, especially when horizontal integration is an essential factor in the pursuit of sustainability and efficiency. Shortage in technological know-how and the costs associated a full-scale adoption is a significant concern, and governments should play a prominent role supporting industries in the transition into the new economy.

Adoption of AI enabled technologies can be seen in digitized industries commonly. Broader adoption of such technologies should be expanded to entrepreneurial firms as well. The circumstance can lead to economic growth across the economy since smaller and medium-sized enterprises are important actors in both emerging and developed nations.

CONCLUSION

Strategic management has gained importance since the 1960s. Companies, at any scale, try to formulate its overall and competitive strategies after careful examination of the environment and try to implement the best alternative possible. AI enabled technologies may eventually change the environmental analysis phase since it can be implemented more precisely and accurately with the data analytics. Strategists should acknowledge of transforming the flat data into a relational and should increase their skill in machine learning capabilities and familiarize themselves with the technological breakthrough of the digitized era.

The chapter tried to simulate the existing practices with the technologies of the fourth industrial revolution from various industries. Companies who have not explored the possibilities should consider certain factors before implementing stage. Firstly, the creation of trust between the customer and the company is vital since AI and related technologies work with data accumulated from personal data from consumers. Companies should ensure that the information will only be utilized from a business perspective. Secondly, managerial support, especially from the C-Suite, is essential in the adoption process. The current workforce should be educated and trained to gain the necessary skills. Lastly, strategist should formulate the “masterplan” in accordance with the new technology, and place emphasis on flexible organization structure and embrace the change at all levels.

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KEY TERMS AND DEFINITIONS

Artificial Intelligence: An intelligent machine that mimics human capability and ability.

Augmented Reality: A technology that combines the physical and virtual worlds.

Digitization: The conversion of existing manual processes into automation.

Re-Shaping Business Strategy in the Era of Digitization

Industrial Revolution: Paradigm shifts creates a substantial change in manufacturing, communication, and transportation.

Industry 4.0: A new paradigm that combines traditional manufacturing process with technologies including IoT, AI, and augmented reality to enhance automation and communication.

IoT: A web of objects, interconnected via Internet, that collect and exchange data.

Machine Learning: A type/application of artificial intelligence in which a machine (computer) automatically learns without explicit programming.

Strategy: A design or a set of planned actions to achieve a long-term goal.

Chapter 5

New Strategies for Evolution of Business Ecosystems: Platform Strategies

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ABSTRACT

Several industries are formed by platform business models. To achieve success and have sustainability, the platforms should follow various strategies, paying attention on several factors. In this chapter, initially, how the platforms as a business model have emerged, in which ways they are used, and their working ways have been explained, and “platforms as a new business model” has been extensively examined. Types of platform business models, general features of platforms, ways to generate income from platforms are explained in detail. How platforms could succeed and what could lead them into failure have been told. Platform leadership, prominent platform strategies, governance of platform strategies have been extensively examined. Emerging trends and future research directions have been mentioned. For this study, a detailed literature scanning has been performed, research fields have been shared in order to fill the gaps. In the final section, the prominent parts of the study to be focused have been expressed.

DOI: 10.4018/978-1-7998-1125-1.ch005

INTRODUCTION

Today's world is a world where digitalization and jointly radical changes are experienced. With digitalization and daily improving new technologies; structure of industries, choice and demand of customers, market dynamics also keep changing. This situation has required the companies to change their way of working, and enabled platform business models to increase between industries.

Big part of today's business world is formed by the platforms. Many industries especially banking, transportation, health, energy use platform business models. Platform ecosystems have an extensive effect on organizations for last twenty years. Companies compete with each other to improve platforms in areas like smart phones and applications, video consoles and video games, personal computers and softwares, credit card companies, internet services companies, micro payments and other private financial services. Basilica companies that use platform business models are Microsoft, Apple, Alibaba.com, eBay, Taobao, Rakuten, Airbnb, Facebook, Google, YouTube, Yahoo, LinkedIn, Twitter, Netflix, Linux, Alphabet, Amazon, Booking. As seen, platforms are being used by the biggest and fastest growing companies of last ten years and nearly all giant companies of present day.

Platforms are technologies, products or services that create value primarily interacting directly between two or more customers or participant groups. Platforms have changed the logic of value-creation by resetting the access barriers. They decrease browsing and transaction costs of participants. Thanks to platforms, companies could reach wider customer mass, and this provides network exteriorities. Network exteriority could be described as providing economies of scales on demanding side (Katz & Shapiro, 1986). As the number of users increases, platform's achievement and sustainability also increase. The advantages of platforms being in great number, and the achievements that the companies using this strategy ensured, directed many different company and industries to use platform-based business models.

Not all platforms could succeed. For example, eBay Billpoint could not reach to PayPal's success and has disappeared. Similar thing has been observed on Google Video/Youtube, Google Buzz/Twitter, Google Orkut/Facebook, Google Knol/Wikipedia examples and while Youtube, Twitter, Facebook and Wikipedia have gained success, other platforms could not maintain their existence.

Platform based business models require a careful governance. Competition level is high in platforms and there are many players. Having no entry barriers simplifies new competitor entries and jeopardizes the position of the platform. Platforms should well plan and protect their core technology and architecture. But on the other hand, they are also required to enable external innovators to improve new products or services by opening their core technology and architecture. Namely from one side They have to protect their technology, but from other side they have to share it. Here the strategy to follow and the decision to be given is very important. For platform's achievement, there should be a constant growth in user-base. This is quite difficult in platforms with high competition levels. This business model requires being open for change and improvement and evolving. For their success, to form platform ecosystems have critical significance. But this also necessitates the participation of many players into game and entails the versatile, strategical decision making process. Different markets require different competition strategies. In order to overcome all of these problems and to properly and efficiently manage platforms, platform strategies are needed.

The goal of this study is to provide a detailed, consepional frame for platform business models, to tell platform strategies and how to govern them. To better understand this business model, It is necessary to initially well understand platform structure and features. Afterwards, which companies use it as

business model and how; the elements effecting their success, how the leadership could be obtained, should be understood.

In this study, respectively platforms as a business model has been extensively examined. Later, types of platform business models have been described in detail, in terms of both relations of “Seller, Developer, Buyer” and “Basic Functions”, together with classifications and examples. In next section, general features of platforms have been mentioned. In following part of study is about ways to generate income from platforms. In next section, how platforms could succeed and what could lead them into failure, have been told. In this section platform design, platform operations & capabilities, platform ecosystem & governance have been especially highlighted. Later platform leadership has been mentioned. Here what makes platform leadership to improve and how a company could maintain its leading position have been emphasized. The critical element here which is platform’s technology core, and how they could benefit from external exteriorities have been highlighted. The prominent coring and tipping strategies and basilica implementers have been studied in detail. In following section, prominent platform strategies have been mentioned. These are: pricing, openness, integration, differentiation and envelopment. The working way of each strategy, when and how to use them, points to pay attention have been explained. In every strategy, the following companies have been dealt with examples and their way of applications. Next section consists of governance of platform strategies. The prominent elements for a successful governance have been told in detail. These elements could be summarized as: following combined strategies, integrating platform strategies, pricing proper for structure of platform and target group, and motivations, creating platform ecosystems and considering the parties in this ecosystem while deciding on strategies. In emerging trends and future research directions section, gaps in literature and possible working areas of the future have been expressed. In final, conclusion section, the prominent parts of the study and parts to be focused have been emphasized.

Platforms as a New Business Model

The innovation of information and communication technologies in second decade of 21st century has enabled the mutually cooperated web communities to be formed (Hamari, Ukkonen & Sjöklint, 2015). As a result of this, the organizations have moved away from traditional vertical integrations, and platform business models aiming to create values with a further innovation-oriented approach have arisen (Gawer 2009). Nowadays, several industries like banking, transport, health, energy are formed by platform business models. Prominent applications such as Microsoft, Apple, Linux, Alphabet, Amazon, Facebook, Uber, Booking, Google, Airbnb, Uber, eBay, YouTube, Yahoo, Facebook, LinkedIn, Twitter, Netflix and credit cards and all operating systems are using platform business models.

Platforms are the mediators that enable direct interactions between two or more customers and participant groups (Rochet & Tirole, 2003; Boudreau, 2012; Gawer & Cusumano, 2014). They are markets having cross network externalities (Eisenmann, Parker & Van Alstyne, 2006). In literature, there are many different platform classifications. These classifications are based on 2 approaches as technical and ecosystemic (Asadullah, Faik & Kankanhalli, 2018). On technical viewpoint, platforms are expandable code basis of a software-based system. This code base provides functionality, being shared by modules and interfaces (Tiwana, Konsynski & Bush, 2010). Ecosystemic approach exhibits the platforms as a commercial network or market that enables product or service transactions between different groups (Tan et al., 2015). In this approach, platforms simplify the interactions between different but interdependent user groups like buyers and suppliers.

New Strategies for Evolution of Business Ecosystems

Platform centered business models aim to connect people, organizations and resources of an interactive ecosystem with each other through the usage of technology, and to create high level of value (Parker, Van Alstyne & Choudary, 2016). In this business model, platforms use two general methods to create the value (Evans & Gawer, 2016);

- Multi-sided marketplaces that are transaction oriented. Primary organizations that use this method; Amazon, Uber, Airbnb, eBay
- Innovation platforms that use open interfaces to attract an ecosystem. Primary organizations that use this model; Apple App Store, Windows, Salesforce

Gawer and Cusumano (2002, 2008) studied the arising of platforms in hardware and software industries in 1990 and 2000s. They investigated how companies like Intel and Microsoft switched to be a market directive power from a simple microprocessor producer or software innovator;

- Substructure of the platform intended to enable many companies to build subsidiary products, services and technologies, has been developed.
- Users have been connected with each other by being matched with producers.

Thus, a collective platform ecosystem that enables making innovations, has been formed (Gawer & Cusumano, 2002). Platform ecosystems have the ability to create new values and attract supply resources. Such as; If Iphone had stayed to be only a product platform, Apple could not have developed applications in this big numbers by using only its organizational resources. Instead, It has presented its product features to all innovators through open application programming interfaces (API). By this means, It has created a greater value in terms of quantity (number of application), speed (average time of product release) and content.

Briefly, success of this new business model is based on 2 basic principles.

- To Construct Successful Digital Platforms
- To Benefit from all Supplier and User Ecosystem

Platform centered business models have induced the reorganization of economical activities by especially resetting entry barriers and changing value-creation logic (Kenney & Zysman, 2016). A platform could create fundamental changes in an organization and even in whole industry. When we look at the present days, we see that several industries are carried out by the platforms.

Successful platforms increase the interactions between producers and consumers. They are well-rounded, and through them companies could reach a larger customer mass. This large and various advantages of the digital platforms have encouraged new and existing companies to head to platform-based business models. The companies that successfully benefit from advantages of platforms have gained important impression and market cap (Evans & Gawer, 2016).

While platform centered business models have many advantages, there are also some noteworthy points. They increase fierce of competition. There could be out of control developments in market. The competitors could show up with different industries. Every sudden a new platform could appear in the market and the existing ones could lose their advantages. Being aware of this, one should be open for constant change and progress.

Types of Platform Business Models

Usage types of digital platforms change according to organizations and markets. Boudreau and Lakhani (2009), have separated platform business models into three categories, considering with and to whom they would be sold: Integrator, product and two-sided platform.

In order to gain ground from a platform, managers should consider about which business model type would mean the most. In integrator platform model, the company consists of exterior improvements and sells final products to customers. In product platform model, external innovators build “over” platform and sell the obtained products to customers. Finally, in two-sided platform, external innovators and customers are free to transact with each other as long as they are committed to the platform owner.

P.C. Evans and A. Gawer (2016) specified 4 types of digital platforms according to their basic functions. These are; transaction platforms, innovation platforms, integrated platforms, investment platforms.

Classification in Terms of Seller-Developer-Buyer Relations

These classifications were made by Boudreau and Lakhani (2009);

- **Integrator Platform:** In integrator platform model, platform has been compressed between external innovators and customers. Platform owners have high control level over the platform. For example, Apple has located itself between iPhone software innovator and consumers. By this means, It could directly monitor and control customer’s transactions. It also takes %30 of acquired profits. The company forms the innovation by vetoing the applications that It considers as being “out of brand”. Besides, It uses iTunes Stores as a way to organize and “take up” the interaction with Iphone users.

Primary Examples of Integrator Platforms (Asadullah, Faik & Kankanhalli, 2018);

- Apple Inc. iPhone (application store)
- Spotify
- WordPress
- InnoCentive (scientific problem solving)
- Google Android (software development of operating system)
 - **Products Platforms:** In product platform, external innovators sell the products that they create directly to customers by going above the technology of the platform owner. Platform owner has less control over the platform model. In this model, platform owner could contract with external innovators to increase her/his control. Thus, It could interfere in technical design of the main technology. Although the platform owner is the processor of the main technology related with the product, external innovators are the ones that make the direct transactions with the users. In this model, external innovators are powerful in terms of determining the price and technical improvements related with technology.

Think about Gore-Tex, a waterproof and breathable fabric developed by W.L. Gore&Associates Inc. licensed core technology and the brand to make hundreds of products for more than 89 companies and various applications including outdoor, shoes and medical implants.

New Strategies for Evolution of Business Ecosystems

Similar to “Intel Inside” strategy for microprocessors of Intel Corp., Gore provides core technology (and rules for usage) and the licensee innovates in this platform and sells the application to the customers.

Primary examples of Product Platform (Asadullah, Faik & Kankanhalli, 2018);

- Wikipedia
- WeCash
- Cloud computing initiatives (Amazon. com Inc. and Google)
- Gore-Tex
- Google Android (hardware development)
 - **Two-Sided Platform:** In this model, external innovator and customers are dependent on the platform owner but are free to transact with each other. The platform simplifies the transactions and interactions between two parties. External innovators are free for product design, development and production. However, the platform owner could put small intervenes with some rules and regulations. For example, Widget is whole of the programs that transfers any data and information to the user, provides them extra functions and shapes user interface with a richer display. Facebook users could directly use the third party applications called widget that consists of a different technical substructure. In here, profit is determined by external innovators. But, these widget innovators have to keep the contract and rules applied by Facebook. Primary examples of Two-Sided Platforms (Asadullah, Faik & Kankanhalli, 2018);
- SAP
- Facebook
- eBay
- WeCash
- eKutir
- SocialHealth
- Taobao
- Twitter

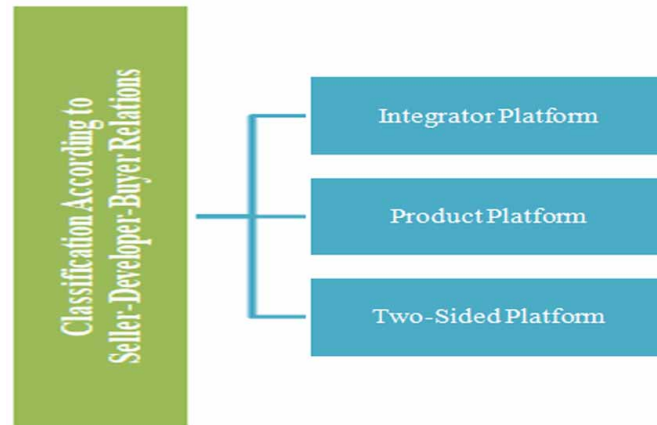
Two out of three platform business models could succeed in a market or society, but managers should remember that both is prone to the minimum control platforms. External innovators prefer autonomy, appreciation in design and direct access to customers; thus, distributed data, entreprising energy and initiative could be ideally applied. In a competitive market, innovators in search of profit could be especially careful to be locked to a platform that can change the rules of the play afterwards.

Classification in Terms of Main Functions

These classifications were made by Evans and Gawer (2016);

- **Transaction Platforms:** Transaction platforms act as intermediary, enable easy shopping or exist between various users, buyers or suppliers. For example: Uber, AirBnb
- **Innovation Platforms:** Used as basis of other companies (not in best way as integrated to innovation ecological system) to develop subsidiary technologies, products or services. Example: Alibaba

Figure 1. Classification of platforms according to seller-developer-buyer relations
Source: Boudreau & Lakhani, 2009



- **Integrated Platforms:** Integrated platforms are both transaction and innovation platforms. In this category, there are organizations like apple with app store platform, and innovators' big ecological innovative system that supports creating new content in this platform.
- **Investment Platforms:** Those consisted of organizations that develop platform portfolio strategy or act as active platform investors or both at the same time. Example: Santander.

Key Features of Platforms

- Platforms are expandable code basis in a software-based system. These code bases are shared by modules and interfaces. Predictability and efficiency of the platform are determined by this interfaces and modules (Tiwana, Konsynski & Bush, 2010).

Figure 2. Classification according to main functions
Source: Evans & Gawer, 2016

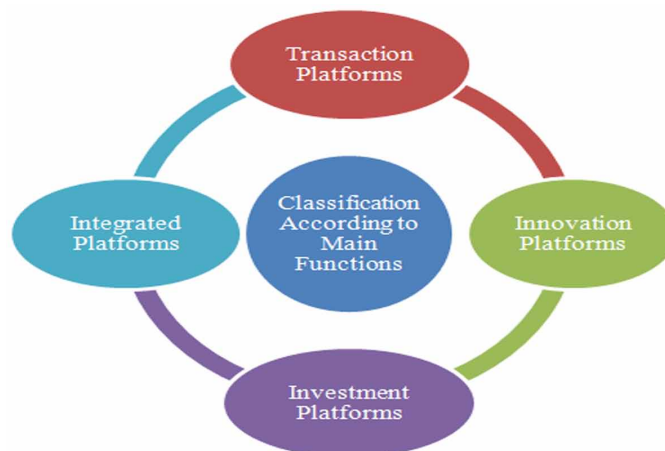
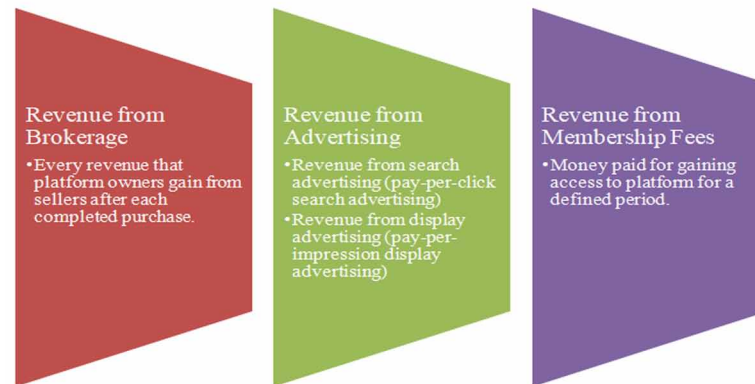


Figure 3. The main sources of income for platforms

Source: Chen, Fan & Li, 2016; Lee et al., 2018



- Every platform has its own architecture and design mechanism. To design the proper architecture and interfaces and their practicability is essential.
- To expand usage system in a platform, to connect or build over existing system should be easy.
- Platforms provide network exteriorities. Which means; as the number of user increases, efficiency and productivity increase in same level and create a higher value.
- User-based variable is mainly used for measuring the success of platforms. The higher number of a platform user is seen as an important metric for that platform's sustainability and success.
- Platform ecosystems are commercial markets that enable product and service transactions between different groups (Tan et al., 2015). Basilica actors of this ecosystem are platform owners, external innovators, suppliers and users and they are dependent on each other. Platform ecosystems have the ability to create new value and attract supply resources.
- Subsidiary innovations are required for the developments of the platforms. Though the platforms consist of certain registered factors, they are no longer under control of the producers as external innovators have contributons on them.

How to Generate Income From Platforms?

One of the fundamental factors for platforms to survive is their capability to generate income. There are three main sources of income for platforms.

- Revenue from Brokerage (Chen, Fan & Li, 2016)
- Revenue from Advertising (Chen, Fan & Li, 2016)
- Revenue from Membership Fees (Lambrecht et al., 2014; Lee et al., 2018).

Revenue From Brokerage

In brokerage model there are platform owners, sellers and buyers. Platform owners gain revenue for earch completed purchase from the sellers. eBay can be given as an example to this kind of platforms.

eBay, gains revenue from the sellers for both adding their products to the platform and residual costs. Residual costs vary depending on selling format and product category, including price and shipping costs. Individual buyers can use eBay platform for free, while sellers need to make payments for each transaction (Chen, Fan & Li, 2016).

Revenue From Advertising

In advertising model, sellers can take part in the platform for free. However, in order to be draw attention of potential buyers, they need to pay for additional advertising and promotion services. An example platform is Taobao. It is one of the popular online customer to customer platforms in China. While Taobao, provides free service to buyers, it also offers free basic platform service to sellers. On the other hand, sellers who aim to gain interest of buyers and benefit from data traffic can select some advertisement and promotion services. Taobao offers two list for buyers. In the first list, the sellers are listed for free, while in the on ther list is organized according to payments to reach potential customer (Chen, Fan & Li, 2016). The main source of income for Taoboa is the advertisement revenue gained from sellers.

A detailed analysis of advertisement revenue resulted in distinction of two main types. These are revenue from search advertising, revenue from display advertising (Lee et al., 2018).

- **Revenue From Search Advertising:** Platform owners provides keyword offer systems. This allows users to find the products that they are looking for easily. Sellers pay platform owners for these keywords to make their products more reachable. As buyers click on these keywords, sellers make payment to platform owners (Fang et al., 2015). This model is based on payment per click and no payment is needed initially. Among the platform companies that prefer this option, there are eBay's AdCommerc, Amazon's Topic Search Advertisements and Google's AdWords (Lee et al., 2018).
- **Revenue From Display Advertising:** Platform companies also use display advertising. In this model, sellers pay initially a determined fee according to advertisement option. The price in display advertisement depends on several factors. The week, day and time at which the advertisement is shown, its place on the web page and many other factors determine the price. The price is determined for a limited time and based on its impact on buyers, the price is updated. Among the examples to this type, there are TMall's Zuanzhan, Amazon's Visual Advertisements and Google's Displayed Advertisement Network (Lee et al., 2018).

Revenue From Membership Fees

Several platform companies ask for a fee to provide customers access to platform for a limited time. As an example, Netflix requires membership with a monthly fee. Sometimes, these platforms may offer the basic services for free and offer additional features with membership fee. For example, LinkedIn is a open platform for everyone. However, additional services such as being in the top places in search results, gaining interest of employers and accessing to the details of profile viewers requires upgrade to premium membership with a fee (Lee et al., 2018).

What Determines the Success and Failure of Platforms?

The high-level competitiveness in especially digital business models, the increasing number of competitors and rapid changes in technology obstruct platforms to be successful and to maintain this status. Therefore, platform owners should be careful about many factors to maintain their existences and should follow various strategies.

One of the most important elements that enable platforms to improve and grow is to build ecosystems, constructing partnerships with key shareholders. These strategic partnerships constructed enable platforms to expand.

The other important group that constitutes platform ecosystem is competitors. Platforms could learn strategies from competitor platform consumers (Ozer & Anderson, 2015). For example, this strategy is being used in Google's Android, Apple's iOS application developing platforms. These applications interact with competitor platform's users and innovator communities, and benefit from competitor's feedback systems.

For improvement of platforms, open policies should be performed in terms of suppliers, technology and users. Openness on suppliers' level means the ability of new suppliers joining the platform with boundary restrictions. Openness on technology level is that the platform could work with other platforms using different technologies, and is adaptable. Openness on user level, though, is to give permission for equal access of all potential users to the platform (Ondrus, Gannamaneni & Lyytinen, 2015). Openness enables platforms to increase their market potentials (Eisenmann, Parker & Van Alstyne, 2011). Example: Mobile payment platforms like Google Wallet and Mobipay increase their users and create positive network effects thanks to openness (Ondrus, Gannamaneni & Lyytinen, 2015).

One of the noteworthy and important elements in platform is to recognize platform potentials of the products. For instance, Apple's Macintosh personal computer was the leader when it was released to market. But, as the company did not open its architecture and software to improvers and licence holders, it could not turn to be a personal computer platform. Not all products can become a platform. Even if a product carries the platform potential, it should still follow two conditions for it.

- The product should fulfill an important function. General systems should be working efficient enough with this product or technology. For instance; Microsoft's Windows operating system and Intel's microprocessors were the basic platform components of original or coherent IBM personal computers.
- To expand the usage system, to connect and to build over the existing system should be easy. External companies could improve subsidiary products that are mutually workable. By this means, an ecosystem could be formed and network externalities could be benefited.

For digital platforms' maintaining their existence and improvement, a continuous growth in user-base is required (Huang *et al.* 2017). Digital platforms like Myspace, Surfbook and Orkut that could not keep up with change and growth, have lost their competitive edge (Agarwal *et al.* 2015). One of the most important reasons not to evolve is to copy mechanisms of platforms that are successful but not applicable in their own environment (Tiwana, 2013). Digital platforms of different types have different mechanisms and they need to consider different factors to evolve (Huang *et al.* 2017; Tiwana, Konsynski & Bush, 2010).

Evolving of the digital platforms is determined by 3 basic factors (Asadullah, Faik and Kankanhalli, 2018);

- **Platform Design:** Elements that form the design mechanisms of the platform are technical specifications, encouraging systems and boundary resources. When you want to design a platform, you are primarily required to determine your aim and your target group. Later, according to this aim and target group, you should realize the design. In platform designs, It is necessary to consider the reliability and financial or unfinancial effective motivators. Platforms designed in this way would enable the users to show internal and external motivations to join the platform (Feller et al., 2012). Consequently, platform would experience growth, having increased its attraction in view of existing or potential users (Feller et al., 2012). Interfaces and software improvement kits of platforms form boundary resources. Efficient management of the boundary resources could enable a platform to form an ecosystem, by improving the capacity of the platform. And the ecosystem obtained could help the platform to create value and be more productive (Skog, Wimelius & Sandberg, 2018). Apple iOS and Spotify could be listed as examples to this. Even if most boundary resources are dependent on the design of the platform owner, It is found on some studies that they could reach the same success in case they are recognized by the external participants. For instance, for improvements of WordPress platform, interfaces of external participants were found to be more efficient (Um & Yoo, 2016).
- **Platform Operations and Capabilities:** Platform transactions and capabilities consist of mechanisms related with internal transactions of the platform and capability of platform owner to support these. WeCash is one of the leading digital platforms in China. The platform applies 3 basic mechanism in order to increase user-base. These are data-based operation, rapid transformation and instant market release. Data-based operation is the analysis of big amount of datas collected in platform. By means of these analyses, innovation opportunities are discovered, and risks are foreseen. Rapid transformation is the capability of a platform to match its core digital technology with new business environments. Thus, It gets possible to have new users joined into the platform and to create value of a higher level. Instant market release means releasing innovations into market rapidly and being perpetual. Thanks to exemplary versions, platform owners could shorten the time between surfacing services and product ideas and benefiting from these ideas to improve the platform (Huang et al., 2017).

Using information technology-based resources with other resources and capabilities, organizing and distributing refer to the capability of an organization (Bharadwaj, 2000). Substructure of the platform, technical skills, planning, cost effective operation and leadership could be listed as examples to these kinds of capabilities. The improvement of these capabilities has critical importance for the improvement of digital platform. Platform owner's ability to use these capabilities in effective and efficient way contribute to the improvement of the platform.

- **Platform Ecosystem and Governance:** Platform ecosystem is the ecosystem that is formed by more than one shareholder around the platform. Governance, though, is to form the relations between shareholders in this ecosystem. In order for the platform to be successful and to maintain this, It is necessary to strategically consociate and thus create ecosystems. This both would provide the advantages of network exteriorities by increasing the number of users, and enable

cumulative progress together with the shareholders. The shareholders in this ecosystem would contribute to the improvement of one another and an innovative environment would be created. And these all would ensure platform's evolving, its quick response to market changes, its transformation and improvement. The primary shareholders of a platform are platform owner, external participants and users. Managing the relations between these is quite important for sustainability of platform ecosystem. For example, the studies have shown that the adoption of an equal income sharing model between platform and the third party participants has an important effect on the platform evolution (Tiwana, 2015).

PLATFORM LEADERSHIP

One of prominent subjects in platform literature is what improves an organization's platform leadership and how an organization could maintain its leadership position (Gawer & Cusumano, 2008). Leadership criteria could be decided using the elements like material return, customer value, market share. The most commonly used method is to focus on the number of users (Evans & Schmalensee, 2010; Lin et al., 2012). In order to obtain the platform leadership, researchers put emphasis on two aspects of the platforms (Lee et al., 2010);

- How the platform's technology core would be benefited
- How the platform network exteriority would be benefited

The ones focusing on technology core, create a high level of access barrier for potential competitors by establishing an inimitable and superior technology system. For instance, Intel makes big investment on microchip technology that hardens potential access to microprocessing platform. The ones benefiting from network exteriorities, though, focus on increasing number of users. They create motivations to attract network participants. Youtube, as an example, subsidizes the content providers by sharing advertising revenues.

If a platform leader worked with organizations with subsidiary product and services, It would be possible to have greater number of users adopted the platform. In this circumstance, an innovation "ecosystem" that is able to highly increase the value of platform innovations, could be created.

The main reason of organizations' being unable to be platform leaders, is that they could not succeed properly handling both technological and business side of platform leadership in their strategy. One of the biggest difficulties to be a platform leader is technological obstacles. To design proper architecture and interface has critical importance. The other essential subject is to create ecosystems. It is necessary to provide subsidiaries and external innovators chances to innovate.

Gawer and Cusumano (2008) proposed 2 basic approaches to be a platform leader and to maintain this;

- **Coring:** Mentions about the difficulties to create a platform that did not exist before. Primary question: How is a New Industry Platform Created?
- **Tipping:** Fights with the problem of how the platform wars could be won by forming market acceleration. Primary question: How could the Platform Wars be Won?

Though the advantages of being a platform are clear, not every market needs a platform leader. For example, in some big markets like video game consoles and web portals, several platform companies could continue with an exact single winner. Platforms, when especially it is not difficult for users to switch between more than one platform, could continue on certain gaps and segments.

Coring

Coring is motions of an organization intended to design a new product, technology or service, and make it basic element of a technological system. The elements that effect great part of the system and solve the problems, act as core for the system. Technologies aimed for platforms could be more effective than business strategies developed for shareholders and customers to have certain products and services adopted. Platform leader should create economical motivations to enable members of ecosystem to invest on creating subsidiary innovations and to keep doing so. Ones willing to be a platform leader should protect their capabilities to have financial gains from innovations as It is necessary for all innovative organizations.

One of the leading examples of coring strategy is Google. Google is focused on web searches. The company that started working as a simple search engine, has turned to be the leading web search engine of today by creating its own special searching technology. In this success, the solutions that It developed for both technology and business sides have effective roles. In technological side; It has developed solutions for technical problems related with advanced search and simplified connection and improvement by distributing Google technology to Web sites developers and users as embedded toolbar. Google has gained its platform leadership in websearch especially with the thing It did in business side. It has found how organizations could earn money by using Internet. It has associated the focused advertising with user searches. Advertisements are displayed only with certain searches; this means that users should be somehow dealing with the advertisers. Google has actually revolutionized in advertising by looking at the relations between advertisers and web users. It still maintains this strategy. It has increased the number of free online softwares that It offers from e-mail to word processing. Developers use Google application programming interfaces to place Google applications like search, maps and calendar into their Web sites, or to develop special search engines. Google bought out YouTube in 2006 and this is also a movement devoted to coring technology (Gawer & Cusumano, 2008).

Not every initiative to create platform with coring may turn out to be successful. WideSky of EMC Corp could be given as an example to this. EMC, one of the leading organizations in data storing, tried to present its hardware and software technology called WideSky as a common platform in sector at the beginning of 2000s. WideSky was a middleware layer that enabled third party hardwares to work as integrated and was solving an important technical problem for IT customers. It helped constantly growing structure of various different information systems to be together managed with important data bases. The company that made an improvement technologically proper for coring with WideSky, could not succeed in business side. It was unable to convince its competitors like IBM, Hewlett-Packard, Hitachi to use its system. The competitors developed their own shared platform based on open standards, and the common use of this new platform forced EMC to give up its own platform and use the same standards (Gawer & Cusumano, 2008).

Tipping

Tipping is motions devoted for organizations to win a platform competition by directing market dynamics. Tipping approaches could be based on sale, marketing, product development and consociating. As in Corning, It is also necessary to be successful in technology and business sides both in tipping.

In competitive situations, companies are required to licence their copyrights in largest scales possible, and to have partners and to invest for their innovative creations. Besides, platform leaders could also enable their technology, production and distribution services to expand by exhibiting themselves. Advantaged prices and financial motivations could also be considered. These supports could be provided to application developers and users. On the other hand, this kind of approaches that increases short-term profit may not be enough to keep the contributing developers permanently attached to the platform in long-term. Besides, serious discounts and free services could affect the business model of contributing shareholders in negative way by changing user expectations. For example; Intel, making such a mistake in video conference with computers, has caused many potential contributors to bankrupt and the idea of using computers for video conferences has been postponed (Gawer & Cusumano, 2008).

Another approach is to receive some technical features from similar markets and to expand the platform by presenting these all together. This approach is called as platform envelopment. For instance, while the company Palm was producing personel digital assistant products, It has added mobile phones, multimedia players and hand-held computers specifications to its platform. In response to this development, mobile phone manufacturers have added personel digital assistant, multimedia players and hand-held computers specifications into their products and thus come up with the concept of smart phones. By this means, both the existing market power increases, technology improves and the chances to go into different markets multiply.

Another approach is that competitors move together, consociate, and battle with the one willing to be new platform leader.

Immensely hiding technological copyrights could result with falling behind in situations that technology improves rapidly, and making different platform difficult to expand. On the other hand, being very open and sharing technological savings also carry the risk that competitors could imitate ideas and products. IBM did this mistake by sharing important informations of computer platform with Microsoft and Intel.

Linux is a successful example for platform tipping. As web server operating system, It has attractted programmers with its open resource code and rapidly improved and pervaded. Other reason for its pervading is its being free compared to the other options like solutions of Windows and Sun Microsystems. This quick growing had directed many companies, even the competitors like Windows, to give Linux support for their products (Gawer & Cusumano, 2008).

The biggest challenges in technology part are faced between technical standards and incompatible technologies. For big sized multimedia storing, Sony's Blue-ray Disc competition against Toshiba's HD DVD could be given as an example. In this kind of competitions, the winner is determined according to the one that general public chooses.

Platform Strategies

Types of Platform Strategies

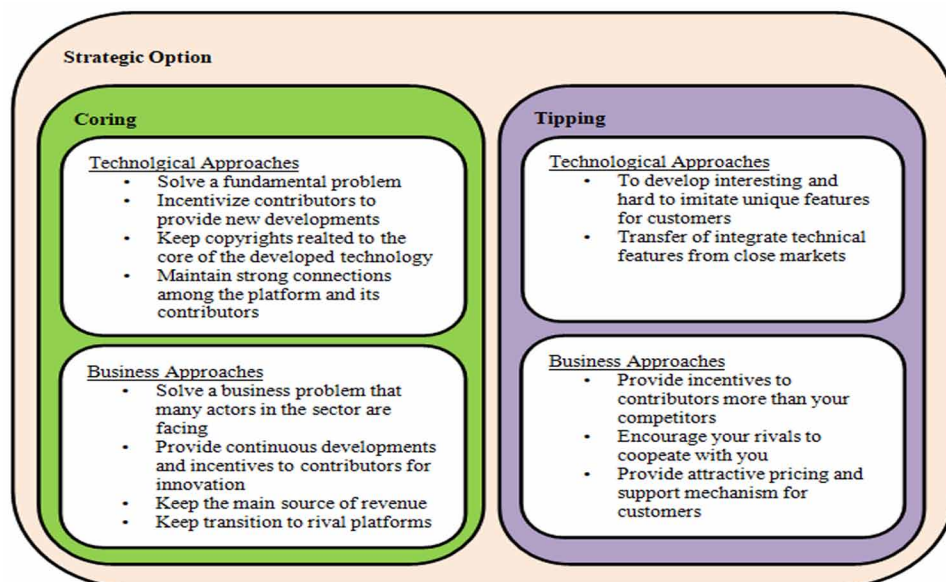
Pricing

Pricing strategy in platform ecosystems is very important and complicated. The mutual dependencies between platform participants and lifecycle of platform ecosystems, make the pricing-decisions extremely complicated (Rochet & Tirole, 2003; Parker & Van Alstyne, 2005). Size of customer base is one of the most important elements for platforms and this is highly affected from pricing-decision (McIntyre & Srinivasan, 2017). When the literature is analyzed, It is seen that the reason of some platforms' having a greater market share and many company's being unsuccessful is the pricing strategy (Eisenmann, Parker & Van Alstyne, 2006; Boudreau, 2012).

In order to increase customer base, platform owners could benefit from subventions. Subventions could include free information (Parker & Van Alstyne, 2005), certain performance features (Anderson, Parker & Tan, 2014), privileged access and technical support (Parker & Van Alstyne, 2005). Deciding on which side to support has critical importance for a platform's success. The elements to be considered in pricing;

- Market Price and Price Flexibility of the Demand
- Quality Sensibility
- Fungible or Subsidiary Relations between Applications
- Competition level in sector
- Price sensibility of customers in time

Figure 4. Strategic options for platform leader wannabes
Source: Gawer & Cusumano, 2008



New Strategies for Evolution of Business Ecosystems

- Industry dynamics
- Lifecycle of platform ecosystem

Platform owners should design pricing strategies in order to gain profit from existing customer base. They could apply fixed or changeable pricing strategies, penetration or skimming strategies (Gupta & Mela, 2008). The competition level in a company should also be considered in deciding for the pricing method. The most important factor that determines the efficiency of pricing strategy is price sensibility of customers in time (Valverde, Chakravorti & Fernández, 2016). When they are less sensible, platform company should initially use a penetration strategy and go for rate increases afterwards.

Platform owners could provide ambidexterity in pricing by domain and temporal separation. While a platform owner uses market on one side, It could explore the market on another. What is significant here is to decide which side would be discovered and which side should be used. Platform owners could discover an area that is more important for another party and could direct to the customer group on that area. These decisions change according to industries (Eisenmann, Parker & Van Alstyne, 2006). Microsoft asks for high prices from developers in return for core technology It offers in video console industry. But, keeping the video console prices under cost, It also discovers end-user market. And when It comes to PC industry, It requires zero royalty for developer's access. This fee that is not collected from developers, has been covered with charges over incremental cost received from customers for softwares.

Pricing decisions change through the lifecycle of a platform's ecosystem. To maintain their existence, platform owners should reach all the parties in platform ecosystem (Evans & Schmalensee, 2010). Therefore, platform owner should initially discover ecosystem base (here the base is all the participants and shareholders in ecosystem) and should decide on strategies to reach this base. Platform owner could apply penetration strategy at first stage to improve user base. Before all else, It could try to increase number of users by introducing low prices and could increase them in time (Gupta & Mela, 2008).

Openness

Platform ecosystems exhibit different levels of openness depending on the rules of participation (Eisenmann, Parker & Van Alstyne, 2009). Platform openness specifies the need for permission for outer access to platform or to build in platform (Tiwana, 2013).

In an open platform, third parties could reach to interfaces of some platform owners, and perform subsidiary innovations. For example, Microsoft allows software developers to access some parts of Windows source code. By this means, licenced software developers could create and distribute applications, using Windows source code without a confirmation process.

The situation of being close limits the number of third party in ecosystem. For example, console provider like Microsoft and Nintendo apply a strict permission process to ensure the high quality of its games.

Some platforms have lower level of openness. The platform owner is the decision giver for that platform's openness level. Owners could determine the degree of ecosystem participation and interactions. One of the elements that affects this decision is compatibility. To enable the features of a platform to be compatible with another, rules are applied for interfaces. Thus, that platforms get open for a greater number of mediator access.

With platform's being open to third parties, innovations could be discovered for whole ecosystem. Platform owners could benefit from third parties' innovations by sharing intellectual properties to improve the platform. And this situation could increase the innovation rate around the platform (Boudreau, 2010).

A platform could perform its openness strategies in 2 ways which are organizational and domain separation.

In organizational separation, platform owner should guarantee that there would be no jamming related with data traffic on platform after participants' entry (Gawer & Henderson, 2007). To ensure this, there could be a unit with the aim to increase the size and power of whole ecosystem. It should both use internal resources and capabilities, and benefit from capabilities of third parties. Here the platform owner should aim not only its own market share but also to enlarge the general market.

Domain separation refers that platform owners follow open strategies in some cases and close in another. While they could follow a close strategy to protect their dominance in an area, they could go for open strategies in area that they want to discover. This method is commonly used in technological platforms. For instance, video console manufacturers follow a close strategy for their consoles. Because, they are dominant in this area. However, again the same companies open their modules to licenced developers for game developing processes.

Integration

Platform owners could also go for vertical integration like normal organizations (Lee, 2013). When they struggle in attracting third parties, they generally direct to this strategy. In this strategy, owners produce subsidiary product and services by themselves (Hagiu & Spulber, 2013). This strategy is commonly used in game consoles, operating systems, e-commerce platforms (Marchand & Hennig-Thurau, 2013). Platforms that has properly built their ecosystems, sometimes use this strategy to also increase their growth and income (Zhu & Liu, 2015). For instance, Amazon could go for vertical integration by providing the products, popular and with high points, itself.

Platform owners could want to discover subsidiary markets while they are already going on their existing one. Here, the datas they collect from their own customers could enable them to produce proper products needed in subsidiary markets and lead them into an advantaged situation. Besides, they can also easily introduce these subsidiary products in their own platforms (Zhu & Liu, 2015).

Differentiation

Differentiation strategy could also be followed in platforms (Kind, Schjelderup & Stähler, 2013). This strategy could be tracked either in platform itself or in its ecosystem. Platforms use this strategy in order to overcome a late-comer disadvantage or to compete with a platform that is dominant on great part of the market.

Platforms could apply this strategy in different ways: to improve platform's main features and to offer a high-quality product (Sridhar, Mantrala & Naik, 2011). For example, the circumstances in video console industry is being enhanced day by day for both users and developers, a higher quality is attained (Zhu, 2012). Platform owners could also choose applying the differentiation in a part of ecosystem to search for new resources and capabilities. Such as; they could use trial versions for potential market (Gallaughar & Wang, 2002), basic versions for new beginners and premium versions for experts (Bhargava & Choudhary)

Envelopment

Envelopment means that a platform provider enters into another platform market, combines its functions and reaches to customers in many platforms. This strategy could provide the platform owner with competitive edge and improvement. Envelopment is an alternative method used to access platform markets that are difficult to be reached due to network effects and high transfer costs. While envelopment complicates aimed platform provider to reach its customers, It benefits from economy of scale between offer and demand (Eisenmann, Parker & Van Alstyne, 2011). Envelopment strategies are commonly used by digital platforms. A platform owner, by going for new platform markets, expanding its business content out of industry, could build dynamic ecosystems.

Envelopment strategy is applied not only by combining two different platforms. Using so called platform's existing resources and capabilities, interfaces could be designed and thus an independent platform could be developed.

Some organizations could use an existing platform's specifications and users in order to build its own platform successfully. For example; Airbnb platform started as integrated to Craigslist. eBay platform used PayPal, while payment service Square started with iPhone and Android platforms (Wan et al., 2017).

The prominent elements in platform envelopment strategy are as the following (Eisenmann, Parker & Van Alstyne, 2011);

- Platform providers could have advantages by improving customer mass with network effects.
- Offensive platform uses the user group in its own platform to enter into other platform market which requires a great number of user mass.
- An offense that obtains a user group in two-sided networks, usually succeeds in getting the other user groups. For this reasons, user mass is valuable resources for platform providers.
- Governing process of platform envelopment could be seen as a dynamic capability.
- Companies like Microsoft, Apple, Google often use envelopment strategy. It is considered that these companies, when they enter into a new platform, strengthen envelopment processes by building strategic routines like improving the coordination between units.

When the examples of envelopment strategies are analyzed, 3 basic conclusions are observed (Eisenmann, Parker and Van Alstyne, 2011).

1. Aim could be substantially or completely replaced. For example;
 - a. Windows Explorer / Netscape (Web browser)
 - b. Windows Media Player / RealPlayer (Multimedia player)
2. Platform is accessed but aim could sustain its position. For example;
 - a. Google Checkout / PayPal (Online payment)
 - b. Google Chrome / Internet Explorer (Web browser)
 - c. Google Android / iPhone iOS (Mobile operating system)
 - d. Apple Safari/Internet Explorer
3. Platform could not be accessed or could not have a sufficient place. For example;
 - a. Nokia N-Gage / Gameboy
 - b. Google Buzz /Twitter
 - c. Google Knol / Wikipedia

- d. Google Orkut/Facebook

Managing Platform Strategies

Managing platforms and their users have critical importance for platform's success. Eaton and others (2015) studied iOS platform and its application offers. It is found out that iOS encourages certain offer types and limits the others, and provides a higher customer satisfaction than Apple itself.

Platform strategies should be changed depending on transforming conditions. A platform strategy that is useful for a company today could lose its significance tomorrow. One of the best strategies is to combine different platform strategies. But, this requires an integral approach and is quite difficult. Therefore, most of the companies focus on only one strategy (Peitz & Valletti, 2008).

Any change in platform strategy could affect value and price of presented product and services. Applying a different platform strategy could require following a different pricing strategy. Platform owners should look at the incomes of different strategies. Efficient and compatible strategies both ensure success in present platform and could be subsidiary for the areas that are willed to be discovered. In some cases, It could be necessary to combine the platforms and follow a different strategy and pricing on each of them.

The results of platform strategies affect the demanding and offering side, both. The demanding side is consisted of more than one agent like users, external innovators and shareholders. It affects user's homogeneity, pricing, differentiation and openness. Multiple roles of actors in demanding side are important for platform ecosystem sustainability. In a strategy on demanding side, repositioning and cost-cutting could be used (Danneels, 2004). Repositioning depends on external demand. In cases where repositioning is difficult to be applied, companies could follow cost-cutting strategy (Robbins & Pearce 1992).

In offering side, the relation between supplier and platform consist of both competition and cooperation. The platforms that are active in multiple markets could benefit from network values of many suppliers, innovations in technology and product platforms. Suppliers, though, could expand the limits of their own business by using capabilities and resources of platforms. On the other hand, both sides could also be competitors for each other. While platform owners could directly compete with suppliers by passing to subsidiary markets, the suppliers could threaten the position of platform owner by creating a new platform (Li, 2009). The important thing here is to successfully balance competition and cooperation.

One of the prominent trends is to try transforming the demanding users to offering ones. By this means, It is considered that a higher value could be created.

EMERGING TRENDS AND FUTURE RESEARCH DIRECTIONS

It is observed that the existing literature mainly focuses on product-based platforms. Service side of the platforms should also be examined (Suarez ve Cusumano, 2009; Gawer 2011). In future studies, the structure, dynamics and operating way of service platforms should be investigated with examples.

The factors that affect behaviors of platform users should be studied. And effect of elements like subsidiary products, service innovations, B2C communication, third party innovations to human behavior should also be researched.

Success of platform business models highly depends on the number of participants. Apart from this, studies on measuring methods for platform business models success should be carried out.

Quality is an important issue for platforms. But, there are not many studies on quality side of a platform. Price control and access limits applied by the platforms should be examined to find out how they affect the quality (Economides and Hermalin, 2015). What activates providers in a platform to renew quality services and how platform qualities could be managed, should be researched.

Platform Envelopment is also a promising subject in this area and there are few studies on it. The offensive strategies that the aimed could be used, and organizational obstacles of envelopment strategy should be examined.

Different pricing combinations to be used in different platform strategies are also another research subjects.

CONCLUSION

With digitalization and daily increasing new technologies, the dynamics of business world and the working ways have also changed. Almost all of the fastest growing giant companies of today are using platform business models and earns most of their incomes also from these platforms. Platform's present success has ensured adoption of it by many companies. Today almost in all sectors, business model is being used.

Despite of successful examples of platforms, there are also ones that failed or were not adopted enough. The competition is very high in platforms and as there is no entry barrier, new companies could easily reach the platform. Platforms have their own core technology and architecture and when this is properly designed, the company could have distinctive competency. However, in order to constantly improve this, It should open its core technology and architecture to external innovators. On the other hand, It should also protect it from getting imitated. It is important to build ecosystems in platform business models, this means participations of many players into the game. The elements that provide success for a platform could turn out to be inefficient for another. A platform leading company of today might not maintain this tomorrow. To overcome all of these problems, It is necessary to use platform strategies. In this study, 5 strategies as platform strategies have been focused. These are: Pricing, Openness, Integration, Differentiation and Envelopment. These strategies should be governed with well rounded analysis of many elements.

In this study, first of all, a conceptual frame has been formed about platforms and business models, and later platform strategies and governance have been told. We think that well understanding these dynamics would give a way to promising research areas, improving the subject in academical literature, and that It contains important findings for implementers of business world.

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KEY TERMS AND DEFINITIONS

Business Ecosystems: A strategic business model formed by stakeholders such as companies, suppliers, rivals, customers, and technology provide for various reasons such as to create high value, improve processes and increase growth and sustainability.

External Innovators: The external developers that provide support to companies for the development of a product, service or process.

Interfaces: The rules and specifications that determine the way the platform and its modules interact with each other and exchange information.

Modules: An add-on software subsystem that add new functions to the platform.

Network Exteriorities: As the number of user increases, efficiency and productivity increase in same level and create a higher value.

Platform: Technologies, products, or services that create value primarily interacting directly between two or more customers or participant groups.

Platform Architecture: A conceptual blueprint that shows the way ecosystem is divided into rather more stable platforms, supported by various complementary modules and design rules for their interconnected operation.

Platform Ecosystems: Commercial markets that enable product and service transactions between different groups.

Platform Leadership: The process that platforms gain power to direct market and become leader.

Software-Based System: A computer system that is based on intercommunication of components through software (hardware and software combination).

Chapter 6

Platform Strategy for New Product Development: The Mediating Effect of Product Platform Strategy in the Korean High Technology Industry

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ABSTRACT

This chapter proves the mediating effect of product platform strategies on the relationship between a firm's subject, environment, and resources and the performance of new product development in the perspective of platform leadership. The author analyzed the mediating role of product platform strategy by considering CEO propensity, competition and customers, and competitiveness of retained resources. Compared to the past, in the perspective of platform leadership, the product platform strategy has a critical effect on the relationship between the business scope of a platform leader, the external relationship with complementors, and the internal organization of a platform leader impact on the performance of new product development. As a result of hierarchical regression analysis with the data of Korean high technology companies, the product platform strategy would be mediating the relationship between the antecedents such as CEO propensity, competition and customers, and competitiveness of retained resources and NPD performance.

INTRODUCTION

Who has the highest company value in the high technology industry? What are the strategically competitive advantages for industry leaders? Are they own specific platforms? How do their platform effect on their new product development?

Nowadays, there are exploding number of new technology and products and increasing customer demands in many industries. Especially, current industry situation tells us the platform strategy as one of

DOI: 10.4018/978-1-7998-1125-1.ch006

the key determinants of success for today's high-technology companies. Many platform leaders such as Apple, Google, Samsung, etc. focus on the new product development as a growth strategy. For this, high technology companies should use product platform strategy for competitiveness, profitability, and growth.

Couple of decades ago, information technology as an industry platform has started to be discussed by Cusumano and several researchers. In the perspective of platform, Cusumano and Gawer (2002) proposed scope of the firm, external relationships with the complementors, internal organization, and platform technology as the determinants of platform leadership. This industry platform provides the concept of complementarity that the marginal profit of an activity is impacted by other activities, assets and activities. Complementors participate in the market cooperatively and are the subjects producing complements (Turnbull & Djoundourian 2003; Kubartz, Lu & Roeder, 2001; Tiwana 2008) such as customers, suppliers, and alliance partners (Cusumano & Gawer 2002).

This article investigates whether (1) CEO propensity, (2) competition and customers, and (3) competitiveness of retained resources leads to the improved product development performance. Especially, in the perspective of platform leadership, I intend to prove the mediating role of product platform strategy for the relationship between the above antecedents and NPD performance of the high technology companies. Even though new product development has been studied for a long time, very few studies on new product development related to product platform has been studied as a new paradigm on new product development in the high technology industry.

BACKGROUND

Product Platform

Product platforms can be defined as something concrete and abstract (Ku, 2010a; Robertson & Ulrich, 1998) in diverse sectors including geography, military, industry, business, technology, and so on (Ku, 2011). Additionally, many people have been focusing on the definitions of platforms by explaining product itself (McGrath, 1995; Meyer & Utterback, 1993), whereas nowadays other people are trying to develop the platform concept regarding a firm's value chain (Sawhney, 1998).

The dictionary meaning of platform is the physical surface to support objects and secure stability and view. More specifically, it can be expressed as physical platform, social platform, platform in geology, product platform, and computing platform. First, physical platform can be expressed as railway platform, jumping platform, and shoes with thick plate. Also, social platform includes political platform as policy principle and military competences. Next is geological platform. Platform cover is the collection of sediment on the upper part of craton which is the stable area after the earth's crust. Continental platform is the sea area with low water level on the side of a continent.

Product platform has been studied in existing researches on business administration. The dictionary meanings of product platform are oil platform as a structure for oil production and automotive platform as a set of components and a technology infrastructure which technologies and processes are embodied. Computing platform is an on/off-line structure for functioning applications. This chapter is to study product platform and computing platform as research targets.

Except the above platform types, the platform regarding core of assets has been studied in many researches. Asset platform is divided and defined as process platform, customer platform, brand platform, and global platform (Sanderson & Uzumeri, 1995). Process platform refers to the specific set-up

of the production system to produce easily the desired variety of products. A well-developed production system includes flexible equipment, for example programmable automation or robots, computerized scheduling, flexible supply chains, and carefully designed inventory systems. Customer platform is the customer segment that a firm chooses as its first point of entry into a new market. Brand platform is the core of a specific brand system. It can either be the corporate brand (e.g. Philips, Toyota, Campbell) or a product brand (e.g., Pampers, Organics, Nivea). Global platform is the core standardized offering of a globally rolled-out product.

Particularly, the definition of a platform has been studied in product development and production management (Wheelwright & Clark, 1992; Meyer & Utterback, 1993; Meyer & Lehner, 1997).

Product platform describes the physical implementation of a technical design, which serves as the base architecture for a series of derivative products. Product platform can be the collection of common elements, especially the underlying core technology that is implemented and used across a range of products (Meyer & Utterback, 1993). There are several ways of expressing the platform concept: a sketch or a rough three-dimensional model or a brief textual description.

A platform can be seen from a strategic, technical, or organizational perspective. A broad definition of a product platform can be a relatively large set of product components that are physically connected as a stable sub-assembly and are common to different models (Meyer & Lehnerd, 1997). However, companies define the platform differently compared to researchers (Clark & Fujimoto, 1991; Muffatto & Roveda, 2002; Ulrich & Eppinger, 1995). According to Meyer and Lehnerd (1997), the potential benefits of the platform approach are reduced development and manufacturing costs, reduced product development lead times, reduced systemic complexity, better learning across projects, and improved ability to update products. In the automotive industry, different models in a family are obtained simply through scaling up and down (in the sense of a physical dimensional scale) a basic model, meaning that the remainder of the product family quickly follows (Muffatto & Roveda, 2002). One basic idea behind using product platforms is that the product technology already used has demonstrated its usefulness in meeting customer needs in the marketplace (Ulrich & Eppinger, 1995). This means that the company can assume the technology will also be useful in the related markets for related products. Hence, developing a product that is based on existing technology is much simpler than if the technology were developed from scratch (Ulrich & Eppinger, 1995). Problems occur, however, when introducing a new technical solution with a longer development lead-time than the lead-time for the product platform (Clark & Fujimoto, 1991). Advanced technologies are still under development when work begins on the new product based on the platform. This makes linking new technology to future product platform concepts and keeping product managers updated on the results of advanced engineering work difficult (Muffatto & Roveda, 2002).

Platform strategy is the critical research result in production stage. A platform in the automotive industry is defined for production processes, not for product development. From this, similar product models can be easily assembled through same production processes (Wilhelm, 1997). Modulization in the production processes is to innovate the industry based on integrated products.

A platform definition can be explained in the perspective of multi-products (Clark and Fujimoto, 1991; Uzumeri & Sanderson, 1995). This defines as the product family which can explain niche target segments (Meyer & Utterback, 1993).

In the perspective of technology, a platform is similar to a product module and a product architecture in concept. A product architecture is the physical blocks arranged and composed by functional factors (Ulrich & Eppinger, 1995).

A module as a sub-system is explained as the component group (Baldwin & Clark, 1997; Wilhelm, 1997). Modulization provides several benefits including securing product diversity, limited component penetration, reduced processing time, and improved productivity and quality by automation.

In the perspective of organization structure, a platform can provide the plan for cross-functional organization in product development to integrate product components. This integration can limit the decision-making regarding technology or market.

In the past, some researchers have studied a product platform to explain strategic management theories such as product development, technology development, diversification, and vertical integration. Product family, platforms and developed products are not used as synonyms. Therefore, product family means product portfolio sharing identical assets. A platform is not an individual product and product family.

Shrinking product life cycles, increasing competition, rapidly changing technologies, and changing customer needs are some of the forces that drive innovative product development. For this, nowadays we are considering a product platform to develop new products in digital convergence era.

Halman, Hofer, and Vuure (2003) described product platform as the common basis of all individual products within a product family. McGrath (1995) described it as a set of subsystems and interfaces that form a common structure from which a stream of related products can be developed and produced efficiently. Baldwin and Clark (1997, 1999) defined product platform as follows: (1) modular architecture, (2) the interfaces (the scheme by which the modules interact and communicate), and (3) the standards (the design rules to which the modules conform). Tatikonda (1999) studied product platform as a family product derived from one central product design. Wheelright and Clark (1992) also expressed new platform and derivative products. Krishnan and Gupta (2001) described product platform as component and subsystem assets shared across family products. Robertson and Ulrich (1998) also described it as intellectual and material assets shared across family products. Economides and Katsamakas (2006) researched technology platforms as the hubs of the value chains in the technology industries - Microsoft's Windows, Intel's Processors, and Sony's PlayStation.

Finally, I would like to define the product platform in this research as (1) a firm's core product, (2) a common basic product within family products, (3) a product possibly generating derivative products, (4) the hub in the value chain in high technology industry, and (5) a product retaining technology platform (Ku, 2010a; 2010b; Ku, 2011; Ku & Cho, 2011).

Establishing competitive product platform strategy generates benefits such as (1) the multiple interfaces with end-users, (2) the lock-in (Witt, 1997; Hayes, 2007; Zauberman, 2003) of customers and stakeholders, (3) the network externality (Kim, 2002; Srinivasan, et.al., 2004; Chun & Hann, 2008; Wang, et.al., 2008; Kikuchi, 2007), and (4) the keystone advantage (Iansiti, 2007; Iansiti & Levien, 2004).

Meyer and Lehnerd (1997) proposed a framework for product family development. This framework represents a single product with a product platform followed by the product platform with derivative product development. The alternative is to express a nonmonopolithic or modular approach to platform development. A third principle of a product platform is that a new platform should have the capability to address new markets which may provide new business opportunities. A fourth principle of a product platform is that common product architecture, subsystems, and interfaces all have within them deeper insights, technologies, and processes that are the crown jewels of the corporation. The last principle of a product platform is that a single platform product family is advantageous of simplicity but may lose market share in high-end market niches or waste capital investment in low-end niches (Dai & Scott, 2004). Multiple platform design offers opportunities to generate more efficient and effective product families.

Platform-Based New Product Development

New product development (NPD) is a process of linking technologies and customers (Dougherty, 1995). On the demand side, customers need to seek certain benefits of products. On the supply side, firms provide certain benefits by applying their technologies and products.

The product development literatures have examined the determinants of new product success (Cooper, 1979; 1980; Montoya-Weiss & Calantone, 1994). These studies identified a positive impact of synergy between a firm and projects on the performance of new product development (Cooper & de Brentani, 1991; Cooper & Kleinschmidt, 1993; Song & Parry, 1997; Zirger & Maidique, 1990). In other words, new products would be more successful when they closely fit a firm's competences.

A firm can gain market leadership by marketing new products to achieve growth and profitability (Iansiti, 1995). A company can also well understand customer's needs and achieve improving responsiveness to the market (Day, 1999).

To judge the viability of a new product, a company should understand two main dimensions: technological assessment and market assessment. Technological assessment involves judging the technological feasibility of the product. Market assessment involves judging the market potential of the product.

The previous researches have not considered the reverse relationship between product innovation and competence. In other words, a company should understand the effect of new product development on its competences. It needs the key market related and technically related resources to accomplish the performance goals (Danneels & Kleinschmidt, 2001; Mitchell, 1992; Moorman & Slotegraaf, 1999). Generally, new product development requires the competences relating to technology and customers. These two types of competences for new product development composed of two dimensions such as new and existing technological competences and new types of customer competence.

The firm competences regarding customer and technology are reciprocally related with the tangible and intangible resources. The firm gains customer competence by serving benefits to certain customers. Customer competence is composed of such market-related resources as: knowledge of customer needs, preferences, and purchasing behaviors, distribution and sales channels to customers, brand reputation, and communication channels for exchange of information between the firm and customers during development and commercialization of new products.

Successful technology commercialization for new product development has multi-aspects including: (1) utilizing it for developing a large number of new products and process technologies (Zahra & Covin, 1993); (2) developing radically new products (Zahra, 1996); (3) introducing new products to the market (Stevens, Burley, & Divine, 1999); and (4) creating new knowledge (Leonard-Barton, 1995).

A firm introduces new products and technologies with more speedy technology commercialization than its competitors. This propensity of a firm attacks its competitors, reduce costs, improve quality, absorb new technologies, expedite learning from customers (Eisenhardt, 1990; Iansiti, 1995), and improve new market performance (Calantone, Vickery, & Droge, 1995).

These examples of previous researches have limitations on the role of new product development for firm innovation. In the resource-based view, core capabilities paradoxically enable and impede product innovation (Leonard-Barton, 1992). Core capabilities expedited project development aligned with those capabilities. Generally, core capabilities have the attributes such as employee knowledge and skills, administrative systems, technical systems, and values and norms. However, the projects with insufficient attributes were constrained. Leonard-Barton (1992) argued that firms have difficulties in utilizing and

maintaining their capabilities, and yet avoiding their dysfunctional effect by continuously renewing and replacing them.

Product development is a dynamic capability of the firm due to resource reconfiguration (Eisenhardt & Martin, 2000). The product development can be one of the mechanisms by which firms create, integrate, recombine, and shed resources.

Regarding modular product platforms, we can have two approaches to design platform-based product family. One approach is to design scalable product family based on platform to the expanding or shrink way. It should be matching with marketing objectives, especially for satisfying various customer needs to retain existing customers and acquire new customers (Simpson et al., 2001). The other approach is to design product family for configuration to rearrange functional modules (Du et al., 2001; Ulrich, 1995).

Simpson et al. (2001) firstly proposed the scalable approach.

Platform selection determines design parameters to take common values. To do this, its optimization requires scalable variables for platform selection (Akundi, Simpson, & Reed, 2005; Dai & Scott, 2004).

It should be required to have the subsequent task to determine the optimal values of valuables for the performance.

Modular product architecture can lead the configurational approach in product family platform (Ku, 2011). Ulrich (1995) explains that the modular product architecture allows each product element to be changed independently only for the corresponding component. This can develop customized products from standard ones.

Competitors and Complementors

We need to understand technological discontinuity before discussing complementary assets. Technological discontinuity means dramatic technological advance which cannot be comparable with existing technologies. Complementary assets play a role in the commercialization of technological discontinuity (Teece, 1986). Milgrom and Roberts (1995) defined “complementary” that if the marginal profit of an activity is impacted by other activities, assets and activities are complementary. That is, these two activities are complementary when the marginal profit of an activity is increased by other increased activities. Therefore, complementary assets are defined as the collection of assets complementary to a platform driving an innovation.

In corporate strategic view, the factors to drive industry competition are customers, suppliers, substitutes, and potential entrants (Porter, 1980). Potential entrants and substitutes have competitive propensity and customers and suppliers do cooperative propensity.

Also, complementors participate in the market cooperatively and are the subjects producing complements (Turnbull & Djoindourian, 1993; Aoki, 1998; Kubartz, Lutke & Roeder, 2001; Mellewigt, Madhok & Weibel, 2007; Tiwana, 2008) such as customers, suppliers, and alliance partners (Cusumano & Gawer, 2002). In open networks, users can be developers as complementors and develop applications as complements by utilizing source codes.

In this chapter, complementors would be suppliers who provide complementary products for end products and customers who produce purchasing information by using open platforms. The balanced act between competition and cooperation becomes more critical, as the roles of platform leaders, suppliers, and customers are redundant by the appearance of a mobile platform market.

Platform Leadership

Cusumano and Gawer (2002) proposed scope of a firm, external relationships with complementors, internal organization, and platform technology as the determinants of platform leadership. First, scope of the firm is defined as the adjustment of internal jobs and jobs from external complementors. For this, it is important to build capabilities to create complements. That is, product platforms require complements to create more values and platform leaders should promote business ecosystems for platform leaders and complementors.

Second, customers, suppliers and business partners as external cooperative stakeholders can form competitive or cooperative relationships with platform leaders. Therefore, platform leaders should build capabilities for the balance between cooperation and competition.

Third, internal organization of a platform leader is also important to resolve internal and external conflicts. Platform leaders should resolve conflicts by organizing internally, setting the goals of internal processes, and acquiring the agreements from external complementors. Their senior executives should arbitrate when conflicts arise among company units — and to foster an organizational culture that encourages debate and tolerates ambiguity. Their management should understand that platforms are complex systems calling for neutral industry brokers to oversee development of the system through external collaboration.

According to Spekman and Davis (2004), cooperative relations can be a source of competitive advantage for firms, industries, regions and nations. Stabell and Fjeldstad (1998) proposed a firm has many formal and informal groups of people and organization units for interdependent activities that co-produce value. Networking and coordination of many groups' effects firm performance (Luo et al. 2006; Hakansson & Snehota 1995; Rulke & Galaskiewicz 2000; Smith et al. 1995). The value of networking among firm groups has been highlighted (Wilkinson 2008; Xu & Beamon 2006; Mattsson 1997; Morgan & Hunt 1994). Prior research has analyzed the role of cooperation in business and identified its effect on firm and network performance.

In general, firm performance can be evaluated for individual firms' improvement, not the performance of networks of firms in industry value chains. It explains especially about behavior, resources, capabilities and orientations of individual firms and their managers in the firm relation and networks. Industry policies focus on rewarding and accelerating the performance of individual firms rather than interrelated networks and industries (Porter 1990; Wilkinson et al. 2000).

In the perspective of platform leadership, as networking and coordination in any industry value chain, the cooperation between platform leaders and complementors would affect their individual firm performance and the value creation of business ecosystems. I need to identify whether the cooperation in business ecosystems under platform leadership would be more critical than in standalone industry value chain.

Three closely related issues particularly concerned the platform leadership. First, even successful platform leaders can fall prey to problems that arise from too much of a platform centric mentality. There are other ways to compete. Second, platform leaders can become so tied to certain technologies that they find it difficult to evolve their platforms. Evolution is often important to long-term survival. And third, there may be some confusion as to whether market leadership is a necessary precondition for platform leadership.

Past researches have been insufficient to study the determinants on the performance of new product and business development.

Figure 1. Research model



The determinants on organizational innovation discussed in the past researches include inter-organizational factors such as specialty, functional differentiation, expertise, centralization, management behaviors, technologies, knowledge, financial resources, and communications and external factors such as competitiveness.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

This statistical study is to prove the mediating effect of product platform strategies on the relationship between a firm's subject, environment and resources and the performance of new product development. Antecedents regarding a firm's subject, environment and resources are composed of 8 independent variables driven from principle factor analysis.

Past researches on product development have showed the impact of new product development by identifying synergy between a firm and projects on the performance (Cooper & de Brentani; 1991, Cooper & Kleinschmidt, 1993; Song & Parry, 1997; Zirger & Maidique, 1990). However, these researches focused on how new products are closely fit to firm competences.

Even though we have known the product platform in the information and communications industry, we should consider the new change of product platform due to web 2.0 and platform openness.

Cusumano and Gawer (2002) asserted the platform leadership which platform leaders driving the development of derivative products make complementors create more values by utilizing the platforms. The platform leadership contains scope of the firm, external relationships with the complementors, internal organization, and platform technology. Also, in the perspective of platform leadership, business ecosystem is very critical to maximize transaction opportunities.

In platform leadership, scope of the firm is related to its subject. Determining the scope of the company - that is, which complements to make in-house and which to leave to external companies - is probably the most important decision. Its management and CEO need to determine how to increase demand for their platform. Top managements of platform producers should not develop their own complements as new products if they lack the technical, organizational or financial capabilities to compete in the relevant markets.

External relationships with the complementors are related to the environment of the firm. To be effective over the long term, platform leaders need to pursue two objectives simultaneously. First, they must seek consensus among key complementors about what technical specifications and standards will make new platforms work with other products. Second, they must influence partners' decisions affecting how

well everything works together through new product generations. Specific management processes can help a platform leader achieve consensus and maintain control at the same time. Platform leaders should build reputations for not stepping out of their new product boundaries into complementors' business areas.

Additionally, internal organization is related to the resource of the firm. A platform producer must create an internal organization that allows it to manage relationships with complementors effectively. It is vital to communicate the multiple goals to the whole company and create a process for resolving conflicts. It keeps groups with different goals separate so that outside companies can more easily entrust Intel people with confidential information.

Therefore, compared to the past, in the perspective of platform leadership, the product platform strategy has a critical effect on the relationship between a firm's subject, environment and resource impact on the performance of new product development.

Hypothesis One: The product platform strategy is positively influential on the performance of new product development.

Hypothesis Two: A firm's subject, -environment and resource are positively influential on the product platform strategy.

Hypothesis Three: A firm's subject, -environment and resource is positively influential on the performance of new product development.

Hypothesis Four: The product platform strategy is mediating on the relationship between a firm's subject, -environment and resource and the performance of new product development.

Methodology

Testing the Mediating Effect

Shrinking product life cycles, increasing competition, I refer to the model by analyzing the mediating effect. The mediator, product platform strategy is regressed on independent variables such as CEO propensity, competition and customers, and competitiveness of retained resources. And, the dependent variable, performance of NPD is regressed on independent variables and the mediator. The mediator should be activated for the relationship between the antecedents and the dependent variable. In addition, I need to consider the paths from the interaction to the mediator and to the dependent variable. I explain the meaning of mediation with three requirements such as the direct impact of the independent variable, the mediator, and the relationship between independent variable and the mediator. To test for mediation, I estimate the three works including regressing the mediator on the independent variable, regressing the dependent variable on the independent variable, and finally, regressing the dependent variable on both the independent variable and on the mediator.

To establish mediation hypothesis, the followings are satisfied: First, the independent variable must affect the mediator; second, the independent variable must affect the dependent variable; and third, the mediator must affect the dependent variable. Here, mediation would be completed if the independent variable has no effect when the mediator is controlled.

Sample

The population of this study is high technology companies out of 1,000 top companies listed on the Korea Chamber of Commerce & Industry. For an empirical test, I selected sample companies by revenue size and network IT value chain structure. First, I selected high technology companies that raised over 200 million USD of revenue in 2012. Second, the firms were selected from an individual business sector such as component, hardware, software, network, access and content & service in network IT value chain. The other companies who rose below 200 million USD of revenue would be inappropriate to compare each other because the mechanism factors inside of the companies might have too much high variation. The number of sample companies from the individual business sector in network IT value chain is as follows.

The number of sample companies is 8 from network, 22 from hardware, 10 from software, 4 from network, 11 from access, and 16 from content & service sector. The total sample cases are 71, and in 'MECE' are 60 companies. Among 60 companies, 31 companies responded to the survey for this research.

Questionnaire Design

The major data collection tool is survey using logical questionnaire structure. To design the questionnaire, I conducted interviews with the most prominent experts in high technology industry, and carefully examined the past literature.

The questionnaires are composed of 10 groups such as general situation, NPD performance, strategic directions, management environment, NPD capabilities, product platform strategy, digital functional convergence, firm profiles, and contact information.

Especially, the questionnaires regarding NPD performance are related to planning objectives, revenue enhancement, market share increase, business domain expansion, technology improvement, and competitiveness of NPD. The questionnaires regarding product platform strategy are related to customer lock-in, early mover advantage, and market leading status.

Variables

Each of subject, environment, and resources can have the effect of increasing or decreasing a firm's NPD performance. Aggregating the outcomes of these factors can make it very difficult to examine whether a particular set of subject, environment, and resources actually creates competitive advantages from NPD. Moreover, except subject, environment, and resources, product platform strategy would be the more important factor to impact on NPD performance. In this sense, a more appropriate way to test the influence of a mediator is to adopt the root causes of NPD performance as the dependent variable.

Independent variables are related to subject, environment and resource. I structured logic tree to identify independent variables. Variables relating to environment can be divided into macro-environment, customer and competition intensity and resource into strategic values by customer, competitiveness of retained resources and competencies, and organization and operating system. For identifying independent variables dividing into subject, environment and resource, I referred the variables past researches used through literature review.

Zirger and Maidique (1990) explained key factors affecting product outcome in new product development: the quality of the R&D organization, the technical performance of the products, the product value to the customer, the synergy of the new product with the firm's existing competences, the competence of

the marketing and manufacturing organizations, competitiveness, and the size and rate of growth of the target market. Out of these key factors they mentioned, the quality of the R&D organization is referred to competitiveness of retained technologies, human resources for new product development, the quality of human resources for new product development, and organization for new product development. The technical performance of the products can be referred to competitiveness of retained technologies and the quality of human resources for new product development. The product value to the customer is referred to changes in customer needs, customer priority for new products, diversity of customer portfolio, and the ratio of new customers. The synergy of the new product with the firm's existing competences is related to horizontal integration. The competence of the marketing and manufacturing organizations can be referred to product differentiation, new market development, competitiveness of sales and marketing competencies, and relevance among organizational units. Competitiveness is referred to the number of competitors, new product launches of competitors, competitors' monopoly, bargaining power of competitors, substitutes, and ease of market entry. The size and rate of growth of the target market can be referred to the ratio of new customers.

Kusunoki, Nonaka, and Nagata (1998) mentioned technological accumulation, HWPM structure, and shared experience to explain the effect on productivity and innovativeness in new product development. Here, HWPM structure means averaged gaps between the integration group and other functions regarding influence on the following six stages in the selected product development; concept development; product planning; product design; prototyping and test; process design; market introduction. They also described variables as subordinate variables. Out of variables, regarding productivity, efficiency of development investment is related to fund availability for new product development. Major innovation in product technologies is referred to technological innovation, and creation of new product concept to product differentiation. Regarding technological accumulation, financial and human resources availability for product development is related to the quality of human resources for new product development. HWPM structure is related to competitiveness of sales and marketing competencies and relevance among organizational units.

Cooper (1979) researched the dimensions of industrial new product success and failure. Out of variables he used, product technology is referred to competitiveness of retained technologies. A strong sales force launch effort can be referred to the quality of human resources for new product development. He also mentioned newness to the firm regarding new potential customers, product use, product technology, distribution and sales force, and competitors. Product uniqueness and superiority is referred to potential to be imitated technologies and product differentiation. He also mentioned market competitiveness and marketing and managerial synergy.

Tatikonda and Montoya-Weiss (2001) adopted a multidisciplinary view of innovation by integrating operations and marketing perspectives of product development. They mentioned time to markets as one of variables. I can refer to this variable for ease of market entry.

Li and Calantone (1998) conceptualized market knowledge competence as the processes that generated and integrated market knowledge. Out of variables, customer knowledge process is referred to changes in customer needs and customer priority for new products. Marketing and R&D interface is related to competitiveness of sales and marketing competencies and relevance among organizational units. Competitor knowledge process can be referred to potential to be imitated technologies, the number of competitors, new product launches of competitors, and competitors' monopoly. R&D strength is related to competitiveness of retained technologies, the quality of human resources for new product development, and potential to be imitated technologies.

Table 1. Variables from principal factor analysis

Variables from Principal Factor Analysis			Reference
Independent Variables	CEO's Propensity	● Propensity on decision making	
		● Propensity on confronting on markets	
	Customers and Competition	● Competition degree	● kaufmann and Wang (2002) ● Lai et al. (2007) ● Kim (2002) ● Srinvasan et al. (2004) ● Chun and Hann (2008) ● Wang et al. (2008) ● Kikuchi (2007) ● Mitchell and Slarzypacz (2006) ● Lambertini and Orsini (2007)
		● Customer portfolio	● Witt (1997) ● Hayes (2007) ● Zauberman (2003)
		● Macro-environment except economic factors	
		● Macro-economic factors	● Putsis and Bayus (2001)
	Competitiveness on Retained Resources	● Competitiveness on retained resources	● Kusunoki et al. (1998) ● Cooper (1979) ● Takikonda and Montoya-Weiss (2001) ● Li and Calantone (1998)
		● Organization for new product development	● Zirger and Maidique (1990)
	Mediator		● Product platform strategy
Dependent Variable	New Product Development performance	● Revenue performance on new product development	● Romanelli and Tushman (1994) ● Felin and Hesterly (2007)

SOLUTIONS AND RECOMMENDATIONS

Descriptive Analysis

I analyzed the mediating effect of product platform strategy on the relationship between a firm's subject, environment and resources and the performance of new product development. I analyzed descriptive statistics and correlations in advance of hierarchical regression analysis for proving the hypothesis.

As a result of correlation analysis, all independent variables have positive correlations with the performance of new product development. This means most factors have positive impacts on the performance

of new product development. Since all correlations of this study are less than 0.8, multicollinearity might not be happened.

Cronbach's coefficient alpha are higher than 0.8, this model is acceptable in reliability. Most independent variables are significantly correlated with a dependent variable ($p < .01$, $p < .05$).

Regression Analysis

I performed the statistical studies on the effect of product platform strategy on NPD performance. The findings prove that product platform strategy indeed enhances NPD performance. Traditional group factors such as CEO propensity, competition and customers, and competitiveness and retained resources play the roles in influencing both product platform strategy and NPD performance. Therefore, product platform strategy would be mediating the relationship between the antecedents and NPD performance.

As a result of proving the effect of Product platform strategy on the relationship between antecedents – CEO propensity, competition and customers, and competitiveness of retained resources and NPD performance in hypothesis 1, the effect of antecedents is reduced by adding the variable of product platform strategy. Therefore, product platform strategy would be mediating the relationship between the antecedents and NPD performance.

In the research model, the effect of product platform strategy could be proved for the relationships between NPD performance and the antecedents such as CEO propensity, competition and customers, and competitiveness and retained resources.

FUTURE RESEARCH DIRECTIONS

Discuss future and emerging trends. Provide insight about the future of the book's theme from the perspective of the chapter focus. Viability of a paradigm, model, implementation issues of proposed programs, etc., may be included in this section. If appropriate, suggest future research opportunities within the domain of the topic.

CONCLUSION

In this chapter, the hypothesis on the mediating effect of product platform strategy as follows: The stronger the product platform strategy is, the bigger antecedents impact on the performance of new product development. In order to maximize the performance of platform utilization of complementors, platform leaders should build competitive product platform strategy. Compared to the past, in the perspective of platform leadership, the product platform strategy has a critical effect on the relationship between CEO propensity, competition and customers, and competitiveness of retained resources and the performance of new product development.

As a result, the hypothesis is statistically significant. It is important for platform leaders to establish the product platform strategy to maximize the performance of new product development.

There are also some limitations on this study. First, the generalizability of the results is limited because I used data from a sample of enterprises in Korea. Second, contingency theory describes several

Table 2. Result of hierarchical regression analysis

	H1	H2			H3			H4		
CEO Propensity		.388***			.390***			.278***		
Competition and Customers			.362***			.319***			.211*	
Competitiveness and Retained Resources				.321***			.452***			.322***
Product platform strategy	.322***									
R ²	.342***	.219***	.245***	.141***	.229***	.211***	.233***	.349***	.351***	.376***
Δ R ²	.268***	.209***	.241***	.109***	.231***	.199***	.211***	.355***	.322***	.355***

integrative mechanisms (Galbraith 1973) that I did not consider here and should be investigated in further research for their ability to leverage platform strategy in new product development.

As a strategic recommendation to the retailing industry, platform leaders, and complementors respectively can't do go-it-alone to deliver the best values to consumers. Like in the high technology industry, world-class retailers or local mega-retailers as platform leaders in the retailing industry should establish competitive platform strategy so that more suppliers can be more competitive in developing new products and services.

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KEY TERMS AND DEFINITIONS

Complementary: When the marginal profit of an activity is increased by other increased activities, these are complementary each other.

Network Externality: Network externalities are the effects a product or service has on a user while others are using the same or compatible products or services.

Platform Leadership: The determinants of platform leadership include scope of a firm, external relationship with complementors, internal organization, and platform technology.

Platform Strategy for New Product Development

Product Platform: A firm's core product, a common basic product within family products, a product possibly generating derivative products, the hub in the value chain in high technology industry, and a product retaining technology platform.

Transaction Costs: The cost associated with exchange of goods or services and incurred in overcoming market imperfections. Examples of transaction costs are legal fees, informational costs, transportation costs, etc.

Chapter 7

Transformation of Marketing With Technology: Case Approach for Artificial Intelligence

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ABSTRACT

Marketing lives as a living organism with its competitive environment and several internal conditions. Marketing functions should adapt to the world they are bound to and develop their activities by taking into account the changes and developments in micro and macro factors. With the increase in technology and the spread of social media, transformation in marketing has become inevitable. Advances in business applications have better results about understanding customer and markets. As previous studies examine artificial intelligence concept with different contexts, there is lack of integrated study which examine marketing and artificial intelligence together. This study proposes three-steps plan for implementing AI with marketing while it includes nine scenarios from different marketing goals. Study also has suggestions for implementing AI methodologies into business processes.

INTRODUCTION

In recent years, the marketing and business world has been undergoing a major change due to technological developments. These changes affect the decision-making processes of the enterprises as well as the consumers and their behaviors. Changing consumption patterns and decision-making processes of consumers and enterprises affect each other, cause market conditions and competition to become difficult. In this study, the effects of artificial intelligence concept, which is one of the important factors of the recent and next years, on marketing concept and its applications will be emphasized.

DOI: 10.4018/978-1-7998-1125-1.ch007

With the increase of digitalization in the world, a huge amount of data flow is provided. People could not have guessed that there was a data increase and input in this way in the past years. According to the report published by Smart Insight (2017), in the world in sixty seconds, 500 hours of video is uploaded, 29 million messages are sent in Whatsapp, 1,440 new content is published in wordpress, 448,800 tweets are posted in twitter, 65,972 photos are shared in Instagram. 3.8 billion searches on google, 3.3 million new posts are shared on facebook, 149,513 e-mails are sent. These figures will increase in the near future by increasing their growth rates. According to the latest report published by We Are Social (2018) about individuals' digital media usage habits; the number of internet users in the world was found to be 4.5 billion. According to the data of 5 years ago, the number of internet users is 2.5 billion. This tremendous increase is one of the most important points in the increase of big data with the use of internet. When we evaluate the situation from a different perspective, 7 billion of the world's population does not use the internet. We can say that the big data will increase more when people use the internet.

While the concept of artificial intelligence is a technical-based concept, it has been studied in various fields in the business world in terms of applications. In this study, these fields will be analyzed from a marketing point of view and will be presented as case studies. From the first point of view of marketing, it will be focused on examining existing consumers in different contexts and making inferences about them. In this perspective, in addition to the fundamental statistical analyzes, which are generally "summative", different methodologies are used as "interpretative". For example, in a service company evaluating consumer complaints; variables such as the number of monthly complaints, total number of complaints "summative" quality. Issues such as the discovery of the text patterns in the complaints and the detection of the emotions in the text are "interpretive". In the second perspective on marketing, inferences are made for the future about consumers. Various statistical methods are used in this perspective in which the future is estimated through the available information. In the third point of view of marketing, it is possible to support the processes related to consumer experience with a business-oriented approach. There are improvements in robotic technologies and production / distribution channels.

The machine learning part, which is an important component of the concept of artificial intelligence, has a lot of benefits especially in the field of decision support systems and business intelligence. Today, it is important to understand and interpret the mass of data called "big data". Large amounts of data produced by consumers and the market could contain specific patterns and meanings. It will be useful for companies to discover these specific patterns and meanings and turn them into usable information for businesses. For example, the decision-making team of a business providing services in the field of tourism can conduct market research for the region where it serves, and can monitor the trends of consumers in real time and periodically. In terms of marketing communication and crisis management, consumers' reactions to social media can be observed. One of the basic functions of machine learning is the technical determination of the characteristics of the current situation.

One of other function of machine learning continues with determined characteristics to predict future events. Similar to statistical concepts, for example a normal distribution detected regarding to customer reaction to specific brand campaign, would follow same normal distribution. This assumption is supported with "large" quantity of data in today's social media. This second function also helps to improving service quality for consumers as they include customer and market insights. Second function of machine learning and improving customer experience are included as three cases in this study.

Previous researches on two main concepts (marketing and artificial intelligences) examine phenomena with specific contexts including classification of reviews, predicting future consumer behaviors

etc. There is lack of integrated study which bridges marketing and AI concepts and this study aims to fill this gap with providing case study approach which summarise AI concepts with marketing scenarios.

The aim of study is two-folds, first aim refers to evaluation of marketing concept and its transformation, while second one refers to examination of artificial intelligence and related concepts for marketing area. Structure of study is consistent to aims of study, as it starts with marketing concept and continues with artificial intelligence and related concepts. Three case steps are also included consistent to approach of study. These three steps are related to customer and business side of marketing and artificial intelligence. Last part of study includes solutions and recommendations, future research directions and conclusion parts.

MARKETING HISTORY AND TRANSFORMATION

Present your perspective on the issues, controversies, problems, etc., as they relate to theme and arguments supporting your position. Compare and contrast with what has been or is currently being done as it relates to the chapter's specific topic and the main theme of the book.

History guides the future by evaluating past events and assimilating the causes of past events. This science, which maintains its popularity with the dynamism of the first day in every century, has always had a close relationship with other branches of science. In order to get ideas about the future and to make predictions, the past developments should be known. It is of great importance for marketing professionals and academicians to understand marketing better, how management approaches they adopt in marketing management and how consumer behaviors go through a period of development. Marketing will continue to be a continuous development process with its dynamic structure, macro and micro environmental factors. Perhaps while we are writing these lines, a new invention in the world will bring a new dimension to marketing understanding and development will continue from a different line.

Marketing has taken its present form with its phases throughout history. The most optimal implementation of the marketing mix and the appropriate selection of market strategies, as well as the marketing science in order to better understand the stages of marketing need to be examined. The developments in marketing science are closely related to the developments in the United States, where marketing science has emerged, and the innovations have shaken the world deeply due to changes in business activities. When the studies in the literature are examined, marketing in general is considered as five separate periods. These are: production, product, selling, marketing and holistic marketing stages.

The understanding of production is the oldest understanding in marketing management. In this approach, consumers are expected to prefer the products with the most appropriate prices. For this reason, marketing management is focused on increasing production distribution efficiency. Businesses that adopt this marketing approach can ignore the wants and needs of the customers because they focus on the activities in the production stage (P. T. Kotler & Armstrong, 2017).

In the product phase, the enterprises focused on the quality, performance and innovation of the products. The aim of the product stage is to achieve competitive superiority by continuously improving the product. Focusing on and improving product quality is one of the most important parts of marketing strategy. However, focusing only on products causes marketing myopia (P. T. Kotler & Armstrong, 2017).

At the stage of sales concept, consumers have the opinion that they will not buy enough unless they are engaged in personal sales efforts. Therefore, businesses should apply aggressive sales techniques to consumers (P. Kotler & Keller, 2015). Sales staff increases the probability of sales in the sales approach

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(Szymanski, 1988). However, the use of such aggressive sales techniques carries a high risk. Instead of creating long-term and profitable customer relations, it focuses on business sales transactions. The aim is to maximize the profit of the enterprise by selling and not responding to the demands of the market. Defends the view that products ready to buy will be liked by customers (P. T. Kotler & Armstrong, 2017). However, in recent years, businesses have realized that marketing is not always equal to sales (Brooksbank, 1995). During this period, businesses ignored their customers' wishes and did not even review their products. Nowadays, many organizations under public administration unfortunately still remain in this understanding and continue to produce very low quality products and services. This situation should be examined with a critical approach from the non-optimal use of the country's resources.

With the increase in production in the early 1900s, the competition rapidly increased. Businesses had to find reasons for consumers to buy products. This situation has made sales important (Bose, 2002). Conventional marketing sees consumers as rational decision makers who prefer functional features, focusing on the benefits of products and services (Schmitt, 1999). In the mid-1950s, marketing and sales were used interchangeably in the business world. According to this conventional marketing approach, the biggest indicator of profitability was sales volume. The main responsibility of marketing was to sell products manufactured at the factory. The focus of businesses was not on customers, but on products. Everything the factory produced had to be sold. The understanding of marketing was based on short-term personal sales, advertising and short-term price reductions. Marketing focused on persuading them instead of focusing on consumers' wishes and needs (Webster, 1988). Marketing or Modern Marketing Period is the period in which the marketing has a real value. In this period, the concept of marketing is defined as the determination of what the customers want and offering the products to meet the requirements and the aim of the enterprise to target long-term profitability.

The marketing concept is to determine the needs and desires of the target markets and to carry out their activities accordingly. If the business responds better to the consumer demands and needs than its competitors, it will be successful. The marketing concept focuses on customer focus and value offered to the customer. Instead of a product or sales-centered understanding, listen to the voice of customers. According to the marketing approach, the products and services must be produced according to the customer's wants and needs (P. T. Kotler & Armstrong, 2017).

Kotler and Zaltman (1971) defines social marketing as

Social marketing is the design, implementation, and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planing, pricing, communication, distribution, and marketing research

Andreasen (1994) extended the scope of this definition and suggested the following definition

Social marketing is the adaptation of commercial marketing technologies to programs designed to influence the voluntary behavior of target audiences to improve their personal welfare and that of the society of which they are a part

Based on these definitions, it is observed that the social benefits are put to the forefront instead of the traditional profit-making approach of the operating mechanisms and this social benefit is tried to be increased. Social marketing is different from traditional marketing. This is much more difficult than trying to market goods and services that can be materially revealed. Creating a change in behavior in

the target audience of social marketing carries enormous difficulties and obstacles. The attitudes and attitudes of the society towards the events reflects the necessity to achieve a successful way of achieving success in the perspective of the mentality. It is difficult to change the beliefs and prejudices of society to a certain behavior.

Marketing has become more complex at the end of the developments and changes in the world. Considering the changes in the world, consumers were the most affected by this situation. Marketing decision makers must understand the behavior of consumers to succeed. The traditional marketing structure is now having a hard time responding to the demands and needs of consumers. The new communication channels have emerged with the changing environment of marketing activities. Marketing decision makers should use these communication channels effectively.

The integrated marketing approach states that it is necessary to look at marketing from a broad perspective in a holistic manner. Marketing activities, processes and elements are implemented in a holistic way. The holistic approach of marketing advocates a broad and integrated approach to the marketing environment. The elements of the marketing mix must act in unison with each other and give compatible messages. Holistic marketing is handled in four different perspectives in the literature (Sheth & Sisodia, 2015)

- Internal Marketing
- Relationship Marketing
- Integrated Marketing
- Performance Marketing

In order for businesses to be successful nowadays, production, sales, distribution, services, advertising, sales promotion, product planning and market research should be integrated in a harmonious manner by integrating each other activities (Rafiq & Ahmed, 2003).

In the study conducted by Rafiq and Ahmet (2000) five main component of internal marketing have been defined (Ahmed & Rafiq, 2000)

1. Employee motivation and satisfaction
2. Customer orientation and customer satisfaction
3. Coordination and integration between business units
4. Marketing-oriented approach
5. Implementation of strategies for the purposes of institutions

Internal marketing means that employees who serve customers are chosen from the most talented people and do the best they can for their customers. Internal marketing is about people working in the enterprise. In another perspective, in internal marketing, the company sees employees as internal customers and aims to create customer satisfaction by satisfying them and meeting their needs (Tansuhaj, Randall, & McCullough, 1988). Receive good education and highly motivated staff can positively affect the service experience. However, preferring inexperienced employees can reduce customer satisfaction and negatively affect service quality (Joseph, 1996). This situation is one of the most common problems encountered by enterprises today. Considering today's economic conditions, enterprises want to achieve maximum efficiency with minimum cost. Companies that do not have a modern marketing approach

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want to minimize costs by giving low wages. However, this situation often turns back to them as unhappy customers. The enterprise is a social organization consisting of employees.

Employees should be seen as assets that will be invested and added value to the company instead of being seen as cost. Employees should be provided with comprehensive training activities and supportive activities should be carried out in their career development. This type of management style will increase employees' commitment to the organization and increase organizational performance by ensuring that they remain committed to the objective (Bansal, Mendelson, & Sharma, 2001). Internal marketing is very important in providing organizational commitment. Internal marketing creates emotional commitment to employees. Emotional commitment is the emotional bond established by the employees. Emotional commitment means employees are more willing to achieve company goals (Calleja & Caruana, 1998). Internal marketing activities carried out by companies make employees happy. Happy employees mean happy customers for businesses. In today's world, businesses are constantly in communication with the business. The attitude of the personnel working in the enterprise to the business affects the next purchasing behavior of the customers and creates an image about the company.

Businesses can increase their market share in three ways. The first is to win new customers, to sell more products and services to second existing customers, and the third is to reduce customer loss. Through relationship marketing, businesses can establish relationships with customers and increase their transactions. Relationship marketing can also help businesses attract more customers. Relationship marketing is an important strategy for today and tomorrow of marketing (Berry, 1995).

Gronroos (1990) defined the relational marketing as follows in his study

Marketing is to establish, maintain, enhance and commercialize customer relationships (often but not necessarily always long-term relationship) so that the objectives of the parties involved are met. This is done by mutual exchange and fulfillment of promises

Relational marketing is often one of the strategies used by businesses operating in the service sector. Service businesses are always in contact with their customers. One of the most important requirements of the companies in the service sector to gain a competitive advantage to their competitors is to establish a long-term solid foundation relationship with their customers.

Customers in the service sector are included in the activities. There is direct contact between customers and businesses in the service sector. Quality of mutual interaction affects customers' future purchases. Banks, insurance companies, organizations operating in the sports sector, retail stores are constantly interacting with their customers. The most critical situation for such enterprises is that their relations with the customer become harder as they grow (Grönroos, 1995).

Although relational marketing is not highly advocated by businesses, there are some differences in practice. Businesses' marketing strategies acquire goals such as customer satisfaction, close contact with customers, loyalty, but customers do not respect them to win it (Fournier, Dobscha, & Mick, 1998).

In a study conducted by Ndubisi (2005) on banks in the service sector, the premise of relational marketing was tried to be determined. As a result of the study, trust plays a key role in the development of loyalty and relations between the company and the client. For these reasons, companies operating in the service sector should endeavor to gain the trust of customers. In addition, when considered as a sector, it can be stated that trust in the financial sector has a more critical importance. The most critical point in establishing customer loyalty is responding to the needs of customers and personalizing the products and services according to the wishes and needs of the customers. In addition, effective communication

with customers is important in terms of relational marketing. It has been concluded that the tendency of the customers to listen to the complaints of the customers and respond to them is the tendency of the customers to be loyal (Oly Ndubisi, 2007).

Pickton and Broderick (2005) define internal marketing as follow

Integrated marketing communications is process which involves the management and organization of all agent in the analysis, planning, implementation and control of all marketing communications contacts, media, messages and promotional tools focused at selected target audiences in such a way as to derive the greatest enhancement and coherence of marketing communications effort in achieving predetermined product and corporate marketing communications objectives.

Along with the increase in global competition in the world and the increase in production in developed countries, there have been changes to retailers and intermediaries. Therefore, establishing long-term relationships with customers is one of the main objectives of every business. For example, the most important role in the success of retail companies is consumers. Retailers can communicate directly with consumers and better analyze their wishes and needs (Schultz, 1992).

There are two issues to be considered in integrated marketing communication. The first of these is to evaluate the communication channels in terms of the area of influence. Different communication channels can be used for different audiences. At this point, it is necessary to use different communication channels in order to create the desired effect. The second situation that should be emphasized here is the compatibility of the communication options (Keller, 2001). Communication channels should mobilize customers by providing messages that support each other. The use of communication channels containing different messages may prevent the formation of brand positioning in the consumer's perception. It should pay attention to the compatibility of the messages used in brand communication channels.

Integrated marketing communication is not just about the use of marketing communication channels. Integrated marketing communication is evaluated in a structure that includes strategic management planning. The strategic communication plan of the brand within this structure is a holistic approach in accordance with the business objectives. The most important issue in the creation of this is the establishment of the marketing culture in the management philosophy of the enterprise (Kliatchko, 2005).

Performance marketing; brand value, customer value and financial returns, as well as social and environmental considerations. Marketing results may not be directly measured by tangible values. In the performance measurements of marketing, brand awareness, brand image and attitudes towards the brand take place. Marketing researches and analyzes provide the most important results in the measurement of marketing performances (Sheth & Sisodia, 2015).

The Changing Marketing Landscape

Marketing has recently entered a period of transformation due to innovations and developments in the world. This transformation of marketing is the beginning of the internet to increase the usage area of the internet, the emergence of the digital world as a result of internet development, and perhaps the use of artificial intelligence applications in the excitement of all humanity is coming.

The transformation of marketing causes changes in business activities. Although the transformation is expressed in financial figures, the main focus of marketing is the consumer, which affects the social transformations deeply. Another striking point in the transformation of marketing is the developments

in big data and cloud technology (Kumar, 2018). With the big data, there have been great changes in marketing activities and strategies. With large data, businesses can be informed about consumers in large volumes, quickly and in a variety of ways. These data and information is a revolution that enables the understanding of consumer behavior and marketing strategy (Erevelles, Fukawa, & Swayne, 2016). Traditional marketing is usually limited to a very limited number of data sets. However, with the recent developments in information and communication technologies in marketing, the use of big data creates a great success in strategic marketing management (Xu, Frankwick, & Ramirez, 2016). Companies that have been successful in the world recently have been successfully used in large data. Netflix is one of the leading companies in the world. Netflix has brought a new breath to film and series industry. Netflix attracts attention with its successful marketing activities and uses big data effectively. Netflix has defined about 80,000 new microfilm genres based on film viewing habits (Marr, 2015).

Another technological development that provides transformations in marketing is the invention of smart phones. With the invention of smart phones, there have been major changes in the behavior of consumers. They can say as the business activities of the smartphones most affected area. Smart phones change the way businesses do business. Thanks to smart phones, the world turned into a global village and the physical boundaries were clear. Through smartphones, people can communicate with each other and businesses at any time and place. Thanks to mobile devices created by smart devices, electronic communication mass has increased, and a mobile lifestyle has emerged. Thanks to mobile technologies, mobile electronic services and mobile transactions have emerged and provided access to very large audiences. With mobile communication, masses can communicate with text, voice and video. Through mobile networks, consumers do not only receive information from the companies, but also initiate interaction by specifying their requests and needs (Shankar, Venkatesh, Hofacker, & Naik, 2010). Mobile phones and tablet computers have become one of the most important parts of our lives in recent years. It was almost impossible to work without devices. People used to use pay phones to meet with their friends. However, this situation seems to us very old dates. 90% of Americans have a cell phone and a third of them have smartphones. In this environment, businesses should develop strategies according to mobile marketing (Kaplan, 2012).

One of the developments that excites the whole world is artificial intelligence. The artificial intelligence applications that humanity has been dreaming about since the past have been started to be applied in the business activities as a result of the developments in technology. From artificial intelligence production systems to smartphones and even household appliances, it continues to grow day by day. Sales and marketing activities are influenced by artificial intelligence technologies. In the near future, it is foreseen that robots with artificial intelligence will replace salespeople and marketers. In addition, the websites will be updated automatically according to the users 'use and the web sites' eye tracking data (Siau & Yang, 2017).

In the new world order, e-learning, webinars, gamification will be popular topics of the new business world. With the participation of robots in working life, performance management of employees will be one of the most important agenda items of human resources managers. Businesses should re-plan their human resources strategies according to artificial intelligence and robots. Books, researches, articles and hypotheses published not only sectorally but also academically should be reviewed and revised (Dirican, 2015). Artificial intelligence applications since 2016 is very popular in our personal and business life and is the most decisive technology of our time. Smart machines are now in shopping malls, hospitals and highways. This new automation technology will change our lives. The factories will digitize their automations and the industrial revolution will be experienced. Artificial intelligence applications will

be beneficial to our lives by affecting not only the commercial field but also the health services (King, 2019). The number of starts of artificial intelligence is increasing. Conferences on artificial intelligence are organized in the world. According to the latest investments, the most invested sector is the artificial intelligence sector (Wirth, 2018).

In the light of all these assessments, artificial intelligence is predicted as the future of marketing. In order to be successful in the activities of the enterprises and to gain a competitive advantage against their competitors, they are constantly renewing themselves by following the technological developments closely. One of the most important aspects of being successful in a competitive environment is compliance with innovation. The more quickly businesses can adapt to the emerging innovations, the more costly they will be by optimizing their costs. Given the passion of innovation of today's consumers, it can be said that the companies that direct and follow the innovation will mark the century. Businesses should continuously revise their strategies, activities and communication channels by following the changes in their macro and microenvironment.

Artificial Intelligence Concept

The transformation process of marketing is related to several concepts and artificial intelligence is one of these concepts. Artificial intelligence is defined by Rao and Verweij (2017) as:

AI is a collective term for computer systems that can sense their environment, think, learn, and take action in response to what they're sensing and their objectives.

Consistent to elements of this definition, new marketing decision making system must sense their environment by observing periodic several KPI's, think and learn market environment by evaluating several variables and take action by being supported by data itself and data methodologies. Artificial intelligence and big data are important topics of today's business world. It is estimated that contribution of artificial intelligence to global economy will reach to \$15.7 trillion potentially in 2030, while AI will cause +26% boost in GDP for local economies by 2030 (Rao & Verweij, 2017) .

On the other hand, Chen et al. (2012) examine business intelligence and analytics concepts in their study and they conclude that business analytic applications can be separated into five groups including: e-commerce and marketing intelligence, e-government and politics 2.0, science & technology, smart health and wellbeing, security and public safety. First group is related to focus of this study and they also conclude five emerging analytics research opportunity areas including; (Big) data analytics, text analytics, web analytics and mobile analytics. Big data analytics and text analytics are studied in marketing research and this study also focuses on them.

Concepts for AI

The concept of artificial intelligence is a very broad concept in terms of the sub-concepts and applications. Sterne (2017) concludes that artificial intelligence is a large umbrella which includes visual recognition, voice recognition, natural language processing, affective computing, expert systems and robotics. In another classification, Kumar (2018) classifies artificial intelligence in seven ways including; machine learning, natural language processing, expert systems, vision, speech, planning and robotics. This study focuses on data mining, machine learning and natural language processing mainly.

Data Mining

Data mining is defined as process related to discover interesting patterns or knowledge from big size data (Han et al., 2011). Similar to artificial intelligence, data mining has a lot of sub-concepts. Berry and Linoff (2004) summarise tasks of data mining as; classification, estimation, prediction, association rules, clustering and profiling. On the other hand, big data and data mining methodologies are employed in a wide range of research areas including; customer behavior (Bahari & Elayidom, 2015), consumer product demand (Chong et al., 2017) and product life cycle management (Li et al., 2015)

Machine Learning

Machine learning simply refers to how computers improve their performance or learn based on data (Han et al., 2011). In machine learning concept, machines do not follow strict rules, they were designed to learn (Sterne, 2017). Therefore, as data size or data variety increases, intelligence will be better.

Natural Language Processing

Natural language processing aims converting human language to a formal representation which is easy to manipulate for computers (Collobert & Weston, 2008). As consumers spend their time in social media, they write posts about their emotions. Therefore, the way of expressing themselves is important for companies to evaluate. For example, sentiment analysis which evaluates sentiments of text-based content is one of text-based research. It is used in different contexts including; news and blogs (Godbole et al., 2007), social media (Pak & Paroubek, 2010; Agarwal et al., 2011; Nguyen et al., 2015) and reviews (Kasper & Vela, 2011; Shi & Li, 2011). As the languages differ, sentiment analysis methodology is studied in different languages including Czech (Habernal et al., 2013), Arabic (Abdul-Mageed et al., 2011; Abdul-Mageed et al., 2014), German (Waltinger, 2010), Spanish (Anta et al., 2013).

AI Cases for Marketing

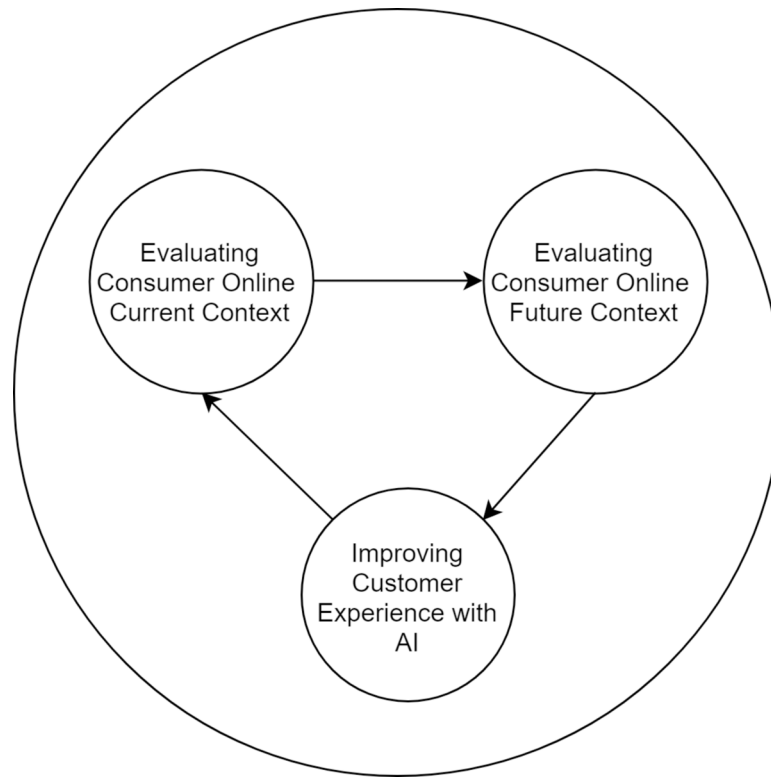
The structure of study is included in Figure 1. In this study, artificial intelligence concept is evaluated in three-steps plan. This plan starts with examining current context and continues with predicting future. Last step includes supporting marketing activities with AI background. This structure is consistent to strategic thinking for marketing decision making which starts with integration of AI to marketing and lasts with embedding AI into real life scenarios.

Case 1: Evaluating Consumer Online - Current Context

First case simply refers to a starting point for introducing AI concepts into marketing efforts. Traditional business decision making employs mostly summative statistical methods for measuring business efficiency. The stage this case refers goes beyond this approach and examine existing data for discovering structures.

Web 2.0 and social media creates big data opportunity for companies in online world. Decision makers of marketing units can use social media and web 2.0 tools for customer and market insights. Available data for companies have several forms including online reviews, social media posts, customer complaints etc. Different types of contents refer to text-based content, rating based content and multimedia based content.

Figure 1. Three steps plan for artificial intelligence and marketing



Three different example companies are evaluated for this case regarding to case one scenario. These companies have different marketing goals, therefore they have different marketing strategies to use artificial intelligence and related technologies to reach.

There are three scenarios included in Table 1 regarding to different marketing goals and competitive positions. In first scenario, a banking company which has market leader position in market wants to segment customers into different segments using clustering algorithms. Beyond descriptive statistics which includes simple demographic information (gender, income group), different combinations of attributes could be used for clustering. For example, combination of several variables; amount of order for month, gender, operating system of consumer's phone, social media interaction amount could be used

Table 1. Companies and strategies for case 1

Attributes	Company 1	Company 2	Company 3
Industry	Banking	Hospitality	Training
Competitive Position	Market Leader	Market Challenger	Market Follower
Marketing Goal	Segmenting Customers with Attributes	Discovering Customer Needs	Evaluating Customer and Products/Services
Artificial Intelligence Methods	Clustering Customers with Clustering Algorithms	Text Mining to Hotel Reviews	Associate Rules for Products/Services

for clustering customers. Clustering customers is studied in different contexts. For example, Dursun and Caber (2016) employ data mining methodology to profile hotel customers while they use RFM analysis. They conclude eight customer groups while they indicate that RFM methodology effectively clusters customers. In another study, Hong and Kim (2012) uses customers' psychographic data to segment customers in online stores.

In second scenario, a hospitality company which has market challenger position in market wants to discover potential and existing customers' needs. Since customer reviews for hotels and places have several insights for marketing, this company could use text mining methodology to detect customer insights. Difference between traditional statistics and this methodology refers to discovering of most used phrases, couple words beyond review amount or review per hotel. For example, hospitality company could use sentiment analysis to detect sentiments of customers regarding to hotels or situations. This could help to understanding of consumers in details. Previous studies examine text mining in different contexts. For example, Mostafa (2013) evaluates sentiments of consumers regarding to brand on social media using text mining and concludes that Twitter can be used for evaluating attitudes. Xu and Li (2016) address customer satisfaction and dissatisfaction concepts in hotel reviews context while they use a text mining approach, latent semantic analysis methodology. In another study, Pınarbaşı and Canbolat (2018) investigate mobile application store reviews of augmented reality applications while they include n-grams for most used word patterns.

Third scenario includes a training company in market follower position. This company wants to evaluate existing customers regarding to service/products they use, since this insight could be helpful for promotion campaigns. Association rule mining process of data mining could help to this company since it evaluates products/services bought together. For example, in a dataset consists of 1 million orders from 10.000 customers, most purchased together products/services could be extracted. The extracted information could lead advertising campaigns targeting existing customers for cross selling. In previous studies, Shim et al. (2012) employ association rules and sequential patterns with other methodologies in customer relationship management context to propose CRM strategies. In another study, Farajian and Mohammadi (2010) employ association rule mining with clustering algorithm to evaluate banking customer behavior.

First case examines current situation with different methodologies to create value for three example companies. Next case includes prediction side of machine learning and artificial intelligence which examines current structure and uses it for predicting next cases. It can be summarised as "experience" of thousands of observations regarding to market or customers. For example, detection of clusters in current customer group of 1 million customers can lead to detection of next 100 customers' clusters, since attributes of consumer clusters are already evaluated.

Case 2: Evaluating Customers' Next Step - Future Context

Second case reflects the dynamic side of artificial intelligence which examines current situation and predicts future events. This case mostly depends on amount of data produced in market as they are used in prediction process. Companies can use artificial intelligence methodologies to use power of amount of data for next events.

This case includes three different companies from different competitive positions like in case 1. Since targets and industries of companies differ, methodologies would be different for each company. They are included in Table 2.

There are three scenarios included in Table 2 regarding to case 2. First company is a health company in market leader position. The market dynamics are important for this company since they reflect potential market opportunities. Therefore, this company can use artificial intelligence methods for deciding standards for market environment first. Periodic observations for these metrics/standards can lead to detecting any anomalies. Search engine queries in macro scale, patient queries by phone, social media popular topics are some of metrics/indicators for health market. This company can create a database with attributes regarding to anomalies and can find whether increasing/decreasing can lead to anomalies or not. In previous studies, Savage et al. (2014) inspect online social networks with anomaly approach and conclude types and characteristics of anomalies. Prado-Romero et al. (2018) study on Twitter users and their influence and open mindedness with anomaly detection approach, while they imply that this approach could help companies regarding to advertising and reach topics. In another study, Ramakrishnan et al. (2019) focus on pricing system of e-commerce with anomaly approach.

Second company is a sports clothing company in a market challenger position. Since challenger position has potential to gain leader position, this company must differentiate using artificial intelligence. In example scenario, social media and engagement concept are selected for demonstration. This company could use historical social media data of clothing industry and train a machine learning algorithm to detect attributes for ideal content for engagement. Followingly, this company can use this algorithm for detecting and evaluating next social media post attribute and its social media marketing plan. Social media engagement is studied in several contexts. For example, Bandari et al. (2012) examine social media popularity of news items with regression and classification methodologies, while they conclude 84% accuracy of predicting popularity. In another study, Shreyas et al. (2016) focus on online articles and employ random forest regression methodology. They conclude 88.8% accuracy.

Last company is a food company and its has market follower position. The company wants to find new niche segments using artificial intelligence methods. Examining attributes of consumers and market environment variables can lead to a set of segments for market. Company can use sets of segments to not only identify existing variables, but also predict future variables. For example a new customer with several attributes can be segmented into one existing group, while another customer is not belonged to any standard cluster. This new customer can be an opportunity for niche market. In macro scale, identifying niche consumers or markets could help to this company.

This case uses prediction approach of artificial intelligence and includes different scenarios for this approach. The first two cases are connected to each other regarding to processes. Next case includes supporting real life applications with methodologies of artificial intelligence.

Table 2. Companies and strategies for case 2

Attributes	Company 4	Company 5	Company 6
Industry	Health	Sports Clothing	Food
Competitive Position	Market Leader	Market Challenger	Market Follower
Marketing Goal	Detecting Possible Anomalies	Increasing Social Media Engagement	Finding Possible Niche Market
Artificial Intelligence Methods	Classification Algorithm for Anomalies	Support Vector Machines for Detection/Prediction of "Ideal" Content for Social Media	Clustering Algorithm for Segmentation

Case 3: Improving Customer Experience With AI

This case mostly refers to practical usage of artificial intelligence in business applications since it includes supporting practices with methodological advancements. Technological side of artificial intelligence has several opportunities for business world, since it affects production/delivery part of business practices.

One of the concept related to this case is internet of things. Internet of things refers to global network of devices/machines which are capable of interacting to each other (Lee & Lee, 2015). With the use of internet in objects and sensors, customer participation has been achieved and marketing has become a whole new dimension in data collection. Because of the interconnection of more technological objects, marketers and customers will be able to interact and exchange more data (Gong, 2016). IoT technology offered a different proposal than the traditional barcode identification solution used to identify existing products. It presented an RFID / NFC-based solution for labeling existing new generation products. Thanks to these barcodes, QR codes were used to access the products via the Internet (Jara, Parra & Skarmeta, 2012).

IoT applications from health sector to the logistics sector began to be used. For example, the microchips used in the healthcare industry enabled the patients to be monitored in real time. These microchips allow the physician to easily check their values and evaluate their condition. Businesses used IoT to create inventory control, security, location and supplier profiles. This has led to improved operations and increased efficiency (Cremer, Nguyen & Simkin, 2017). Lee and Lee (2015) conclude three internet of things categories regarding to enterprise applications; monitoring and control, big data and business analytics, information sharing and collaboration.

Case 3 includes three cases regarding to different artificial intelligence methodologies. They are included in Table 3.

There are three cases included in Table 3, this table also includes output of AI for companies. First company is an airline company which is a market leader and it wants to improve customer experience since the company has customer-based service. The company can use AI methodology to detect patterns of customer interactions in first case, while it can use AI for predicting next interaction. For case 3, the company use detecting and predicting algorithm to support online chat service of company. Therefore every time a new customer starts an online conversation with company, AI supported chat-bot answers customer with already solved cases. Thus, the company could use i) large data of previous chats, ii) predicting power of machine learning algorithms. This could help to company with low-cost service improvisation and improved customer satisfaction.

Table 3. Companies and strategies for case 3

Attributes	Company 7	Company 8	Company 9
Industry	Airline	E-Commerce	Industrial Production
Competitive Position	Market Leader	Market Challenger	Market Challenger
Marketing Goal	Delivering Best Customer Experience	Increasing Logistics Efficiency	Increasing Production Efficiency
Artificial Intelligence Output	Chat-Bot System supported with AI	Distribution System with AI	Production System with AI

Second and third company are both market challenger position, while they have different marketing goals. Second company is an e-commerce company and wants to increase efficiency of logistics processes since new tools and advancements are available. For example distribution system with drones could be useful for future logistics but they must be supported with AI methodologies. Finding the best routes for distribution, decreasing delivery times are some of problems to be solved. Therefore, the company examines existing logistics practises and evaluates them with AI methodologies in first two cases. In third case, the company integrates logistics knowledge with technology and improves efficiency of distribution system. On the other hand, third company focuses on production system. The company could use robotics system for production but they must be supported with AI. Therefore, the company use AI to improve production methodology of company. Existing data from production system is examined with AI methodologies and efficiency of production is increased.

Artificial intelligence is expanding its use in the sector. For example, SKY, one of the UK's major media outlets, implemented a machine learning model designed to propose content based on the viewer's spiritual mode (Carey, 2018; Sentance, 2019).

With 3 cases included in this study, the subject of artificial intelligence was evaluated within the context of marketing. Since the concept of artificial intelligence is a very comprehensive concept in content, a three-stage case approach is presented to enterprises. In the first stage, artificial intelligence methodologies were used to examine the existing systems. Then, artificial intelligence methods were used for future predictions. In the last stage, it is mentioned that technological applications in the stages of production / distribution and communication with consumers are supported by artificial intelligence applications. Although artificial intelligence applications are not limited to those mentioned in this study within the scope of marketing, it is useful to address the issue in an integrated manner in general. In companies where artificial intelligence methodologies will be applied, it is recommended to list the current operation and data sources. Subsequently, it will be possible to examine these systems with artificial intelligence methodologies and make inferences for the future. Finally, artificial intelligence methods and findings can be used for the development of other business and marketing applications.

SOLUTIONS AND RECOMMENDATIONS

The overall solution regarding to this study refers to detailed examination of artificial intelligence for marketing efforts. At this time the question must be answered includes;

- Are current marketing efforts ready to be integrated to artificial intelligence?
- Is Personnel or team of marketing ready to manage and maintain artificial intelligence for marketing efforts?
- Beyond the integration of AI, are short- and long-term goals planned?

These questions will be starting points for integrating artificial intelligence to marketing efforts. Thus, the first solution of study is examination and preparation of integration plan. As the scope and content of artificial intelligence applications are complex, it is useful to plan the current situation and integration first.

Second solution refers to variety artificial intelligence methodologies. Decision Maker must examine which methodology would be best choice in terms of efficiency. For example, a service company

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could employ AI technologies to improve human-related conversations, while a B2B company use it for statistics-based processes like customer retention prediction. Methodologies with different characteristics should be planned according to the marketing objectives of the enterprise.

Last solution is related to amount of data market produces. Everyday the data in market environment is increasing in several forms including text, photo, video, even location info. The potential of data must be considered by marketing decision making. For strategic thinking, data itself and evaluation of data must be part of marketing planning as they support strategic targets of marketing. Some questions must be answered for this phase.

- What kind of data will be useful for the enterprise's marketing operation?
- How often should the specified data types be tracked?
- What are the standard KPI's for data types and platforms?

Answering these questions will be the basis for the application of artificial intelligence technologies such as machine learning. Measuring the correct data type with the correct indicator and predicting with the correct methodology will contribute to the marketing decision making.

In addition to amount of data increases, advances in methodologies and computer technologies must be examined for further researches. For example, computer vision methodology which examines graphical elements and evaluate them would be useful for further researches. Pre-trained datasets would contribute to small and medium budget marketing teams as they do not require high-scale computer infrastructure.

FUTURE RESEARCH DIRECTIONS

Future research directions of study include three different topics; evaluating three steps of this study, examining artificial intelligence with different methodologies and detailed consideration of specific marketing cases. As this study points out artificial intelligence can help marketing decision making and strategic goals in three ways. These three ways could be examined in detail in future. For example, examining current market conditions has several characteristics regarding to variety of market conditions. Therefore, including several different contexts would contribute to scientific knowledge. Second topic refers to integrity of artificial intelligence with other methodologies. Since artificial intelligence can use output of other methodologies, creative research methodologies would contribute to artificial intelligence scope. For example, sentiment analysis methodology could be starting point for machine learning and artificial intelligence. Last topic for future research direction refers to specific marketing cases and AI. Improving chat-bot customer service would be an option for marketing and AI together. Another example for this case refers to robotic advances for production and distribution planning. In addition to these directions, time dimension and volume of data would help future researches. As technology and social media changes, produced data increases. Researches with longer period and more samples would be starting points for new researches.

CONCLUSION

In this study, artificial intelligence and related concepts were evaluated within the framework of marketing. The study has seen the role of a bridge between artificial intelligence and marketing. This bridge role is one of the first findings of the study. Artificial intelligence and related issues will have an important place in the future in terms of marketing and management studies.

The second finding of the study is that artificial intelligence and related concepts will be useful in various stages of marketing and business decision making. In this study, these benefits are listed in three sections. In the first chapter, the implicit structures in the existing system are emphasized. These structures also form the basis for the studies in the second chapter. In the second part, methods such as machine learning are used for predictions about marketing scenarios. In the last section, the methods used in the second part are transformed into a business output or support an existing business process. In this section, examples such as improving chat-bot services, improvements in production and distribution lines can be mentioned.

The modern-day marketer has quite different possibilities and different challenges compared to the previous years. When the history of marketing is examined, it has been passed through many different stages from production and product period to sales period and from marketing period to present. Decisions on marketing strategy are shaped according to the conditions and prevailing paradigm of each period. In today's marketing strategy, decisions are influenced by managing and using data. The companies that want to differentiate in today's competition will be the ones that keep up with this new period. Therefore, long-term planning in marketing requires a perspective that meets the requirements of the new era. This perspective should be supported not only by marketing but also from an integrated perspective in many different departments, from human resources to R & D. For instance, the human resources department of an enterprise that determines the application of artificial intelligence in marketing should also be able to purchase the appropriate personnel. Strategic achievements can be achieved with the harmony between R & D unit, production unit and management.

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KEY TERMS AND DEFINITIONS

Artificial Intelligence: Technical concept referring to transferring knowledge and prediction power to machines or systems.

Data Mining: The process of sense making through processing data.

Digital Marketing: The concept of marketing which uses digital channels and tools for managing marketing activities.

Machine Learning: The concept of teaching machine about specific calculations/processes.

Marketing: Science and art of managing value related activities.

Marketing Management: The business side activity of marketing which includes planning, managing and maintaining several marketing activities.

Text Mining: The process of evaluating text-based data through computer-aided processes.

Chapter 8

Designing Digital Marketing Strategies for International Business: A Comparative Analysis

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ABSTRACT

As its popularity increased, internet was converted to a main marketing tool for many types of businesses. However, it preserves more promising features due to offered globality and rapidness when it comes to communicate people effectively. As invested financial budgets and intellectual power are increased for global brands, which internet marketing strategies a business would succeed in international market has become a crucial inquiry. This study subjected 10 different international brands by conducting qualitative and quantitative research methods to compare efficiency of internet marketing strategies in order to correspond this question.

INTRODUCTION

Our world is getting smaller each day as a consequence of the globalization in every field especially after introducing internet to our lives. In order to adapt globalization, it is almost imperative for business-owners to enter foreign markets and become international, also while doing this to profit latest technological opportunities and factors. Operating on international fields required to minimize the risk of long distances in a quick duration and build strong relationships with customers (Chisholm, 2009). Thus, internet preserves a great opportunity to communicate overseas effectively and by the twenty-first century, serves as a key factor in the light of marketing concepts. Comprising various options of marketing, internet enables to benefit from different channels simultaneously in different business fields when used wisely considering the characteristics of target market. To enhance positive effects of internet marketing it is

DOI: 10.4018/978-1-7998-1125-1.ch008

essential to analyze features of these options along with company's properties and build a strong strategy to beat entanglements of the global market (Fawzy & Dworski, 2010).

International businesses occupy a great place in global market and its position becoming more important each day due to technological progresses of our century. Limitations of an international business can be reduced to the utmost with a significant assistant of internet which is already considered as a major aspect of marketing in both international and domestic markets. The object of study is to review and compare the efficiency of the internet marketing strategies on international businesses in terms of metrics which defined both financial and sociological impacts.

As summarized above research problem can be defined as "Which internet marketing strategies have been chosen by international businesses?" However, since comparative analysis was chosen as a research approach, the extension of this question may be presented as follows: Importance of internet marketing for international marketing, financial statements of internet marketing options for international businesses, if results are not in quantitative, which aspects driving during the selection of internet marketing strategies.

The study aimed to demonstrate impact of internet marketing strategies on the international businesses by presenting numerical data comparison between global brands. However, as a major limitation it has been seen that there are too many different approaches about measurable effects of internet marketing and their direct correlation with return on investment. Thus, by preserving comparative analysis aspect of the study, the research concluded as comparing strategies and their impacts on the considered brands, and comparing return on investment data of different strategies and different brands if it is available.

CONCEPTUAL FRAMEWORK

This chapter presents a general overview to the scope of international businesses, their differences compared with domestic businesses, their risks and benefits along with internet marketing strategies' characteristics and measurement of the impact of internet marketing on international businesses.

Many definitions have been indicated for international business. But a common concept used by different sources is cross border transactions between two or more countries (Geiersbach, 2010; Chisholm, 2009; Perry, 1990). In its simplest form, international business is described as "any business activity that crosses national boundaries. The entities involved in business can be private, governmental, or a mixture of the two" (Ajami et al., 2006). International market is a field where international business has been operated. In contrary to the definition of international market; domestic market is where domestic business has been operated (Perry, 1990). Before describing pros and cons of international businesses it may be beneficial to give a perspective in differences and similarities of domestics and international markets.

Perry (1990), suggests that international marketing as an extension of domestic marketing. By underlining domestic marketing is superior to international marketing, it has been emphasized that domestic marketing features or strategies can be applied to international marketing with limited alterations which may differ from one market to another. However, despite being similar in terms of gaining profits, building basic relationships (Perry, 1990) and requirement of research development process (Geiersbach, 2010), there are certain differences which can be described as essential molders for international businesses. Political environment, legal mechanisms, cultural differences, different marketing infrastructures, possible complexity in documentation process and presenting more unsteady conditions compared to domestic markets, international market required to much more profound investigations to achieve (Ghauri & Cateora, 2011).

As all market's preserver potential risks and benefits which needed to be considered as a whole; international business holds a delicate place due to its cross-border transaction processes. Differences and similarities outlined above section, these drawbacks and positive effects have been taken by them. Table 1. indicates risks and benefits of international business as summarized by Ghauri and Cateora (2011):

Giving the factors required to be reviewed to run an international business successfully, it is essential to intervene to the marketing events since it is the key concept of the success of any type of a business.

As a domestic company decides to enter to a foreign market it is required to consider adopting alterations caused by differentiations of business environment. Simply, business environment is accumulation of internal and external elements regarding to operation of the company (Ferreira et al., 2009). Worthington and Britton (2006), suggests that business environment has two main components including macro environment and microenvironment. Among them macroeconomic environment more related to the aspects of international marketing contains external elements such as political, economic, socio-cultural, technological and legal factors. On the other hand, microeconomic environment consists of consumers, stakeholders and suppliers and finally, a company's internal environment is sum of workforce, monetary issues, operational instruments, products and operational duration. For international businesses, business environment is a critical element since it effects broad fields from expectations of profit yield to marketing strategies (Kotler& Armstrong, 2006). Thus, from the moment of a business was introduced to the market whether domestic or international.

Transforming an existed domestic company to an international one is critical process. It is an obligation to understand the risks and benefits of interested foreign market(s) and construct a realistic expectation to harvest a remarkable profit for a certain time interval. As a matter of fact, these obligations and recommendations are valid for any type of business whether it is a new form of business at start-up process or a well-established domestic company which planned to enter a foreign market (Chisholm, 2009).

Samli (2013) described some basic steps to be considered for whole international market entry process as follows:

1. Deciding on a target country
2. Deciding on a market to enter
3. Deciding entry strategy for target market
4. Deciding on the market program

Table 1. Risks and benefits of international businesses

International Business	
Risks	Benefits
• Extreme cost differentiation may occur in engaged workforce	• Overabundant production
• Considering diversification in terms of socio-cultural, economical, political or technological aspects profits may be influenced deeply	• Positive affects on firm's reputation due to entering a global market
• As a consequence of operating in a foreign market; anti-dumping duty may prevent huge stock selling in lower cost	• Increased profit margin
• Required modification of the goods may reduce the impact on economies of scale	• Seasonal unsteadiness of local markets may be compensated by another foreign market

Source: (Ghauri and Cateora, 2011)

5. Deciding on marketing organization

According to indicated steps above; it is indicated critical decision procedure before introducing a company to a foreign market. For instance, current situation analysis for target country and opportunity assessment for both country and target customer profile will directly influence the whole prospective strategy for the company. Since domestic company presents more risk-free environment for a company due to less competition advantages, no currency exchange or financial risk possibilities or uniformity for cultural aspects; international markets still preserve an appealing opportunity for dominating market if marketing management accomplished intelligently (Ajami et al., 2006; Perry, 1990).

While there is evidence of some marketing methods being used in the ancient and medieval ages, the marketing discipline in the modern sense formed in the early 20th century. Bartels (1988) offers a chronology of marketing theory, which sees the discovery of the basic marketing concepts in the 1900s and their evolution through the decades. The chronology can be generally divided into five eras: production orientation, product orientation, sales orientation, market orientation, and holistic marketing orientation (Kotler & Keller, 2006; Hoffman et al., 2005; Bartels, 1988). However, since marketing practices from different evolutionary periods coexist today, the development of marketing should not be examined in a strictly linear fashion. This means that the different orientations should rather be understood as competing concepts, all of which can be used depending on the needs of the organization:

1. The production orientation holds that consumers will prefer products that are widely available and inexpensive;
2. The product orientation holds that consumers will prefer the best products on the market, and can be expressed as “If we build it, they will come”;
3. The sales orientation holds that the organization must undertake an aggressive selling and promotion effort because the consumers will not buy the organization’s products if left alone, and can be expressed as “Sell what we make”;
4. The market orientation holds that to achieve the organizational goals the company should be more effective than competitors in creating superior value to its chosen target markets, and can be expressed as “Make what we sell”; and
5. The holistic marketing orientation or the relationship marketing orientation holds that everything matters with marketing, and that a broad, integrated perspective is often necessary, and can be expressed as “A 360-degree view of serving customers”.

The production orientation is held as one of the oldest concepts in the business while the holistic marketing orientation is a relatively new idea, and is yet to be fully defined. That said, all of the above orientations can be used at any point given the short-term and long-term goals and objectives of the organization.

Marketing can be seen as an exchange process in which “two or more parties give something of value to each other to satisfy needs or wants” (Hoffman et al., 2005, p.10). In this sense, exchange has a prominent place in the marketing definition given by the American Marketing Association, and has long been used as a key factor in understanding the role of marketing (Houston & Gassenheimer, 1987; Bagozzi, 1975). According to Kotler and Keller (2006), there are several conditions that must be satisfied for exchange potential to exist:

1. There are at least two parties;
2. Each party has something valuable to the other party;
3. Each party can communicate and deliver;
4. Each party is free to accept or reject the exchange offer; and
5. Each party believes it is desirable to deal with the other party.

Whether the exchange will take place or not, however, depends on the terms of the agreement between the two parties (Bagozzi, 1975). In any case, marketing facilitates the exchange by providing (Hoffman et al., 2005):

1. **Form Utility:** Transforming raw materials into finished products;
2. **Place Utility:** Making the product readily available;
3. **Time Utility:** Making the product available in timely fashion; and
4. **Ownership Utility:** Transferring the product title from producer to consumer.

Marketing can also be seen as a social process “by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others” (Kotler & Keller, 2006, p.6). This means that through their marketing efforts the organizations generally improve the standard of living, an idea that has been further expanded by the concept of societal marketing, which takes a prominent place in the discussions of the modern marketing organization. Societal marketing can be defined as “satisfying customer needs and wants in a manner that is in the best interest of customers and society-at-large” (Hoffman et al., 2005, p.13). In theory, the societal marketing concept should look beyond the customers’ short-term self-interest, and work on improving the customers’ as well as society’s long-term welfare by providing customers with alternatives, making products more affordable, promoting societal causes, providing jobs, etc. Societal marketing programs, on the other hand, increase the brand equity of the organizations by building brand awareness, enhancing brand image, establishing brand credibility, evoking brand feelings, creating a sense of brand community, and eliciting brand engagement (Hoeffler & Keller, 2002).

As an organizational process, marketing is focused on developing and implementing a successful marketing strategy within an unstable business climate (Hoffman et al., 2005). This is particularly achieved by gathering marketing intelligence, establishing the product’s value proposition and satisfying customers, which in turn leads to sales growth, profitability and other organizational objectives. Research has also shown some of the features of marketing as an organizational process (Tatikonda & Montoya-Weiss, 2001):

1. The organizational process factors are associated with achievement of operational outcome targets for product quality, unit cost, and time-to-market;
2. Achievement of operational outcomes aids the achievement of market outcomes, which suggests that development capabilities could be very valuable organizational resources;
3. The above relationships are strong even under conditions of technological, market, and environmental uncertainty.

As the above information suggests, crucial concept in the development of the marketing strategy is the marketing mix, which will be further analyzed in the following section.

Marketing is described as accumulation of process chain consist of communication, creation and delivery to customers with assistance of customer relationship management (CRM) in a way to gain benefits for both organization and stakeholders (Kotler & Keller, 2011). Marketed elements were defined as products including all kinds of goods, services, properties, informations, organizations and experiences which required to consider demographic, financial, socio-cultural, political, legal, technological and natural situations to accomplish better marketing management (Ajami et al., 2006). Marketing has become a key concept since the very early form of shopping was defined. By the means of ability to sell or promote something towards to gain more profit, marketing naturally transformed through the historical events more specifically in terms of technological and socio-cultural aspects. At the present time marketing is grouped as traditional and digital marketing (Mirzaei et al. 2012).

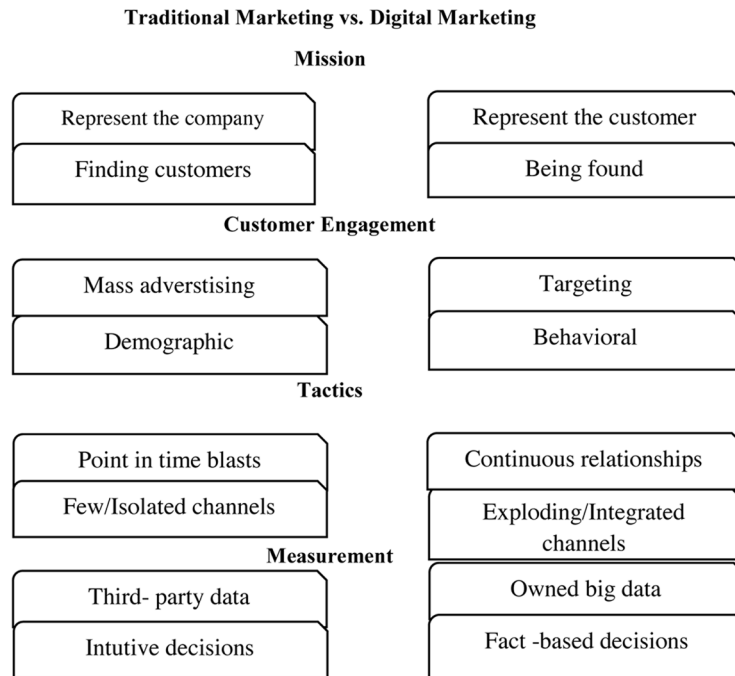
Described as 4Ps principles by Kotler and Keller (2011), traditional marketing is the oldest form used by companies since decades. Those 4Ps included, product, price, place and promotion which needed to be carefully operated to fulfill the requirements of the market and upgrade the reputation of company. Product takes the place of every kind of marketed items which customer wants or needs. Price, described as easiest principle to contrive, required to be adjusted according to the product principle. Price is completely driven by product's objectives. Place is represented in terms of distribution channels, factory, storage and warehouse positions which can directly affect the profitability of the company possible cost increments. As a final element, promotion –the strategy to be chosen to reach target customer- considered as a crucial principles of 4Ps. Promotion includes any type of communication models to upgrade visibility and salability of the product and utilizes advertising, PR, sales forces in order to achieve this goals. Traditional marketing encompasses printed materials (newspapers, pamphlets, magazines etc.), broadcasting (radio and television), direct mailing (postcards, direct letters, catalogs etc.), and telemarketing (calling customers over the phone) devices (Mirzaei et al., 2012). The efficiency of traditional marketing influenced by development of digital marketing; however it would not be accurate to state that digital marketing completely invaded marketing industry. Prolificacy of traditional marketing and impact on digital marketing to the traditional marketing will be discussed in further chapters.

Digital in contrasted with analogue, means “relating to, using, or storing data or information in the form of digital signals (Oxford Dictionaries, n.d.) and in the present day mostly associated with computer-utilized processes. As traditional marketing, digital marketing aims to accomplish to promote company's reputation and sales proportions by some differentiations on utilized devices. Digital marketing often used as a substitute for internet marketing, but internet marketing is in scope of digital marketing, and thus, digital marketing considered as a broader concept since all devices orchestrated with digital signals including television (TV), radio, internet and mobile mediums are described as elements of digital marketing (Ryan and Jones 2009). Although, the main target of digital marketing is identical with traditional marketing, there are certain differences in terms of mission, customer engagement, tactics and measurement aspects as illustrated in Figure 1:

It is possible to deduce digital marketing as more personal, comparing to traditional marketing channels, as Figure 1 demonstrated elaborately. Digital marketing aims to be noticed by customers and create a sensation that representing customer oneself directly. As Ryan and Jones (2009) discussed, digital marketing preserves opportunities to communicate consumers one-to-one with almost unlimited channel options and create a remarkable brand loyalty as a result of this personalized engagements. By including TV, radio and billboards digital marketing it is obvious there are junction points with traditional marketing. But as the main scope of this study is internet marketing, it is necessary to demonstrate the relationship between digital marketing and internet marketing Figure 2:

Figure 1. Comparison of traditional marketing and digital marketing

Source: (Vardanyan, 2014)

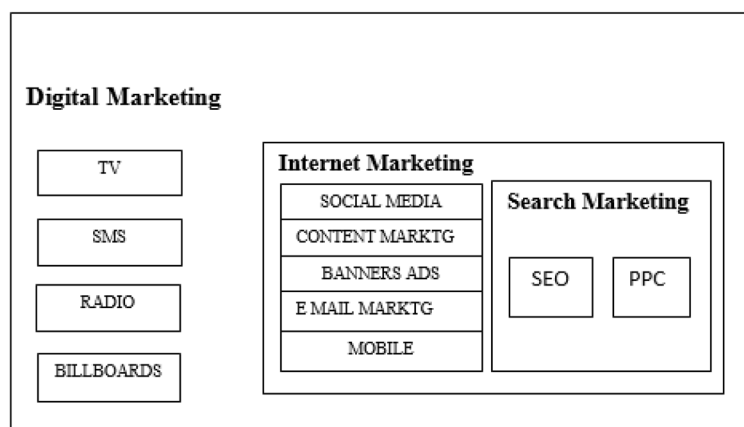


As one of the main components of digital marketing, internet marketing is deeply investigated field and indicated as a crucial strategy in the age of information. Hence the function and characteristics of the subfield of internet marketing application required to be reviewed carefully.

Internet is “a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols” (Oxford

Figure 2. Relationship between digital marketing and internet marketing

Source: (www.reliablesoft.net)



Dictionaries, n.d.). Aside from, its technical definition, internet has become one of the most common communication and acquiring information tools for our century. As a consequence of the popularity and provided technical advantages made internet as a key player for marketing industry. Chaffey et al. (2006), defined internet marketing (or online marketing) as accumulation of marketing tools powered by internet to drive sales, enhancing customer profiles and exceed profits of the company.

Today, the success of every organization depends on its marketing capacity. If there is no demand for the product or service of a given company, the effectiveness of its business support functions will not matter much. For this reason, marketing practice and theory play a prominent role in the present corporate landscape, and their effects are visible at all times through an increasingly broad choice of media. However, finding the right marketing solution can be very difficult both for upstarts and well-established companies, especially in periods of great technological changes. The marketing manager has the responsibility of the design of the new product, its final customer price, place of sale and promotion budget, all in a very fluid and competitive marketing environment. To this end, the marketing manager must carefully monitor the behavior of the customers and competitors in order to maximize the overall value of the product. This is where Internet marketing really comes in. Internet marketing is different from traditional marketing communications because the Internet and other digital media such as smart-phones, tablets have enabled new forms of interaction and information exchange between the various stakeholders – prospects, customers, media, shareholders and partners. The importance of the Internet might vary among different fields but it is impossible to deny that the behavior of the stakeholders has radically changed. After all, Internet usage is constantly increasing across the globe and it is only natural that consumer behavior will be appropriately modified to accommodate this change. The Internet also presents a big opportunity for marketers, broadening the marketing field through significant shifts in personalization, direct response and marketing research, as well as an overall transformation of the integrated channel communications.

Internet marketing is a very recent term; however it is one of the fastest developed, most promising and thus, most invested marketing tools (Ryan & Jones, 2009). The reason of foreseen opportunities that internet marketing preserves is directly related to the progress and instant pervasion of internet usability in a short time. As Table 2 the number of global internet users.

Considering the wide internet penetration all over the world (approximately 4, 38 billion people by Jan 2019), it is impossible to ignore internet as a marketing tool. Giving the consideration to the simplest definition of internet it is clear that it presents solid advantages for international marketing industry just by creating a global network among the people even who lived in long distances.

When we consider the elements of internet marketing, as a marketing strategy is established towards the marketed products and consumer profiles (Kotler & Armstrong 2006), there are various options in internet marketing in order to enhance its efficiency Figure 3 Unlike the traditional marketing tools,

Table 2. Global Internet user statistics

Internet Use: Device Perspective(June 2019)			
Total Number of Active Internet Users	Internet Users as a Percentage of Total Population	Total Number of Active Mobile Internet Users	Mobile Internet Users as A Percentage of Total Population
4388 Billion	57%	3986 Billion	52%

Source: (Wearersocial Statistics, 2019)

Figure 3. Elements of Internet marketing

Source: (www.reliablesoft.net)



Internet itself is growing and transforming rapidly, thus it is essential to investigate and comprehend current internet marketing elements properly in order to keep familiarity and track future developments to expand profit margin as much as possible.

A website is “a location which contains one or more webpage maintained by internet connection”. Mainly a website aims to navigate user properly to reach his/her target actions (Fawzy & Dvorski, 2011). By maintaining a good website infrastructure it is possible to promote marketing activities as well. A website maintains connection between customer, supplier, employee and employers. Beside advertising and promotions, it is also possible to evolve a website to conduct human resource management (HRM), customer relationships management (CRM) and PR activities at the same time (Macfarlane & Bultitude, 2012).

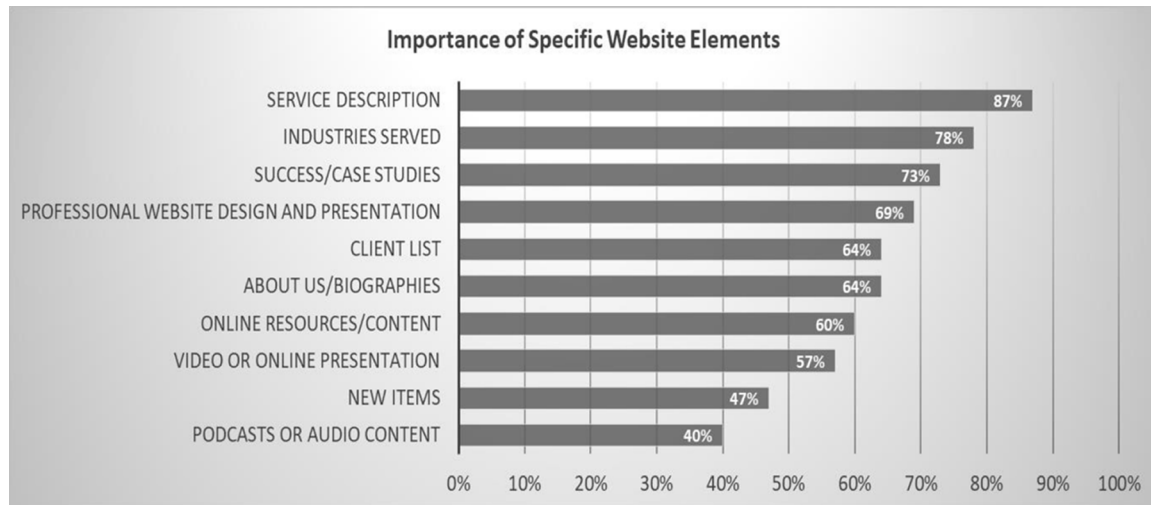
For a business website it is crucial to be user-friendly, upgrading brand visibility, sustaining up-to-dateness and being clear about service segments and marketed products are described as critical aspects (Fawzy & Dvorski, 2011). According to a survey conducted by RainToday (2009), other website elements indicated as important are illustrated in Figure 4.

According to the findings of the survey, consumers value the marketing credibility of the products and think that it is important to be clear and simple about the service description through the website. Also, it is an important evidence that specific case studies and extent of industries served were found crucial for consumers. It may be important especially for international businesses, since becoming global present an advantage for the marketed products. Macfarlane and Bultitude (2012) also underlines the necessity of globalization of the websites of the company through updates according to the different time zones, multiple language options through the target foreign markets and familiarity to the different cultural aspects to achieve website functions efficiently.

A search engine is a specialized website that scans and indexes web pages or registered sites, allowing users to search the resulting index by entering the keywords with their specified interests (Chaffey et al., 2006). Typical examples of search engines are Google and Yahoo, the growth of which suggests the significance of search engine marketing within the integrated marketing mix. Simply put, search engines

Figure 4. How important is website elements according to the consumers?

Source: (RainToday, 2009)



are vital for attracting visitors to a website, and the higher the rank of the organization or product in the search engine results, the more visitors will be drawn to the website.

Search Engine Marketing has turned into an inexorably focused fragment of business in the Web business and especially among ecommerce merchants. In spite of the fact that SEM can fill in as a key advertising driver for any e-business, it is a particularly effective instrument for web-based business because e-business sites commonly have lower user traffic and higher income than a content web site. This implies even a little increment in activity can make a substantial increase in incomes. In this manner making it exceptionally cost effective for an online business vendor to contribute promoting dollars on search engine marketing as a general piece of their business' advertising plan and activities. One essential refinement while advancing an ecommerce website versus a content website is that your website ought to be setup to utilize web index agreeable URLs and significant identifiers.

Most of the e-businesses websites are database driven and most of the shopping basket solutions are not search engine friendly. This can exhibit an issue since search engine tools may experience difficulty navigating your pages. If a search engine indexes your homepage as opposed to your product pages, you may miss out on key activity since consumer frequently search for correct brand names or product names.

Likewise of critical significance with ecommerce websites is the correct improvement of image data to help the Search Engines in distinguishing the key concentration of individual product webpages. Utilizing proper identifiers in image code constructs pertinence quality for every product webpage and will give additionally boosting in Search Engine rankings. Special consideration should likewise be paid to the structure and outline of a multilingual site. In most cases, vital changes to website structure, source code, URLs, and space names might be fundamental. Besides, imagery, hues, and page design will have distinctive intentions from culture to culture, and may should be altered to improve the experience of a retailer's multilingual guests. According to the study conducted in 2010, fifty-eight percent of Americans conduct an online search before buying a product (Jansen, 2010). By which way do they do this search?

Search engines are computer programs created to find and reach desired websites or information by using key words (Google n.d.). Currently, there are various search engines on Internet (Figure 5) and despite minor differentiations from one country to another, Google leads the market by far.

Search engines have become more and more important each day due to the opportunities they preserve for business owners as well as their wide range of uses in pre-buying process for consumers (Moran & Hunt, 2005).

Search engines retrieve information through the databases they corporate. By entering key words, they bring the most relevant results to the user and aim to satisfy their inquiries. Just as website has, search engines also have their own ranking systems (Ryan & Jones, 2012). Ranking system simply indicates the popularity and visibility of the website. Among the recent developments of search engines offered, upgrading the visibility of a website by fixing them to the first pages has become very popular marketing tool (Moran & Hunt, 2005). Recently defined terms included search engine optimization (SEO) and pay-per-click (PPC) have become very important tools to drive marketing remarkably (Chaffey, 2006).

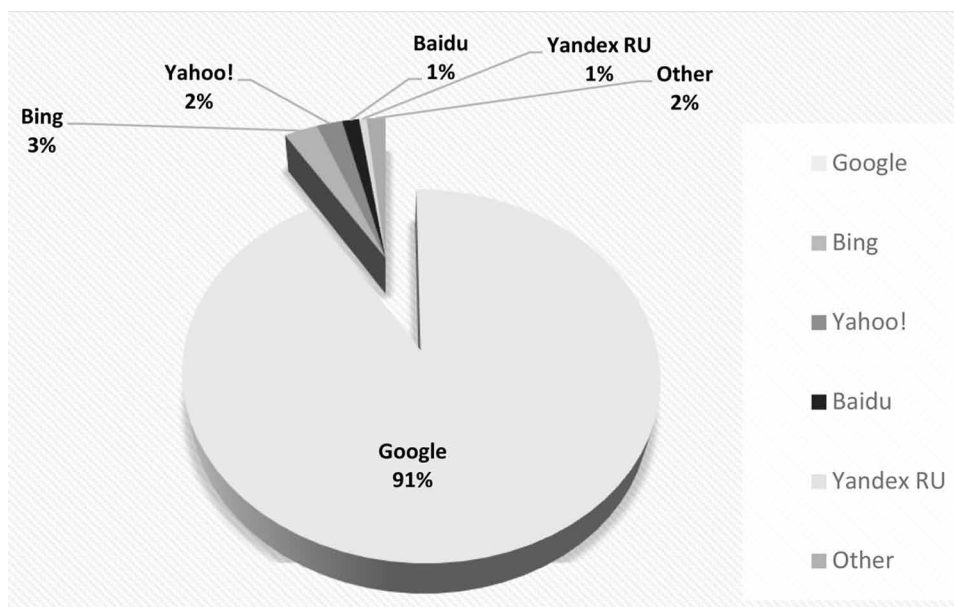
As it means very critical for small and medium sized companies, being top of the search engine result pages may not be that critical. Because of their well-established popularity, websites of global brands usually reached by direct links not by search engines. These loyal direct visitors have been marked as success of traditional marketing tools which created unique brand awareness (Chaffey, 2006). Search engine marketing mostly related to SEO which is the technique to upgrade company's website's visibility in the first pages of a search engine which penetrated for searching desired key words. It has been described as a simple and easy form for increment of website traffic and ranking system (Ledford, 2008).

There are crucial steps to achieve SEO properly included (Chaffey, 2006):

1. Initially, submission of the website to various search engine to introduce a website to internet

Figure 5. Search engine shares graph (Jan 2018 - Jan 2019)

Source:(Statcounter)



2. Investigation for keywords and key concepts to meet more accurately searching process. This investigation also contains the keyword density which is defined as frequency of entry of a certain keyword which lead to increasement of page ranking
3. Link building between high-ranking webpages to gain bilateral profits in virtual medium.
4. Utilizing HTML as a tag due to its superiority on the search engine utilization
5. As a part of up-to-dateness concept, sustaining a dynamic content enhances the possibilities to acquire higher rankings.

PPC, or cost-per-click (CPC) refers to an online advertising structure which appears on specific part of the search engine result page when explicit key word was entered. Leading search engines included Google, Yahoo! and MSN all have their own PPC systems named AdWords, Yahoo! Search Marketing and adCenter, respectively. As they differ mainly payment policies; PPC enhances for advertiser following issues (Mordkovich & Mordkovich, 2005):

1. Content building for relevant advertisement
2. Linking keywords and advertisement accurately
3. Building a well-established payment policy (usually determined for each keyword)
4. As whole computerized issues, PPC also based on algorithmic process to achieve following concerns (Ledford, 2008):
5. Considering editorial guidelines, extending an investigation for the advertisement
6. Demonstration of the advertisement pertaining to the entered keywords
7. To analyze measurable parameters including rankings, status, keyword statistics etc. in order to extent proficiency of the system.

Another important aspect for SEO is bid strategy refers to the maximum bid to pay for advertisement. Basically it is the maximum number determined by the meaning of minimum amount by search engine company but its maximum amount depends on the business-owner. Paid bid amount is corelated with the position of the sponsored website's visibility primarily. Thus it will affect the click-through-rate (CTR) means the number of the people who click on the sponsored link. This CTR statistics directly determines whether website will preserve its place, upgrade to higher place or drop down.

As another important component of SEO, online partnership contains link building, affiliate marketing and online sponsorship. Link building consists of visibility of the sponsored link of a certain website on third-party websites. Besides advantages of efficiency and bilateral online PR functions, link building is also considered time consuming process since detailed checking mechanism for the sponsored ads required (Chaffey, 2006). Affiliated links refer to the direct buying links for the products appeared on a webpage. A retailer pays to the website owner who displays products on his/her websites and constructs a direct link for shopping. In contrast to link building mechanism, affiliate marketing considered as safer and more auitable since there is no obligation to pay anything until the relevant product has been purchased (Edelman, 2014). As last element of online partnership, online sponsorship aims mainly brand awareness and reputation via linking a brand with the website content (Chaffey, 2006). To summarize, SEO has become very popular and productive tool of Internet marketing considering prevalence of utilization of search engines among consumers and broad opportunity intervals they offered via different options.

Similar to the PPC mechanism, banner advertising consists of settlement of ad banners on other websites, however it differs from PPC in terms of non-intervention of third-party websites or search en-

gines. Banner advertising is present in various forms including video ads, pop-ups or layers (Manchanda, 2004). Banner advertising aims to achieve brand promotion, increasement in sales and drive web traffic of the company's websites by clicking the sponsored link to lead main website. Just as, advertisement strategies of SEO, banner advertising also takes account of CTR, content of website, ranking and ad impression (Kuneinen, 2013).

E-mail marketing categorized according to who sender and receiver are. If e-mails were sent to customers from the constitutions it is outbound e-mail marketing, whereas companies take the role as receiver and customers as sender; it is named as inbound e-mail marketing (Fariborzi, 2012). By 2013, e-mail marketing strategy is most preferred digital marketing strategy (Figure 6).

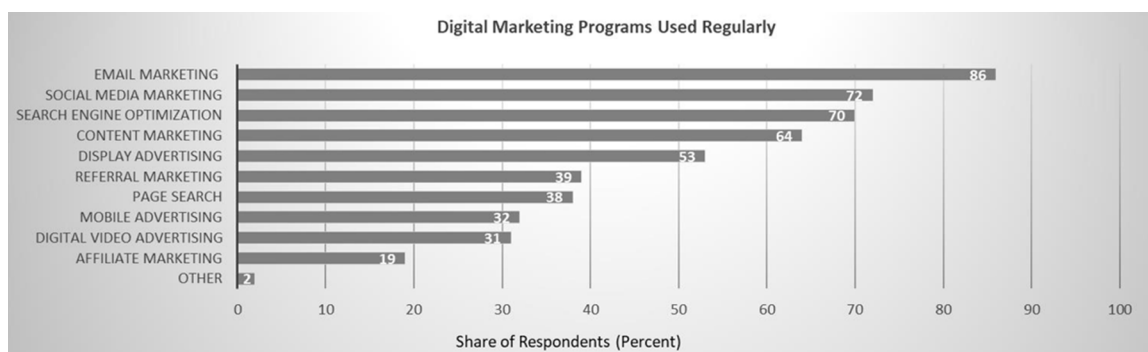
Mainly, e-mail marketing consists of maintaining communication between customer and company via e-newsletter or regular e-mails. Just as, other Internet marketing strategies there are certain metrics mechanism to measure effectiveness of e-mail marketing including delivery rate, open rate and CTR. Percentage of delivered e-mails defined as delivery rate which utilized to address viability of e-mail adress or blockage ratio. The data demonstrate metrics of opened e-mail ratio called open rate. Open rate has been indicated as an important aspect since number of receivers delete the sent e-mails without reading (Fariborzi 2012). And finally, CTR alludes to the number of delivered e-mails are clicked (Chaffey, 2006). E-mail marketing comprises three forms called cols e-mail campaign, co-branded e-mail and third party e-newsletter. Chaffey (2006) stated the properties of those types of e-mail marketing as follows:

1. Cold e-mail campaign: Regarding to bilateral delivery agreement, receiver (consumer) receives an e-mail from an organization which assigned a customer mail list provider
2. In order to gain customer's interests a company sends an offer via e-mailing called co-branded e-mail.
3. Third party e-newsletter consists of advertisement of one company on a third party sponsorship.
4. As another internal measurement inbound e-mail statistics plays key role for e-mail marketing. It is crucial to establish an efficient inbound customer contact strategy and advance CRM (Fariborzi, 2012).

Last decades of twentieth century were mainly driven by personal computers. However starting with early years of twenty-first century led by mobile devices. Mobile devices consist of any type of portable

Figure 6. E-mail marketing is leader among the digital marketing strategies

Source: (Gigaom Research, 2018)



devices such as cell phones, smartphones, tablets and other handheld devices like e-readers (Techopedia n.d.). Mobile device usage increased dramatically by 2010 as illustrated in Figure 7.

By means of marketing mobile devices penetration for digital marketing is just as novel as their invention. Leppäniemi and Karjaluo (2008) described mobile marketing as engaging mobile devices for promotional activities in order to acquire similar targets to other types of digital marketing channels. Additively, mobile marketing operated in four different field including mobile marketing, mobile advertising, wireless marketing, and wireless advertising. Although not many literature incorporated mobile marketing academically, remarkable and rapid spreading of mobile device usage triggered the investigation of mobile marketing strategies by international brands (Rowles, 2013).

As demonstrated in Figure 7, mobile marketing is still behind e-mail marketing, social media marketing SEO, but its role and invested mobile marketing budget increased dramatically and foreseen budget target in future shows the importance of mobile marketing strategy .

As Figure 8 demonstrated, one can conclude mobile marketing would dominate digital marketing fields by taking account of dramatic spreading of mobile device usage all around the world. Rowles (2013) suggests that current mobile marketing strategies based on retrospective statistics and prospective presuppositions which reviewed by marketing authorities. However, by foreseen increment of mobile marketing investigations it is inevitable to intensify marketing budgets and intellectual power to mainly mobile marketing topic. As mobile devices included handheld devices and other portable machines, by preserving core target of marketing, it is essential to maintain interactive features of the marketing campaign. It is possible to conduct mobile marketing by two ways included 2-way interactive and 1-way broadcast. When a promotional advertising delivered to the customer's mobile phone, receiver mobile phone number was recorded to the company's databases for prospective marketing campaign usage is called 2-way interactive mobile marketing strategy. After introducing customer to the database maintaining communication and delivery of promotional campaigns called 1-way broadcast (Rowles 2013). Other types of mobile marketing includes short message service (SMS), multimedia message service (MMS), quick response code and mobile advergaming.

Figure 7. Number of mobile users worldwide between 2010 and 2020 (in millions)

Source: (Statista, 2019)

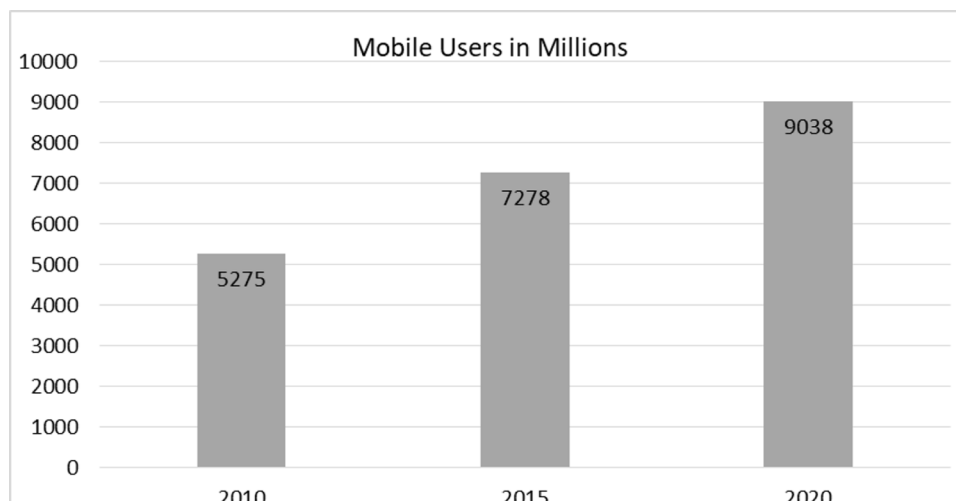
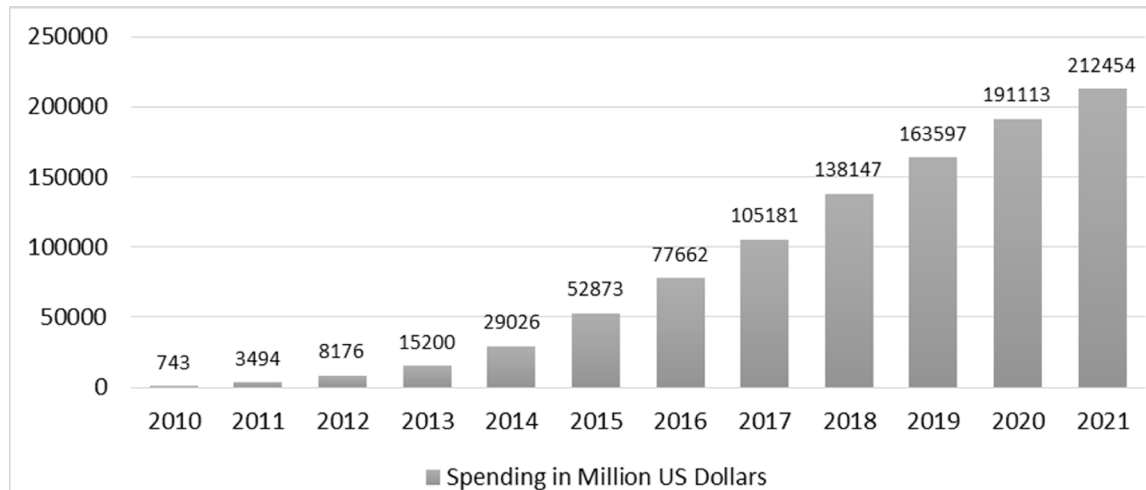


Figure 8. Mobile advertising spending worldwide from 2010 to 2021 (in million U.S. dollars)

Source: (Statista, 2019)



The rise of the social media, anchored with the establishing of the Web 2.0 platform, has allowed people to build new social and business connections, share information and collaborate on online projects, creating new marketing opportunities in the process (Parise et al., 2008). Social media marketing focuses on creating content that will attract attention and encourage Internet users to share through their social network profiles. The idea here is that the intended marketing message would be spread among users because it is coming from a trusted source, an opinion maker, instead of the organization. To this end, the goal of the social media marketing campaign is to create a social authority – an individual or organization that is established as an expert in a given area. The social authority would then spread the marketing message through various platforms and applications such as YouTube, Facebook, Second Life or Twitter. The problem, however, is that the authority should be genuine, and established through direct contact with the Internet users.

Just by saying Facebook reached 1.52 billion active user by 2018 (Statista, 2019), would be enough to emphasize the power of social networks among the people. Social media based on social networking refers to platforms aim to create and extent relationships with other people (Kawasaki & Fitzpatrick, 2014) is now one of most important Internet marketing elements since seventy-two percent of digital marketing strategies invested on social media marketing. To maintain CRM, HRM and PR simultaneously in an effective way and to promote brand awareness through social media is a common strategy used by both global brands and small businesses. However, social media indicated as a delicate platform (Chaffey, 2006), and a company which conducts traditional advertising successfully may stumble when it comes to communicate virtually.

Many social media platforms of businesses were adopted by functioning to receive customer reviews, observe brand value from the view of people and measuring the reaction of a certain marketing campaign (Kawasaki & Fitzpatrick, 2014). International companies through their marketing budgets, invested enormous amount of money and intellectual power for social media marketing with a great care, since the evidences showed prestige and reputation of a company may easily be reversed on social media (Fawzy & Dvorski, 2011). As a summary, internet marketing preserves appealing opportunities

and becoming more popular and crucial by each day internet usage increased. However, it is important to understand utilization of each element of Internet marketing to maintain a successful strategy by means of global brands.

Measuring the Effect of Any Types of Marketing: Return on Investment

In business, a profitability of an investment was measured by return on investment (ROI) a ratio calculated by dividing the result of subtracting gain from investment and cost of investment to the cost of investment as shown in Equation 1.1.

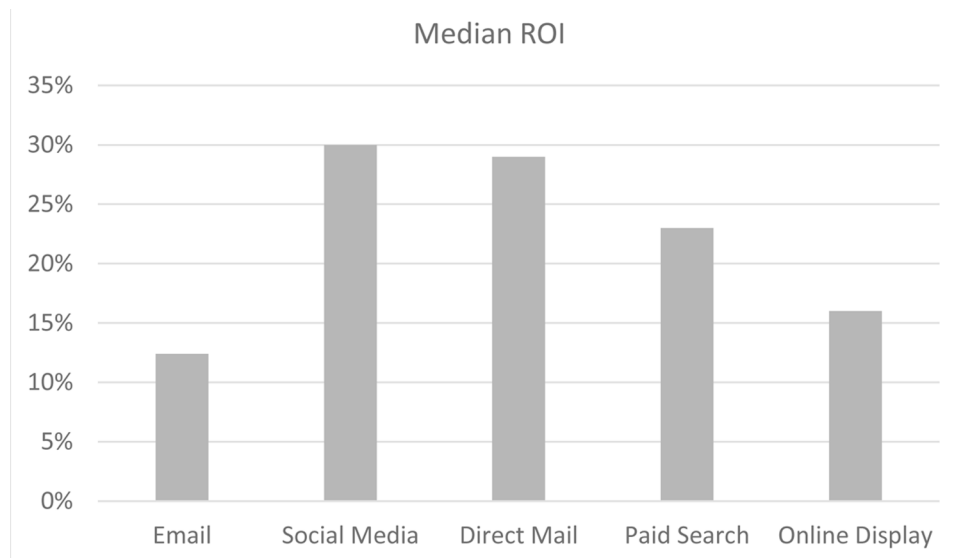
$$\text{ROI} = (\text{Gain from Investment} - \text{Cost of Investment}) / \text{Cost of Investment} \quad (1.1)$$

A positive result of ROI demonstrates the company earning profits. By the meaning of traditional aspects it is more facile to determine ROI of marketing, however it has become tricky to apply ROI statistics to digital marketing (Hoffman & Fodor, 2010). Figure 9 shows the ROI comparison of digital marketing strategies. According to the annual report of Google, ninety-six percent of company's revenue consists of advertising Google AdWord and Google Adsense, which was \$43.7 billion by 2012. (Google, 2012).

Unfortunately, it seems inaccurate to endure the findings from Figure 9 to analyze ROI of social media marketing, because Hoffman and Fodor (2010) suggests the metrics of ROI needed to be redefined for social media marketing instead of monetary incomes, social network terms follower, interaction, hashtags, subscriber and likes needed to be taken into consideration to measure efficiency of social media marketing. Not just Hoffman and Fodor (2010) but other studies evaluated ROI as an ineffective metric to investigate function of Internet marketing as well (Veldhuizen, 2008; Epstein & Yuthas, 2007).

Figure 9. Median ROI generated by selected direct marketing channels according to marketers worldwide (2017)

Source: (Statista, 2019)



As a conclusion, no matter traditional or digital, marketing plays crucial role for any type of businesses. Nevertheless, giving the delicate conditions of international markets, Internet marketing takes the leader role due to its nature which makes possible to reduce distances by creating a global network and maintaining communication easily between customer and company. When used intelligently, Internet marketing presents unlimited advantages and opportunities for international businesses. Not just enduring monetary incomes but considering actual prospects of Internet, it is possible to promote company's prestige and increase sales all around the world.

METHODOLOGY

This study objects to understand internet marketing strategies conducted by international businesses aims to answer the questions indicated in section one, by taking account of research limitations in next section. At first, object was to investigate a comparison of ROI in terms of different Internet marketing strategies; however as outlined section ROI indicated as inaccurate metric for measuring efficiency of online marketing.

Research Design

Research design defined as plan and structure of the investigation which clearly outlines sources and concerned data collection process for the study (Saunders, Lewis & Thornhill, 2003). As illustrated in Figure 10, research design process of this study consists of literature review of theoretical background of the research topic and obtaining relevant data from selected case studies of Internet marketing strategies invested by international companies. To examine different aspects of the study, qualitative and quantitative analysis methods were combined and comparative approach was conducted to review both of these methods. A qualitative analysis is a research method aims to investigate phenomenal concepts by responding questions based on experiences, views and definitions (Meurer et al., 2007). By qualitative analysis researcher intensifies questions such as "What?", "When?" "How?" and "Who?". Thus, qualitative analysis considered critical approach in social sciences since its advantages enhance the examination of natural phenomenon (Saunders, Lewis & Thornhill, 2003). Another method utilized for this research is quantitative method which includes analysis of mathematical/statistical findings to show superiority or inferiority of a specific tool (Gorman & Johnson, 2013).

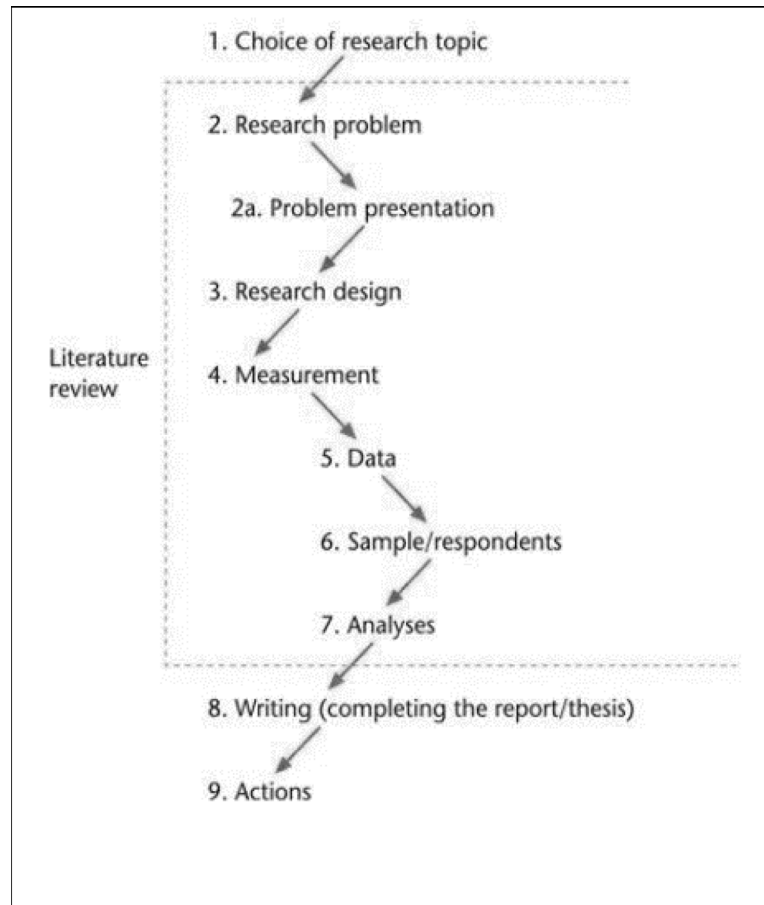
In social sciences, comparative analysis defined as rigid investigation by contrasting values of two or more characteristics (Ragin et al. 2003). By utilizing comparative analysis for a study, it is often aimed to demonstrate certain superiority or inferiority especially combining with the evidence from quantitative analysis (Caramani, 2008). For this study, mixed research methods were investigated on different case studies in order to understand Internet marketing strategies conducted by international companies.

Studies in Scope

Tetere (2011), investigated mobile marketing strategies of three global sportswear companies included Nike, Adidas and Puma. With an overview for each brand, author attempted to relate main perspective of the companies with their mobile marketing strategies. By conducting an empirical approach on a case study mobile marketing tools were grouped and described under various aspects as follows:

Figure 10. Research design process

Source: (Ghauri and Gronhaug, 2010)



1. Mobile Internet (mobile websites and social media utilization through available options such as Facebook, Twitter and YouTube)
2. Mobile services described as mobile store and mobile sales promotion
3. SMS and MMS
4. Utilization of applications and games

Literature review of this study also mostly investigated on comparison of those three brands in terms of brand identity, marketing strategies and product functions. Outcomes of study showed that while Adidas integrated its mobile websites with other channels like social media accounts, mainly to promote its campaigns, Puma focused on mobile store which mainly function as product related tool by giving no specific information about campaigns or company itself. On the other hand Nike has a well-designed mobile website which can be customized through the customer's interests. Despite of emphasizing to its campaigns, Adidas' mobile website is lack of detailed information thus it is identified as mainly focused on young age interval and narrow-scoped. Also their social media strategies found similar in order to engage customer relationships by penetrating reciprocal communication through replying posts. In terms

of mobile store availability all three companies modify their mobile store mainly on purchasing product process. SMS and MMS are not often preferred tools while mobile advertising occupies a remarkable place among them. All three brands have mobile application which can be utilized for taking interests of one certain company.

Petersen (2014) published a review which intensified ROI of social media marketing strategies of international companies included Walmart. As described a pioneering retailer company, Walmart uses Facebook as a main tool of social media marketing. By demonstrating its popularity on its official Facebook page with 8,167,973 fans and estimated value of one fan of Facebook page determined as \$71.84. Hence total value of Facebook page of Walmart deduced as \$586,787,180. Minimum bid of Facebook page is \$2.00 PPC. Author also underlines the value of one fan correlated with brand value as well. Thus it wouldn't be same value if one person likes a small business' Facebook page. By analyzing Facebook policy of Walmart, Peterson demonstrated additional relationship between customer and company in terms of loyalty since forty percent of the customers visited Facebook page before its own website and retailer stores. Also, highlighting Walmart's Facebook posts were mostly product related, company comprehended an obvious statistics –eighty percent of the online shopping customers scan reviews and recommendations before purchasing a product- carefully. By penetrating product related posts Walmart also overcomes market search online and reduces the cost of this process. Additional data may be included as 2012, Walmart spent only \$524 million budgets of total advertising budget which is \$2.1 billion to TV advertising and rest of them invested on social media channels (Banjo, 2012).

Jessen (2013); investigated a research focused on impact of the Stratos mission social media strategies of Red Bull. By introducing the Stratos mission, jumping from edge of space -39,045 meters in height- to the earth, accomplished by Felix Baumgartner and made him first man in history who exceeded supersonic limits by himself; Jessen presents a relationship between Red Bull's social media marketing metrics and its sponsorship to the mission. Despite it has been stated as main goals of the mission were "testing human body limits and understand the human behaviours under the space conditions" it has been claimed, Red Bull also intended to promote its brand value as well. By describing Red Bull as the highest selling energy drink in the world with a mainstream target customers included young men in age range 16 to 29; Red Bull used "Gives you wing." as a slogan which actually refers to caffeine level of the drink, but highly promoted by sponsorships to Formula 1 and American football teams. Lastly, this slogan was used to promote the Stratos mission in October, 2012. To publicize this historical moment to all around the world, Red Bull integrated its official YouTube channel with thirty TV networks in forty countries. Official YouTube channel of Red Bull maintained livestreams including test jumpings operated before the actual Stratos mission. By jumping succeeded, Red Bull's official YouTube channel reached to eight million views instantly, and other social networks Facebook and Twitter also corresponded an expanded reaction by 21,000 comments and 489,000 likes and 200,000 followers and 2,000 tweets, respectively. Jessen suggests that by number of reach, Red Bull's silent advertising strategy achieved with a natural result of driven official website traffic through TV broadcasting and livestreaming on YouTube channels.

Shima and Varfan (2008) presented comparative evidences of the study which comprises traditional marketing and Internet marketing strategies of five international fashion brands including Vero Moda, Heart of Brands, Tiger of Sweden, Polarn & Pyret and H & M. By giving a brief background of the brand, semi-structured interviews were conducted with PR managers of the brands, in Sweden. Interview questions indicated as follows:

1. What marketing tools does your company mainly use?

2. Which marketing tool does your company consider most effective? Why?
3. What is your point of view on Internet marketing and its importance for your company?

Vero Moda –a fashion brand targets women and serves on 700 stores all over the world- used printed and online advertising however focused on traditional marketing tools and PR mainly. Internet marketing evaluated as a favourable tool by enhancing to reach large numbers of people instantly and creating a global environment easily. Nonetheless, it is stated that not whole marketing strategy based on Internet marketing. Heart of Brands, a retailer company, indicated main marketing tool decision depended on company's target. By highlighting contribution of Internet marketing for company and its revenue, it is indicated the brand has online stores available and considering expanding the number of these stores. Tiger of Sweden, a menswear brand, operated in Europe and Canada with online store option, utilized different kinds of marketing tools including websites and magazines. Tiger of Sweden accepts beneficial properties of Internet, however Internet marketing has not been indicated as a must, due to lack of opportunity to interact customers face-to-face. Polarn & Pyret, a children clothing company, operated in ten European countries preferred direct mailing, advertising and PR as marketing tools. By underlining the importance of face-to-face communication for the company, Internet defined as a complement tool for traditional marketing due to its advantages being fast and global. Lastly, H & M, serves as a fashion brand for women, men and children and operated in twenty-eight countries and three continents, offers online shopping and store options for consumers. TV advertising, catalogues and Internet were most preferred marketing tools for H & M. Addressing to its advantages like presenting appealing information channels and being globally accessible by underlining cruciality of functions of company's website, Internet was pictured as a critical marketing tool which would be more efficient if operated along with traditional marketing channels.

Deodhar (2014) investigated the affects of Nike's social media marketing strategies on women consumers. By introducing company's social media policy based on connecting customers efficiently and increment of brand trust; author conducted a series of questionnaires to examine approach of women customers towards the Nike Female Division which founded on 2007. It has been stated that, participants which all included women, used Facebook and Twitter as most common social media tools. It has been revealed that Nike's social responsibility missions played important roles to attract customers to the brand. By enhancing personalization options, Nike's Facebook Fan Page seen effective, however it has been deduced that certain events or posts outshined noticeably. Participants also stated that posts included group activities attract them due to it seemed possible to socialize at the same time exercising.

Briggs (2015) presented data and insights of mobile ROI of Walmart, The Coca Cola Company and MasterCard by inquiring following questions:

1. Can mobile assist to reach target aspects?
2. What is optimal mobile allocation for a certain campaign?
3. What is the business value of mobile compared to other channels?

Through this study, first time compact global data provided for mobile marketing incomes. Not just by financial data but mainly ratios and effectiveness were investigated. By scanning certain mobile advertising campaigns, it is concluded as brand awareness increased 7% for MasterCard and 15% intent shopping ratios were obtained for Walmart. Also it has been indicated effectiveness of mobile videos were inversely proportional with the frequency of displaying video on a mobile device. According to

this finding, A mobile ad displayed in low frequency enhanced ROI from 40 to 450 (11.25 times more). Also, Briggs stated that format (size of ad comparing to the size of mobile device or audio content), location and time of day are important aspects to achieve mobile marketing effectively. It is also indicated that mobile marketing ratio would increase 20-30% regarding to the increment of mobile device usage.

FINDINGS

In order to maintain an effective comparative study, both qualitative and quantitative approaches were used. Phenomenal studies subjected for qualitative analysis, on the other hand quantitative analysis method was conducted on the studies presented statistical data.

Investigation of 10 different international brands, demonstrated main functions of internet marketing were reaching consumers instantly and globally and through that, promote products effectively. Most of the target companies combined traditional marketing with Internet marketing by underlining effectiveness of Internet (Jessen, 2013; Shima & Varfan, 2008).

Based on the data obtained from Banjo (2012) and Petersen (2014), ROI of Walmart's social media marketing calculated according to Equation 1.1:

Total online ad budget: \$2.1 billion - \$524 million = \$ 1.576 billion

Cost of investment = $\$2.00 \times 8,167,973 = \$16,335,946$

Gain from investment = $\$586,787,180 (\$586,787,180 - \$16,335,946) / \$16,335,946 = 34.9 = \text{ROI from Facebook marketing}$

As Briggs (2015) demonstrated ROI insights from mobile marketing of Walmart, the comparison between mobile marketing and Facebook marketing ROIs were displayed as in Figure 11:

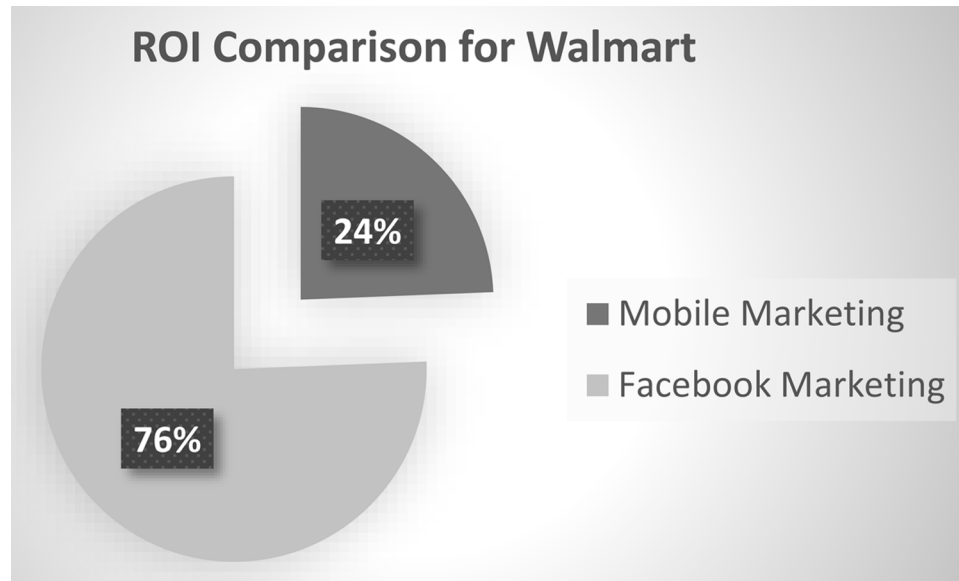
International brands such as Nike, Puma and Adidas mainly utilized mobile marketing tools to reach customer profiles and enhance sales effectively, however through company policies which all have very similar young customer potential; the usage of mobile marketing devices mainly shaped by mobile stores and applications (Tetere, 2011). Also all of the subjected brands investigated an official website for their companies in order to advertisement and promotion.

FUTURE RESEARCH DIRECTIONS

The article identified the important trends in internet marketing research to provide a future direction, particularly in terms of research gaps and expected topical areas of interest. Internet marketing presents unique opportunities for international businesses. Just as traditional marketing, internet marketing aims to extend profit margin and customer potential, upgrade brand awareness and maintain communication between company and customers. Since it offers various options for reaching aforementioned aims, demographic issues, political-legal environment, economic aspects and socio-cultural properties of target markets required to be taken account by marketers.

Figure 11. Mobile ROI vs Facebook marketing ROI for Walmart

Source: Own calculation



CONCLUSION

International businesses play crucial role in global market due to their large profit margins, promising expanding aspects and large customer profiles. Advantages and disadvantages of international businesses along with differences or similarities to domestic businesses required to be deeply comprehended at the stage of target market entry. During the market entry process, marketing strategy is one of the most important factor for international businesses since it effects delicacy caused by different socio-cultural, political-legal, economical environments (Ajami et al., 2006).

Internet marketing, considered as a subset of digital marketing; includes various options like banner advertising, social media marketing, mobile marketing, e-mail marketing, SEO and website has become a pioneering option for international business by each day due to its advantages including connecting people globally and instantly.

To examine internet marketing strategies of international businesses, findings from the literatures which subjected 10 different international brands were contained by this study. Qualitative and quantitative analysis were combined to compare efficiency of the Internet marketing strategies along with inquiry of the reasons push the company's to establish those strategies.

Shima and Varfan (2008) subjected 5 international fashion brands in order to understand their attitudes towards to Internet as a marketing tool. It is possible to relate the findings of this study with 4Ps outlined by Kotler and Keller (2011). Most prominent aspects were using traditional channels for marketing, related to the level of commonness of stores (place), variety of products and extension of customer profile (people).

Pertaining the penetration of mobile marketing, Briggs (2015) demonstrated correlated data for the future of mobile marketing, by estimated increment 20-30%. As Petersen (2014) showed insights for Walmart's Facebook marketing revenues, ROI was calculated according to the Equation 1.1. and com-

pared to the mobile marketing ROI obtained from Briggs (2015). Outcomes were illustrated in Figure 11, and this superiority of Facebook marketing over mobile marketing may corresponded the usage of social media tools over the mobile marketing (Figure 7).

As Macfarlane and Bultitude (2012) stated, website utilization plays crucial role among the international brands (Jessen, 2013; Shima & Varfan, 2008). More than one brand indicated combining traditional methods with digital methods (Jessen, 2013; Shima & Varfan, 2008) and combining different Internet marketing tools (Briggs, 2015; Deodhar, 2014; Petersen, 2014; Tetere, 2008) when it comes to marketing which is pertaining to the scope of digital marketing .

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KEY TERMS AND DEFINITIONS

International Business: International business refers to the trade of goods, services, technology, capital and/or knowledge across national borders and at a global or transnational level.

Internet Marketing: Internet marketing, or online marketing, refers to advertising and marketing efforts that use the web and email to drive direct sales via electronic commerce, in addition to sales leads from websites or emails.

Mobile Marketing: Mobile marketing is the interactive multichannel promotion of products or services for mobile phones and devices, smartphones and networks.

Return on Investment (ROI): Return on investment (ROI) is a performance measure used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments.

Social Media Marketing: Social media marketing is a form of Internet marketing that utilizes social networking websites as a marketing tool.

Section 2

Reflections of Digital Transformation on Business Ecosystems

Chapter 9

Business Transformation and Enterprise Architecture: The Holistic Project Asset Management Concept (HPAMC)

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ABSTRACT

This chapter presents the holistic project asset management concept (HPAMC)-based transformation projects to optimize asset/wealth creation/management in transformed enterprise system that is the result of research and development on 1) business case studies, 2) asset/wealth management, 3) business transformations, 4) applied mathematics/models, 5) software modelling, 6) business engineering, 7) financial analysis, 8) decision making systems, 9) artificial intelligence (AI), and 10) enterprise architecture.

INTRODUCTION

The HPAMC is based on an authentic and proprietary research method that is supported by an underlining mainly qualitative holistic reasoning model module; which is an AI/empirical process that uses a natural language environment that can be easily adopted by the project teams (Trad & Kalpić, 2019b; Myers, Pane & Ko, 2004; Kim & Kim, 1999; Della Croce & T'kindt, 2002; Trad & Kalpić, 2017a, 2017b, 2017c, 2017d; Gunasekare, 2015). The HPAMC is implemented in a proof of concept for the feasibility of the chapter using the HMM approach. The HPAMC supports Business Transformation Projects and Enterprise Architecture Projects (EAP) (or simply *Projects*). This chapter is supported mainly by an adopted fictitious case from the insurance domain (Jonkers, Band & Quartel, 2012a). The uniqueness of the authors' proposed HMM, promotes a holistic cohesive architecture and implementation model

DOI: 10.4018/978-1-7998-1125-1.ch009

that supports complex HPAMC integrations (Farhoomand, 2004). The integrated Asset Management System (AMS) and Decision Making System (DMS) are used in a day to day business and technology problems solving. In this chapter, the proposed solution (or model) is supported by a real-life case of business transformation methodology in the domain of HPAMC that in turn is based on the alignment of various standards and avant-garde methodologies. The “i” prefix, which will be used later in this text, does not stand just for the common intelligent agile environments but for a distributed and holistic intelligent asset system’s approach that identifies this works background; and “a” will stand for assets. This research project’s main keywords are: 1) HPAMC and AMS; 2) Enterprise Architecture; 3) *Projects*; 4) Business Transformation Manager; 5) Applied Mathematical Model; 6) Neural Networks; 7) Holisms; 8) Risk Management; 9) Decision Making Systems; 10) Artificial Intelligence; 11) Knowledge Management Systems; and 12) Innovation. Using the scholar engine, in Google’s search portal, in which the authors combined the previously mentioned keywords and key topics; the results have shown clearly the uniqueness and the absolute lead of the authors’ methodology, research and works (Trad & Kalpić, 2019b). From this point of view and facts the authors consider their works on the mentioned topics as successful and useful; so the main topics will be introduced.

HMM for *Projects* uses a natural language development (testing and simulation) environment that can be adopted by any *Project*, and for that goal the authors propose to use the HPAMC that can be instantiated (in n instances) by an AMS, as shown in Figure 1 (Myers, Pane & Ko, 2004; Neumann, 2002).

The HPAMC is (or can be) supported by a central DMS/HMM and any type of Enterprise Architecture Projects (EAP). The Proof of Concept (PoC) is based on a concrete business case; where the central point is the transformation process of the existing legacy AMS into a modern and intelligent AMS (iAMS). Such *Projects* are managed by the Business Transformation Managers or an Enterprise Architecture Manager (simply a *Manager*); who are supported with a methodology and a framework that can support and estimate the risks of implementation of such *Projects*. The *Manager* is responsible for the implementation of complex *Projects* using iAMS; the HPAMC supports him or her (for simplicity, in further text – him) in a just-in-time manner where he should have a solid background in DMS based iAMS (Trad & Kalpić, 2016b).

BACKGROUND

To achieve the *Project’s* goals, resources management, technology components, cultural, financial and logistics integration strategy factors should be classified in Critical Success Areas (CSA) categories that contain CSFs that can be used to evaluate possible pitfalls and risks, to audit, assert, govern, automate, trace, monitor and control the iAMS. This research is considered as a pioneering and unique one and actually or even unfortunately, there is no similar frameworks, what confirms it lead; proposing a HPAMC that can be used for *Projects* in design and maintenance phases, which come after the finalization of

Figure 1. The relation between the asset pattern and asset management system



the implementation phase. This research phase's background is related to risk evaluation of *Projects* using CSF-based iAMS that are managed by the Trad Kalpić Methodology and Framework (*TKM&F*), as shown in Figure 2 (Trad & Kalpić, 2018f). CSFs are selected from various iAMS areas like asset categories, valuation, processes, technology, human skills and other. Dm stands for Decision making...

In this chapter, the authors present a set of HPAMC managerial, financial and technical recommendations that can be applied to various fields, like iAMS, Knowledge Management (KM), HMM, EA, information technology management, business transformation and other engineering field (Trad & Kalpić, 2018a, 2018b; Cearley, Walker & Burke, 2016).

The DMS, iAMS and HPAMC are based on the authors' Research and Development Project (RDP) method that in turn is based on intelligent neural networks (Trad & Kalpić, 2018a) where the HPAMC is agnostic to any specific application, technical or business domain, as shown in Figure 3, and is based on the Architecture Development Method (ADM) (The Open Group, 2011a), but it can use any existing architecture framework.

Any EA framework is central to implement *Projects*, where the *Manager* or an enterprise architect can use the HPAMC for *Projects* iAMS' integration (Trad & Kalpić, 2017b, 2017c; Thomas, 2015; Tidd, 2006). In *Projects*, the *Manager's* role is important, and his actions are supported by the HPAMC to build a distributed web enterprise system, or a Holistic (e)Business/(e)Commerce Management System (HeBCMS) (Trad & Kalpić, 2019c; Lanubile, Ebert, Prikladnicki, Vizcaíno & Vizcaino, 2010).

A holistic systems approach is the optimal choice to model such a HPAMC for an HeBCMS, as shown in Figure 4, where the DMS interacts with the external world via the *TKM&F* to manage CSFs (Daellenbach & McNickle, 2005; Trad & Kalpić, 2016a). As shown in Figure 5 the CSFs are important for the phase 1 that qualifies the needed CSF set and decides whether there is a need for a PoC.

Projects and iAMSs are very difficult to implement, because of their holistic and complex nature, where the big part of complexity is met in their technical implementation and integration phases (Gudnason & Scherer, 2012). As shown in Figure 6, the *TKM&F* can be applied to all types of *Projects* including the iAMS' integration (Joseph, 2014).

Figure 2. The research framework's concept (Trad & Kalpić, 2016a)

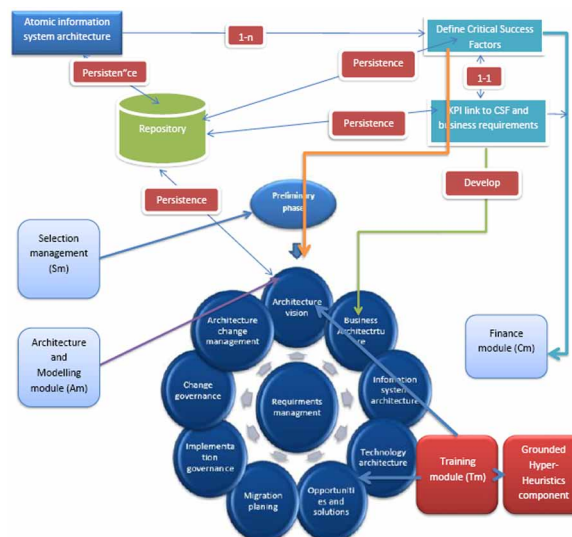
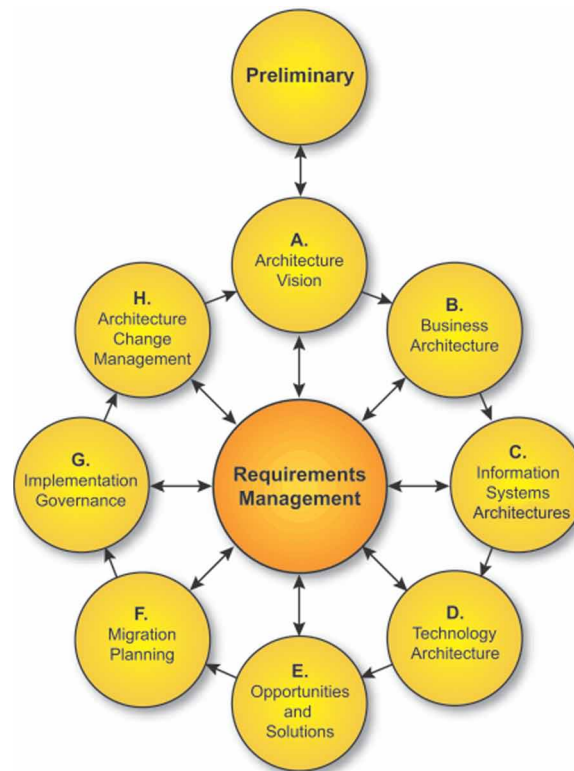


Figure 3. The research framework's architecture method's interface (The Open Group, 2011a)



FOCUS OF THE ARTICLE

HPAMC recommendations can be applied by *Managers* and stakeholders (Desmond, 2013) that use *TKM&F* to manage assets. The RDP is based on a mixed methodology and it is unique (Easterbrook, Singer, Storey & Damian, 2008); where this chapter tries to prove the HPAMC and iAMS feasibility through an experiment and Research Question (RQ) for this research process.

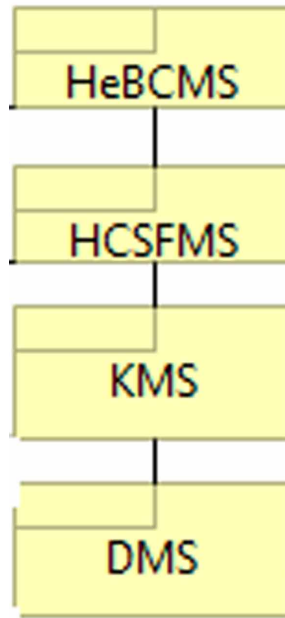
THE RESEARCH PROCESS

Projects failure rates are high and were constantly increasing (Bruce, 1994) that is due to the complexity encountered in the implementation phase (CapGemini, 2009). *TKM&F* recommends linking the HMM to all levels of the iAMS that is in the target level, as shown in Figure 7 (Trad & Kalpić, 2018b; Agievich, 2014; Tidd & Bessant, 2018).

Research Meta-Model and Templates

The proposed research project is based on a methodology and framework that were developed by the authors. For the readability and comprehension of this research project some important sections are in-

Figure 4. Intelligent management system that supports a distributed web enterprise system



sorted, otherwise the article would be a sheet full of references and the respected reader would be obliged to look for them and the reading process would become unreadable; we had many of such feedbacks in the past. The sent article follows the proposed methodology's precise meta-model; like many other research frameworks. Therefore we conclude that each topic treated by the applied research framework is authentic.

The Applied Research Framework

The HPAMC can be applied to various types of iAMSs (Trad 2018c; Trad 2018d) and is a part of the Selection management, Architecture-modelling, Control-monitoring, Decision-making, Training management, *Projects* management, Finance management, Geopolitical management, Knowledge management, Implementation management and Research management Framework (SmAmCmDmTmPmFmGmKmIm-RmF, for simplification reasons, in further text the already familiar term *TKM&F* will be used). This chapter's RQ is: "Can a holistic asset management pattern and system be used in business transformation and enterprise architecture project(s)?" (Trad, 2011a; Trad & Kalpić, 2011a).

Critical Success Areas, Factors and KPIs

Critical Success Area (CSA) is a set of Critical Success Factors (CSF) where CSF is a set of Key Performance Indicators (KPI), where each KPI corresponds to a single *Project* requirement and/or knowledge feature. For a given problem, an enterprise architect can identify the initial set of CSFs for the HPAMC. Hence the CSFs are important for the mapping between the knowledge constructs and organisational items (Peterson, 2011). Therefore, CSFs reflect performance areas that must meet strategic *Project* goals and

Figure 5. Interaction with factors

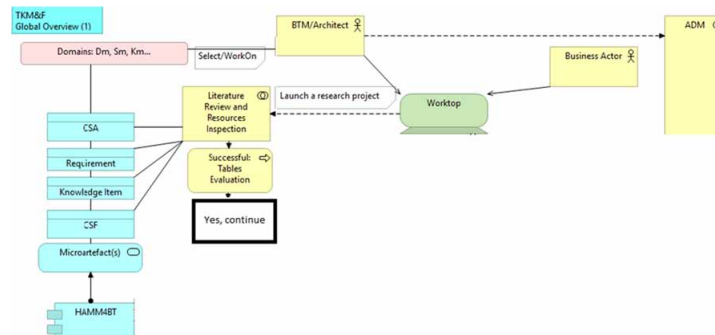
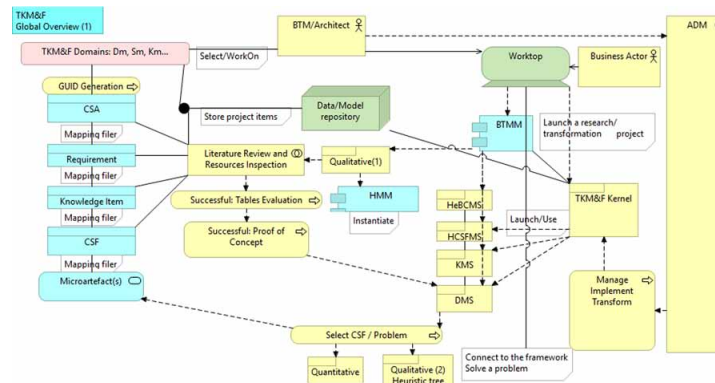


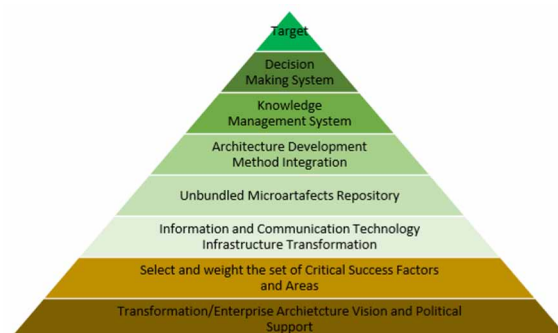
Figure 6. The Trad-Kalpić methodology and framework's flow and interaction



defined constraints. Measurements are used to evaluate performance in each of the CSA sets, where CSFs can be internal or external to the environment (Trad & Kalpić, 2018a, 2017b; Trad, & Kalpić, 2017c).

The *Project* team has to identify the initial set of CSFs to be used for the performance measurement system. Hence CSFs are the most important mapping/relation between strategic planning, enterprise

Figure 7. Levels of project's interaction (Trad & Kalpić, 2017b; Trad, & Kalpić, 2017c)



architecture vision and decision-making system's performance measurement systems; and an example of possible operational CSAs.

Evaluation of Critical Success Factors in the Context of Critical Success Areas

The HPAMC promotes the transformation through the use of CSAs that contains a set of CSFs, where a CSF is a set of KPI, where each KPI corresponds to a single *Projects* requirement and/or an item that can be a profile requirement or skill that has a column in each evaluation table (Putri & Yusof, 2009; Peterson, 2011; Trad & Kalpić, 2018f). For each CSA an Excel Workbook (WB) is created, in which all its CSFs are stored. As shown in Figure 8.

As shown in Figure 9, the CSA WB contains all the information needed for the category, including the RQ and hypothesis; and we see the sheets HPAMC_1, HPAMC_2... that represent the CSA's CSFs that map to an enumeration which contains meaningful names representing values from 0, 1, etc...

As shown in Figure 10, a *Project* starts with the first phase called the feasibility phase to check the basic CSFs, to check if the *Project* makes sense; that is based on the Excel Workbook (WB) evaluation. Based on the HPAMC literature review and related evaluation processes known as the Qualitative (1), the most important extracted CSFs are used and evaluated (Trad & Kalpić, 2018f).

Review's Critical Success Factors as an Independent Element

A *Project* starts with the first phase called the feasibility phase to check if the whole *Project* makes sense. Based on the HPAMC's literature review and related evaluation activities, the most important extracted CSFs are used and evaluated using the *TKM&F*'s configured rules.

The Research's Literature Review and the Gap

The knowledge gap was noticed, mainly because the existing literature on failure rates and on various methodologies treating *Projects*, offers practically no insight into a holistic approach to designing iAMS (Trad & Kalpić, 2013b, 2013c). This Research and Development Project (RDP) inspects a holistic approach for the RQ, which is mainly based on the *TKM&F*, what makes it unique.

Figure 8. The factors and areas development workbook sheets

Malhotra, y., (2005). Integrating knowledge management technologies in organizational business processes: getting real time enterprises to deliver

Color: Orange 1997
Date: 05/05/2011

Items value: IMPORTANT

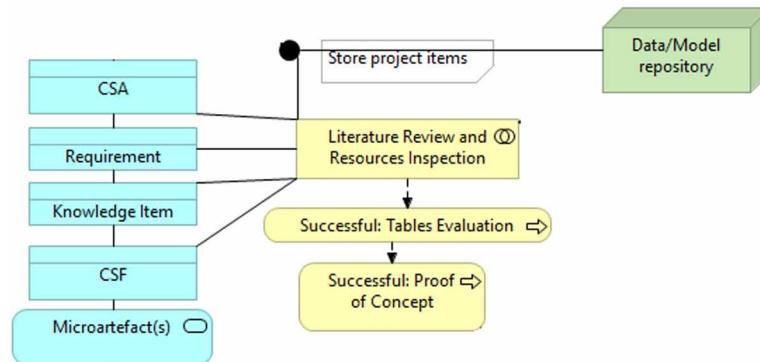
ABSTRACT
to provide executives and scholars with pragmatic understanding about integrating knowledge management strategy and technologies in business processes for successful performance

NONE

Figure 9. The critical success factors in the workbook sheets

Label	Description	Factor Category	Weighting	Origin	Status
HPAMP_2_H1	BPs integrate business and innovation knowledge. (See Theme Ho)	EducationFacCat			
HPAMP_2_Q1	Managers capable to integrate business and innova	HPAMP_2_H1			
HPAMP_2_V1	KIj Integrated in BPs_Metric	HPAMP_2_Q1			True

Figure 10. The factors interaction in the TKM&F



The Research's Uniqueness

The uniqueness of this research is in promoting a holistic unbundling process, the alignment of standards and strategies to support an intelligent Asset Management System (iAMS) (Farhoomand, 2004).

Related Research Works

This research chapter, like all the other research works that are related to this RDP, follow and have the same common construct that looks as follows:

- An introductory part that explains the overall subject.
- The R&D part that explains the research concept.
- The Applied Case Study (ACS) and PoC (Trad & Kalpić, 2018c) parts that specify the specific business topic to be researched.
- The Information and Communication Technology (ICT), ADM, KMS, DMS and CSF parts that present these sections in the work's specific RQ context.
- Each table contains a table of selected and weighted CSFs.

As well as a specialized part that looks as follows:

- Asset Management System (AMS) in automated business environments (Trad, & Kalpić, 2018g).
- The alignment of AMS and EA methodologies (Trad, & Kalpić, 2018h).
- The PoC, for EA and iAMS (Trad, & Kalpić, 2018i).
- The basics, of EA and iAMS (Trad, & Kalpić, 2018j).
- The AMS' HMM basics (Trad, & Kalpić, 2018k).
- The AMS' HMM PoC (Trad, & Kalpić, 2018l).
- A specialized part like in this case the HPAMC's section that presents the literature review and synthesis of the main topic.
- The PoC, conclusion and recommendations that summarize and conclude the research work that can be considered as an empirical engineering research model.

The proposed intelligent Asset Management System (iAMS) integration concept supports classical assets' implementation constructs as well as complex ones in order to support business sustainability (Trad & Kalpić, 2017a, 2017b). The HPAMC is business-driven and is founded on a research framework that is presented using a business case (The Open Group, 2011a).

THE BUSINESS CASE

Managing the Business Case

HPAMC uses an Applied Case Study (ACS), developed by the Open Group as a reference study, it presents the possibilities to implement *Project's* components and is related to an insurance company named ArchiSurance (Trad & Kalpić, 2018f); in this chapter it is used to check the HPAMC.

Integrating Critical Success Factors

A CSF is measurable and mapped to a weighting that is roughly estimated in the first iteration and then tuned through Architecture Development Method (ADM) iterations, to support the iAMS; where holistic business and enterprise architecture CSFs are essential (Felfel, Ayadi & Masmoudi, 2017). The main issue here is how to define the skills needed to integrate iAMS and how to interrelate the different business and EA skills (KPMG, 2014).

The Architecture Development Method and Projects

This Research & Development Project (RDP) focuses on the design of *Projects'* integration and presents the influence of Holistic Project Asset Management Pattern (HPAMC) to select the *Manager*. In the actual age of distributed intelligence, complexity, knowledge, economy and technology; permits HPAMC to offer a pattern that includes a hyper-heuristics tree that supports a wide class of problem types, and it is a major benefit (Markides, 2011), where the Decision Making System (DMS) supports the iAMS (Trad, Kalpić & Fertalj, 2002; Trad & Kalpić, 2014d). The *TKM&F's* parts must synchronize with the Architecture Development Method (ADM) that are shown in Figure 11.

The Business Case Study's Critical Success Factors

Based on the CSF review process this section generated Table 1.

As shown in Table 1, the result's aim is to prove or justify the HPAMC' business case and how it can be used with the PoC. The next CSA to be analysed is the holistic Mathematical Model's (MM) integration.

The Research Section's Link to the Applied Mathematical Model

This section's deduction is that the applied MM is crucial for the RDP's credibility.

THE APPLIED MATHEMATICAL MODEL'S USAGE

A Quantitative-Qualitative Research Mixed Model

The Basic Element and Structure

The HPAMC CSFs define the initial algorithm nodes that are identified as vital for successful targets (solutions) to be reached and maintained. The CSFs and tree nodes are the HMM's basic elements that are needed for the *Project's* iAMS to estimate and optimize its asset management processes and avoid

Figure 11. Business architecture phases (The Open Group, 2014b)

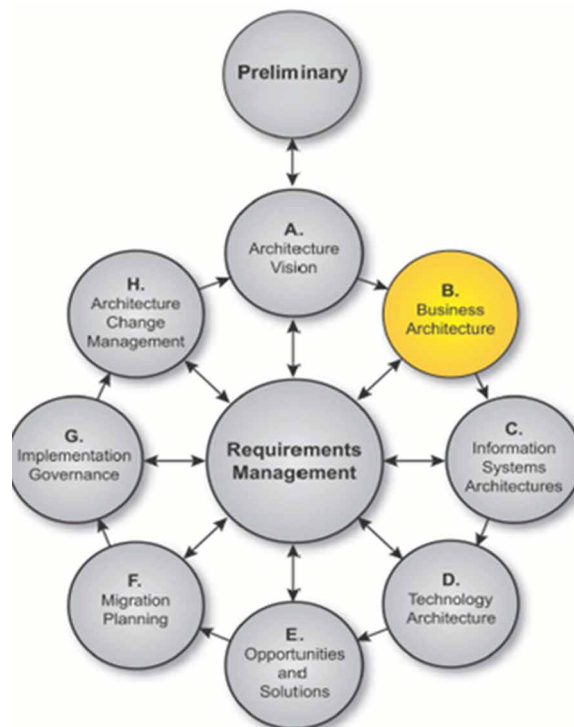


Table 1. The applied case study's critical success factors that have an average of 8.90

Critical Success Factors	KPIs	Weightings
CSF_AssetCase_Modelling	ModeratelyComplex	From 1 to 10. 08 Selected
CSF_AssetCase_Factors	PossibleClassification	From 1 to 10. 10 Selected
CSF_AssetCase_References	Exists	From 1 to 10. 08 Selected
CSF_AssetCase_ArchitectureDevMethod	IntegrationPossible	From 1 to 10. 08 Selected
CSF_AssetCase_Technologies	AdvancedStage	From 1 to 10. 09 Selected
CSF_AssetCase_Governance	Advanced	From 1 to 10. 09 Selected
CSF_AssetCase_Transformation_TKM&F	IntegrationPossible	From 1 to 10. 10 Selected
CSF_AssetCase_Leading_Governance	Possible	From 1 to 10. 09 Selected
valuation		

failure; using the exposed two phases (Morrison, 2016). The *Project* and its underlying HPAMC have a major precondition and that is, that the traditional business environment has to undergo a total and successful unbundling process of the whole environment's ICT system to deliver a repository of classified services and scenarios, as described with a mathematical nomenclature, as shown in Figure 12.

The RDP offers a holistic mathematical model, (HMM), which in its instance uses an intern Mathematical Language (ML) to describe, transform and implement the behaviour of any business (or non- business) system and its HPAMC (Goikoetxea, 2004). The HMM is presented to the reader in a simplified form in Figure 12, to be easily understood on the cost of a holistic exact formulation of the architecture's vision.

As shown in Figure 13, the sum symbol $\sum$ indicates summation of all the relevant elements called set members. The proposed model should be understood in a broader sense, more like related sets and unions. The proposed HMM enables the possibility to define *Project* as a model; using CSFs weightings and ratings.

The HMM nomenclature is presented to the reader in Figure 13 in a simplified form, to be easily understood, on the cost of a holistic formulation of the model. As shown in Figure 13:

- The abbreviation (and prefix) “mc” stands for micro.
- The symbol $\sum$ indicates summation of weightings/ratings, denoting the relative importance of the set members selected as relevant.
- The symbol $\cup$ indicates sets union.
- The proposed HMM enables the possibility to define *Project* as a model; using CSFs weightings and ratings.
- The selected corresponding weightings to: CSF $\in \{ 1 \dots 10 \}$; are integer values in ascending importance.
- The selected corresponding ratings to: CSF $\in \{ 0.00\% \dots 100.00\% \}$ are floating point percentage values.
- For a selected CSF there is a predefined enumeration of KPIs or ratings. For example: KPI $\in \{ ImpossibleToIntegrate, VeryComplex, Complex, PossibleIntegration, Feasible \}$ are the possible discrete constant values.

A weighting is defined for a HPAMC CSF and a rating for a KPI; where the KPI for a given CSF is a value taken out of an predefined enumeration. The first evaluation is generally very rough and through frequent ADM iterations it is tuned (the results are numeric values), because a *Project* may take more than 20 years to be completed.

Figure 12. The applied mathematical model's nomenclature (Trad, & Kalpić, 2017a)

Model's nomenclature	
mcEnterprise	A micro enterprise component
mcRequirement	A micro requirement
mcArtefact	A microartefact
action (or action)	An atomic service (or neuron) execution scheme
mcIntelligenceArtefact	A set that contains: dynamic basic intelligence + governance + persistence+ traceability + data_xsd + resources
mcArtefactDecisionMaking	A microartefact_decision making entity
mcArtefactScenario	A microartefact scenario

Concerning the constructs (or formulas) containing the symbol $\underline{U}$, they are generated when the valuation button is pushed, like for example, for the CSF, CSF_AssetCase_Modelling:

- REQ_AssetCase_Modelling is linked and created for the associated requirement.
- mcArtefact_AssetCase_Modelling is linked and created for the associated microartefact.
- ...

$$HMM = \text{Weigthing}_1 * \text{Qualitative}(2) + \text{Weigthing}_2 * \text{Quantitative}(2) \quad (1).$$

Figure 13. The applied mathematical model's nomenclature (Trad, & Kalpić, 2017a)

HMM		
mcRequirement	= KP I	(1)
CSF	= Σ KPI	(2)
CSA	= Σ CSF	(3)
Requirement	= $\bigcup$ mcRequirement	(4)
(e)neuron	= action+ mcIntelligenceArtefact	(5)
mcArtefact	= $\bigcup$ (e)neurons	(6)
mcEnterprise	= $\bigcup$ mcArtefact	(7)
(e)Enterprise	= $\bigcup$ mcEnterprise	(8)
mcArtefactScenario	= $\bigcup$ mcArtefactDecisionMaking	(9)
IntelligenceComponent	= $\bigcup$ mcArtefactScenario	(10)
OrganisationalIntelligence	= $\bigcup$ IntelligenceComponent	(11)
HMM	= ADM+ OrganisationalIntelligence	(12)

As shown in Figure 14, Qualitative(2) is the heuristics tree algorithm where Weighing₁ and Weighing₂ are tuned by the *Project* team. The presented nomenclature defines the HMM of the static part of the HMM. Quantitative(2), is any appropriate quantitative method.

Phase two that follows the literature review qualification (or phase 1), Qualitative(2) is the heuristics tree algorithm, where Weighing₁ and Weighing₂ are tuned by the *Project* team and the presented nomenclature defines the static part of the HMM.

The Applied Business Transformation Mathematical Model

The HMM can be modelled after the following formula for Business Transformation Mathematical Model (*Manager*) that abstracts the *Project*:

$HMM = \sum MM$ for an enterprise architecture's instance (2).

(*Manager*):

$Manager = \sum HMM$ instances (3).

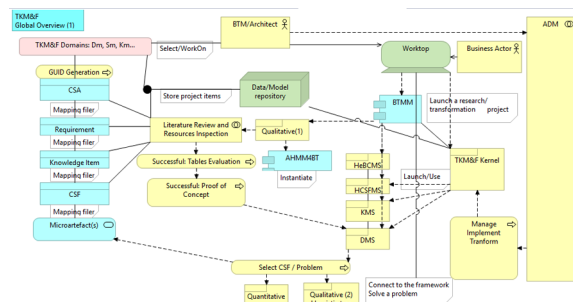
Where an instance is created for each iteration; the objective function of the *Manager*'s formula can be optimized by using constraints and with extra variables that need to be tuned using the HMM. The variable for maximization or minimization can be, for example, the *Project*'s success, costs or another CSF. For the HPAMC's PoC, the success will be the main and only constraint and success is quantified as a binary 0 or 1, where the objective function definition will be:

Minimize risk *Manager* (4).

By minimize, the authors refer to the optimization of phase 1; and if it is successful, then phase 2 is launched to inspect and solve surging problems.

The *Manager* is the combination of a *Project* methodologies and a holistic mathematical model that integrates the enterprise organisational concept, information and communication technologies (Lazar, Motogna & Parv, 2010).

Figure 14. The framework's components and its mathematical model



As shown in Figure 14, the HMM is a part and is the skeleton of the *TKM&F* that uses microartefacts' scenarios to support HPAMC requests (Kim & Lennon, 2017).

The HPAMC components interface the DMS and KMS, as shown in Figure 15, to evaluate, manage and map CSFs for selection activities; if the aggregations of all the *Project's* CSA/CSF tables exceeds the defined minimum, the *Projects* continues to its second part, the HPAMC PoC.

THE APPLIED TRANSFORMATION MATHEMATICAL MODEL

A holistic HMM is a part and the skeleton of the *TKM&F* that uses microartefacts to support just-in-time requests to the HPAMC. The HPAMC components and interfaces, are based on a light version of the ADM.

The HMM that can be modelled after the following formula for the Transformation Mathematical Model (TMM) that abstracts the *Project*:

(HMM):

$$iHMM = \text{Weigthing}_1 * HMM\_Qualitative + \text{Weigthing}_2 * HMM\_Quantitative (1).$$

$$HMM = \sum iHMM \text{ for an enterprise architecture's instance } (2).$$

(TMM):

$$TMM = \sum HMM \text{ instances } (3).$$

The objective function of the TMM's formula can be optimized by using constraints and with extra variables that need to be tuned using the HMM. The variable for maximization or minimization can be, for example, the *Project* success, costs or some other objective (Dantzig, 1949; Sankaralingam, Ferris, Nowatzki, Estan, Wood & Vaish, 2013). For this PoC, the success is quantified as a binary 0 (failure) or 1 (success), where the objective function definition will be:

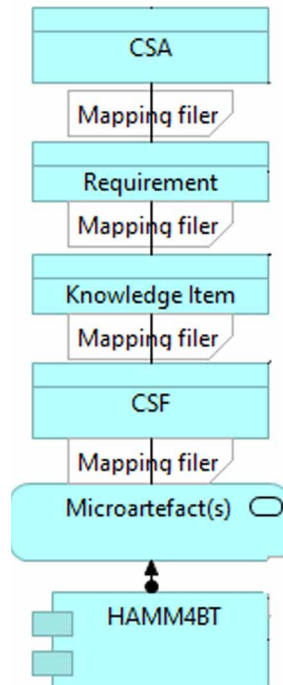
Minimize risk TMM (4).

The TMM is the combination of an EAP, *Project* methodologies and a holistic mathematical model that integrates the enterprise organisational concept, information and communication technologies (Lazar, Motogna & Parv, 2010).

Framework's Applied Mathematical Model Integration

A generic *Project* model and its kernel ADM are the base of this R&D and they are the basics of its *TKM&F*. The authors want to propose a mathematical model to represent the *TKM&F* global architecture and solve its integration problems. The literature review has shown that existing research resources on *Project* topics, as a mathematical model, are practically inexistent. This pioneering research work is cross-functional and links all the *Project's* microartefacts to *Projects* and enterprise architecture method (Agievich, 2014).

Figure 15. The framework's components mapping



The *Project's* initialization phase generates the needed CSAs/CSFs and hence creates the HPAMC patterns to be analyzed. The HMM is a part and is the skeleton of the *TKM&F* that uses microartefacts' scenarios to support HPAMC instance requests (Agievich, 2014).

The Mathematical Model's Integration Critical Success Factors

Based on the HPAMC review process the most important CSFs are evaluated as shown in Table 2.

Table 2. The critical success factors that have an average of 9.00

Critical Success Factors	KPIs	Weightings
CSF_HMM_TKM&F_Integration	Feasible ▾	From 1 to 10. 09 Selected
CSF_HMM_InitialPhase	Stable ▾	From 1 to 10. 10 Selected
CSF_HMM_PoCPhase	Complex ▾	From 1 to 10. 08 Selected
CSF_HMM_Qualitative&Quantitative	Complex ▾	From 1 to 10. 08 Selected
CSF_HMM_Final_BTMM	VerifiedModel ▾	From 1 to 10. 09 Selected
CSF_HMM_ADM_Integration	Synchronized ▾	From 1 to 10. 10 Selected
CSF_HMM_HPAMP_Interfacing	Stable ▾	From 1 to 10. 09 Selected

valuation

As shown in Table 2, the result's aim is to prove or justify that HMM is mature and possible to be used for the HPAMC and can be used for the PoC. The next CSA to be analysed is the holistic management of the ICS.

The Research Section's Link to the Information and Communication System (ICS)

This section's deduction is that the infrastructure and ICS unbundling processes are crucial for the HPAMC.

THE INFORMATION AND COMMUNICATION TECHNOLOGIES' INTEGRATION

Internet of Things, Telecommunication and Infrastructure Control-the Glue

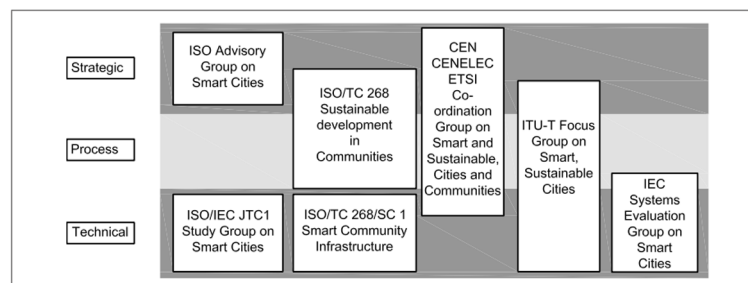
For iAMS distributed communication, a standard from the Institute of Electrical and Electronic Engineers (IEEE) for an architectural framework for the Internet of Things (IoT) can be used. The standard is in its early stages and offers a reference model defining relationships among various IoT domains like, transportation, healthcare and many others... (BSI, 2015).

IoT and mobile infrastructure has expanded to interconnect endpoints and iAMS, to create a virtual and holistic environment. In these virtually interconnected iAMSs, standard applications, endpoints and mobile apps collaborate in real-time, using standard technology procedures.

Standard Information Technology Procedures

The evolution of intelligent systems and the actual design, development, qualification and operations for *Projects* are still in an infancy age, or simply chaotic. Tools for implementation environments are still confronted with serious project issues. These problems show that archaic tools are inappropriate for large enterprise intelligent systems and the authors recommend the use of standard information technology concepts.

Figure 16. Internet supported services (BSI, 2015)



Asset Management System's Standards

To manage agile *Projects*, an adequate mapping concept integrates mainly technology standards (OASIS, 2014) and is the main principle and strategy using a linear “1:1” manner. The proposed standards have the following levels: 1) strategic; 2) process; and 3) technical.

These standards and tooling environments support the *Projects* through an iterative pseudo-bottom-up approach. Without the use of HPAMC, a *Project* can: 1) very probably have poor performance; 2) lack scalability; 3) fail, become un-usable and un-maintainable; 4) fail in producing a successful distributed unit of work or a microartefact concept.

Distributed Unit of Work as a Microartefact

Microartefact granularity and responsibility definitions for HPAMC scenarios is a complex undertaking; added to that there is the implementation of the “1:1” mapping and classification of the transformed microartefacts. The asset and EA concepts use methodologies like the TOGAF's ADM that supports the HPAMC (Neumann, 2002) where various types of identifiers can be used.

Defining a microartefact granularity and responsibility for a *Project* is a complex process; added to that, there is the complexity in implementing the “1:1” mapping and classification of the discovered microartefacts. The applied design concept uses standard design methodologies like the TOGAF's ADM. This proposed design and mapping concepts are supported by a set of the *TKM&F*'s microartefacts where its internal HMM ML consists of implementing microartefacts to dynamically evaluate compound expressions, according to the HMM principles (Neumann, 2002). Defining the unit of work, serves as a concrete microartefact that can be represented by a class diagram, where mapping supports the interoperability between all the *Project*'s microartefacts.

Intelligent Microartefacts Integration and Strategy

The *TKM&F* applies Service Oriented Architecture (SOA) concepts that use service directory for vertical HPAMC solutions, as shown in Figure 17. The *TKM&F* recommends the adoption of a light variant of TOGAF, where its atomic HPAMC services approach provides the conceptual and logical viewpoints (Gartner, 2005).

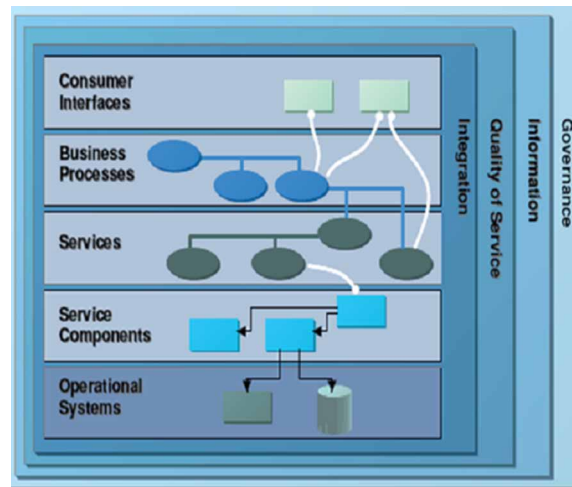
Security

The *TKM&F* and HPAMC define a global vision on iAMS's security by applying holistic qualification procedures that englobes security concepts from many domains (Clark, 2002).

Electronic Payments and Finance

Projects use technologies to transform the quality of an iAMS where automating economy and digitalization of financial services are fundamental by transforming the legacy system. The evolution of technologies-based services is un-linear in different business environments. *Projects* need to transform

Figure 17. Service's integration (Gartner, 2005)



the interaction with banks to automate crucial iAMS financial services. The technology transformation of Deutsche Bank, Raiffeisenbank, Hana-Bank and Bank Group are good examples for *Projects* (Makarchenko, Nerkararian & Shmeleva, 2016).

Intelligent Static Assets

An intelligent reorganization of *Project*, if possible, makes it ready to integrate the local, regional and global smart world, whatever that means; such a *Project* needs visceral automation. Smart devices are exponentially increasing in number and so the need to interface *Project* data and functions. The hyper-evolution of, new smart scenarios and applications make lives superficially easier but very chaotic. IoT is automation main infrastructure supporting scalable iAMS solutions; insuring the interoperability between natively incompatible automation technologies, information infrastructure, software apps; it has progressed to support iAMS automation that can interact using Internet addresses to support a pattern architecture (Miori & Russo, 2014).

Figure 18. Financial services integration (Makarchenko, Nerkararian & Shmeleva, 2016)

Banking is changing ... with or without the banks. Response to the millennials. Financial services, (2015)
http://onacledigitalbank.com/resources/pdf/DBOF_Industry_Research_Report.pdf

	Important	Current capability	Market lag
Mobile device payments	94%	44%	-50%
Market Lag	92%	24%	-60%
Real-time analytics	90%	30%	-60%
Digital advisory service	83%	28%	-55%
Location-driven services	82%	19%	-63%
Offers via social media	78%	34%	-44%
Comparison services based on financial profile	76%	28%	-48%
Social media account management	72%	14%	-58%
Gamification	72%	15%	-57%
Digital personal assistant	67%	12%	-55%

Modelling and Patterns

The HPAMC pattern expresses a structural concept or schema for *Projects*' implementations: 1) it offers a set of predefined HPAMC templates to instantiate iAMS; 2) it describes their responsibilities and content of asset (micro)artefacts known as items; 3) it defines the software artefacts for these iAMS' modules; 4) it defines a iAMS engineering model; and 5) it includes the description of the relationships between the different HPAMC templates. HPAMC components support the *Project* by offering items to handle various types of iAMS endpoints. The usage of endpoints provides some of the mechanisms needed to make HPAMC tuneable with CSFs.

The Information and Communication Technology's Critical Success Factors

Based on the literature review and factors' evaluation, the most important CSFs that are used are evaluated to what is shown in Table 3.

As shown in Table 3, the result's aim is to prove or justify that it is very complex to implement an HPAMC for ICS that enables the next CSA to be analysed, which is the integration of the ADM.

The Research Section's Link to the Architecture Development Method

This section's deduction is that the ICS and other fields are dependent on an EA paradigm and therefore the ADM is crucial for the integration of the HPAMC.

THE INTEGRATION WITH THE ARCHITECTURE DEVELOPMENT METHOD

The HPAMC' integration with TOGAF and ADM, enables the management and automation of *Projects* where the ADM is a generic method and recommends a set of phases and iterations to develop the *Projects*; it designs parts.

Table 3. The critical success factors that have an average of 8.90

Critical Success Factors	HMM enhances: KPIs	Weightings
CSF_ICS_UID_IntegrationProcessesModels	Standard	From 1 to 10. 10 Selected
CSF_ICS_Standards	AdvancedState	From 1 to 10. 10 Selected
CSF_ICS_Services	Supported	From 1 to 10. 09 Selected
CSF_ICS_Performance	ExistingProcedures	From 1 to 10. 08 Selected
CSF_ICS_IoT_Telecom	StableEnvironments	From 1 to 10. 09 Selected
CSF_ICS_Finance	ExistingSupport	From 1 to 10. 09 Selected
CSF_ICS_Security	Complex	From 1 to 10. 07 Selected
CSF_ICS_Automation	Supported	From 1 to 10. 08 Selected
CSF_ICS_HPAMP_StandardsIntegration	Supported	From 1 to 10. 09 Selected
CSF_ICS_Procedures	Supported	From 1 to 10. 10 Selected

valuation

Reference Architecture and Its Phases

The intent HPAMC's reference architecture is to support *Projects* with an implementation and vendor agnostic concept with enhanced interoperable and standards blueprint. Technological and implementation agnostic concept promotes: 1) avoiding locked-in concepts; 2) integrate various asset platforms; 3) certification and compliancy; 4) modularity; and 5) market structure agnostic concept. The ADM manages the *Project's* development iterations and its interaction with the HPAMCs.

The Unit of Work and Enterprise Architecture

In this section the authors present ADM's phases and the HPAMCs implications (Visual Paradigm, 2019):

- The preliminary phase prepares the business enterprise for a successful HPAMC integration and defines its main HPAMC.
- The architecture vision and business architecture phases define the HPAMC model's constraints and objectives; validate the business capabilities and create the Statement of Architecture Work (SAW).
- The information system architecture phase develops the HPAMC' ICT architecture paradigm.
- The technologies architecture phase develops the HPAMC's technology architecture and its baselines.
- The requirements management and tests phases, testing and validation are applied to all the build microartefacts and mapped to the requirements.

Asset Management System's Architecture Blueprint

The *TKM&F* uses iAMS standards that include EA frameworks, microartefacts interoperability... The mentioned iAMS standards are managed by the *TKM&F*, which delivers added value and robustness to *Projects*. The proposed *TKM&F's* EA capabilities help in establishing an architecture principal guideline that defines the *Project's* initial phase and vision; which is based on a "just-enough" architecture in the ADM (The Open Group, 2011a).

The Architecture Development Method (ADM) Critical Success Factors

Based on the literature review and CSF evaluation process, the most important ADM's CSFs are evaluated to what is shown in Table 4.

As shown in Table 4, the result tries to prove or justify that it is possible to integrate and automate the ADM's interaction with the *TKM&F*; and the next CSA to be analysed is the holistic KMS.

The Research Section's Link to the Asset Knowledge Management System

This section's deduction is that the HPAMC can be integrated with important difficulty in *Projects* and a holistic ADM and the HPAMC is applicable for KMs and DMSs; or any other intelligence-based systems, like the asset oriented KMS.

Table 4. The critical success factors that have an average of 9.20

Critical Success Factors	AHMM enhances: KPIs	Weightings
CSF_ADM_CSF_Initialization&Setup	Heterogeneous&Feasible	From 1 to 10. 10 Selected
CSF_ADM_IntegrationProcesses	ExistsSupported	From 1 to 10. 09 Selected
CSF_ADM_Phases	Supported	From 1 to 10. 09 Selected
CSF_ADM_Requirements	MappingAutomated	From 1 to 10. 09 Selected
CSF_ADM_HPAMP_Architecture	Supported	From 1 to 10. 08 Selected

valuation

THE HOLISTIC ASSET KNOWLEDGE MANAGEMENT SYSTEM

For an asset KMS (aKMS) the goal is basis to manage information items using a holistic management concept that offers also the possibility to access distributed heterogeneous knowledge; where the knowledge items are associated with the CSFs (Rockart, 1979). In the 21st century aKMS is of ultimate strategic importance for the management of asset knowledge in an iAMS. In an iAMS many traditional knowledge management accesses exist and are a barrier for an aKMS and *Projects* in general (Malhotra, 2005).

The Asset Knowledge Management Basics

The HPAMC and its aKMS concepts are based on a set of multiple coordinated asset knowledge management patterns that correspond to various just-in-time asset microartefacts that are based on a complex transformation concept (Cearley, Walker & Burke, 2016). Asset microartefacts are responsible for the manipulation and processing, which are holistic and empiric. They mimic the human mental capabilities that coordinate and control various access activities, combining actions, information management and processing. Related and networked asset information coordination manages knowledge patterns, data, extracts and correlates them in space and time to detect heuristic patterns to deliver various types of problem solving (Gardner, 1999). These HPAMC microartefacts and their underlying mechanics are used to generate sets of factors' weightings for possible actions that are called asset knowledge/intelligence microartefacts that are the stub of the aKMS and the *TKM&F*. Weightings' concept enables the HPAMC patterns and microartefacts to build an asset subsystem that delivers answers in the form of asset values known as items. In many cases, fast change requests may generate an important set of corresponding asset solutions that can be ambiguous and make HPAMC's actions uncertain and complex to implement. The HPAMC is responsible for a rational heuristic approach for enterprise asset extraction (Clark, Fletcher, Hanson, Irani, Waterhouse & Thelin, 2013).

The Holistic Asset Knowledge Access Management

A HPAMC is managed by the *TKM&F*, where the enterprise's KMS officer configures the types of KM microartefacts to be involved; these microartefacts are orchestrated by the HMM actions to deliver possible asset information. The HPAMC actions map to the various processes, which are responsible for the implementation of mechanisms needed to deliver aKMS support. The aKMS pattern is implemented in all of the iAMS components and the implementation of HPAMC's mechanisms should be able to

deliver the requested asset knowledge items; such a set of actions can be modelled and managed by the HMM (The Open Group, 2011a; Trad & Kalpić, 2017a, 2017b, 2017c).

The Holistic Asset Knowledge Management

The aKMS manages asset Knowledge Items (aKI); where aKIs and microartefact scripts are responsible for the manipulation of intelligence and control various aKMS processes. The aKMS supports the HPAMC underlying mechanics to manage aKI microartefacts; and is responsible for access and aKI's extraction, using holistic systemic approach (Daellenbach & McNickle, 2005; Trad & Kalpić, 2016a).

The Holistic Asset Knowledge Strategy

aKIs map to CSFs and microartefact(s) and are classified in specific CSAs. A HPAMC concept expresses a fundamental structural *Project's* concept for the aKMS/aKI implementation; which enables a holistic approach to asset access and its mapping to CSFs.

The Knowledge Management Success Factors

Based on the literature review, the most important asset CSFs that are used are listed in Table 5.

The Modules Chained Link to the Intelligence Support or Decision System

The aKMS' integration result proves that it is fairly possible to implement an HPAMC to interface the DMS.

THE INTEGRATION WITH THE DECISION-MAKING SYSTEM

Critical Success Factors and Objectives

CSFs can be applied in the (Trad & Kalpić, 2014b): 1) selection of iAMS resources; 2) Strategy; 3) iAMS and DMS engine; and 4) iAMS training needs. Where the main objectives would be: 1) livability; and 2) workability; 3) sustainability; and 4) performance and security. As shown in Figure 19, various decision domains have enabled the integration of Artificial Intelligence (AI) (or complex decision systems) to support iAMS (Vander Ark, 2018).

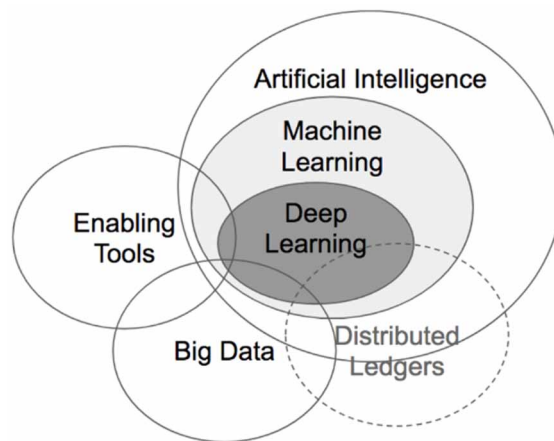
Complex Asset Decision Making Systems

The aim of such systems is: 1) to help administration of complex iAMS; 2) improving communication, technology, performance and infrastructure; and 3) improving security. These actions would improve economic situation. That implies that the analysis and management of risk is one of the important pre-requisites to ensure the success of an iAMS implementation. The *TKM&F* integrates iAMS risk management and performs the analysis using a DMS (Hussain, Dillon, Chang & Hussain, 2010).

Table 5. The critical success factors that have an average of 9.20

Critical Success Factors	AHMM4BT enhances: KPIs	Weightings
CSF_aKMS_Infrastructure_Integration	Supported	From 1 to 10. 09 Selected
CSF_aKMS_eKI_Mapping	ComplexToImplement	From 1 to 10. 08 Selected
CSF_aKMS_Patterns	Implementable	From 1 to 10. 09 Selected
CSF_aKMS_HPAMP_Integration	Implementable	From 1 to 10. 09 Selected
CSF_aKMS_HPAMP_AccessManagement	StandardIntegration	From 1 to 10. 10 Selected

Figure 19. Intelligent iAMS decision domains (Vander Ark, 2018)



An Extremely Long and Risky Transformation Process

Standard *Projects* (and iAMS) are very risky, the risk levels are very high at about 70%; *Projects* are even more risky when using radical and long transformations (Malhotra, 2005).

In the HPAMC based DMS, *Project's* team members can select and tune types of CSAs and CSFs to be processed. The selected CSFs are orchestrated by the HMM's choreography engine that is the base of the DMS (The Open Group, 2011a; Trad & Kalpić, 2017a, 2017b, 2017c). The *TKM&F* interfaces the DMS that uses an empirical problem-solving algorithm, which is used in the case when an optimization algorithm approach is impractical or when the problem is too complex and multi-dimensional.

The Decision Making Process

In the HMM based DMS, where any *Project* team member can configure the types of microartefacts and CSFs to be used, these microartefacts are orchestrated by the HMM's choreography engine. The HMM based DMS' actions map to the various ICT system's mechanisms to deliver the needed actions. The HMM instance is in all of the *Project's* processes; such a set of actions is modelled and presented in this chapter's experiment or a proof of concept (The Open Group, 2011a; Trad & Kalpić, 2017a, 2017b, 2017c).

The Decision Making System's Critical Success Factors

Based on the literature review and evaluation processes, the most important DMS's CSFs that are used are evaluated to what is shown in Table 6.

As shown in Table 6, the result tries to prove or justify that it is possible and mature to implement a holistic and distributed DMS using the HMM formalism and that will be presented in this section.

The Research Section's Link to the Proof of Concept

The DMS' integration result proves that it is possible to implement an HPAMC to interface the DMS.

THE HOLISTIC ASSET MANAGEMENT DESIGN CONCEPT

The Basics

Melvin Conway cited that: "...organizations which design systems ... are constrained to produce designs which are copies of the communication structures of these organizations", where the *Project* and HPAMC produce a set of artefacts based on CSFs that map to the organization's structure and its information technology system (James, Grinter, & Grinter, 1999). This work's background combines asset management, enterprise architecture, mathematical models, heuristics, business transformation and business engineering fields. iAMS building using an HMM is the most strategic goal for business companies. Fast transformations and efficient business environments have to be supported by a HPAMC. A loose HPAMC can help in having a holistic and broad guide to non-predictive asset operations that depend on various factors like finance, business, resources, etc. A *Project* should be adapted to handle complex iAMS requirements that can generate complex problems, randomness, unpredictability... Loose iAMS problems can be measured and weighted; while financial risk is not easily measurable. This explains the difficulty of estimating the financial risks of a consequential and rare iAMS problem that could be fatal to the *Project*. The *TKM&F* must evaluate the iAMS risks through the use of the decision module and logged events. This chapter proposes an efficient approach to prediction, proactive risk management; that are the basic structures of an HPAMC (Taleb, 2012).

Weightings concept enables the HMM to find and select the optimal solution for a given iAMS problem. In many cases, fast changing transformation requests may generate an important set of solutions that can be ambiguous and make the iAMS actions uncertain and too complex to implement.

Table 6. The critical success factors that have an average of 9.00

Critical Success Factors	AHMM4T enhances: KPIs	Weightings
CSF_DMS_ComplexSystemsIntegration	Possible	From 1 to 10. 09 Selected
CSF_DMS_HPAMP_Interfacing	Supported	From 1 to 10. 09 Selected
CSF_DMS_KMS_Interfacing	Possible	From 1 to 10. 09 Selected
CSF_DMS_DMP	IntegeratesAsKernel	From 1 to 10. 10 Selected
CSF_DMS_HolisticApproach	Complex	From 1 to 10. 08 Selected

An iAMS can give a company the most important competitive business advantages that may insure its future and it is not a secret that intelligent asset artefacts are the basis for such a system. Major research and advisory firms like Gartner, confirm that asset knowledge services will leverage business information systems' components tangible and intangible assets from various enterprise departments.

Tangible and Intangible Assets

Tangible Assets

Tangible assets are mainly physical and measurable enterprise assets that are used in research, development and operations (Murphy, 2019).

Intangible Assets

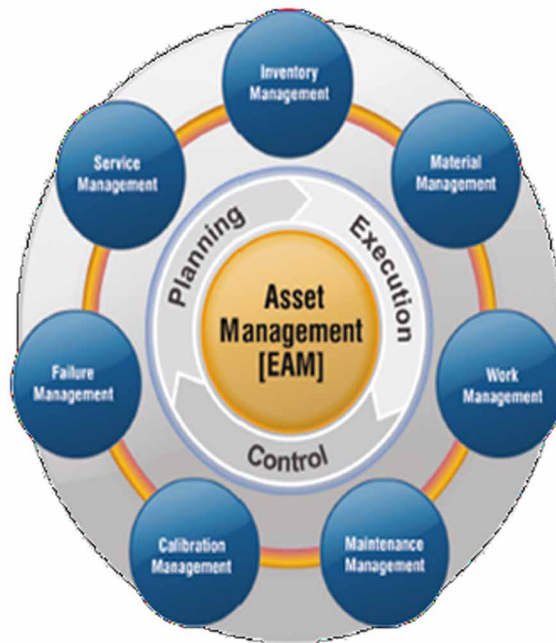
Intangible assets are nonphysical assets needed in *Projects*, for a long-term and mainly intellectual assets, and it is difficult to evaluate them because of the uncertain outcome of *Projects* (Murphy, 2019).

The Role of Assets Processing

A *Project* focuses on all aspects like, business transformation, assets management, business engineering, organizational design and enterprise architecture, where all these fields share some kind of choreography layer that is in turn based on microartefacts and "1:1" mapping relationships. A neural network perfectly corresponds to a heuristic tree that is an asset information processing paradigm inspired by the biological nervous systems, such as the human brain. The key element of this paradigm is the novel structure of the iAMS that is based on the HMM. As already mentioned, the HMM is composed of a large number of interconnected modules needed to solve specific *Project* and iAMS problems, as shown in Figure 20. iAMS units are connected to each other like nodes in a tree and there is a real number associated with each connection, which are called weightings used in iAMS (Soft Expert, 2018).

Enterprise Asset Management

iAMS integrations are complex and the massive use of tools and technology to radically improve the performance and achieve hyper-fast business benefits through asset management scripting, makes it complex. Accountant oriented iAMS scripting that promotes off-shoring and rapid ruthless growth has a grave negative effect on *Projects* and business environments, because they promote fast and dirty conclusions and or decisions. iAMSs are of extreme strategic importance for companies. If an iAMS is successful, the business company and the economical ecosystem will excel, but when it fails, the business company might face important problems and multiplication of such phenomenon would hurt the overall growth. Today, businesses that have been transformed need iAMSs to automate the management of their assets through design (Trad & Kalpić, 2013a).



Asset System Design and Integration

An important prerequisite for a successful *Project* is the development of a central iAMS architecture and integration in the business enterprise by the means and use of existing standards. A *Project* is to be assisted with existing standards like TOGAF, Archimate, Object Oriented Methodologies, UML, etc... These standards include artefacts to be used to integrate iAMS modules in the existing processes, like Configuration Management, Development and Operations (DevOps), Architecture Development Method (ADM), etc... (Desfray, 2011). The main goal of an architected change management process, as shown in Figure 20, is to support the enterprise's architecture to meet its business results; and that includes the management of architecture changes in a synchronous manner to enable tracking and assessment of the underlying iAMS modules (North, 2010). Today, business enterprises are encountering massive pressure to manage their enterprise assets proactively and holistically in order to insure their business sustainability, reduce costs, and to integrate the continuously transformed legal, regulatory and economic environments. For a business transformation process, there is a need for a just in time decision making, planning and optimization activities; and to achieve that the designed transformation process can manage the inventory of the enterprise's assets, as shown in Figure 20. The enterprise architects' role is to coordinate the iAMS integration in the very complex *Project*. A concise iAMS integration pattern that uses CSA which represent iAMS' subparts like: Information Technology Asset Management (ITAM), Hardware Asset Management (HAM), Software Asset Management (SAM)... is presented in his paper. In turn, the CSA contains selected CSFs that relate to unique standardized tags like the Software ID (SWID) that are used in SAMs; to create a dynamic evaluation of the iAMS' *holistic value* (Uppal, Rahman, 2013).

The Holistic Asset Management System's Design Concept Critical Success Factors

Based on the literature review and evaluation processes, the most important HPAMC's CSFs that are used are evaluated to what is shown in Table 7.

As shown in Table 7, the result shows that it is virtually possible to integrate a HPAMC but this means that there is no need for rescoping of the RQ and focus on the *Manager* capabilities.

The Research Section's Link to the Proof of Concept

This chapter's deduction that selects and evaluates the CSFs, is based on the six tables that this RDP has generated, and the following phase is the PoC for HPAMC's implementation.

THE PROTOTYPE'S INTEGRATION

The HPAMC proposes a functional language development environment that can be used to implement the PoC. The HPAMC uses CSFs sets, actions and applicable solutions for *Projects*. The model's main constraint is that CSAs having an average result below 7.5 will be ignored. This fact qualifies all the seven CSAs and presented tables that concludes the first phase, that is: "the HPAMC initial research and qualification is successful and a PoC can be conducted". The results of Phase 1 are illustrated in Table 8, that shows clearly that the HPAMC (and iAMS) is an independent component and is possible to integrate it in *Projects*. The ACS is a concrete case where the demo application uses the *TKM&F* for the PoC implementation (Trad & Kalpić, 2018c).

The Architecture Method's Phases' Setup and iAMS Factors

The HPAMC's implementation phases' setup looks as follows:

- Phase A or the Architecture Vision phase, establishes a roadmap.

Table 7. The critical success factors that have an average of 8.95

Critical Success Factors	AHMM4T enhances: KPIs	Weightings
CSF_HPAMP_SystemsIntegration	Possible	From 1 to 10. 09 Selected
CSF_HPAMP_Architecture_Structure	Feasible	From 1 to 10. 10 Selected
CSF_HPAMP_(in)_Tangible	ManagementEnabled	From 1 to 10. 09 Selected
CSF_HPAMP_DMP_Capacities	Feasible	From 1 to 10. 10 Selected
CSF_HPAMP_HolisticApproach	Supported	From 1 to 10. 08 Selected
CSF_HPAMP_TKM&F_Support	Complex	From 1 to 10. 08 Selected
CSF_HPAMP_RoleOfFinance	Possible	From 1 to 10. 09 Selected
CSF_HPAMP_Skills	Existing	From 1 to 10. 09 Selected
CSF_HPAMP_ExistingStatus	Transformable	From 1 to 10. 08 Selected
CSF_HPAMP_Automation	Supported	From 1 to 10. 09 Selected
CSF_HPAMP_Tracking_Auditing	Feasible	From 1 to 10. 09 Selected

- Phase B or the Business Architecture phase shows how the *Project's* targets roadmap realizes the key requirements.

The Proof of Concept

The chapters' PoC, implemented using *TKM&F*, was also developed exclusively by the authors, who own the total copyrights. The PoC presents the HPAMC mechanics, which interface the DMS that uses the internal initial *Project* set of CSFs' that serves as an example for this chapter; it is presented and evaluated in Tables 1 to 7. The services-based microartefacts have bindings/mappings to specific *Projects* resources like CSFs, as shown in Figure 21.

The used microartefacts are designed using EA methodologies and related tools. The HPAMC concept defines relationships between the *Projects* requirements and services-based microartefacts (and CSAs/CSFs), using global unique identifiers, as shown in Figure 22.

The PoC is achieved by using the *TKM&F* client's interface that is shown in Figure 23; where the starting activity is to structure the organizational part.

Once the development setup interface is activated, the NLP interface can be launched to implement the needed microartefact scripts to process the defined six CSAs. After starting the *TKM&F's* graphical interface, the sets of CSFs are selected. Then follows the CSF attachment to a specific node of the *TKM&F's* graphical tree, as shown in Figure 24; to link later the microartefacts.

From the *TKM&F* client's interface, the ML development setup and editing interface can be launched to develop the iAMS services to be used in microartefacts. Once the microartefact is ready, the CSF and NLP files are configured; in this chapter six tables and the result of processing of the first initial phase, as illustrated in Table 8, show clearly that the HPAMC can be used in *Projects*. HPAMC is not an independent component and is bonded to all the *Project's* overall architecture, hence there is a need for a holistic approach.

The *TKM&F* and hence the HMM's main constraint to implement the HPAMC is that CSAs for simple *Projects* components, having an average result below 8.5 will be ignored. In the case of the current CSF evaluation, an average result below 7.5 will be ignored. As shown in Figure g08, the overall average is over 9, this fact keeps the CSAs (marked in green) that helps to make this work's conclusion; and drops the ones in red. It means that the HPAMC integration is mature and can be used in all types of *Projects*. Of course, the complexity in integrating the HPAMC in *Projects* must be done in multiple transformation sub-projects, where the first one should try to transform the base iAMS services repository.

SOLUTION AND RECOMMENDATIONS

The managerial recommendations are needed for finding the solutions to enable the holistic management of iAMS. Because of the relatively low score, Figure g08 shows that the HPAMC implementation is a feasible but risky transformation process and that today the *TKM&F* can be used for *Projects*. The resultant technical and managerial recommendations are:

- A HPAMC must be established and tried to check its feasibility.
- The ADM's integration in a HPAMC enables the automation of its interfaces.
- The *Projects* must be separated in multiple transformation sub-projects.

Figure 21. The TKM&F services based microartefacts concept

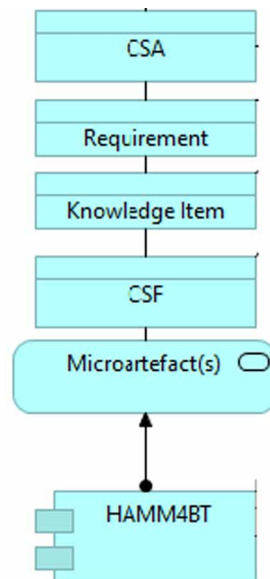
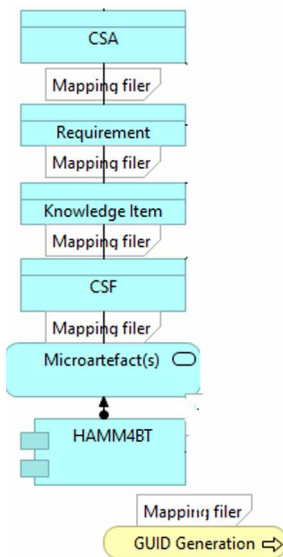


Figure 22. The TKM&F's global unique identifiers interaction



- Unbundle the iAMS' services to deliver the needed HPAMC's services classification.
- The *Manager* must be an iAMS specialist.
- Setup the weighting and rating rules.
- Setup the mapping concept.
- Setup a central HPAMC to be used in *Projects*.
- Select the HPAMC's CSFs, KPIs and CSAs.

Figure 23. The TKM&F's client interaction

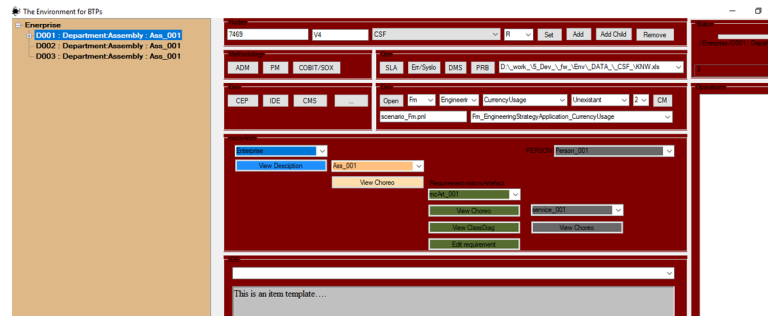


Figure 24. The TKM&F's factor setup interface



Table 8. The holistic factor management system research's outcome is over 9,00

CSA Category of CSFs/KPIs	Influences transformation management	Average Result
The Applied Case Study Integration	CredibleStable_Complex	From 1 to 10 8.99
The Usage of the Architecture Development Method	FullyIntegrated	From 1 to 10 8.99
The Information and Communication Technology System	Transformable	From 1 to 10 8.99
The Mathematical Model's Integration	IsApplicable	From 1 to 10 8.99
The Decision Making System	Implementable	From 1 to 10 8.99
The Holistic Knowledge Making System	Implementable	From 1 to 10 8.99
The Holistic Project Asset Management Pattern	Implementable	From 1 to 10 8.99
Evaluate First Phase		8.99

- A *Manager* must be an agile project manager.
- Use of iAMS process models.
- The *Manager* must have cross-functional skills and a strong leadership.
- Define the interface to the aKMS and DMS. The *Project* needs to implement a DMS.
- Model the HPAMC's and microartefacts' interaction.

HPAMC managerial recommendations, and the *TKM&F*, round up the approach needed for the complex *Project*.

FUTURE RESEARCH DIRECTIONS

The future research and development process will continue to tune the *TKM&F* and will work more specifically on the enterprise resources management.

CONCLUSION

The most important managerial recommendation that was generated by the previous research phases was that the *Manager* must be a strong leader. The managerial recommendations are offered to help *Managers* decrease the high failure rates. The already published research and development publications have produced the following outcomes:

1. The research has proved the existence of a multi-dimensional knowledge gap that exists between the complexity and the feasibility of iAMS development.
2. The iAMS needs to interface the aKMS and DMS.
3. The PoC proved the research's method and delivered the recommendations on to how to manage an iAMS.

The *TKM&F* supports the *Project* by using the HPAMC pattern and delivers a set of managerial recommendations for *Projects*.

ACKNOWLEDGMENT

In a work as large as this research project, technical, typographical, grammatical, or other kinds of errors are bound to be present.

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KEY TERMS AND DEFINITIONS

ADM: Architecture development method.

Chapter 10

Reflection of Digital Transformation on Corporate Sustainability and a Theoretical Perspective

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ABSTRACT

With its high process automation and digitalization, Industry 4.0 provides new opportunities to actualize more flexible, higher quality, speedy, cheap, and productive manufacturing and services. Containing numerous technology and paradigms, Industry 4.0 is expected to transform the industrial manufacture and society by aiming at economic, social, and environmental gains. The facts that natural resources are running out, lifecycle of the world is diminishing, and society has increasing anxiety on this situation. These have been the propulsive power for the development of Industry 4.0. By means of the technology and innovations that Industry 4.0 brings along, it is clear that it could also contribute to the recent popular and emphasized concept: sustainability. In this chapter, after giving information about the paradigms related with Industry 4.0, the theoretical frame of corporate sustainability and the effect of digital transformation on corporate sustainability have been evaluated. And then, constructing sustainable digital business models and focusing on value proposal have been discussed.

DOI: 10.4018/978-1-7998-1125-1.ch010

INTRODUCTION

Digitalization certainly being one of the most important trends that orient the present and the future, exists as a subject that all sectors should be following. Seizing the opportunities created with technology and digitalization ensures the firms both an important competing advantages and benefits in various fields from increase in productivity to employee satisfaction.

Sustainable development, on the other hand, is described as fulfilling the needs of today's shareholders by directly or indirectly showing respect to their living rights (Dyllick & Hockerts, 2002) This description was indeed performed in UN Brutland Report in 1987 and covers a fairly broad meaning. The goal of this report was to create a common future for the humanity and being able to provide answers to the question of how social and economic development could be achieved without endangering the natural living conditions. With the description from this report, to make contribution to the sustainable development by means of an emphasis on foundational equality is aimed (Ehnert & Harry, 2012).

In order to annihilate poverty, save the universe and make all people live in peace and prosperity, 17 goals have been designated within the scope of UN 2030 Sustainable Development Goals. The importance given to information and communication has been mentioned in context of 9th Goal titled 'industry, substructure and innovativeness'. It has been emphasized that to eliminate digital inequality has critical significance in light of providing equal access to information globally and improving innovation and entrepreneurship. Digital transformation and innovation having crucial role in reaching this 17 goals has been urged on.

EU 2020 strategy report has embraced the principle of "Wise, Sustainable and Inclusive Development". In the strategy, the aim is the concepts of strategical innovation and better usage of the resources, an entry to a new, sustainable social market economy having information as the most important player; to a wiser and greener economy. Within this context, for Europe, digital agenda goals and economically growing goals based on data have been determined and to make the people and firms have benefit from advantages of digital market together with generalizing high speed internet has been aimed.

In the light of these developments, It is to the point to state that the necessities and expectations of digitalizing world has been included in the sustainability concept and to fulfill these requirements is an universal goal. In today's world in which concepts like economy and digitalization; data and economy; freedom and internet access, and many more interwine, It will be a missing situation to think the contrary and to talk about a sustainability that does not cover achievements of informatic world.

Reflection of sustainable development on the science of business has been approached as corporate sustainability. Corporate sustainability could be described as dealing with the economical, social and environmental extents besides corporate management principals, managing the risks by entegrating these into firm's all processes and decision mechanism, in order to create value in long run. There are four elementary powers that direct firms according to this understanding to decide and manage their activities. These four powers; legitimacy, gaining social reliability, providing answer to customer demands and the desire to act in harmony with expactations of investors. Beyond these powers, the biggest truth that is faced is to force the firms to act with understanding of sustainability. Namely, the fact that the resources world is offering for one year usage period is being consumed in less than eight months stands as the biggest indicator that tomorrows are in danger. In that case, to be able to talk about the sustainability of a firm; a management performing in a conscious of economical, social and environmental responsibilities is required.

Main goal of digitalization with high level of automatization can reach high level of operational productivity and activity (Lu, 2017). Grounding on cyber-physical systems, internet of things, internet of services and the new industrial paradigm constructed by wise factory main components, the collaboration with robots, It aims providing faster, flexible and much more special products to customers. In this context, It is foreseen that the experienced developments will have a direct effect on environment, economy and society that create the basis of the sustainability concept.

For firms to totally integrate the digitalization that has initiated in industry, into all processes of their value chain, into whole workflow is a requirement to be also able to ensure a sustainable competing power. For this; It is inevitable to constitute strategies aimed at reconstruction of every operating functions from procurement to distribution, from marketing to human resources, with digital solutions. In this study, the effects of digital transformation on corporate sustainability management paradigm and what kind of an sustainable digital business model the firms should build, will be investigated.

DIGITALIZATION AND CORPORATE SUSTAINABILITY

Digital Transformation and Basic Components

In 2011, German Ministry of Education and Research investigated the situation the country is in at that time and put ten projects forward under the name of “High Technology Strategy 2020 Action Plan” (Fang, 2016). These projects were based on sustainability, usage of the smart technology and new energy resources (MacDougall, 2014). Industry 4.0, one of the projects introduced, was first announced in 2011 Hannover Trade Fair for improvement of German economy (Jian, Ying, & Grosvenor, 2016; Lu, 2017; Witkowski, 2017) and was considered as a critical strategy to be able to compete in industrial manufacture (Mrugalska & Wyrwicka, 2017; Bonilla, et al., 2018).

Theoretically It was first come up with the article titled “Industry 4.0: Towards 4. Industry Revolution with internet of things” by Kagerman and his friends in 2011 (Kagermann, Lukas, & Wahlster, 2011).

Industry 4.0 has the aim to make a production that is of higher quality, cheaper, faster and of less waste by taking the production over with robots which can perceive the environments with sensors and distinguish the needs by making data analysis. Furthermore, Industry 4.0 lets the things to communicate with each other and people by tracking physical transactions via cyber physical systems in smart factories modularly built and as a consequence It ensures the noncentral collaborator decisions to be taken.

In today’s competitive environment, It has been inevitable for the organizations to perform Industry 4.0 organizations for maintaining their existence and being sustainable (Yıldız, 2018). Primary goal of Industry 4.0 is to be able to reach an higher level of automation and operational activity and productivity (Lu, 2017). While this technological context is built by IoS (Internet of Services) and IoT (Internet of Things) which internally and externally binds the industry with supply chain, It gets “smart” with support of industrial treatment CPS, Cyber-Physical Systems (Müller, Buliga, & Voigt, 2018).

Industry 4.0 encourages the manufacturing systems that can momentarily accommodate with customer’s changing needs, the automation systems which are in constant coordination and communication with each other (Sinan, 2016) and the close collaborations between various disciplines in product development (Herter & Ovtcharova, 2016). For example, customers could give their decisions anytime during production or has the right to change their orders free of charge till the last minute. Besides, with smart

products, It enables customers to both know the products manufacture information and to receive usage suggestions depending on his/her own behaviours (Jian, Ying, & Grosvenor, 2016).

New and destructive business models improving around Industry 4.0 paradigm elements (Stock & Seliger, 2016), cover the design and practice of competitive products, services, powerful and flexible logistic and manufacture systems (Mrugalska & Wyrwicka, 2017). This flexibility can actualize with planning department through information technology and as the following, with integration of the suppliers. By means of this integration, products efficiently and rapidly specialized could be marketed (Fallera & Feldmüllera, 2015), products could be simultaneously planned, manufacturing process and product quality could be improved and market entry time could be decreased (Oesterreich & Teuteberg, 2016). In brief, It is stressed that It is necessary to adopt industry 4.0 paradigm to be able to increase resource efficiency and decrease market entry time (Rennung, Luminosu, & Draghici, 2016). Figure 1 exhibits an overview of characteristics and aims about Industry 4.0.

Industry 4.0 hosts innumerable technology and related paradigms (Thames & Schaefer, 2016). Some of these paradigms can be listed as RFID (Radio Frequency Identification), ERP (Enterprise Resource Planning), IoT (Internet of Things), IIoT (Industrial Internet of Things), CPS (Cyber-Physical Systems), CBM (Cloud Based Manufacturing), smart factory, smart product (Andreas, Erol, & Sihn, 2016; Thames & Schaefer, 2016), 3D printing (Zawadzki & Zywicki, 2016), blockchain etc. (Fu, Shu, & Liu, 2018).

Cyber Physical Systems

CPS is a system in which physical and software components engage, each of those work in different spatial and temporal scales, exhibit numerous and different behavioral methods and interact with each other in different ways (Bonilla et al., 2018). These systems are new generation systems that provide interaction both with things and people through unifying operative and physical abilities by using new methods (Baheti & Gill, 2011). CPS compounds physical devices with cyber area and provides aggregated data through sensors, 3D printers, cameras or RFID devices (Hermann, Pentek, & Otto, 2016). In other words, CPS cooperates with things being in intense contact with physical world around it by simultaneously using internet based data access and data transaction services. By means of CPS providing interaction with physical world and having crucial role in terms of the technological developments of the future (Baheti & Gill, 2011), It is possible to communicate, calculate or follow, control and coordi-

Figure 1. Industrie 4.0 and its characteristics

Source: Landherr, Schneider, & Bauernhansl, 2016



nate transactions with computer (Monostori, et al., 2016). Besides, with CPS, the nimble and dynamic requirements of manufacture could be carried out and the efficiency and productivity of entire industry could be increased (Bonilla, et al., 2018).

CPS represents a paradigm break from the existing work and market models with the possibility of revolutionary new applications, service providers and value chains (Soylu, 2018). When this technology is unified with manufacturing, It could also be defined as a reformist technology in which all the datas received from all the related perspectives are tracked in a complete physical way and synchronized between factory ground and cyber calculation area (Lee, Bagheri, & Kao, 2015). In CPS, by means of the systems already programmed with sensors and softwares embedded to the settled manufacture factors, M2M (Machine-to-Machine) communication could be provided and the machines could operate without the need of any intervention (Oesterreich & Teuteberg, 2016). For this reason, CPPS (Cyber-physical production systems) both ensures the possibility to connect the physical things like components, machines or sensors to cyber area and necessitates the application of software services to provide extra functionality to the user in manufacture. CPPS, as displayed in Figure 2. performs the integration of networks with usage of more than one sensor, actuator, control processor and communication device (Landherr, Schneider, & Bauernhansl, 2016). So that, the manufacturing process becomes more practicable, the productivity increases and with mass-production ways It gets possible to make products specialized (Weyer, et al., 2015). When we consider that flexible production processes are needed to individualise the products, It is necessary to build smart factories. In order to achieve this, CPPSs should be integrated in manufacturing areas (Reinhart, et al., 2013).

Internet of Things

IoT created by Kevin Ashton in 1999, has been formulated as a system in which the material world communicates with computers and sensors (Witkowski, 2017). The Internet of Things which is called as “The IoT”, is paradigm that provides the connection of physical devices with each other by means of the network place in it without any human intervention, namely, makes the machine-to-machine communication possible and enables the things to autonomously work with the other things and be remotely controlled (Gubbi, et al., 2013; Roblek, Meško, & Krapež, 2016; Gago, Moyano, & Lopez, 2017; Conti, et al., 2017). IoT devices are technological components that enable a product or manufacturing machine to connect with a organization network and to collect and/or share datas. These include sensors, RFIDs, 3D printers and cameras. Big amounts of products especially with RFID labels in manufacture areas highly simplify the process management in factories. While the datas automatically collected with RFID readers are stored in data network, It could start a different process that sets another smart system going. The relations between the processes also shed light on the updated datas like new purchase order on ERP system, device status, delay on production line (Atzori, Lera, & Morabito, 2010). It is foreseen that IoT

Figure 2. Cyber-physical production systems
Source: Landherr, Schneider, & Bauernhansl, 2016



is going to create many economical opportunities and be one of the most promising technologies having a big, destructive potential (Hofmann & Rüsç, 2017).

The integrated application of IoT and industrial automation systems is called as IIoT (Industrial Internet of Things) (Lin, et al., 2015). With utilization of IoT and existing industrial automation systems together, smart manufacturing machines with IoT skills could automatically communicate with each other through network, control the manufacture, minimize the operator contribution and decrease the stopping time by predicting mechanical and electrical breakdowns beforehand. Besides, the shortage of raw material needed for the manufacture could be quickly detected and ceased, factory managers could reach the real-time datas related with manufacture and breakdowns from anywhere in the world and these datas could be shared with distributing channels and customers (Xu, 2011).

Cloud Based Manufacturing

CBM is an important paradigm that can contribute for the achievement of Industry 4.0. Cloud computing whose central feature is the virtualization of data transaction resources and services, is being described as a combination of settled computer technologies expected to create productivity effects in operations and economy, and the opportunities to provide external resource (Haug, Kretschmer, & Strobel, 2016). The specialities of CBM include the network bounded manufacture, scalability, agility, accessibility at every turn, virtualization, big data, IoT, everything for a service and resource pool (Thames & Schaefer, 2016). The scalability of data transaction sources enables the utilization and payment of needed resources without making big investments and thus decreases the costs and increases the competitive power. When operational and strategical layers are integrated to manufacture, suppliers and customers, these basic technologies allow the specific features characterizing Industry 4.0 to appear. These are automation, digitisation, decentralization (Stock, et al., 2018), virtualization, real-time data collection and processing, and real-time data communication (Kagermann, Wahlster, & Helbing, 2013).

Smart Factory

Industry 4.0 can be described as “smart production” in which all things can communicate and interact with each other through internet with the developments in areas like artificial intelligence, 3D printers and space technology. One of the important places that the things can communicate with each other in Industry 4.0 is the smart factories which are also called as dark factories because of being equipped with “smart” technologies and having no human being inside (Aksoy, 2017). The smart factory is a conscious and smart system consisting of a digital integration in which the manufacturing resources are connected to each other and automatically communicate, and which foresees the machine breakdowns, avoids them and controls and manages the manufacture process (Qin, Liu, & Grosvenor, 2016; Jian, Ying, & Grosvenor, 2016). Besides, with this system, product design, manufacturing plan, manufacturing engineering and manufacturing process could be modularly stimulated (Jian, Ying, & Grosvenor, 2016). With “smart factories” based on the idea of a noncentral manufacturing system in which human, machines and resources naturally communicate on a social network, It is expected that the close connection and communication between products, machine, transportation systems and human beings would change the existing logic of manufacturing (Hofmann & Rüsç, 2017). With smart factories turning into a obligation beyond a dream, It seems inevitable for the operations to go for a transformation in their factories to be able to give answer to the demand of personalized production and change in consumer choices.

It is very important that big data analysis is properly performed by the system in smart factory and application ability is obtained. From this point of view, smart factories should unify smart things with big data analysis. While the smart things could be dynamically reconstructed in order to enable high flexibility, the big data analysis could provide global feedback and coordination in order to obtain high productivity. Therefore, smart factory could manufacture products personalized and in small quantity in a productive and profitable way (Wang, et al., 2016). By means of the smart factories that could provide solutions for the rapidly increasing complexity in industrial manufacture, the productivity could be ensured (Gabriel & Pessl, 2016). Besides, It is quite clear that the benefits of this system would not only stay in the factory but also help the supply chain network to obtain further information related with the subject situations (Shrouf, Ordieres, Miragliotta, 2014). As the smart factories are designed according to the sustainable and service oriented work applications, they could be summarized as adaptability, flexibility, self adaptation and learning features, fault tolerance and risk management (Soylu, 2018).

Theoretical Structure of Corporate Sustainability

Providing competitive edge in global market, decreasing the dependency on inqualified labor force, releasing fast and flawless products to the market, increasing flexibility and decreasing costs could be considered as the main starting points of Industry 4.0. In addition to these aforesaid factors, resources used being run out, the life cycle decrease and increase in anxiety of the society on this situation has been the propulsive force for the development of Industry 4.0. By means of the technology and innovations that Industry 4.0 brings along, It is quite clear that It would contribute also about the sustainability which is the most popular and stressed concept recently.

Increasing world population, climate change, global warming, natural resource depletion, economical crisis on global level, organizational scandals and increase in anxiety for the environment force the organizations both to maximise their profitability towards the shareholders' interests and to clamp down for social and environmental issues (Guerci & Pedrini, 2014). Therefore, sustainability has turned into a base priority for today's organizations (Boons, Montalvo, & Quist, 2013).

Sustainability paradigm has been effected from three main group referred as ecologists, work strategists and Brundtland Commission. Primary goal of the ecologists is to enable the protection of natural environment by focusing on the environmental dimension of sustainability. The primary goal of the work strategists is to try to maintain the economical sustainability of the organizations. Strategy experts identify the term of "sustainability" with "sustainable competitive edge" (Mazur, 2015). As for Brundtland Commission, they have added a social dimension to environmental and economical one and in a manifesto named "Our Mutual Future" (Roosa, 2010) in 1987, they have described the sustainable development as "*a progress that fulfils the needs of today without making concessions on the ability of future generations to fullfill the same*" (Glavic & Lukman, 2007). This description is bringing about two concepts as need and disability. Here, the word need refers to the essential needs of world's poor population that is required to be prioritised; and with the concept of disability, the idea that social and technological organization constraints the power to fulfill the needs of environment today and in future, is being expressed. Therefore, as the resources used while meeting the needs are not limitless but exist in limited amounts, It is necessary to maintain their contunuity by putting the unused into place before they run out completely (Küçükoğlu, 2014). The sustainability concept published through Brundtland Report and reaching a wide significance, is primarily correlated with environmental issues in work

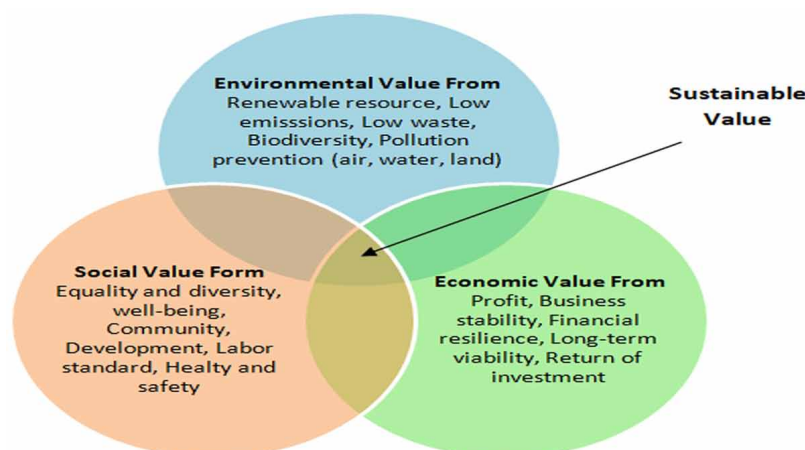
practices (Pisani, 2006). But in the last years, focusing on social aspect of the sustainability has become more of an issue (Mazur, 2015).

In present literature, there is a consensus that all individuals of the society should be responsible to create a sustainable progress way, but It is clear that the organizations should also be acting responsibly. As already known, while both the individuals fulfill their needs and the organizations perform their activities, they give non-recovery damages to their environments. Beside of this, natural resources depletion, climates change, glaciers melt and famine gets off the ground. The results of the studies reveal that the responsible person for the change being experienced is the mankind. From this point of view, to be able to make the world fit to live in and to use the nature any time, governments, non governmental organizations, companies and individuals in society have roles and responsibilities. In the point we are in today, It would be a correct approach to state that big organizations are at least as effective as a government of a country in everyday's life. Organizations are daily increasing their relations with society and playing big roles on life of the individuals in society. Therefore, It could be said that organizations are one of the central factors in any social transitions towards the sustainability (Baumgartner & Rauter, 2017).

In order for the organizations to contribute for the sustainable recovery, It is necessary that they go for a paradigm on different social dimensions (Ramus & Steger 2000). Change of paradigm on organizations comes to us as corporate sustainability approach. The corporate sustainability could be described as dealing with the three, economical, social and environmental dimensions of sustainability with corporate management principles in a way of creating balance, and integrating those in decision making process. The approach of "Triple Bottom Line" (TBL) threw out by John Elkington supports the necessity that the sustainability, its three economical, social and environmental footings should be in balance. The critical point in here is not to neglect three dimensions of the sustainability (Aras & Sarioğlu, 2015). These three sustainable areas that can not be independently considered and each of those containing several dynamics in itself, also form the systems that effect each other with their outputs. It is accepted that when the organizations deal, manage these dimensions as together (as displayed in Figure 3), they act sustainably (Dao, Langella, & Carbo, 2011). In this context, It has become more of an issue for managers to evaluate, manage these three elements together for the sake of the organizational success.

Figure 3. The triple bottom line

Source: Evans, et al., 2017



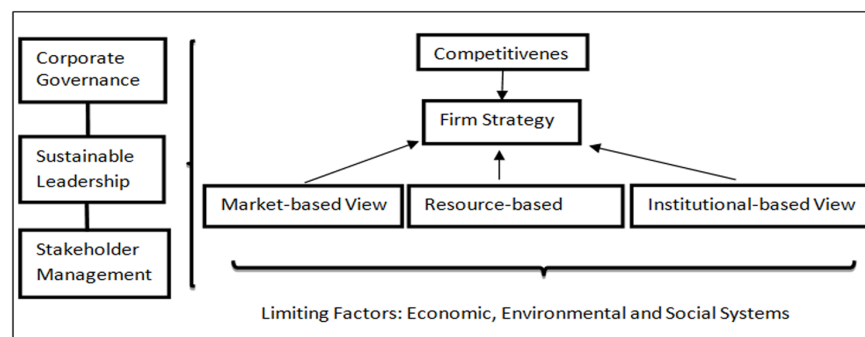
The sustainability used as synonym of the words “long term”, “persistent” and “systematic” in 21st century, has turned out to be a critical subject for the world and especially the businesses as already mentioned before (Mazur, 2015). When the sustainability applications are considered to be absolutely important for an organization’s existence in future, It could be expected that the targetted sustainable actions on an organizational strategy turns out to be a competitive edge. As known, an organizational strategy should take the long-run into consideration in order to enable the competitiveness. Therefore, the organizations could maintain their corporate sustainability when they develop a strategy that contains the restrictions economical, social and environmental systems brings about, that sustainably brings a added value to the future and that makes production (Lloret, 2016). It is recommended that in an organization’s value creation which is dependent on the restrictions of economical, social and environmental systems and its goal maintaining in an effective way, differentiation and cost leadership strategies, the vision for resources and skills peculiar to it and institutionalisation theory should be included in organizational strategy (Peng, et al., 2009). With the approach of decision making based on corporate management, a business model that meets shareholder expectations for durable leadership and sustainability has been developed (Lloret, 2016) and displayed in Figure 4.

The corporate sustainability business model which has been developed, contains several approaches. First one being related with shareholder management, requires to act responsibly towards investors and government and to manage the work responsibly by motivating the workers in a way to make them create added value for the organization (Eesley & Lenox, 2006; Freeman, et al., 2010; Henriques & Sadorsky, 2008). Another approach covers the the relation between environmental and financial performance (Clarkson, et al., 2008; King & Lenox, 2001; Orlitzky, Schmidt, & Rynes, 2003). The literature confirms that an organization trying to improve its environmental performance also enhances its financial performance in time. Another approach devoted to competitiveness and sustainability focuses on the strategically usage of the resources and capacities. This approach rests on the resource-based view and subsidiary existence of an organization. And another approach shows that the corporate circumstances change an organization’s behaviours (Bansal & Clelland, 2004; Campbell, 2007; Hoffman, 1999; King & Lenox, 2000).

In this context, while the organizations include their sustainable development problems into the strategical planning process, It is important for them to consider both the opportunities and threats and the strong and weak sides (Eccles, Perkins, & Serafeim, 2012; Engert, Rauter, & Baumgartner, 2016).

Figure 4: Conceptual Model of Corporate Sustainability

Source: Lloret, 2016



As a result, the corporate sustainability strategy integrates the social and environmental dimensions into strategical management and It makes emphasis on the strategical position of an organization in terms of sustainability. The organizations willing to improve their sustainability performance, should strike a balance between the needs of internal and external shareholders. As the needs of shareholders lean to change timely and geographically, It is an important matter that the strategical planning process is flexible enough (Baumgartner & Rauter, 2017).

On the other hand, normative and operational matters effect the integration of sustainability. Normative management level contains the values shared by the managing board and embedded in organization culture. The departmental goals on operational levels are decided according to the corporate sustainability strategy (Baumgartner, 2014). Therefore, from the standpoint of corporate sustainability management, the strategy process requires the sustainability matters to be included in all related corporate levels and systems. This condition means that sustainability matters are integrated in organization culture, strategical goal determination, the cycle of learning and feedback and the daily activities of an organization (Baumgartner & Rauter, 2017). The other cultural elements that support the adoption of a sustainable strategy are the ability and willingness to embrace a change, loyalty to innovation and high level trust within the organization (Eccles, Perkins, & Serafeim, 2012).

The Effect of Digital Transformation on Economical Responsibility

Industry 4.0 is expected to transform the industrial production and society by aiming at economical, social and environmental gains (Kiel, et al., 2017; Herrmann, et al., 2014). These aims referring to the three dimensions of the sustainability, are the result of a development that has been made since “Brundtland report” of World Commission on Environment and Development. In Sustainable Development Summit that is to follow Millenium Development Goals, in 25 September 2015, UN member states approved 17 Sustainable Development Goals that include the issues related with ending the poverty by the end of 2030, fighting with inequality and injustice, economical growth, energy, sustainable consumption and production, industrialization and climate change (United Nations, 2015). When these goals are studied, It is well understood that It is necessary to protect the resources on one hand and to ensure the growth not being limited on the other hand. In this context, to increase productivity, to develop technologies with which the resources would be used in minimum levels, becomes more of an issue.

The main goal of organizations in age of Industry 4.0 though, is to strenghten and improve the competitive edge by increasing the manufacturing flexibility and productivity through knowledge and rationism (Gabriel & Pessl, 2016). Industry 4.0 is aimed to be actualized with smart industrial value creating, energy and resource efficieny, increase of productivity and decrease of marketin cycle time, horizontal and vertical integration through value networks, providing digital integration from end to end in whole value chain of engineering (Prause, 2015) and high level digitalization (Müller, Kiel, & Voigt, 2018). What is aimed with Industry 4.0, the digitalization and the connection of industrial processes gets easier with data analysis, learning of machines and artificial intelligence; and this paves the way for several potentials on economical, social and environmental dimensions of sustainability. At the same time, some obstacles are experienced in time of Industry 4.0 application process (Hossain & Muhammad, 2016; Kuhl, et al., 2016; Kiel, et al., 2017; Müller, Kiel, & Voigt, 2018).

The optimization of technical productivity is connected with economical dimension of TBL in literature. Industry 4.0 would be able to increase economical performance by means of using predictor analysis and maintenance that helps the organizations to decrease faults and defects on assembly line (Braccini &

Margherita, 2019). With decreased transaction faults, less scraps; more reliable manufacturing systems and time savings could be achieved and consequently increase in manufacture quality could be observed. (Kiel, et al., 2017; Mole, et al., 2004). Several studies on the economical dimension of sustainability show that Industry 4.0 leads to the improvement on productivity and efficiency with new ways on product manufacture and supply chain optimization (Ehret & Wirtz, 2017). Besides, It could also be said that by simplifying the solutions for economic problems with productivity increase, products customization according to customers with transparent and tractable product systems, Industry 4.0 has the potential to create positive sustainability effects on whole value chain (Wagner, 2016). Owing to the value creating with customizing the products according to the customers, the utilization of real-time datas during supply chain and the coordination of the products on demand, It is expected that the stock level would experience decreases (Oettmeier & Hofmann, 2017). Smart factories that provide both innovation and a manufactural reform in terms of cost and time saving, also represent the arising of a value-creating model on manufacture that creates new and more market opportunities and increases the network capacity. In near future, by means of manufacture advantages enabled by the smart factories, It is foreseen that the manufacture costs excluding the raw material would get improved between %15-25. (Soylu, 2018).

3D printers breaking new grounds in science and technology and considered in the scope of Industry 4.0 concept, support the manufacture sytems which are cost efficient and stock-free (Montess, 2016). As the other advantage of 3D printers, It would be possible to manufacture one single product as well as to make manufacture in small groups depending on the orders placed and in low costs thanks to these printers (Rifkin, 2015). For the organizations using sensor on assembly line, they could increase economical sustainability with improved stock and warehouse management (Ehret & Wirtz, 2017).

On the other hand, CPS with its artifical processes, provides real-time interconnections between the whole supply chain and as a result of this, the transparency and connection of processes help optimization, productivity, flexibility, quality and personalization (Müller, Kiel, & Voigt, 2018). Besides, logistic costs decrease with the increase of process transparency in logistic (Zhong & Others, 2015; Schuhmacher & Hummel, 2016; Müller, Kiel, & Voigt, 2018). It also shows that IoT applications increase the productivity and efficiency of supply chain management and decrease stock errors (Goyal, et al., 2016).

At the same time, blockchain technology has gained interest in several industries including manufacture industry due to its real-time transparency and cost advantages (Ko, Lee, & Ryu, 2018). Yermack (2017) argues that the investors could increase their production, decreasing the cost with improved liquidity and blockchain technology. On the other side, It is also emphasized that the real-time transparency of blocakchain technology could enable the investors to control the managers more easily and the information asymmetries between the market, managers, investors and the other market actors could be solved and thus this could bring about more efficient prices. Shortly, It is stressed out that blockchain technology effects the corporate management and enables the shareholders to control the managers in an easier way. The datas created by Industry 4.0 has been conceived with the aim to collect information to improve economical performance of the product, manufacture, life cyle and finally of the industry (Shahbaz, et al., 2012). Thus, Industry 4.0 could strenghten the organizational decision making that provides the improved analytical abilities of the organizational phenomenon. As a result, It is expected that Industry 4.0 would provide a decrease of %10-30 on manufacturing costs, %10-30 on lojistic costs and %10-20 on management costs for the organizations (Rojko, 2017).

Industry 4.0 brings along many difficulties together with the opportunities. It reforms the limits of industry, creates new industries and leaves the settled manufacturing organizations head to head with compelling new competitive environments. Namely, there could be totally new business models like

new competitors and/or platforms that provide smart and related products solutions and thus settled manufacturing organizations could face treats for their current market positions (Kiel, et al., 2017). On the other hand, the organizations that decide platform standarts, could hinder the sale offers of the settled organizations and eventually could erase those from the market. Besides, Industry 4.0 creates high level of transparency depending on online and web-based connection. This situation could force the manufacturers to take cyberattack and industry related risks and to secure data rights and access (Zhou, et al., 2017). Also, for the application of Industry 4.0, It is required that the organization size, organizational structures, different manufacture structures and manufacture scenarios are to be considered and specially designed. But If the organization does not have enough financial recources, this situation could be difficult to fulfill (Müller & Voigt, 2017; Herman, Pentek, & Otto, 2016).

The Effect of Digital Transformation on Social Responsibility

In terms of social dimension of the sustainability, It is pointed out that with Industry 4.0, more secure workplaces would be created (Braccini & Margherita, 2019), more learning would be actualized with smart asistance systems and there would arise several benefits for employees with human machine interface that increases the employee satisfaction (Beier, et al., 2017; Kiel, et al., 2017). With usage of smart devices and robots in ergonomically unsuited and physically difficult work stations, employee health and productivity could be protected (Hirsch, 2014). By performing the constantly repeating jobs, smart and autonomous manufacturing systems could increase employee contentment and motivation. Besides, as the work environment could be designed properly for the age, demographic obstacles could be avoided (Kagermann, Wahlster, & Helbig, 2013).

However, there is not any clear viewpoint in literature regarding how Industry 4.0 would effect employee number (Müller, Kiel, & Voigt, 2018). Numbers differ in this matter (Beier, et al., 2017; Kiel, et al., 2017). It is expected that simple tasks would be changed and tasks like monitoring, cooperation and training would continue (Kiel, et al., 2017). In this context, It is considered as possible that new businesses based on education would arise (Römer & Bruder, 2015). Besides, many tasks of decision-making, planning and tracking would transmit to autonomous systems and jobs in this area would change (Meyer, Meyer, & Distelkamp, 2012). In general, It is seen that there are expectations for new job profiles related with data analysis and BT and for the decrease of requirements for mechanical labour with existence of smart factories and high technology automation systems used together with them (Kiel, et al., 2017; Tesch, Brillinger, & Bilgeri, 2017; Müller, Kiel, & Voigt, 2018). It is accurate to state that together with the improvement in information and communication technology, automation would be provided for complex tasks with certain rules (Hagemann, 2016) and thus there will be no need for employees in great numbers for process-based tasks in factories. Besides, It is also expected that new job categories using human skill in different ways would arise (Baldassari & Roux, 2017).

As known, one of the most important dynamics of new manufacture manner is to enable adoption for automation processes and control. Therefore, It is required that the needed software programs should be created and machine and process parameters should contain data processing and data mining technologies. An important element to improve dynamic manufacture systems is to construct manufactural tracking, detection and awareness processes. It could also be said that there would be needs for highly qualified man power that can use computer power and robots needed to analyse the advanced sensor technologies and the datas derived from these sensors (Bağcı, 2018). As It is seen, prefered qualifications in labor force are the desire to learn about Industry 4.0, social creativity, the ability to solve problems and find

practical solutions, understanding the network technologies, data analysis and processing (Kiel, et al., 2017). The organizations face difficulties and obstacles to improve or buy these qualifications. The other important point is to have Industry 4.0 accepted by employees (Erol, et al., 2016). It is very important for the organization to handle fear and doubts of the employees to increase their trust in issues related with data transparency, dependency on technical assistance systems and job safety on human-machine interaction systems (Bozionelos, 2004; Müller, Kiel, & Voigt, 2018).

The Effect of Digital Transformation on Environmental Responsibility

The primary description of environmental sustainability is based on the input-output rule determining that the waste emission sourced from a project should be within assimilative capacity of biosphere and the resource inputs should be within regenerative capacity of natural system that creates them (Goodland & Daly, 1996). When considered in this way, natural resources utilization rate should not exceed the renewal rate, and waste production rate should not go beyond assimilative capacity of biosphere (Daly, 1980).

As already known, 17 goals have been determined within the context of UN 2030 sustainable development goals. 4 out of these 17 goals are closely related with environmental issues. These are SDG #7 “Affordable and clean energy”, SDG #9 “Industry, innovation and infrastructure”, SDG #9 “Industry, innovation and infrastructure” and SDG # “13 Climate actions”. As seen on Table 1, on a study carried out, the integration of the approaches between UN 2030 Sustainable Development Goals and Industry 4.0 elements, and the improvement opportunities derived from these integration have been described.

Table 1. UN 2030 Sustainable Development Goals and Industry 4.0 elements, and the improvement opportunities derived from these integration

SDG	Integration through Industry 4.0 Elements	Enhanced Opportunities towards Environmental Sustainability	Effect on Flows
SDG # 7 Affordable and clean energy	• Digitization (IoT and CPS) • Real-time monitoring and data collecting • Big data analytics	Implementation of smart grids Implementation of life cycle assessments	Decreased energy flows Increased renewable energy
SDG # 9 Industry, innovation and infrastructure	• Digitization (IoT and CPS) • Real-time monitoring and data collecting • Additive manufacturing • Novel business models	Improve weak points of additive manufacturing (energy and recyclability) Extend integration with the circular economy	Decreased energy flows Decreased material flows Decreased waste flows Decreased end-of-life products
SDG # 12 Responsible consumption and production	• Digitization (IoT and CPS) • Real-time monitoring and data collecting • On-demand production/customization	Implementation of reliable and transparent sustainability reporting on-demand parts manufacturing services instead of tangible product	Increased reliable data Decreased material flows Decreased waste flows
SDG # 13 Climate actions	• Digitization (IoT and CPS) • Real-time monitoring and data collecting • Big data analytics • Blockchain	Implementation of smart grids Implementation of life cycle assessments Blockchain-enabled emission trading	Decreased energy flows Increased renewable energy Decreased GHG emission

Source: Bonilla, et al., 2018

Industry 4.0 provides several benefits about the environmental dimension of the sustainability (Arnold, Kiel, & Voigt, 2016; Kiel, et al., 2017; Sarkis & Zhu, 2017). According to this, It enables the transparency of demand and processes and the task and processes to be smartly programmed. Thus, energy consumption could be reduced with advanced transaction stimulations (Herrmann, et al., 2014) and the prediction of energy consumption through smart energy systems (Shrouf & Miragliotta, 2015; Ding, Jiang, & Zheng, 2015; Weinert, Chiotellis, & Seliger, 2011). Together with this, It is also possible to reduce greenhouse gas emissions with data centered and trackable carbon footprint analysis (Peukert, et al., 2015). Besides, the number of false deliveries, unnecessary feeding hours and damaged goods could be decreased throughout the whole supply chain with data transparency (Qiu, et al., 2015; Herman, Pentek, & Otto, 2016). From this point of view, the waste as well as the resource and energy consumption could be avoided (Herman, Pentek, & Otto, 2016; Berman, 2012).

As there is a continuous data availability in all points of manufacture process, Industry 4.0 could give support by means of constant resource management (Gabriel & Pessl, 2016). Namely, It could create consciousness of real-time data tracking, resource consumption and sensitive manufacturing management. Energy saving could be possible with the adoption of IoT and the integration between information technology devices and platforms of the organization with real-time datas (Shrouf & Miragliotta, 2015). Thanks to the additional manufacture opportunities provided by Industry 4.0, remarkable improvements are observed on physical transportation and logistic processes (Oettmeier & Hofmann 2017). With Industry 4.0 supported by real-time tracking, foreseeing and remote maintenance also effects the environmental burdens in positive way. The foreseeing and preventive remote maintenance supported by big data analytics could make the life-span of the machines increase (Bressanelli, et al., 2018).

Besides, because of the extensive digitalization provided by Industry 4.0, the necessities for corporate sustainability; reporting of the environmental accounting more correctly, in high quality and on time, and environment management could be simplified (Burritt & Christ, 2016). With 3D printers coming into question, environmentalist groups already producing their own energy could create a sustainable manufacturing system by means of these printers and in addition to fulfilling their personal needs, they could market their surplus through internet and turn to be both a producer and a consumer (Rifkin, 2015).

From the perspective of life cycle though, the acceptance of the technology connected with Industry 4.0 necessitates raw material, water and fuels to manufacture all new machines and devices, and also resources to annihilate the old equipments (Bonilla & Others, 2018). At the same time, blockchain technology could reshape the business models through the integration with Industry 4.0, by keeping records on industry models and performing contracts. As the blockchain is transparent, stable and unchangeable (Sikorski, Haughton, & Kraft, 2017), It allows forming reliable datas. However, the remarkable energy that It consumes stands as a limitation that should be considered in adoption of environmental sustainability (Zheng, et al., 2017).

BUILDING SUSTAINABLE DIGITAL BUSINESS MODE AND FOCUSING ON VALUE PROPOSAL

Industry 4.0 is a fact that takes the process transparency to the highest level by taking advantage of digitization, and integrates the supply chain into new customer value creation level with corporate value chain, through its technological existence and activities. It is known that the forth industrial revolution will have effect on all organizations. Therefore, It is very important for the organizations to understand

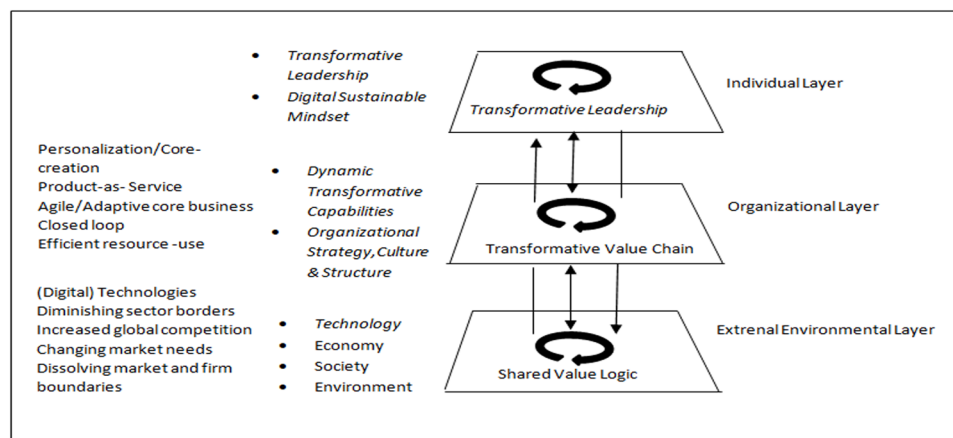
how they will be using the opportunities proposed by digitalization. In order to construct this, the theory that the core value of the industry process is to create value for customers, is the thing needed. Because, this industrial revolution initially effects the various elements of value creation and at least in the beginning the manufacture itself (Nagy, et al., 2018).

Dynamic globular economy, with the technological developments, necessitates the creation of the most innovative business models that use the more sustainable resources rather than rational and destructive ones (Joyce & Paquin, 2016; Schaltegger, Hansen, & Lüdeke-Freund, 2016). From this point of view, in order to determine how the sustainable and transformer business models will create new value proposals, Brenner (2018) studied both internal organizational distinctives in workplace and dynamics of external environment. Contingency theory taking transaction cost theory, resource based approach and shared value logic as basis, offers an all-round frame for sustainable transformative business models in Figure 5. In this business model offered, It shows that personal, organizational, economical, social, technological and environmental layers interference, so they are consistent in horizontal and vertical plane. The facts that the components of all layers are consistent and three layers are vertically in same line, confirm that this business model is more durable and integrated system (Joyce & Paquin, 2016; McGrath, 2010).

The shared value principle simultaneously deals with economical, social and environmental conditions of the society being active in, and contains the policy and applications that increase the competitive edge of an organization. In the end, the competitive edge of an organization interferences with the conditions of the society It is active in (Porter & Kramer, 2011). An organization, performing innovative working methods, new management approaches and new business models, decreases the corporate costs deprived from social restrictions and increases the productivity. Sustainable transformative business models embraces the mutual value approach that covers technological, economical, social and environmental issues. Organizations, with advantages of digital technologies, should improve their dynamic transformative capabilities to be able to provide new sustainable solutions. In order to achieve this, they need to change their organizational mind and culture. However, If the performance of transformative actions based on both analytic and sustainability is requested, leadership is preeminently needed. Transformative leader should coordinate all initiatives for digital transformation, believe that the existence of the organization depends on the transformation, create a sense of urgency for transformation and spread this into the

Figure 5. Sustainable Transformative Business Models

Source: Brenner, 2018



organization, make constant commitments for transformation, be resistant and predict the difficult moments, listen proactively relying on the new informations just received, move and be open to organization, constitute new culture, adopt ways to create new abilities and things (Brenner, 2018). On the other hand, the arising of the effects of Industry 4.0 on corporate level and its being maximized is dependent on the construction of a digital strategy on corporate level and its application (Oesterreich & Teuteberg, 2016).

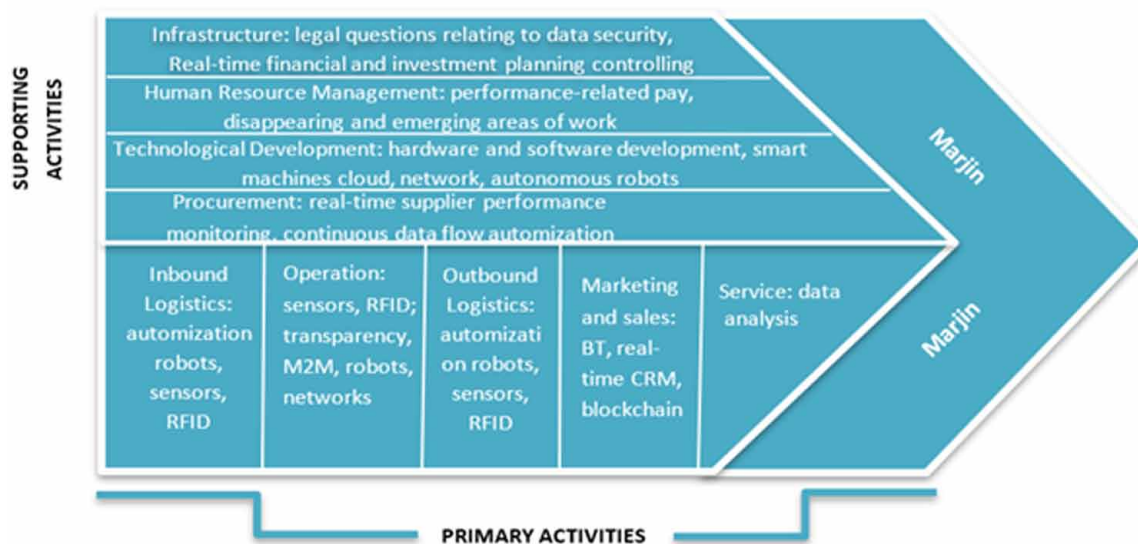
The sustainable transformative business models are dependent on the cost decrease on all stages of value chain, the increase of resource efficiency, the improvement of customer experience and innovative digital solutions that add value (Brenner, 2018). Figure 6 shows how the technological devices of Industry 4.0 on corporate value chain can effect all value-creation process of an organization (Porter & Heppelmann, 2014). In that case, It is necessary for the organizations to integrate digitalization started in industry into all processes of value chain, into all work flows in a totaliter way for maintaining sustainable competitive edge. Besides, in order to take the digital technology based synergies to the highest level, It could be said that customers should be included in product/service design process of the transformative value chain. In the end, a business model, by providing the needed products/services to its customers, covers the whole value creation process (Porter & Millar, 1985). To understand the approach based on values and know the needs of customers forms the basis of the corporate strategy (Nagy, et al., 2018).

When basic technologies of Industry 4.0 is adopted by manufacture processes, It makes out several capabilities. These are the capabilities depending on the value given to the last customer, the personification (Lasi, et al., 2014; Kiel, et al., 2017), the increasing agility depending on the decrease of stock levels on value chain and delivery times (Stock & Seliger, 2016), the raw material and product tracking throughout product life cycle (Bressanelli, et al., 2018) and the construction of new business models that allow new value creation ways.

The capabilities aroused related with manufacture process are the increasing productivity, the integration through dataflow (Kagermann, Wahlster, & Helbig, 2013; Lasi, et al., 2014), the increasing modularity

Figure 6. The tools of Industry 4.0 in the corporate value chain

Source: Nagy, et al., 2018



(Stock, et al., 2018; Qin, Liu, & Grosvenor, 2016), the possibility to design and test new institutions before they are built, with stimulation and virtualization (Stock, et al., 2018) and the improvement of learning capabilities of machines (Pagoropoulos, Pigosso, & McAloone, 2017). On the other hand, they enable the growth of vertical integration with the integration of the hierarchical levels of departments and organizations from product development stage to sale (Deloitte, 2015; Kagermann, Wahlster, & Helbig, 2013), also enable the improvement of horizontal integration by providing global optimization of manufacture process throughout the factory and organization limits by means of utilization of product datas on whole network (Kagermann, Wahlster, & Helbig, 2013; Kiel, et al., 2017; Deloitte, 2015). Besides, the productivity related with both value increase and manufacture process capability improvement, provides an increasing flexibility that enables adaptations, changes in manufacturing necessities without making concessions on speed and quality, or enables including machine components (Kagermann, Wahlster, & Helbig, 2013; Lasi, et al., 2014).

FUTURE RESEARCH DIRECTIONS

Industry 4.0, being a concept that has just begun to be discussed in business life and literature, is very effective in process of industrial value creation. Studies on its advantages and disadvantages for the firms are still not in adequate levels. As there is not one single viewpoint for what the concept of Industry 4.0 means, generalibility of empirical elements could be special for application. Therefore, more studies would reveal the advantages of Industry 4.0 and the difficulties in application. The high practicality and theoretical importance of digital and related production technologies, clearly show that It is necessary to understand dynamics underlying Industry 4.0 applications. In context of sustainability, for advantages and difficulties of Industry 4.0 to be understood, firm size and characteristic of the sector should be dealt and studied. Frankly speaking, It could be said that in context of sustainability, there is a necessity for a research model consisting of Industry 4.0 advantages and difficulties faced in its application.

It is also very important to attach importance to fairs, seminars, workshops etc, and to form basis for cooperations of industry and university. Firms clearly need basic means as source book, guide, road map, and debate and idea platforms related with the subject. In this respect, It is suggested that future studies would analytically deal with Industry 4.0, focus on the components of the concept, examine the relations of the components in question with each other and the sectors, and that the state policy needed to be formed in context of Industry 4.0 would be academically discussed. And It could be said accordingly that SMEs especially forming the propulsive power of economy should be the basic content of the researches and thus would be directive for industry policies to be created, in terms that provided empirical results would detect present structural deficient and needs.

Another subject that Industry 4.0 has let for discussion is competency and capability of human resource needed by this new era. There is need for a further research about the competency of employees and the acceptance of Industry 4.0 application. From this need on, shortcomings of new employees in existing work force should be detected and researches should be made to determine the needed training areas. At the same time, It would be also necessary to make important researches on the areas secondary and higher education of new generation should be updated and improved. On the other hand, different cultural backgrounds, political support and industrial structures could limit generalizability of Industry 4.0. For this reason, It is also necessary to make international studies enabling comparison of different country views. Data groups collected within the framework of this future studies should be intended

for enabling the Industry 4.0 to be dealt within the concept of sustainability. Social, economical and environmental substructure mechanisms to be created in Industry 4.0 transit process should be evaluated within sustainability in every step, any possible destruction during this process should be predicted beforehand, and proactive policies should be adopted and applied.

CONCLUSION

The increasing world population, climate change, global warming, natural resource depletion, economical crisis on global level, ethical problems, organizational scandals and increase in anxiety for the environment force the organizations both to maximise their profitability towards the shareholders' interests and to clamp down for social and environmental issues. Therefore, sustainability has turned into a base priority for today's organizations. All shareholders have turned to be demanding for manufacture of industry sector in an economically, socially and environmentally sustainable way. Nowadays, to run an organization, to create a profitable, sustainable growth is getting more difficult.

Digitizing of industrial processes and linking them to each other with Industry 4.0 creates several benefits and opportunities on economical, social and environmental dimensions of sustainability. It is necessary for the organizations to place simultaneous emphasis on three dimensions of sustainability, to be able to create sustainable industrial value. The necessity of placing emphasis on each of these dimensions with balanced and systematic approach and evaluating those simultaneously has also been stated by John Elkington in 1997. From this point of view, It is quite clear that managers should consider the benefits of Industry 4.0 to gain long term sustainable success.

In order to get competitive edge and to maintain this, the organizations should go for the necessary changes in their customer, technology, end product manufacture processes, human resources, management manners and corporate cultures. Porter (1985) supports the way to create new advantages, the necessity of design and improvement of activities in organization's value chain to provide higher value to customers, and he stresses out that this could be achieved with innovation. According to Porter, improvement, innovation and change creates the basis of competitive edge. Therefore, It has been inevitable to constitute and apply strategies in direction of reforming of all the organization functions from marketing to human resources with digital solutions. In order to achieve this, organizations should improve their dynamic transformation capabilities. As for planning and actualizing of transformative actions based on digitalization, transformative leaders are needed.

As a result, in order to maintain their corporate sustainability, the organizations should take the digitalization among the priorities, clarify the processes by making assessments before digitalization, make the digitalization an organizational culture, hire the digitally capables and create customer oriented business models in digitalization.

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KEY TERMS AND DEFINITIONS

3D Printing: A machine that turns the datas created by computers into three dimensional real objects which are possible to hold. It is considered that in future, almost all mechanical parts could be pressed through 3D printings.

Artificial Intelligence: To realize the artificial simulation of function of human brain called mind, with computers. It is generally a term that is used to refer to an area of science and engineering to produce computational understanding which could be stated as clever behaviour, and mechanisms in parallel (robots, speaking computers, etc.).

Blockchain: With this system, it is possible to create, approve, cryptographically block every data; thus to prevent algorithms created to be solved by human hand irrevocably. With the blockchain created with adding datas in every block to each other, every transaction is saved and can not be deleted.

Dynamic Transformative Capabilities: The capabilities of a firm to integrate, build and restructure internal and external resources in order to deal with and form fast changing environment.

ERP (Enterprise Resource Planning): The general name given to information systems designed for resources of firms to be united and efficiently used. They are systems that help compounding transactions and datas created in all processes from sale to accounting, from production to human resources, from stock management to purchase.

RFID (Radio Frequency Identification): A technology that enables tracking of the movement of an object which carries microprocessor and a label with antenna, through the datas It carries on this label and wireless communication technology (RF signals).

Transformative Leadership: Provides an atmosphere to the organization, in which all of the employees would voluntarily display their potentials. With this atmosphere, employees with mutual aim and values could go above their possibilities.

Chapter 11

The Effects of Digital Transformation on Organizations

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ABSTRACT

The developments in information and communication technologies in the digital age have significant and varying effects on organizations. Changes in traditional business ecosystems have created new business environments called “digital business ecosystems.” Digital transformation (DT) studies are continually being carried out in organizations to adapt to these new digital business ecosystems. Besides technological adaptation, structural changes in processes, human resources, and company culture also occur in DT process. Under these conditions, organizations need to create their strategies and road maps. In this context, it is aimed to develop a conceptual framework for examining the effects of DT on organizations by taking into account Michael E. Porter’s value chain framework and Henry Mintzberg’s typology of organizational configurations. The proposed framework is expected to make contribution to the literature in terms of adapting Porter’s value chain to the organizational structures in digital age and will be adaptable to different types of organizations.

INTRODUCTION

In this section, brief introduction about the information age, digital era, digital business ecosystems, management understanding in digital business ecosystems, and digital culture are given respectively, to provide a basis for the topics that will be discussed in the remaining sections of the study.

DOI: 10.4018/978-1-7998-1125-1.ch011

The Modern Era, which is the last of the four eras after the invention of the writing, began with the French Revolution in 1789. Historical events such as revolutions, inventions, migrations, etc. led to the beginning of important periods in human history. The introduction of the internet to people's use had started the period called "information age", although it is not yet accepted among the historical ages.

In this age, accessing information became much easier than before, with development of ICTs.

Between the years 2000 and 2010, there was a significant increase in the awareness of the use of information in business life. Information and knowledge exchange through ICTs in high volumes led to structural changes in business ecosystems, and made it possible for organizations to collect, store and process the data to be used for obtaining meaningful results. The fact that data, which is the basic element of information, could be used by organizations to achieve seamless results, raises the question whether a new period had started or not.

In order to obtain meaningful results from the data, the methods other than the analogue ones had to be used. Because, analog methods had many disadvantages in collecting data. For example, the size and the variety of the collected data was not sufficient to analyze the processes to increase efficiency. In addition to the inadequacy of the data size and variety, transfer of the collected data to a computer environment by analog methods, was time-consuming and low quality. The accuracy and speed of this transfer process was strongly dependent on the people involved in the process. Developments in ICTs, especially in the second decade of the twenty-first century, enabled the use of digital methods instead of the analog ones. This paradigm shift was the main enabler of the beginning of the digital era for organizations in business ecosystems.

Along with the digital age, there occurred many changes in business ecosystems, as well as in other areas. Addressing the "ecosystem" and "business ecosystem" concepts would be useful to understand the business ecosystems in the digital age.

An ecosystem is the ecological system of living and non-living environments. As its name implies, it is basically a system and consists of components, relations, and boundaries. There are four basic components in a biological ecosystem: abiotic components, producers, consumers, and decomposers. In order to maintain the continuity of the ecosystem, these four fundamental components remain in a harmony in order to fulfill certain functions.

Business ecosystems are ecosystems that host business environments. The most important part of a business ecosystem, which differs from a biological ecosystem, is that the business environments consist of their own components and relationships. There are industrial-based variations in business ecosystems. Each industry has its own environment and sub environments. Despite their differences, organizations in business ecosystems must be able to fulfill certain functions, as the components in the biological ecosystems, in order to survive.

Business ecosystems include manufacturers, service providers, suppliers, customers, and many other stakeholders. These stakeholders need to make necessary preparations in order to continue their existence in the future. Here, strategic decisions will have significant impacts on the future structure of the organizations rather than their current structure. One of the main reasons why strategic-level decisions are much more difficult than the decisions at the lower levels, is the ambiguity and uncertainty about the future.

Changes in the business ecosystems affect the strategic decisions of the organizations related to the internal and external environment. The size and frequency of these changes are the parameters that make the concept of change more meaningful. Until 2010, the size and frequency of the changes in business ecosystems were thought to be manageable by organizations. In parallel with the developments in ICT, the frequency of change has increased significantly. Nowadays, it cannot be said that all organizations

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can keep pace with change. Digital business ecosystems have emerged as a result of structural changes in business ecosystems in the digital era.

Digital business ecosystem is a form of business ecosystem based on the use of current ICTs. It is also as known as “digital ecosystems” in the literature. The concept of digital business ecosystems have been known by the beginning of the twenty-first century. It seems inevitable for organizations to integrate human resources and processes with ICTs, in order to sustain and grow their assets in a digital business ecosystem.

Organizations need to have a management approach to keep up with the change in digital business ecosystems and in order to manage the organizations effectively, using current ICT tools had become a necessity for executives at all levels. The minimum change expected from organizations is the use of meaningful results obtained from the data, for correct positioning in the ecosystem. Organizations that cannot meet this requirement will face significant challenges in the future.

The management approach applied in the organizations should ensure that new technologies, such as, robots, artificial intelligence, etc., should be properly managed. Although the idea that the robots and artificial intelligence will replace human resources in a near future can cause a fear of losing job security for many employees, technology support employees to create value and efficiently achieve business goals. The role of humans in the value production process had become more important than ever before with the recent technological developments. These technologies are still evolving and are not yet in maturity stage, so, the costs of ownership of these technologies are quite high. The return on investments (ROI) in terms of business value should be prior to experiencing these technologies for their popularity in the relevant business ecosystems.

Digital culture is the result of the formation of traditional culture with the use of current ICTs. In digital business ecosystems, traditional forms of business have been turning into digital business practices. This kind of transition would be possible through a technological change, a new management approach, and a cultural change as well. Organizations struggling to adapt to digital business ecosystems must establish and maintain a digital culture.

BACKGROUND

In this section, theoretical background information about the relevant topics is presented. The industrial revolutions are discussed in an historical order, and the Industry 4.0, which is currently under way, is addressed. The concepts of DT, Industry 4.0 revolution, and the literature researches are detailed. The scope of change management in organizations and the important aspects of creating digital culture are given in terms of management and organizational point of view. In terms of strategic management point of view, “value chain analysis” developed by Michael Everett Porter (1985) and “organizational structure configurations” developed by Henry Mintzberg (1980) are explained.

Industrial Revolutions and the Fourth Industrial Revolution (Industry 4.0)

By the middle of the eighteenth century, the concept of industry emerged. With the invention of the steam engine, human power have been replaced with machines in some manufacturing processes. The society, which was engaged in agriculture and farming, has been transformed into an industrial society. This was the first industrial revolution (i.e., Industry 1.0 revolution).

Nearly a century after the first industrial revolution, the use of electrical energy in the manufacturing processes in 1870s was the signal of a new revolution. In the second industrial revolution (i.e., Industry 2.0), individual production was replaced by mass production, which made the production factors much more efficient.

As a result of the invention of the computer in the twentieth century, the automation of production processes came up with the assistance of computer programs in the industry. In the 1970s, the use of programmable logical controllers in manufacturing processes was achieved through the use of information technologies in industry (i.e., Industry 3.0).

In the last 50 years, there have been important developments in ICTs. The technology called “cyber-physical systems (CPS)” is one of technological enablers in Industry 4.0. The most important point of Industry 4.0 that differs from the other industrial revolutions is replacing not only muscle power but also intelligence with robotic technologies as well. Combination of artificial intelligence algorithms and robot technologies has been launched to the industry usage.

With the use of new technologies, it has become more possible than ever to collect and analyze different types of data that can improve production processes and produce meaningful results. These new technologies enable organizations to create digital twins of physical systems and processes in production environments, which is an important part of the Industry 4.0 concept. Digital twin of a system allows analyzing the relevant system, detection of improvement possibilities in that system, and testing different scenarios about the system that cannot be experimented in real life contexts.

Digital Transformation

In period of the fourth industrial revolution, one of the issues affecting not only the business life, but also the daily life, is DT. In every aspect of life, the effects of digitalization are evident. In particular, the traditional processes and approaches in the business ecosystem change with DT, as required.

Industry 4.0 consists of multi-dimensional concepts such as CPS and IoT based on computerization, digitization, and intelligentization. With Industry 4.0, it is expected that there will be positive changes in areas such as industrial processes, engineering, materials use, supply chain, and product lifecycle management (Lin et al., 2017).

DT is the transformation of business models, business processes, capabilities, and competences by using existing digital technologies. The efficient functioning of human resources in organizations facilitates the adaptation of new technologies to the organization. Although technology is the most important item of DT projects, investment in human resources should also be taken into account. In other words, return on investment (ROI) in DT projects would be maximized with the correct positioning of human resources in this process.

DT has become one of the most studied topics in academic research. The keywords used in the literature include intelligentization, computerization, digitization/digitalization, industry 4.0, internet of things, cyber-physical systems, smart factory, etc.

Change Management in Digital Transformation

From a management and organization perspective, change can be defined as the transformation of the current situation in a process in organizations (i.e., the way the organizations function) by the intervention of internal and external factors. An organizations’ adaptation to the changes in its external or

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internal environments should be handled in a controlled manner. In this context, change management is the process of changing the processes in organizations to ensure the highest benefit for the relevant organization, and adoption and adaptation of innovations in organizations is a critical part of change management. Hence, change management is inevitable in every organization to plan, start, execute, and disseminate the DT process effectively.

Change management in organizations consists of many sub-processes. DT will create some changes throughout the organization and can be managed effectively by following the steps below:

- Establishing awareness of DT activities throughout the organization,
- Performing DT projects in a healthy communication environment and periodically sharing the results with stakeholders,
- Acquiring the skills required for DT in the organization or retention and development of talents within talent management system,
- Bringing the relevant teams together in order to meet the expected deliveries during the DT process and working in accordance with pre-defined goals and objectives,
- Ensuring that the DT process is carried out within the framework of corporate governance.

The studies about DT awareness, DT capabilities, DT teams and communications, DT governance and digital talent management are summarized below.

Digital Transformation Awareness

In Brunei Darussalam various e-government initiatives, which were launched to increase access to the technical infrastructure, created a more conscious community and more efficient government, and hence increased the effectiveness and efficiency of the public sector mechanism. ICT related projects had been planned and implemented within the scope of Brunei Economic Development Council and e-government initiatives. DT of digital libraries and heritage information were determined to be the most appropriate areas to be developed to strengthen the knowledge base of the society. The main and sub components of Virtual Library System of Brunei (VILIS) conceptual framework are given as resources, products and services, e-business services, technological implementation, and electronic publishing (Karim, 2004).

Digital Transformation Capabilities

Valentine and Stewart (2015) emphasized that the board of directors should have the competence of DT leadership. The absence of this competence can significantly increase financial, performance and conformance risks. A part of the leadership in DT is demonstrated by the boards' ability to lead Enterprise Business Technology Governance (EBTG). The technology governance leadership of the board of directors has positive impacts on income, profit, and return on investment (ROI). The independent roles of the board of directors are determined as follows: achieving the fiduciary responsibilities, governing risk and compliance, managing strategy and performance, and effective digital change and cultural leadership.

Digital Transformation Teams and Communications

In the study conducted by Mulhern (2009), an overview of DT in the media sector is presented and the effects of DT on the integrated marketing communications (IMC) are discussed. Networked information economy features are listed as follows: infinite reproduction and sharing of content, modularity of content, consumer networks, user-control and content production, customized content and information streams. Advertising as a Service (AaaS) is also highlighted in the study. The basic principles of IMC (i.e., consumer insight, data-driven decision making, cross-media integration ve communications with multiple stakeholders) represent the framework developed to manage communication in digital world.

Digital Transformation Governance

Shubha's (2017) e-Governance Competency Framework (e-GCF), is an important framework to demonstrate the general structure of business ecosystem in the context of India's DT. e-GCF explains the basic steps to be executed by managerial and technical roles in projects from the strategic level to the operational level. The roles in the framework are divided into two general categories: administrative / managerial roles and technical roles. e-GCF overlaps competences in four dimensions: (i) a set of professional skills, (ii) a set of information, (iii) a behavioral cluster, and (iv) training courses/certificates/qualifications. e-GCF enables enhancing the skills of roles in digital e-governance programs/projects by analyzing, planning, and conducting trainings.

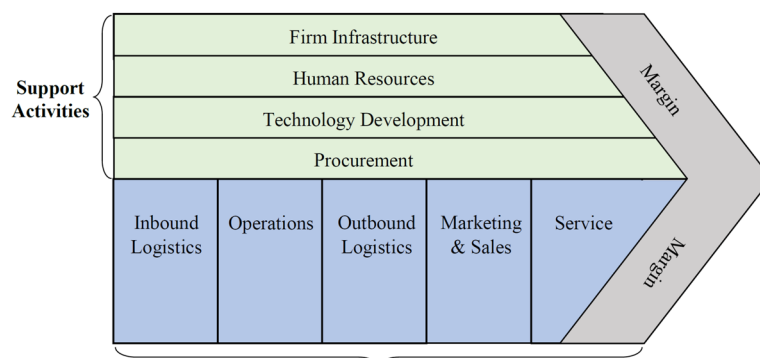
Digital Talent Management

Jung and Lehrer (2017) categorized the necessary skills to achieve the educational objectives in universities. The necessary skills to achieve the desired outcome in DT should be determined and evaluated within the scope of talent management.

Porter's Value Chain Analysis

The value chain analysis in Figure 1 was first introduced in "Sustain Competitive Advantage: Creating and Sustaining Superior Performance" book by Michael Everett Porter (1985). Activities ranging from

Figure 1. Porter's value chain analysis (Porter, 1985)



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the pre-production preparations of the product/service to the delivery to the customers, constitute the rings of a value chain. Activities in organizations are divided into two main groups: primary activities and support activities. As a result of these primary and support activities, the profit margin of the organization will be achieved.

Primary Activities

Primary activities, which directly contribute to value generation, are summarized below:

- Inbound logistics include the activities such as procurement, stocking, and transfer of the materials supplied from the suppliers to the production process, in accordance with the demand in the relevant process.
- Operations include the activities in which raw materials and semi-finished products are transformed into final products. Adding value to the product or service is initiated at this stage.
- Outbound logistics include the activities related to delivering the final products to the customers. In this stage, the value created in the production process is presented to the customer.
- Marketing and sales include the activities associated with getting buyers to purchase the product/service, such as, providing the products or services to meet customers' needs and demands, informing the customers about the products/services and selling the products.
- Service include the activities such as responding to the requests of the customers, the evaluation of the complaints of the customers and receiving feedbacks.

Support Activities

Support activities have a facilitating and assisting role for performing primary activities. These kind of activities indirectly contribute to value creation and are described below.

- Firm infrastructure includes the activities related to the organizational infrastructure. Finance, administrative management, accounting, and quality management are within the scope of an organization's infrastructure. The functions of an organization's infrastructure depend on the industry in which it operates.
- Human resources management (HRM) includes the activities related to the management of the organizations' human resources. HRM function has a direct impact on the human resources' contribution to the value creation.
- Technology development includes activities related to the technology structure, usage, and development in the organization. Success in the development of technology plays an important role in creating competitive advantage. Increasing operational efficiency, improving processes, and managing innovation have a high correlation with the efficiency in usage of technology.
- Procurement includes activities related to the procurement process of inputs used in production processes. It is worth to mention here that the purchasing function plays a critical role in ensuring production continuity. The main purpose of procurement is to maximize the quality and minimize the price.

Profit Margin

The margin in the value chain framework is the difference between the level of value created and delivered to the customer and the cost of creating that value. The reason for this part of the framework being defined as ‘profit margin’ is that it can be calculated as the difference between revenues and costs.

Mintzberg’s Organizational Structure

Henry Mintzberg’s (1980) “Structure in 5’s: A Synthesis of the Research on Organization Design” article contains details about the structural configurations in organization design. Five basic configurations were introduced as simple structure, machine bureaucracy, professional bureaucracy, divisionalized form, and adhocracy. The elements of organizational structural configuration include the ones shown in Table 1.

The Basic Parts of the Organization

Figure 2 exhibits the basic parts of the organization which are briefly described below.

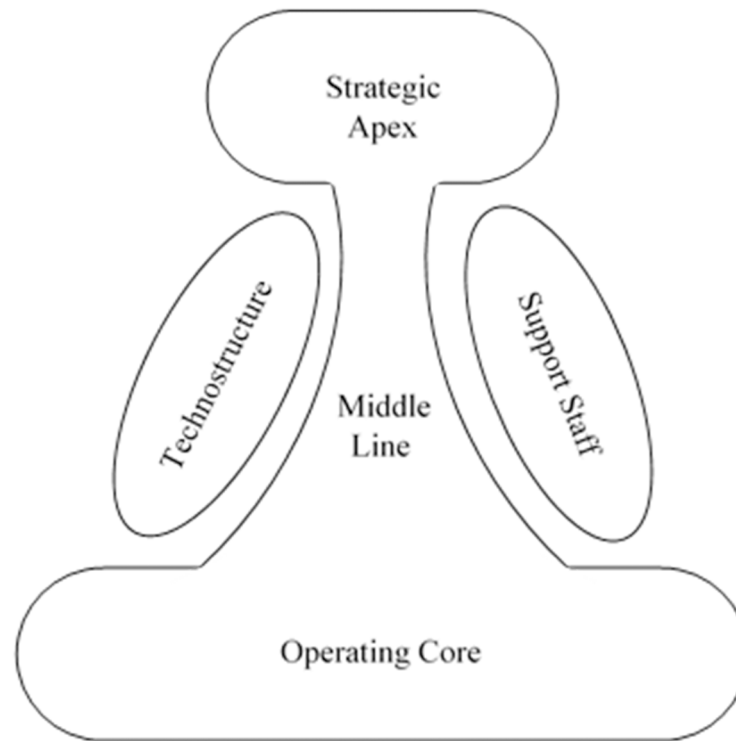
- **The Operating Core:** Employees who have responsibilities in the product/service production process of the organization, either directly or indirectly, work in the operating core. Shortly, they carry out the activities necessary to deliver outputs.
- **The Strategic Apex:** Top executives and board of directors, who ensure the organization serves its mission effectively, manage the organization’s environmental relationships, and develop the organization’s strategy, work in the strategic apex.
- **The Middle Line:** Managers who deal with organizations’ strategic goals and objectives in the form of operational action plans, work in the middle line.
- **The Technostructure:** The technostructure consists of employees who contribute technically to the structure and design of the organization. The employees, who work in the technostructure, decide on the best ways to perform jobs, try to standardize skills, decide on outputs, and define quality requirements.
- **The Support Staff:** Consists of administrative employees support other functions in the organization by providing expertise and service.

Table 1. The elements of organizational structural configuration (Mintzberg, 1980)

Basic Parts of the Organization	Basic Mechanisms of Coordination	The Design Parameters	The Contingency Factors
The operating core Strategic apex Middle line Technostructure Support staff	Mutual adjustment Direct supervision The standardization of work processes The standardization of outputs The standardization of skills	Job specialization Behavior formalization Training and indoctrination Unit grouping Unit size Action planning and performance control systems Liaison devices Vertical decentralization Horizontal decentralization	Age Size Technical system Environment Power

The Effects of Digital Transformation on Organizations

Figure 2. The basic parts of an organization (Mintzberg, 1980)



The Basic Mechanisms of Coordination

Coordination in organizations is carried out in the following ways:

- **Direct Supervision:** Coordination through the directions of one person who is responsible for the work of others.
- **Standardization of Work Processes:** Coordination through work standards (work orders, rules, regulations, procedures, etc.).
- **Standardization of Outputs:** Coordination through business deliverables, performance measurements, and contracts/specifications.
- **Standardization of Skills:** Coordination through employees who have standard knowledge and skills.
- **Mutual Adjustment:** Coordination through informal communication between people conducting interdependent work.

The Design Parameters of Organizational Design

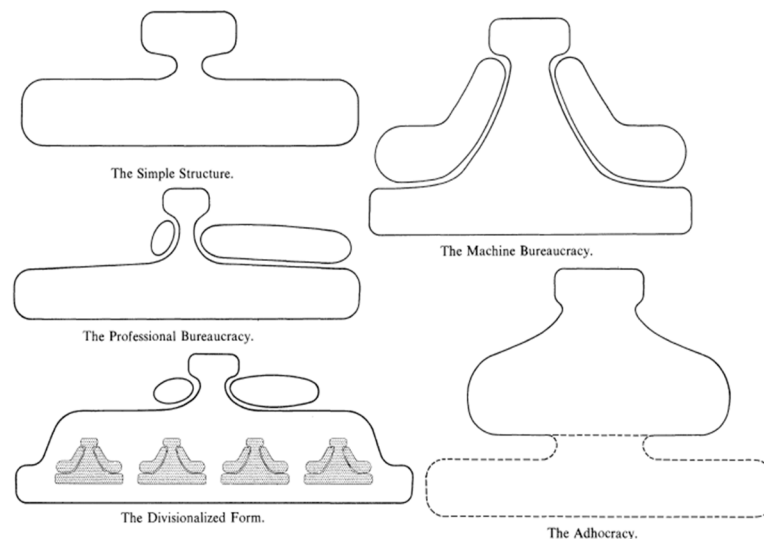
Design parameters (DP) used in organizational structure design are given below.

- **Job Specialization:** DP concerning the number of tasks and employees' horizontal and vertical job expertise.
- **Behavior Formalization:** DP concerning the standardization of business cases in form of business rules, procedures, policy guidelines, job descriptions, work structures, etc.
- **Training and Indoctrination:** DP concerning the standardization of employees' knowledge and skills through trainings.
- **Unit Grouping:** DP concerning the grouping of all roles under the strategic level into units.
- **Unit Size:** DP concerning the number of roles or sub units grouped under a single unit which is also known as "span of control".
- **Action Planning:** DP for preplanning of decisions and actions.
- **Performance Control:** DP concerning the performance measurement of positions' or units' decisions and actions over a time period.
- **The Liaison Devices:** DP for encouraging mutual arrangement between units in the organization.
- **Vertical Decentralization:** DP concerning the delegation of official decision-making authority throughout the chain of command.
- **Horizontal Decentralization:** DP concerning the controlling of power which is out of the chain of command.

The Configurations of the Organizational Structure

The values of the above mentioned elements for five structural configuration types and the components of these configuration types are given in Table 2 and in Figure 3, respectively.

Figure 3. The components of organizational structure configurations (Mintzberg, 1980)



THE EFFECTS OF DIGITAL TRANSFORMATION ON ORGANIZATIONS

This section summarizes the studies investigating the effects of DT on organizations grouped according to the industries in which they are performed, the modified framework of value chain analysis, and finally the organizational structure configurations in the digital age.

Industrial Based Review of Digital Transformation Studies

This section includes studies about DT on various levels (government, public, and industry). Industry level is detailed into education, finance, aerospace, manufacturing, chemistry, mining, media, and healthcare. Some of these studies and their results are summarized below.

Government

Nerurkar and Das (2017) investigated the necessity of addressing the large-scale DT projects in the state and public sector with ‘agile project management’ perspective. It is revealed that the large-scale DT projects that are planned to be completed in a short period of time would provide more benefit, if agile project management approach is applied.

Education

Sackey and Bester (2016) investigated the impact of fourth industrial revolution on industrial engineering (IE) and proposed improvements in the IE curriculum in South Africa. The research methodology consists of a literature survey, a study on industrial engineering curricula, and a questionnaire survey of awareness levels and actions of IE departments in South Africa. According to the results of the study, it is observed that some functions of industrial engineering have been transformed, became less visible or diminished in Industry 4.0; and traditional methods have been transformed into data-driven functions and cyber-physical systems. In particular, it is suggested that big data analytics and human-machine interaction should take place in the IE curriculum.

In another study, Sackey et al. (2017) considered the current situation and practices for supporting IE education in South Africa and formulated fourth industrial revolution’s learning platform framework. They introduced Industry 4.0 didactic interaction triangle of ‘IE knowledge and competences’, ‘the IE learning factory’ and ‘IE learners’ components, in which learning towards industry 4.0 principles is in the center (i.e., in the intersection of three components). Here, in this triangle, the learning factory is seen as a hub connecting all entities in the knowledge-creation and application process. The results obtained from the questionnaire surveys at universities indicate that it is beneficial to establish a learning factory in technical universities.

Richert et al. (2016) considered the capabilities, competences, and qualifications of the future engineers who will work in the virtual environments that emerged as a result of fourth industrial revolution. Development and innovation of CPS will require the universities to evolve in the training of engineers and scientists. Using big data and transforming analytical information into competitive information are considered to be key competences. Engineers would have competences and qualifications to work in hybrid human-robot teams. In cooperation with universities and educational organizations, it would be

Table 2. The values of the elements for five structural configuration types (Mintzberg, 1979)

Basic Configurations		Simple Structure	Machine Bureaucracy	Professional Bureaucracy	Divisionalized Form	Adhocracy
Basic Mechanisms of Coordination		Direct Supervision	Standardization of work	Standardization of skills	Standardization of outputs	Mutual Adjustment
Design Parameters	Specialization of jobs - horizontal	Low	High	High	Some	High
	Specialization of jobs - vertical	High	High	Low	Some	Low
	Training	Low	Low	High	Some	High
	Indoctrination	Low	Low	High	Some	Varies
	Formalization of behavior	Low	High	Low	High	Low
	Bureaucratic/organic	Organic	Bureaucratic	Bureaucratic	Bureaucratic	Organic
	Grouping	Usually functional	Usually functional	Functional and market	Market	Functional and market
	Unit size	Large	Large	Large	Large	Small
	Planning and control systems	Little	Action planning	Little	Performance control	Limited action planning
	Liaison devices	Few	Few	Some in administration	Few	Many throughout
	Decentralization	Centralization	Little horizontal decentralization	Horizontal and vertical decentralization	Limited vertical decentralization	Selective decentralization
Contingency Factors	Age	Young	Old	Varies	Old	Young
	Size	Small	Large	Varies	Very large	Varies
	Technical system - regulation	Low	High	Low	High	Low
	Technical system - complexity	Low	Low	Low	Low	Low in Operating Adhocracy / High in Administrative Adhocracy
	Technical system - automated	No	No	No	No	No Operating Adhocracy/Often in Administrative Adhocracy
	Environment - complexity	Low	Low	High	Low	High
	Environment - dynamism	High	Low	Low	Low	High
	Power - focus	Strategic apex	Technostructure	Professional operators	Middle line	Experts
	Power - fashionable	No	No	Yes	Yes	Especially

Note. Adapted from “The structuring of organizations” by Mintzberg, H., 1979, p.466-467. Copyright 1979 by Englewood Cliffs, NJ: Prentice-Hall.

possible to enable the virtualization of lifelong learning, qualifications, and competences in virtual en-

vironments. As a result, the education, following the industry, is also on the way of 4.0 (Education 4.0).

Finance

Liu et al. (2011) analyzed the importance of implementing electronic banking products to benefit from digital economy. Within the scope of the study, “resource-based theory” and “strategic fit perspective” are discussed holistically and “resource fit framework” given in Table 3 was introduced.

Aviation

Abollado et al. (2017) investigated the benefits of implementing digital workflows against the significant difficulties and human factor risks in aviation industry. The support of senior management, integration of digital workflow systems with existing systems, support from end users, and implementation in phases, focusing on fully understood processes, and using metrics were determined as the success factors of digital workflow projects in this study. Based on the results, the awareness of the importance of DT in the aviation industry increases through the implementation of digital workflows. The benefits of implementing Workflow Management Systems (WMS) in aerospace organizations means of realization are listed below in Table 4.

Manufacturing

The tendency to tailor-made production instead of mass production is related to the development of technology-based manufacturing. Paritala et al. (2017) stated that the manufacturing process is optimized in terms of quantity, design, and time in the product life cycle of digital manufacturing. They state that digital manufacturing includes the management of manufacturing process information with the digital product definition and covers visualization, manufacturing simulation, ergonomics, human factor analyses, and product/process design. The difference between a traditional manufacturing process and a digital manufacturing process is shown in Figure 4.

Paulus-Rohmer et al. (2016) claimed that an organization within an ecosystem could determine the strategy that will form the right business model, only if it is aware of its strategic role. Opportunities can

Table 3. The matrix of resource fit for DT (Liu et al., 2011)

Strategic Fit	Resource-based View	
	Resource	Capability
External	External Resource Fit The firm's external resources fit the demands of DT. – Historical path – Embedded trust	External Capability Fit The firm's external capabilities fit the demands of DT. – Collaboration – Customization
Internal	Internal Resource Fit The firm's internal resources fit the demands of DT. – Dedicated liaison device – Highly authorized team	Internal Capability Fit The firm's internal capabilities fit the demands of DT. – Information Technology integration – Configuration agility

Note. Adapted from “Resource fit in digital transformation: Lessons learned from the CBC Bank global e-banking project” by Liu, D., Chen, S. and Chou, T., 2011, *Management Decision*, Vol. 49(10), p.1732. Copyright 2011 by Emerald Group Pub. Ltd.

Table 4. Benefits of implementing WMS in aerospace organizations

Benefits	Means of Realization
Improved Efficiency	Workflow automation
Improved Accountability and Visibility	Workflow status tracking tool Role assignment tool
Document Right-First-Time	Error-proofed, pre-filled forms
Streamlined Processes	Workflow progress tracking tool
Superior Control, Scalability and Flexibility	Workflow management software
Improved Communication	Automatic notifications
Employee Motivation	Workflow automation
Integration and Real Time Reporting	Tool and databases integration

Note. Reprinted from “Challenges and benefits of digital workflow implementation in aerospace manufacturing engineering” by Abollado, J.R., Shebab, E. and Bamforth, P., 2017, *Procedia CIRP*, Vol. 60, p.82. Copyright 2017 by Elsevier B.V.

be utilized when necessary implementations are achieved in the digitization process. The model developed for the ecosystem within the scope of the study was implemented in the manufacturing industry and a strategic positioning roadmap was created for the organizations.

Chemistry

By examining the fourth industrial revolution concepts developed in different countries, Andieva and Kapelyuhovskaya (2017) considered the reference architecture of digital industrial transformation for the products produced in the energy industry. Two proposed models (‘IIRA’ and ‘RAMI 4.0’) were discussed and evaluated together. ‘Reference Architecture’ has been proposed to provide the basis for fundamental changes in production management approaches based on automation of production process control.

Mining

Sganzerla et al. (2016) revealed that the disruptive effects of the technology in the mining industry have emerged as ‘mines automation’, ‘new analytical capabilities’, ‘digital workers’, and ‘remote and automated labor’. It was stated that all of these effects should be handled closely together to ensure

Figure 4. Conventional and digital manufacturing processes (Paritala et al., 2017)

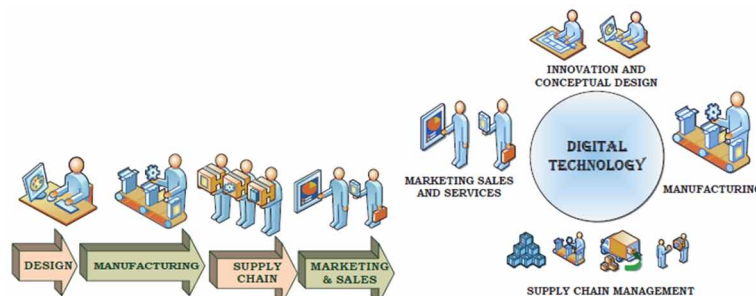
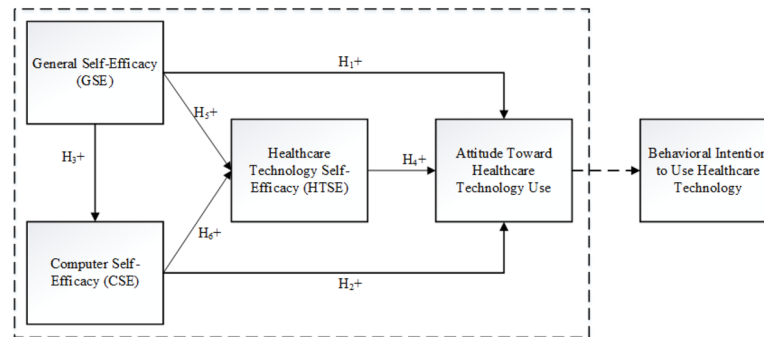


Figure 5. The conceptual model for users' attitudes toward healthcare technology use (Rahman et al., 2016)



growth and to increase productivity. According to the digital mining survey (Accenture, 2014), 85% of 151 mining companies' senior managers have an aggressive DT issue on the agenda, 88% of them have already implemented DT in order to benefit from growth opportunities, and 90% of them applies DT in the decision-making phase. The 'integration', 'multi-paced structure' and 'flexibility' should be combined to gain full value from DT.

Media

According to Karimi and Walter (2015), the internet and digitalization have devastating effects on the media industry. The role of dynamic capabilities based on 'disruptive innovation theory' and the ability to respond to disruptive innovations have been explored in their study. The results of the research indicate that the first-degree dynamic skills, which change, expand and adapt the company's assets.

Healthcare

In health industry, Agarwal et al. (2010) examined the use of health information technologies (HIT) globally in order to complete the digitalization of health systems and make these systems more reliable, more capable, and more accessible. According to the results of the study, to improve the quality of health information technologies and to reduce costs, there are three major areas of further research: (i) 'HIT design, implementation, and meaningful use'; (ii) 'measurement and quantification of HIT payoff and impact'; and (iii) 'extending the traditional realm of HIT'.

Rahman et al. (2016) expressed self-efficacy as a factor which plays role in accepting and adopting technology. The conceptual model, which was developed to analyze the effect of three self-efficacy factors ('general self-efficacy (GSE)', computer self-efficacy (CSE)', and 'healthcare technology self-efficacy (HTSE)'), is given in Figure 5. This model was validated with a questionnaire and as a result of the study, Rahman et al. (2016) indicated that HTSE effects attitude toward using technology and it is positively affected by GSE and CSE factors.

Digital Transformation and Porter's Value Chain Alignment

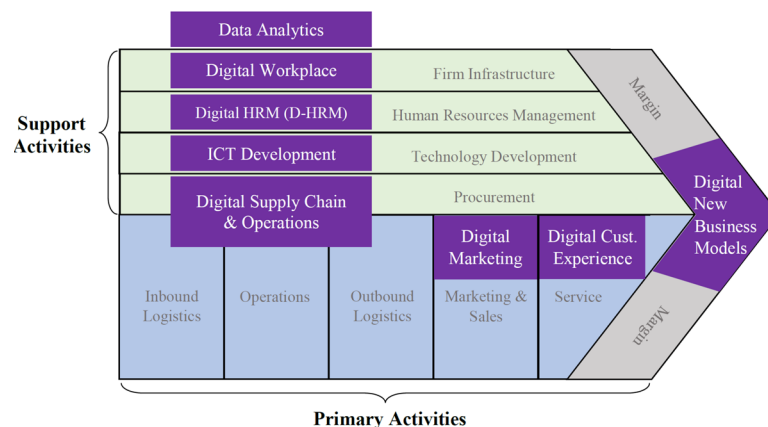
According to the scientific literature and reports prepared by professional consultancy firms, DT affects all activities conducted in organizations, which can be classified generally as either primary or support activities within Porter's "Value Chain Framework". This point of view provides an opportunity for the enhancement of Porter's "Value Chain Analysis" framework as the "Digitally Modified Value Chain Framework" (See Figure 6) that can be applied to all type of industries. The digitally transformed activities in an organization that are performed to add value to the product/service and to obtain competitive advantage in the industry include 'digital customer experience', 'digital marketing', 'digital supply chain and operations', 'digital workplace and agile organization', 'digital HRM' and 'digital new businesses models'. The essential enablers of DT process are "information technologies development" and "data and analytics".

Digital Supply Chain and Operations

Digital supply chain and operations include the activities of purchasing, logistics and stocking, production and shipment of the products to customers in a digital environment. Supply chain processes are among one of the leading areas of technology applications within Industry 4.0 in the production environments. Fourth industrial revolution applications and industrial internet of things (IIoT) are covered within the field of digital supply chain and operations. Scuotto et al. (2017) revealed the need for a research on supply chain management (SCM) digitization process by considering ICTs, the importance of information sharing and the use of electronic markets for small and medium enterprises (SMEs). Service industries' electronic infrastructure reduces all costs, enhances vendor relations, and facilitates contracting and related processes. Based on "Structural Equation Modeling (SEM)" analysis, the results of the model indicated that vendor relations, know-how transferring, and adoption of electronic markets affect ICT usage; but ICTs specialized human resources does not.

Zhong et al. (2017) examined intelligent manufacturing within the scope of Industry 4.0. Basic technologies such as IoT, cyber-physical systems (CPS), cloud computing, big data analytics (BDA), and ICTs were reviewed for intelligent manufacturing. A framework of Industry 4.0 intelligent manufacturing

Figure 6. Digitally modified value chain framework



system (IMS) is presented where research topics are devoted to intelligent design, intelligent machines, intelligent monitoring, intelligent control, and intelligent programming.

Digital Marketing

Digital marketing is the marketing activities of organizations in digital environments. The biggest difference between digital marketing and traditional marketing is related to interactivity levels. Through digital marketing, organizations can instantly reach the results of marketing activities and measure success. Targeted marketing, search engine optimization (SEO), social media marketing, display advertising, and content marketing are covered in the field of marketing.

Mobile devices have become an essential part of human life in terms of both personal and professional use. With the development and increasing use of mobile technologies, organizations have the chance to reach customers in location and time-independent manner. Mobile marketing is the marketing channel which is a sub-type of digital marketing that enables organizations to reach customers through mobile devices. Regardless of the type of marketing the organizations use, it is important to consider the innovations introduced by mobile marketing. Shankar et.al. (2016) defined the shopper, employee, organization, and mobile technology entities related to mobile shopping marketing.

The distribution channel or the marketing channel can be expressed as the way the product or service is delivered to the customer. With the emergence of digital marketing, significant improvements in cost items have been achieved, even if there are no structural channels in traditional distribution channels (direct distribution, indirect distribution, and mixed distribution). Klotzki et al. (2017) examined the distribution costs of different channels and distribution infrastructure supported by digital technologies. Based on the results of research carried out with subject matter experts in the insurance sector, it has been shown that the distribution costs do not only depend on the distribution strategy but on other several factors. It is emphasized that future distribution costs would be affected by market regulations, market dynamics, and maturity of digital transformation, product structure, and competition between organizations.

Social media is a preferred and invested area for marketing activities by organizations in recent years. Social media marketing is a digital marketing method in which marketing activities of the product or service are carried out (promotion, brand recognition, etc.) on social media platforms. Organizations prefer to use social media marketing instead of traditional marketing, because they have the chance to reach right and more customers with lower costs. Another differentiating feature of social media is that it enables organizations to interact with their customers. Although social media sites are successfully used in marketing for B2C business model, B2B business model cannot be successfully used for marketing activities. Lacka and Chong (2016) investigated the use of B2B business model for marketing purposes in social media. According to the results of the research, it was revealed that the perceptions of the marketers in the organizations have impact on the adoption and use of B2B business model.

Today, organizations can reach millions of online users (some of which are existing customers, and others are potential customers) via computers and mobile devices. Thus, it is possible for organizations to ensure that existing customers would be aware of their new products, and potential customers would be aware of the organization itself and the product portfolio through online advertisement. Garcia et al. (2017) examined the use of different online communication techniques and the perceptions of the professionals working in the advertising industry on the digital proficiency level. It is foreseen that organizations achieving successful results through online advertising, would increase their digital marketing budgets. Online advertisement professionals will be expected to be more familiar with the digital technologies and

produce more innovative solutions. Based on the findings of the research, it is revealed that the number of professionals who will meet the demand is not high, due to the lack of necessary education and the first step in development of online advertisement should be to eliminate this training gap.

Digital Customer Experience

Digital customer experience is the output of the interaction between organizations and their customers through digital media interfaces. Customer centric experience, omni-channel experience, consumer decision journey, and category management are covered in the field of digital customer experience.

The recent trends show that omni-channel marketing, which is defined as the integration of multiple channels to create a seamless and consistent customer experience, grows rapidly, as the customers are becoming increasingly mobile and channel-agnostic (Hendriyani and Chan, 2018). In their study, Hendriyani and Chan (2018) tried to illustrate omni-channel marketing usage to understand Indonesian consumers' purchasing behavior. The results show that the organizations in Indonesia use online/offline channels to grow their customer base, and try to be fast, creative, and innovative.

Vendrell-Herrero et al. (2018) examined how the implementation of digital services facilitated international expansion of the cultural industries. The results of the study indicate that cultural distance, exoticness (interaction between country of origin and cultural distance), brand image, and congruence in the image underlying country of origin and company brand image effect purchasing intentions.

Grewal et al. (2017) focused on the future of retailing and highlighted specific areas, such as, technological tools, auditory and visual technologies, and big data analytics. IoT, virtual reality, augmented reality, artificial intelligence, and robotics are some of the topics which require additional research and can be applied in different areas.

Digital Workplace

The digital workplace refers to DT of human resources, processes, and technology elements in an organization to increase the operational efficiency of the relevant organization. Process digitalization, data-driven decision making and agile organization are covered in the field of digital workplace.

The processes in organizations are in the form of activities that take place in or between departments. Business processes are needed to be improved if the outputs in these processes are not as expected. In addition to business process improvement (BPI), business process management (BPM), business process re-engineering (BPRE), business process redesign (BPRd), and change management are also carried out in organizations. Denner et. al. (2017) proposed a method supporting organizations to digitalize their business processes. For this purpose, firstly the managers and BPM experts from five organizations were interviewed to evaluate the proposed method, and then the process owners and participants made evaluations with real-world case studies.

Gölzer and Fritzsche (2017) focused on the change in data management resulting from the introduction of new digital technologies in the industry. Generally, internal business structures give direction to the organization of data processing activities in the management of operations. However, as big data becomes more important in the context of DT, business structures will progress on the basis of new data processing solutions. Gölzer and Fritzsche (2017) investigated the effects of big data on industrial operations and thus on organizations. Industry 4.0 data processing requirements can be grouped in two main categories: (i) data requirements including data modeling, data integration and data content; and

(ii) processing requirements including decision processing, information processing, real-time processing, and security and protection. Big data software used for this requirements, have different levels of data modeling, batch processing, distributed information processing, real-time queries, random access, and horizontal scaling capabilities.

Lowry and Wilson (2016) constructed a model to analyze the direct and indirect effects of an organization's internal information technology (IT) service perceptions on IT agility. The developed model included IT service quality as a mediator variable between (IT) service perceptions and IT agility. According to the results of the study, internal IT service perceptions have an impact on the effectiveness of IT and the quality of IT service. Here, IT personnel has a crucial role, and their service orientation is essential for IT agility. The results of this study acts as a guide for IT community who aims to identify effective strategies for managing limited IT resources.

Sharma (2017) carried out a study that emphasized the developments in ICTs could be used to create smarter buildings. The study focuses on the use of ICT to improve space utilization and create a better working environment, identifies the ICT architecture for smart buildings, and explores the advantages of these type of smart working areas. According to the results of the study, in order to realize the potential of smart buildings, enterprise IT systems should be integrated with IoT (machine to machine sensors) and building management systems to benefit from smart buildings' features; and this integration can be realized with ICT.

Digital Human Resources Management (D-HRM)

D-HRM is the digitalization of human resources processes in organizations. By providing process improvements through D-HRM, the time spent by employees in routine operational tasks will be reduced, and some of the tasks will be performed without human intervention in today's DT environment. Betchoo (2016) discussed the effects of DT on HR factors, such as, HR development, HR talent management, and HR performance management, in public organizations. The results of the research conducted on two unrelated businesses in the public service (i.e., a university and two public post offices) indicated that DT had a positive effect on HR development, HR talent management, and HR performance management.

Shamim et al. (2017) proposed a management framework for organizations to support organizational innovation and learning and to adapt to the requirements of Industry 4.0. According to Shamim et al. (2017), appropriate management approaches have an impact on the development of dynamic capabilities, organizational learning, and innovation, and hence enhance compatibility with Industry 4.0. HRM functions, such as, staffing, training, compensation, performance appraisal, and job design, among this management approaches, appear to make significant contribution to this transformation process.

Hecklau et al. (2016) stated that the increasing complexity in the business environments, resulting from technological developments and Industry 4.0, creates knowledge and competence challenges for the organizations, and increases the level of education required to cope with this complexity. In this context, acquisition, development, and retention of employees that are classified as talented becomes crucial. Therefore, in order to develop a qualified workforce to face economic, social, technical, environmental, political, and legal challenges occurring as a result of Industry 4.0, the required competences for each position in an organization should be identified clearly. Parallel to this requirement, Hecklau et al. (2016) developed a competence model including technical, methodological, social, and personal competence categories. The relevant competences classified under these categories in the competence model are given below:

- **Technical Competences:** State-of-the-art knowledge, technical skills, process understanding, coding skills, media skills, and understanding information technologies security.
- **Methodological Competences:** Creativity, entrepreneurial thinking, problem solving, conflict solving, decision-making, analytical skills, research skills, efficiency orientation.
- **Social Competences:** Intercultural skills, language skills, communication skills, networking skills, ability to work in a team, ability to be compromising and cooperative, ability to transfer knowledge, and leadership skills.
- **Personal Competences:** Flexibility, ambiguity tolerance, motivation to learn, ability to work under pressure, sustainable mindset, and compliance.

This competence model enables an organization to perform gap analysis for the Industry 4.0 required competences. In other words, by analyzing individual competences, organizations can use this model to evaluate employee readiness, and consequently, to build up required competences. During this process different methods and techniques related to HRM (e.g., trainings and education) can be used.

According to Weber et al. (2017), DT gives organizations the chance of making production improvements, but accomplishing these improvements necessitates new individual competences to be owned or developed. They revealed that highly developed cognitive and process competences of individuals support DT process on one hand, but social competences have little impact on the other hand.

Information and Communication Technologies (ICTs) Development

Agile approaches, digital architecture, cybersecurity, ICTs infrastructure, and the role of ICTs are covered within ICTs development in DT. Melas et al. (2014) carried out a research to identify the technology readiness profiles of the healthcare personnel, and to model technology readiness variations based on ICT usage, ICT knowledge and ICT feature demands (i.e, medical staffs' preferences about the medical computing systems' capabilities). Structural Equation Modeling was used to validate the constructed Technology Readiness Index (TRI). The results of the study confirm the five classes of the Parasuraman & Colby's (2001) technology readiness taxonomy: (i) explorers, (ii) pioneers, (iii) sceptics, (iv) paranoids, and (v) laggards. There were statistical differences between these classes in ICT knowledge, ICT feature demands, and ICT usage performance. The results of this study indicates that medical personnel's technology preparation taxonomy classes should be considered in order to accelerate the adoption and use of the ICTs.

Karre et al. (2018) focused on lean operations, energy efficiency, agile operations, and digitization. They emphasized the importance and need of agility to be ready for an uncertain future. Organizations that are able to respond to the changing market conditions quickly and intelligently will gain and maintain competitive advantage.

Christensen's (2016) research was carried out by Protiviti, which is a global consulting firm, in the fourth quarter of 2015. The purpose of the survey was to explain the competences required for internal auditors and to determine which knowledge areas should be improved mostly among others. The important findings of the survey are as follows:

- The strength of cyber security measures depends on the top management support and they should be planned in regular checks.
- Cyber security risk is an important issue in the annual audit plan.

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- Outstanding regular checks about Industry 4.0 applications and standards.
- Analysis of data and audit capabilities that are supported by technology should be advanced.

Software developers have freedom and simultaneous development opportunities in open source technologies. Due to high ownership costs, organizations tend to use open source software, instead of licensed ones. Another advantage of using open source technologies is to find experts who have knowledge and skills required for software development. Chengular-Smith et al. (2010) examined open source infrastructure technologies, and presented a model to show the benefits of open source technologies. According to the results of the study, in order to benefit from open source infrastructure technologies, organizations must have human resources besides technological resources.

Data Analytics

Analytics tools and platforms, data ecosystem, modeling, and predictive analytics are covered in the field of data analytics. Akoka et al. (2017) examined the scope and further research areas of big data. The presented framework includes social media, mobile technologies, data analytics, cloud computing, and IoT. By this framework the authors addressed the big data concept according to different dimensions: time dimension, application dimension, and objective dimension. The systematic mapping method, which is used to structure a research field and which offers a visual summary map of the field, was used in this study. Hot topics, objectives, and artifacts related to the concept of big data are given below.

- **Hot Topics:** Cloud, analytics, social, mobility, and IoT
- **Objectives:** Performance, quality, security, scalability, privacy, reliability, availability, integrity, usability, confidentiality, and traceability
- **Artifacts:** Algorithm, framework, architecture, methodology, language, metric, prototype, ontology, system design, guideline, and taxonomy

Loebbecke and Picot (2015), discussed how digitalization and big data analytics lead business and community transformation, and identified the mechanisms that underlie the potential impacts of these concepts on employment. The effects of digitalization and big data analytics on the workforce in organizations are as follows:

- Labor substitution in production processes
- Elimination of knowledge-based and cognitive processes
- Increasing the share of machine-supported decision-making
- Mass amateurization
- New digital products and services that replace physical/analog pioneers

Sheng et al. (2017) examined the academic researches contributing to the big data revolution in the last decade, and clustered 285 studies according to their perspectives, topics, and application areas. The results of this classification are given in Table 5. The analysis performed in this study indicates that awareness about the value of big data is increasing day by day, and data driven approaches are causing managerial changes.

Table 5. Perspectives, topics, and application areas related to big data concept

Perspective	Topic	Application Area
Organization	Organization Strategy	Business Intelligence
		Strategic Management
	Organization Management	Organizational Change
		Organization Engagement
Operation and Production	Operation Management	Operation Process
		Production and Innovation
		Operation Research
	Supply Chain Management	
Marketing	Consumer Behavior	User Behavior
		Online Community
		Social Network
	Consumer Sentiment	Online Review
		Online Rating
		Sentiment Analysis
	Marketing Strategy	Advertising and Targeting
		Brand Analysis
		Electronic Word-of-Mouth
		Market Analysis
		Recommendation
Information Management		Analytic Techniques
Others	Accounting and Finance	
	International Business	
	Public Administration	

Note. Adapted from “A multidisciplinary perspective of big data in management research” by Sheng, A., Amankwah-Amoah, J., and Wang, X., 2017, *International Journal of Production Economics*, Vol. 191, p.1013. Copyright 2017 by Elsevier B.V.

While the service economy grows very fast, many organizations focus on service-oriented applications, organizational processes, tools, and products. The changes from past to present are indicated as follows: from standardization to customization, from transactions to relationships, from focusing on products to services, from cost reduction to revenue growth, from mass marketing to individual marketing, and from limited information sharing to extended communication. Demirkan and Dolk (2013) presented a conceptual view of the service ecosystem and the challenges in ICT processes that are summarized in Table 6.

Digital New Business Models

Digital new business models enable organizations to generate new value propositions through digital technologies. Design thinking, agile delivery, and test and learn approach are covered in the field of digital new business models.

The Effects of Digital Transformation on Organizations

Table 6. The challenges in the business and ICT processes

Healthcare	Fragmented processes across payers, providers, and hospitals; Poor quality of patient records; Accelerating costs and slow responsiveness
Finance	Under-utilized data and silo structures
Banking	Diminishing customer loyalty with deficient products and services
Electronics	Challenges in transitioning from mass production to configure-to-order supply chains that achieve productivity and customer responsiveness
Retail	Fragmented systems and under-utilized information across the supply chain from track-and trace innovations (e.g. radio frequency identification)
Telecommunication	Incomplete view of customer because of fragmented systems for billing, customer care, self-service, and activation of services
Overall	Challenges with resource, capacity, risk, human, technology, communication, information, customer, market etc. management challenges, issues and opportunities

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In the design thinking approach, processes are maintained in a human-centered manner until the best output is achieved in product or service design. Governments seeking to address complex governance issues are increasingly applying design thinking approaches and methods, but design thinking does not consider policymakers' views and prioritizes a specific policy style without taking into account other policy styles (Clarke and Craft, 2017). Although there are above mentioned shortcomings, policy designers can produce more adaptable designs, understand the behavioral dynamics of designing and solve social issues by applying design thinking. Design thinking, therefore, has the potential to inform and empower governance. When design thinking is compared with traditional policy design, both approaches allow for adaptation, appreciate behavioral dynamics of designers and design goals, and accept design as a networked activity; but only policy design considers policy constraints, and accommodates different policy styles and accounts (Clarke and Craft, 2017).

Digital Transformation and Mintzberg's Organizational Structure Alignment

In order to examine the effects of DT on organizational structures, organizational structure configurations (See Table 7 for an overview), which were introduced by Henry Mintzberg to the literature, were discussed in previous sections.

If the key coordinating mechanisms dominating in organizations, the type of decentralization used, and the key part of the organization are reviewed within the context of DT:

- In environments, which are dominated by agile working models, coordination between agile teams would rely on mutual adjustment, in which each team member coordinate their own work by communicating informally with each other;
- Considering that both the organizational structure and the human resources have significant impacts on dt, support staff would be more effective when they use up-to-date technologies;
- And the type of decentralization should be selectable based on the agile organizational structure.

Table 7. Overview of organizational structure configurations (Mintzberg, 1980)

Structural Configuration	Key Coordinating Mechanism	Key Part of the Structure	Type of Decentralization
Simple Structure	Direct Supervision	Strategic Apex	Vertical and Horizontal Centralization
Machine Bureaucracy	Standardization of Work Processes	Technostructure	Limited Horizontal Decentralization
Professional Bureaucracy	Standardization of Skills	Operating Core	Vertical and Horizontal Decentralization
Divisionalized Form	Standardization of Outputs	Middle Line	Limited Vertical Decentralization
Adhocracy	Mutual Adjustment	Support Staff	Selective Decentralization

Birkinshaw and Ridderstrale (2015) stated that adhocracy type of structure emphasizes experimentation, motivation, and urgency, and gives the opportunity to progress in advanced analytics and in machine learning, which automates decisions. Actually, the right structural configuration for an organization varies according to the business environment in which it operates. But in particular, adhocracy, which privileges action, is appropriate if the level of unpredictability is substantially high. In adhocracy, activities are coordinated around a problem or opportunity, and decisions are made through experimentation (i.e., trial and error). And employees are motivated by challenging goals and being recognized when they achieve these goals.

Adhocracy, which is the opposite of the bureaucracy, is the type of structure that is suitable for organizations to easily adapt to the external environmental conditions. An adhocracy type organization can adapt to different conditions depending on its agility capacity in rapidly changing environments. The values that an organization should have in order to achieve its vision and to fulfill its mission are important for adhocracy type organizations. A dynamic organization can have innovative and value generating structure around these values.

Agile organizations, which support experimentalism and innovation, would not face any problem in adapting to recent technologies. Adhocracy type organizations can quickly and easily adopt “digital culture”, which enables the dissemination of DT throughout the organization.

Nowadays, many organizations make efforts to transform into an agile structure. In agile transformation process, it is important to support technology-oriented investments with human resources. In addition to technology and human resources, processes should also be modified. Only technology and human resources investments will not be enough to make the organization agile and transform it into an innovative structure, especially for the bureaucratic organizations. Organizations can have an innovation culture if they do not have a complex, bureaucratic structure.

To conclude, in order to keep pace with today’s fast moving environment, it has become a necessity for organizations to successfully implement the adhocracy structure, which was first introduced fifty years ago.

FUTURE RESEARCH DIRECTIONS

As a result of research conducted by the authors of this study, Porter's value chain framework has been modified in accordance with the digital business ecosystems, and a digitally modified version of the Porter's value chain framework is proposed. It is possible to re-evaluate and elaborate this proposed framework further. For example, in addition to the primary and support activities, new types of activities (e.g., hybrid activities, integrated activities, etc.) can be evaluated to be added into the framework in the future.

Nagy et al. (2018) examined fourth industrial revolution application tools and discussed the Industry 4.0 tools that can be used for the primary and support activities in the traditional value chain framework in detail. Similar to Nagy et al. (2018)'s study, Industry 4.0 tools that can be used for the primary and support activities in the proposed digitally modified value chain framework can be analyzed.

Instead of taking a holistic approach in examining the effects of DT on organizations, the effects of DT on a specific function of an organization can be analyzed in more detail. For example, the effects of DT on HRM function (e.g., on (i) Job Analysis and Design, (ii) Task Description, (iii) Job Evaluation, (iv) Wage Management, (v) Reward Systems, (vi) Performance Management, (vii) Staff Planning, (viii) Staffing, (ix) Diversity Management, (x) Training, (xi) Development, (xii) Career Management, (xiii) Competence Management, and (xiv) Talent Management) can be analyzed.

Finally, Mintzberg's adhocracy type of organizational structure configuration's appropriateness for the organizations that are in a DT process can be examined in more detail, or a new organizational structural configuration type can be introduced for the digital business ecosystems.

CONCLUSION

DT is the transformation of organizations in terms of technology, people, and processes in order to adapt to digital business ecosystems. With the fourth industrial revolution, the use of emerging technologies has become widespread to digitize the processes at all hierarchical levels within the organization. Although DT is perceived as a technology-oriented transformation, it is also necessary to modify the processes enabling the use of human resources in the adaptation of the relevant advanced technologies in the organization.

As mentioned above, DT has several effects on organizations. Primary and support activities, that are included in Porter's "Value Chain Analysis", are changing throughout the digital age. Inclusions or changes in activities create differences in organizations' business models. DT creates opportunities and challenges for organizations. The organizations, which are attempting to shape a digital culture, will have more opportunities, and the organizations, which are adapting to new business models will gain and sustain competitive advantage. Additionally, providing automation by means of leveraging new technologies in an innovative way within the scope of improving business processes, will reduce or even eliminate the dependencies on human resources. Although this kind of impact of DT on society may not seem acceptable from a social perspective, the fact that the organizations would benefit from cost reduction and utilize their employees in more value-added activities.

A digitally modified value chain framework is proposed in this study for the organizations that are planning to undertake DT initiatives. Within the proposed digitally modified value chain framework, new types of activities are introduced instead of traditional ones (i.e., primary and support activities). It

is expected that this framework can be used by the organizations that initiate and expand DT to modify their business processes. To successfully transform digitally, the organizations need to be dynamic, innovative, and agile to keep up with the pace of change and deliver greater value faster. The organizations, which desire to have these properties, should have to be structured as an adhocracy, which is the opposite of bureaucracy. In today's digital business ecosystems, only adhocratic organizations would have the chance of gaining and sustaining competitive advantage, and besides possessing the required technological and human resources, these organizations should also adopt a digital culture.

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KEY TERMS AND DEFINITIONS

Digital Business Ecosystem: The form of business ecosystems in digital era.

Digital Business Models: The form of business models in digital era.

Digital Era: Current era in which digitalization is predominant.

Digital Transformation: The digitalization of business processes using recent technologies.

Digital Twin: The virtual twins of products, which are developed in virtual environments.

Organizational Structure: The overall components and relations between of them in the internal environment of the organization.

Value Chain: The creation of value through many activities in organizations.

Chapter 12

Strategic Approach to Business Intelligence and Its Impacts on Organizational Performance

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ABSTRACT

Organizational structures have changed as a result of the widespread use of information technology, as well as the development of software programs and its daily use in all departments. When such technologies became more widespread throughout every sector, enterprises began to understand its effectiveness and have established information technology department requirements in their organizations. With time, these requirements have become integrated into whole organizations, thereby increasing the importance of business intelligence. Competitors, increasing uncertainties, and risks of the sector have resulted in the further development of the concept of business intelligence to support organizations and senior management wishing to achieve a competitive advantage and make strategic decisions. In other words, analyzing data and sharing it among the departments within the organization became significantly important as senior management use this information to make strategic decisions.

INTRODUCTION

In order to be successful in an intensely competitive environment, organizations should be able to establish coordination between departments effectively and efficiently. Therefore, functional units, such as production, human resources, and management, require an accurate data flow for decision-making (Gangadharan & Swami, 2004). In order to handle the challenges of intense competition, information management should be ensured at all times. In addition to obtaining timely information, it is also necessary to implement decisions with an effective and efficient management approach. Business intelligence systems need to be established in order to analyze the large number of organizational data and to provide accurate information for the success of the decision-making process (Yeoh & Popovic, 2016). Especially, since 2000, several significant developments have arisen in the field of information technologies, making

DOI: 10.4018/978-1-7998-1125-1.ch012

it increasingly important in business operations. In the early days, organizations were getting information technology support from consultancy services due to the limited number of qualified specialist staff and the use of information technologies in relatively narrow areas. However, in today's environment, organizations have to use information technologies to monitor their activities and offer differentiated services or products. Strategic moves are very important in a competitive environment and therefore business intelligence plays an important role in the development of beneficial strategic steps. The competition, in a dynamic and volatile environment, can affect the performance of organisational decisions in a positive or negative direction. Each organization implements strategies to challenge their competitors, but also to have clear and significant paths in the competitive environment (Foster et al., 2015).

The concept of business intelligence first emerged in the 1980s in France, and the purpose of the idea was to increase the literacy of companies regarding information technology in order to monitor competitors, enrich strategic thinking processes, and provide faster and easier decision-making mechanisms. At first, business intelligence was used to access to the resources. However, its use has increased with new strategies as business intelligence helps organizations to analyse data more efficiently and transfer it to departments within the organization. At the same time that incredible changes were happening within the competitive environment, large companies were leaving, new firms emerged in the market, and new strategies were developed increasing the importance of global competition and technology for business intelligence (Nasri, 2012). Increasing uncertainty in the strategic decision-making process also resulted in increased information processing and analysis activities of organizations (Dishman & Calof, 2008). If these activities are not intensively carried out, the survival of organizations in a competitive environment will be at great risk (Shollo & Galliers, 2016). In the field of management, the terms of business intelligence and information technology can additionally be used to highlight the importance of monitoring environmental factors (Tej Adidam et al., 2012; Gudfinnsson et al., 2015). Clearly, business intelligence is important for analyzing competition strategies, determining their strengths and weaknesses, and examining technological dynamics (Nenzhelele & Pellissier, 2013).

A competitive advantage can be achieved by analyzing a wide range of data and responding promptly to customers or other parties (Muñoz Castellanos & Salinero Martín, 2011). Business intelligence can always help organizations to remain competitive by providing an overview of critical information for strategic management, and in fact, Howson (2008) explains that if organisations adopt business intelligence, they can gain a competitive advantage. In their study in 2004, Phillips-Wren and his colleagues revealed the strategic benefits of business intelligence systems for the organizations. Furthermore, in general terms, if business intelligence is used by organizations in a highly competitive environment, it is likely that a competitive advantage will be achieved in their sector (Kiron & Shockley, 2011).

With an appropriate business intelligence approach, organizations can make effective decisions and gain a competitive advantage in their sector (Li et al., 2008). At the same time, organizations can gain a competitive advantage by using data storage technology for their business intelligence initiatives (Ramamurthy et al., 2008). In a 2014 study, Maune suggests that there is a positive relationship between business intelligence and competitiveness. Generally, business intelligence studies tend to focus on established organizations rather than on new organizations. In particular, the concept of business intelligence may have the capacity to increase the competitiveness of organizations. Business intelligence studies often tend to focus on technical aspects, but it is also important to consider its other positive impacts on organization. Business intelligence helps organisations develop and maintain strategic competencies and creates value for organizations in terms of strategic management. Having a common vision makes it possible to realize the strategic goals of organizations, and organizational cooperation supports participation in

a company's strategic goal planning. The most important element in terms of strategic management is to add value to the organization and to improve its survival, growth, and competitiveness both in the sector and in the long-term. These profit-oriented and benefit-oriented elements support the position of the organization in the sector.

An organization must first be capable of developing a common vision among all employees (Ferioli & Migliarese, 1996). An organization's vision defines the overall objective or purpose of the organization. Therefore, business intelligence must correspond to both the strategic management principles and the vision of the organization in order to provide organizational benefits and increase organizational performance. In terms of strategic management, when top management of an organization determines priorities, it is important to generate business analysis and planning to see what will bring benefits to the organization and how it will reflect on an organization's performance. Therefore, the concept of business analysis and vision are the heart of the strategy (Orndorff, 2002). In this study, the importance and the advantages of business analysis for organizations will be examined in terms of their strategic management approach. Furthermore, it will be specified how it will negatively affect the organisation if they do not prepare business analysis.

CONCEPT OF STRATEGIC MANAGEMENT

The concept of strategy comes from military literature regarding business and other sciences. Military strategy is the art of designing and managing the operations and activities of the armies in a war, and the purpose of military strategy is to use available resources in the most effective and economic way (minimum loss, expense, and damage) and to achieve victory (Ülgen & Mirze, 2010). Military strategy, which is the art of designing and managing the operations and activities of the armies in a war, also indicates strategy as a 'thinking method' (Çomaklı, Ekici & Şahım, 2007). The word 'strategy' means 'the path to reach the determined goals' the, meaning 'directing, referring, sending, guiding, routing'. It is thought that it was first used as a reference to the knowledge and art of the ancient Greek general Strategos. However, other sources state that the strategy comes from the Latin word 'stratum', which means a road, line, or riverbed. Although, there are different ideas about the origin of the word, it can be said that both definitions have similar meanings from a general approach and are all related to showing direction (Dinçer, 2007).

The history of strategic management started with the simple planning of business activities between 1900-1930. The classical management opinion of this era was about organising hierarchical relationships and work activities according to the specialization of the labour force. Between the years 1930-1950, planning and standard business procedures or functional rules and policies were discussed in a broader scope organisations were to be seen as a whole structure. In the 1950-1960s, the most important problem for businesses was developing and implementing plans for the next few years. The business policies and new rules were developed to show managers how to behave in the future. In the 1960s and after; long-term planning was carried out based on past achievements and includes sales estimates covering more than one year and the analysis of the products and the markets. Furthermore, the concept of strategy, which has been used as a military concept for centuries, was introduced to business literature as strategic planning. Shortly after the strategic planning phase, the concept of strategic management began to emerge (Üzün, 2000), and the concept of strategic management has been used in the field of business and management since the second half of the 20th century. Strategic management is defined by various

authors and its wide variety of definitions includes many different factors. There are writers who say that it is a science or even a type of science: Strategic management from a modernist point of view can be defined as an 'efficient and effective use of resources (natural resources, human resources, capital, infrastructure, raw materials, etc.) in order to ensure the long-term life of the organisation and to provide a sustainable competitive advantage' (Ülgen & Mirze, 2004).

Strategic management is all of the factors necessary to ensure the long-term survival position business in a competitive environment. Strategy is a way of telling how an enterprise creates significant value and affects consumers who are the lifeblood of the company (Dobson et al., 2009). The most general definition of strategic management is that of an organisation defining its goals and objectives and using its resources in order to achieve these goals (Feurer & Chaharbaghi, 1997). In fact, strategic management is the implementation of managerial decisions and activities that define the long-term performance of an enterprise. These activities include environmental monitoring, strategy formulation (strategic or long-term planning), and assessment and control of strategy tools. Strategic management focuses on the evaluation and monitoring of opportunities and threats in the business environment, revealing the strengths and weaknesses of the enterprise. Strategy refers to the use of resources to regulate environmental relations and to outperform competitors. Not only organizations in the private sector but also in the public and third sectors (non-profit voluntary sector) attach greater importance to strategic thinking, planning, and decision-making, especially in the face of the competition brought by globalization (Becerikli, 2000).

The purpose of management in business is not to protect power but to ensure effective decision-making. It is important that decisions are fair and taken with the participation of the employees of a company (Apak, Bal & Şen, 2013). Before the 1980s, strategic management was only recognized in the private sector. Later, all the organizations, either in the private sector, or the public sector, or the third sector (non-profit voluntary sector) started to use strategic management methods to determine what actions to take in order to achieve the objectives and targets of the future. If public institutions can not provide efficient and quality services, or if there is corruption, or if their activities carried out against the legislation, it undermines public's trust in the institutions and causes a loss of resources. Strategic management ensures that measures are taken to eliminate these risks or minimize them (Eren, 2010). As a whole, the performances of internal environmental elements and the business external environment are considered.

The sum of many functions or subsystems does not represent a parent system, rather they are a combination of many interactive systems. In certain operating periods, organisations need to evaluate changes in external and internal environments. Organisations should not only pay attention to the changes and needs of the internal environment but also consider other factors related to the organization performance. In terms of both strategic and organizational performance, it is important to provide accurate trainings of 'business intelligence' for the employees in order to increase productivity. Since employees are dynamic and important stakeholders of the business, they directly affect the organisational performance. In this sense, in terms of strategic management, employees in an organization have an important role in reaching objectives and targets (Bakoğlu, 2010).

Purpose of Strategic Management

The aim of strategic management is to increase future performance and the efficiency of the organization. It is a management method that allows organizations to evaluate their external and internal environment, emphasizing the importance of teamwork for the organization to achieve its goals. Strategic management enables organizations to operate in harmony with the environment, to respond to the expectations

from the internal and external institutions, to help the organization predict the future and evaluate its activities, to direct the organization to a common purpose, and to increase the quality of management (Durna & Eren, 2002). The basis of strategic management is to develop the right strategy for achieving a goal, to implement the strategy effectively, and to evaluate its results to see if they hit targets also known as the implementation of strategic thinking in the management of an organization. The aim or results should include the main objectives and ideas, the understanding of the environment, and the ability to develop plans against competitors or obstructive forces (Pamuk, Erkut, Ülegin, Ülegin, Akgüç, Alpay & Koşma, 1997).

If organizations analyse their position and external environment, they can build up their structure, systems, and processes more effectively. It is very important to remember that the environment outside the organization (market structure, competitors, customers demands and expectations, suppliers etc.) needs to be analyzed. In terms of the operational environment, strategic management includes a process of possibilities and limitations. Organizational orientation processes include activities such as creating the missions, visions, and objectives of the organisation; determining the strategic steps to show specific direction; ensuring decisions are accepted by everyone, and specifying the common values and tasks of the organisation which differentiate it from others (Becerikli, 2000). Strategic management refers to the path between the organization's current position in the sector and its target position and includes strategic planning and supervision. Senior management has an important role in determining the objectives, targets, and methods. In order to achieve maximum level of organization performance, it is necessary for organisations to have a long-term and future-oriented perspective. In organizations, top management should prepare the budget in line with long-term goals, objectives, and priorities, and arrange allocation of resources in the end, take the responsibility of accountability (Teşkilatı, 2003). An organization is only complete with all its stakeholders, conversely, if the performance of the organization is not above a certain level or if it is negative, all the stakeholders will be affected adversely. This is why organizational performance plays an important role in terms of strategic management.

Importance of Strategic Management

In today's world, enterprises must constantly change their position. In order to survive in dynamic environmental conditions. The rapid and constant changing of the world significantly affects all sectors, making existing goals and strategies invalid and inadequate, and creating new problems that threaten the existence of organizations. The accumulation of knowledge led to the development of technology, and this new technology accelerated production and consumption and increased the speed of change. In such an environment, the life of an organization depends on its ability to be aware of the conditions of environmental conditions: to fulfil its needs and expectations, to differentiate itself from its competitors, to be more flexible and respond more quickly to the environment, adapting to the changes.

For efficient and strategic management, managers need to set separate plans in the workplace, even for each unit, if necessary (Wheelen & Hunger, 2011). These strategies should be well planned and include follow-up monitoring activities. Providing necessary financial and technical facilities are also within the responsibility of the manager. How problems will be solved and decided are the joint activity of management and relevant units. According to the strategic management approach, it is important to inform employees about the purpose of the organisation, and the aims and principles of decisions and organisational targets. In this way, employees better understand their duties and know that their success will be measured and evaluated. Thereby, managers and employees can more clearly identify the

strengths, weaknesses, opportunities, and threats of organisations. A business without a strategy cannot foresee the future or give direction to its activities. In terms of strategic perspective, it is necessary for organisations to create a focal point by developing plans, manoeuvres, models, positions and perspectives, and to set goals and objectives in harmony. There might be changes in organizational structure depending on the strategies determined by management, which can effect whether team activities are carried out efficiently, with resources being innovatively used to follow and provide positive changes in the external environment (Yilmaz, 2001).

Businesses need to make long-term choices in order to maintain their assets, and plans reflecting strategic thinking include the scope, purpose, resources and evaluation steps. They also state aims, target formulations, and tools to be used in this process. This relationship between strategy and plan leads to the widespread use of strategic management in modern management. The main steps of strategic management consist of action plans, methods, tactics, vision, and goals. It is also important to learn from past activities, transfer the knowledge to the future, and gain benefits at an optimum level: analyses of the internal and external environments, determination of organizational direction, conducting necessary tasks to achieve goals, selecting methods, implementation of projects, and canalising attitudes and behaviours (Aktan, 2006).

It can be said that strategic management is about managing environmental turmoil and change. In this sense, instead of waiting for the future, strategic management can effect, motivate, and direct the future. This requires organizations to be managed in such a way that they can improvise in quickly changing conditions. In terms of strategic management, it is not enough to predict the future (it is seen as a passive function), instead, an organisation should actively manage change by improvisation (lead the change or create a change) and shape the future. Because it may not be enough to reach the strategic goals of the future, it is possible make new conscious and systematic jumps to further targets and manage the future (Karakaya, 2004).

From a strategic point of view, if businesses have the ability to evaluate the environment and predict the future, they can focus on common aims and activities of the organisation. In this way, organisations can create a framework by planning their activities, organising certain departments, and evaluating the results. This increases the quality of business decisions and projects. Strategic management is a set of decisions of implementing, assessing, and controlling activities to achieve pre-determined or reviewed objectives by developing effective strategies: concepts, methods, approaches and principles related to the planning, organizing, staffing, directing, and evaluating (Rodoplu, 2001).

Following strategic analysis is an important phase of strategic management all the strategies are reviewed, assessed, and the most efficient alternative is selected. After this point, implementation of the strategies phase starts and includes forming organizational structures, applications of annual programs, resource allocation, budgeting, procedures, appointment of leaders and managers in line with the new strategy, evaluation and control procedures (Eren, 2005). During the implementation phase of the strategy, the organisation focuses on the definition of a new mission and the re-determination of objectives, establishment of an organizational structure in accordance with the strategies, mobilization of all types of business resources and systems, and the appointing and training of leaders who can develop and implement the new strategies, thereby generating an appropriate organizational climate (Ülgen & Mirze, 2010).

Strategic Decision Making Process

Mintzberg et al. (2005) state that the concept of the strategic decision-making process can be expressed in terms of innovation, complexity, and limitlessness. As a result of this process, organizations are faced with something they have experienced before and are not clear what the solution will be or how it would be evaluated if a particular solution was chosen.

There are three key strategic decision-making phases; identification, development, and selection. The identification phase consists of two stages, the first of which is called the stage of 'decision-detection': recognizing opportunities, problems, or crises.

The second phase is the development stage, also known as the 'taboo phase'. During this process, managers interpret the emerging stimulant elements and specify cause-effect relationships in order to make decisions. It is considered the heart of the strategic decision-making process and includes multiple activities: addressing current problems, bringing solutions to the crisis or to assessing opportunities in detail. This development stage also consists of two stages. First, the research stage requires finding ready-solutions and the second is the draft stage where these solutions are adapted or created according to the situation. During the research stage, four types of research methods are hierarchically ordered. First, is the Memory Research Method (current review of the organisation), the second is the Passive Research Method (alternatives are observed), the third is the Trap Research Method (research forces are activated to produce alternatives) and the last one is the Active Research Method (broader field of study or direct exploration of alternatives by focusing on a narrow field).

The final phrase of the strategic decision-making process is the selection phase and consists of three stages. In the first stage it is necessary to determine the criteria for selection purposes, and in the second stage, alternatives are evaluated according to selected criteria, and the final stage is the selection stage.

The strategic decision-making process is a fundamental activity and if everything is carried out smoothly and according to proposed decisions, it will be possible to reach the targeted performance. In order to processed and completed without any problems, it is necessary to use the technological facilities of today. The importance of the business intelligence concept emerges precisely from this point.

OVERVIEW OF BUSINESS INTELLIGENCE

Humanities unstoppable motivation to search for better conditions is the driving force behind the development of technology, as in many areas of life. The underlying reason for all these developments is the excitement of human beings to access information. In today's world, modern organizations store data in different resources such as operational systems, data warehouses, computer networks, and personal computers. All this data is used to help companies in their operational, tactical, and strategic activities. Many companies view information as an important weapon to gain strategic value, achieve management optimization and competitive advantage, and shape investments. The new economy has been reshaped as a result of the enormous impact of information resources on the production chain, with the gradual disappearance of the boundaries between products and services, and the emergence of new business opportunities based on information technologies. The success of any company depends on how well it understands business processes, how effectively it manages its operational activities, and how well it knows its customers. In order for companies to exist in a competitive environment, they must specify

business trends, best-selling products, and the most efficient distribution chain while understanding the profile of profitable customers.

Companies understand that the way to achieve strategic goals involves analysis, reporting, forecasting, and even real-time data management. Information is the basis of all activities in a company, and efficient production and management depends on the effective use of information systems, systems which offer information support to all users in a timely and appropriate format (Weill & Olson, 1989). Furthermore, business intelligence technologies provide the ability to monitor and manage business processes, so decisions can be made accordingly. Business intelligence has an open and flexible structure, and integrates innovative technologies into a suitable format for the organization and its environment, transforming data into information and using it in the decision-making process to increase a competitive advantage (Miller, Bräutigam & Gerlach, 2006). From this point of view, the concept of 'Business Intelligence' needs to be adapted into the philosophy of strategic management in order to have successful organizational performance and to get ahead of competitors in an intensely competitive environment.

Business intelligence can be expressed as a technological approach developed for companies to support the decision making process and to increase the efficiency of the administrative decision making process. The acceptance of new solution by the masses is not only requires a well-designed technological infrastructure but also needs a good definition of its philosophy and accurate explanations of the meaning of the solution. Business intelligence is the delivery of the right information, to the right person (decision maker), at the right time (Miller, Bräutigam & Gerlach, 2006). That is to say, the success of the organizations also depends on the right choice of internal stakeholders and their level of authority and responsibility, as they are very important elements of the formation of the organizational structure. Today, many companies store huge amounts of data. The role of business intelligence is to separate and process data to obtain useful information and to use this data in the administrative decision support process. The greatest benefit of such solutions for decision-makers is the ability to view business performance by having up-to-date and integrated data (Gibson, Arnott, Jagielska & Melbourne, 2004).

Nowadays, companies use different data sources and formats to obtain necessary information in line with changing business needs, and since data is handled and managed by different sections and systems, Business Intelligence is the most effective solution that optimizes all distributed data and provides a big picture. Thanks to this method, all departments within the company can use the data from the same storage and save the data to the same location after updating it. Thus, information discrepancies between the departments are also prevented. Yet, recent studies show that a large number of companies have not been able to use their corporate data effectively in decision-making processes. The amount of information gathered increases each day and this means that the inter-company race increases at the same rate. For an effective decision-making process, different and well-integrated sources of information are very important, and it is at this point that business intelligence can provide a powerful, low-cost, easy-to-use, shareable resource to meet needs (Reinschmidt & Francoise, 2000).

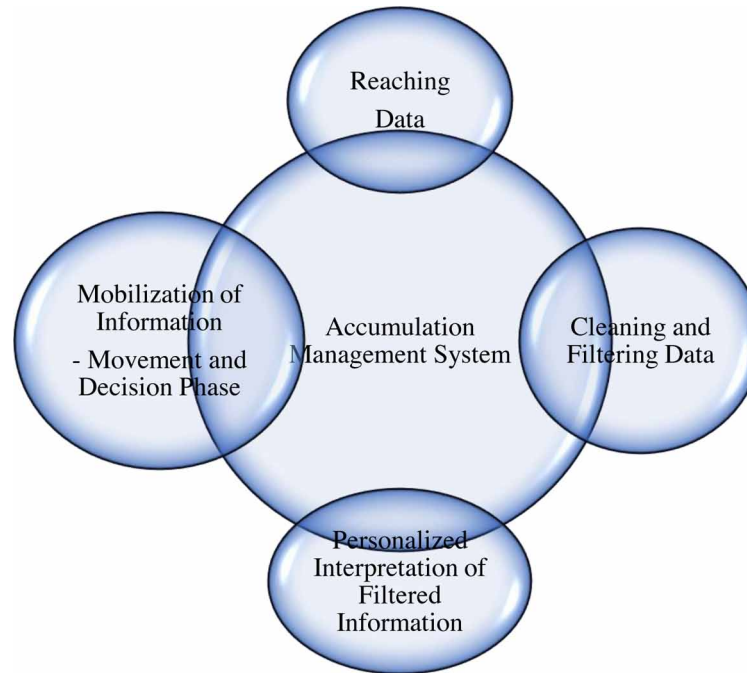
Business Intelligence

Today's successful companies are the ones that can carry out their business activities profitably even at a time when profit margins are rapidly melting. In today's business world, globalization is gaining strength every day, and it is necessary to keep expenses under control, and reach opportunities in time. Until recently, business intelligence was only the interest of large firms and seen as an academic, futuristic, and expensive field. But, in today's world, business intelligence solutions and applications have

Figure 1. The four main steps of business intelligence applications

Source: *Manage Your Business with Smart Software*, 2002,

http://www.btvizyon.com.tr/kulakcik.phtml?kulakcik_nox=53 (22 March 2019)



become very common among companies. Business intelligence solutions enable companies to integrate with other information systems and access information from a single source when identifying the strategies of companies (Wanda & Stian, 2015). Today, business intelligence solutions cover a wide range of areas such as querying, reporting, statistical analysis, forecasting and data analysis, data mining, and data quality. Primarily, operational data is required to build up business intelligence applications in an organization, such as information about customers, production, distribution, and accounting. Business intelligence systems provide solutions based on operational data, making it possible to make certain logical conclusions about the future, provide predictions, and prepare reports by examining and understanding current data. Organizations need to have data to be interpreted and implemented to provide business intelligence solutions.

The level of maturity of the Accumulation Management System and the four main steps of business intelligence applications can be summarized as follows:

Business intelligence solutions have become a necessity for every sector. The main goal in every sector is to obtain and report information within a large-scale data set, and further, to make predictions for the future. During this process, it is not enough only to see activities conducted according to the rules of the organisations, but it is also very important to catch the exceptional relations. The concept of strategic management comes into the scene at this point. If top management of an organization needs to gain strategic success, they should be able to use and analyse the data correctly. Thus, artificial intelligence definitions are also included in current business intelligence applications. In today's companies, one of the highlighted issues of top management is business intelligence. The main goal is to integrate many different systems and create Information Management Systems. Moreover, business intelligence

is expected to generate a system that can perform a certain reasoning, produce results, and be proactive within the organisation. The first step is to collect data from different sources into a hub, and then to interpret it for decision-making purposes. There are two approaches at this point. Expert systems that have rules defined by the users, or, artificial intelligence systems that can create rules by itself. In order to develop artificial intelligence systems, the organization needs to be advanced enough to have accurate and abundant data volume. Today, organisations still prefer to work with expert systems. Unfortunately, this mistake can force organizations to withdraw from the market or be put in a very difficult position. For example, world-famous companies such as Nokia, Sony, and Panasonic were late in understanding the concept of business intelligence and therefore had to draw from the competition as a result of their incorrect strategic moves.

Business intelligence tools help organisations to manage information efficiently and allow them to act proactively. Corporate business intelligence systems provide a platform for the end-users, especially those without technical background, and allow them to access and analyze information using the terms of daily life, thereafter sharing their results with other users inside or outside the organization. Compared to past decades, increasing the number of internal and external users requires instant access to information within the organisation. Therefore, the integration of operational business intelligence solutions into the corporate business intelligence platform has become a necessity. Parallel to this, reaching large audiences involves visualization of the data in order to address the lower level users. The usage of business intelligence should be measured to understand how much intelligence was made available for the organisation in the computer environment (i.e. how much intelligence was reached). Without this measurement, it is not credible to say that corporate intelligence has been increased. Bringing information together be seen as temporary intelligence surplus, however, this can be misleading. The creation and measurement of business intelligence is not only the matter of information systems but also the interest of social scientists. This issue is one of the most outstanding research areas of today (Nonaka, Von Krogh, & Voelpel, 2006).

Business Intelligence and Its Benefits

Business Intelligence provides tools to determine the customer profitability values in Customer Relationship Management (CRM), and specifies the causes of this value in order to increase activities aimed at certain customers with an optimum threshold value. As mentioned before, these tools assist the expansion of user groups as employees who interact with the customers get service from business intelligence.

Business intelligence platforms gather all system data together through networks, then store and organise them in a data warehouse within the framework of a model. In this way, it supports the decision making process by allowing an organisation's performance to be analyzed in terms of finance, customers, and employees in daily and historical dimensions. When organizations want to make new strategic moves or when they want to regulate their targets or operational methods, they can use business intelligence to change. However, if organizations do not understand the importance of business intelligence or if they are too late to adopt it, their strategies can be unsuccessful, leading to an inability to stay competitive or accepting a smaller share of the market.

Business Intelligence provides:

- Transition from tactical use to strategic information,
- The possibility of analysis with standardized data instead of fragmented data,

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- •The transition from personal and private information to common and general information,
- The transition from mass data to information units

In order for these stages to be implemented successfully, organizations must establish their infrastructure accurately and select their employees according to the corporate culture.

Strategic Decision Making Speed and Business Intelligence

The speed of strategic decision making is expressed as taking decisions in a short time. Strategic decision-making and the actions that follow take place after the simultaneous intervention of many factors. When current conditions are considered, competition between companies has become more difficult and challenging as a result of the development of technology, thus including advanced technologies in the structure of a company may not be enough to survive in this dynamic business life. These technologies should be combined with competent decision-makers who can accurately assess the results of analyses the main cornerstone of a rapid and effective strategic decision-making process, providing a significant competitive advantage for the companies. Data is one of the most important factors of rapid strategic decision making at this point, but the storage and evaluation of knowledge is not an modern idea. Even in prehistoric times, people realized the need for information and kept records for this purpose. The introduction of computers into human life has revolutionized data storage, with many manual processes being left its place to machines that increase accuracy and ensure faster and more reliable activities.

By the 1980s, the Information Center concept had begun to enter the lives of companies. The Information Center (IC) was established as a general support unit that serves as a group of end users and acts as a bridge between the non-technical group and the technical group. This center supports data addressing and management through training (Biere, 2003). It can be said that these were the decision support systems which formed the basis of business intelligence. The idea of reporting and analyzing information emerged in the 1970s with the presentation of static and two-dimensional reports, and in the 1980s, the transition from static reports to dynamic reports started. In addition to determining the current situation and operation, it is aimed to make decisions about future processes and determine critical objectives by using the available information. These studies led to the emergence of Decision Support Systems. Decision support systems have not been sufficient enough to handle growing information over time and more intelligent systems were needed. In the 1990s, the concept of business intelligence was born in response to this requirement Power uses the term of 'Data-oriented decision support systems' for business intelligence systems (Power, 2007). Business intelligence application software has also been considered the last point in the development process of decision support systems. Therefore, it has a broader scope than decision support systems. It has more analysis capability and predictive algorithms; in addition, a strong visual tool support that is the most important factor of its use today. Business intelligence systems, together with strategy, contribute to the positive performance of an organization. One of the most important skills of successful companies is the ability to create tactics with the combination of business intelligence and strategy, and subsequently get ahead of their competitors.

STRATEGY AND ORGANIZATIONAL STRUCTURE

Each strategy is implemented within an organization and there is a very strong relationship between structure and strategy in the organisation. Generally, the structure follows the strategy as the organisation is structured in accordance with the strategies. The organizational structure (such as functional or product-based segmentation), the degree of decentralization or decentralization, and the authorities and responsibilities of the executives should be arranged according to the chosen strategy. Structures that are not suitable for the implementation of the strategy cause intra-organizational conflicts and increase costs, leading to inefficiency (Dinçer, 1998).

The first phase of the implementation of strategic management is the establishment of a rational organizational structure. An organisation can not exist without a strategy, and a strategy can not exist without an organisation. The organizational structure should be created in line with the strategy of the organization. In other words, if the organizational structure is not created in accordance with the strategy, it will be not sufficient for the implementation of the activities, and the goals will not be achieved. Similarly, if an extremely large organization is not structured according to the strategic management approach, it can have negative outcomes, such as increased costs, complexity of duties, powers and responsibilities, and unnecessary bureaucratic procedures. In the implementation of strategic management, it is important that employees are not seen as mechanic devices and that they should be persuaded to accept the strategies and changes (Wheelen et al., 2017). Indeed, the implementation of new methods may cause hesitation in people or lead to a fear of losing his/her status or decreased self-confidence, but these difficulties can be eliminated by the participation of employees. At this point, it may be necessary to create strategic management groups during the implementation of strategic management activities in the organization (Söyler, 2007).

Studies about improving organizational performance suggests that the information technology strategies of an organization must comply with its organizational strategy (Luftman et al., 1999; Sabherwal & Chan, 2001). Organizational performance is increased when there is harmony between the organization's competitive strategy and information technologies (Croteau & Bergeron, 2001). Therefore, there is a need for experienced employees who know the concept of business intelligence. If the organization does not have sufficient resources to reach an expected performance in an intense competition environment or when it falls behind its targets, an organization should learn from its mistakes and harmonize their organization-technology relationship, preparing for unexpected situations (Boynton & Zmud, 1987; Brown & Magill, 1994).

Since the top management of organizations always try to both understand the relationships between strategic subsystems and also responsibilities of managing the multivariate structure of organizations (Premkumar & King, 1994), they should have a good working knowledge about the relationship between strategy and business intelligence. In addition, in order to analyze the critical aspects of strategic contexts, such as organizational competencies and strategic orientation, and beyond that, to verify their impact on organizational performance, business intelligence needs to be managed well by the top management of the organization.

Moss and Atre (2003) define information technologies as 'an important feature that leads to the success of decision support applications and enables the organization to access data easily, in addition to being integrated into the organization in an architectural and operational sense' (Moss & Atre, 2003). Bosilj Vuksic and his friends remarked on the importance of organizational culture in the integration of

information technologies and stated that if an organizational culture does not adapt, the desired level of performance cannot be reached (Vukšić, Bach & Popović, 2013).

Elbashir et al. (2008), carried out a study on the effect of business intelligence on organizational performance and determined that (1) businesses process performance and (2) organizational performance can be used as tools for evaluating the benefits of information technology and business intelligence in the organisations. At the same time, a series of studies on business intelligence reveal the effects of organizational performance. For example, it is argued that investments in information technologies that result in benefits to organizational performance should be given more importance (Lukman, Hackney, Popović, Jaklič & Irani, 2011). At the same time, Wieder and Ossimitz (2015) provide evidence of the direct and indirect impact on decision support improvements as a consequence of investment in information technologies. Based on a secondary data analysis in a US public survey, Daneshvar and Palvia (2016) explain that the investment in information technology has a positive impact on organizational performance, and if business intelligence only address functionality and technology issues, it cannot lead to an improvement in corporate performance. At the same time, the importance of strategic management should be highlighted, and a harmony should be formed between strategy and business intelligence in terms of organizational performance.

Solutions and Recommendations

According to Peru (2010), in increasingly competitive conditions, it is necessary to control the impact of every decision taken in the formulation process of the strategy, and furthermore, every step taken in the implementation process by a evaluation system. In this context, when we look at the academic or real sector business management literature, it is clear that organization performance is one of the most studied concepts. As stated by Venkatraman and Ramanujam (1986), the scales that determine the performance of the organization vary according to the researchers' point of view and the subjects they measure. However, the determination of such scales can be a very complex process. For example, Zaim (2006) draws attention to the difficulty of identifying the scales to show the effects of information management on business performance, in terms of benefits and costs. Therefore, in order to determine the variables and evaluate the findings and to reach conceptual depth, it is useful to decide on the elements of the organization performance after a comprehensive literature search.

In many organizations, performance management is considered a system that evaluates individual achievements and behaviours of the workforce over a period of time. On the other hand, the performance for organisations is explained by Işığçık (2008) as the status of the organization activities in reaching its targets. Coşkun (2006) defined the organisational performance in the framework of the concept of strategy. According to him, organisational performance is one of the most important activities within the control function of management. Firstly, the strategy and its sub-component of vision, target, plan, program, policies and practices should be formulated and implemented; then the values should be measured before and after the implementation and compared, with organizational strategy components amended if necessary. Yildiz (2014) defined the organization performance as the presentation of the results of strategies with different variables that aim to reach organisational goals.

In the literature (David, 2011) defines strategic performance as the performance obtained as a result of strategy implementation. Mintzberg, Ghoshal, Lampel & Quinn (2003) defined strategic performance as gathering information from the business environment, using this information in the long term strategy

formulation, and then turning this strategy into organizational goals, objectives, and activities, which will be the key to organizational effectiveness and point out the target positioning.

According to Aksoy, Apak, Eren & Korkmaz (2014) Performance of Organizations can be measured with objective or subjective variables depending on the aims of the organization and the level of tools. According to Bulut, Alpan and Yılmaz (2009), it can be measured by using qualitative or quantitative and objective or subjective variables. Helvacı (2002) argues that if the concept consists of quantitative elements, the measurement might be easier but if it is made up with qualitative elements it may be difficult to measure. Therefore, it is thought that it is not possible to reach a standard scale that can measure all the criteria in the literature. In some studies, it is possible to measure qualitative and quantitative performances with the same objective and subjective criteria. At this point, as Yildiz (2014) stated, the main concern of the researcher is to find the criteria that measure his / her own values. For example; Mills and Smith (2011) conducted a study to examine the impact of information management and brand value on organizational performance and define market performance with sales growth scale. In this context, according to Digman (1986), strategic performance can be determined in accordance with the model proposed by Yildiz (2014), depending on the objective and subjective factors. However, in the literature, strategic performance (Hitt, Ireland & Hoskisson, 2012) is generally measured in three main areas in line with the determinations of Venkatraman and Ramanujam (1986);

1. Financial performance (Digman, 1986),
2. Operational performance based on financial variables such as productivity, efficiency, innovation, quality, etc.
3. Organizational effectiveness (David, 2011).

According to Venkatraman and Ramanujam (1986), the data collected from these three areas may be primary or secondary resources. However, there are limitations and advantages of the methods for each field and source. In the literature, operational systems for generating information (eg, ERP, data mining and business intelligence systems), logical structures for storing information (eg, file presenter and database), physical structures (eg, jukebox, hard disk) are used to measure the impact of information technology on business performance. Considering that technology is considered an indispensable strategic element of businesses, within the framework of competition in today's world; if organizations want to be successful in their sector, they need to give necessary importance to investments in information technologies and they should use business intelligence concepts in accordance with an organizational culture.

FUTURE RESEARCH DIRECTIONS

Today, this strategy is not only used in the military field but also in the fields of economics and management. In the face of increasingly overwhelming competition in the global world, similar to a battlefield, organizations should attach much more importance to strategic thinking and making strategic decisions. In management science, the strategy is used to refer to 'the path for an organization to follow and achieve its aims' (Aktan, 2008). The concept of strategy began to be used in the field of business and management. in the second half of the 20th century. The strategy here also means to organize relations between the environment and the enterprise and mobilize its resources in order to take advantage of its competitors. The concept of strategy is related to the relations between the organization and its environment, and the

generally accepted definition has not been made yet due to the uncertainty of the environment constant changes, the diversification of the functions within an organization, and the fact that the authors have different perspectives. However, there is no disagreement about the fact that strategy regulates the relations between the organization and its environment (Dinçer, 2007).

There are different definitions of concept of strategy in the management literature. Quinn (2003) defined it as a model or plan, showing the organization's main objectives, policies, and activities as unified and whole. Lynch and Smith (2006) states that organizational's strategy is about the organization's basic direction for the future and that it is related to objectives, targets resources, and also includes the process of interaction within the environment (Lynch & Smith, 2006). In another definition, strategy is defined as a outcome-oriented, long-term, dynamic community of final decisions, aiming to reach the goals by examining the activities of competitors (Ülgen & Mirze, 2004).

The historical process of business intelligence starts with Lotus 1-2-3, which was released as the first spreadsheet in 1983. The computational tables provided were strengthened to allow users to prepare their own analysis and calculations. The only problem was the low rate of access to data. At the end of the 1980s, the idea of processor-server systems was born. This idea was based on the opinion that data should be kept in its own place. The data was stored in different formats on different computers, and it had a considerable cost when taken from the source and transferred to other computers. In time, standardization in databases has become compulsory. These standardization activities have laid the groundwork for business intelligence (Biere, 2003). Masses of information emerged with the changing technologies, but they were not useful for top management. Therefore, there was a need for management information systems that would enable the data to be presented in an integrated and summarized manner. Decision support systems were developed for this purpose. However, the visual deficiencies of this system, user difficulties and integration problems have created a need for a new system, and it has formed the ground for the emergence of Business Intelligence Systems.

Organizational performance, theory of contingency, and theory of conformity measures the impact of technology on business and its contribution of organizations to their goals. Both the external and internal environments of the organization affect this performance (Das et al., 1991). Naturally, the top management of organizations is not only responsible for analyzing the external environment, but also strategically evaluating their internal stakeholders, representing the organization, and assessing their participation in the organization. Organizational performance is related to internal operational activity, which is supported by norms, rules, and cognitive maps shared for values and beliefs (Ferioli & Migliarese, 1996). When organizations invest time and money in technology, they expect to have a positive impact on the organization's performance (Smith & McKeen, 1993), which enables the organization to effectively evaluate the quality of its investments in terms of growth and profitability (Venkatraman, 1989).

CONCLUSION

Strategic management is a process that ensures a strong interaction with its environment, uses its resources effectively, aims to determine the objectives of the organisation, and implements and controls activities in order to provide sustainability for the organisation to get ahead of their competitors. This process never ends, because dynamic environmental conditions bring new threats as well as new opportunities to the organisation. There is a need for field surveys for organizations in different sectors, and areas on how strategic management and business intelligence can be implemented in organizations, and what

methods and stages should be followed. In strategic management, future decisions should neither be made blind-folded nor completely intuitive. Instead, it is important to make predictions for the future with comprehensive analysis, using analytical and scientific methods. It is necessary for organizations to use the concept of business intelligence in accordance with an organization strategy- with all its layers. Employees should be informed about the benefits and objectives of business intelligence applications with examples and trainings. If employees understand the purposes, definitions, benefits, utilization, and reporting aspects of business intelligence, it will be easier for strategic management to implement decisions. Business intelligence software is frequently used by organizations today and it provides significant and summarized information to decision makers by combining its reporting, analysis, and data mining services with its rich visual components. The competition environment is becoming more and more challenging every day, and if the right decision was not given at the right speed, it may be difficult for organizations to exist in today's business world. Business intelligence solutions provides a data model, which stores the data from different sources in a single centralized data warehouse in line with organisational needs. This provide a base for data singularity and generates a common language between all stakeholders.

The most important point in data warehousing is that it should be created according to the characteristics and requirements of the organisation, therefore making it very difficult to form a standard structure. One of the most important factors that will determine the success of data warehousing is the modelling of the data warehouse. Organizations should also have theoretical and practical knowledge about the creation of a data model and its life cycle. In today's world, if organisations reach information speedily and have competent people, they will be outstanding in every platform. Business intelligence technologies store the data in a structured way and allow access to information by user-friendly methods, therefore it has a strong role in formulation of the organizational strategies and strategic decision-making. Serious investments made by organizations in recent years support all positive comments written for business intelligence technology. For this reason, organizations should adopt strategic management and business intelligence approach into their organizational culture in order to build its corporate identity with a sustainable management perspective.

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KEY TERMS AND DEFINITIONS

Consumption: Explained as the expenditure made to obtain the Benefit of individuals. It is an important concept for institutions and economics, but also an important topic studied in many social sciences.

Data Analysis: As a result of data analysis, cleaning, transformation and modeling, It is an important process that supports obtaining useful information, making information and making decisions.

Data Mining: The term used in computer science. It is the process of accumulating a large amount of information and screening useful information. It is also called knowledge discovery in databases (KDD).

Data Quality: Data quality is an important feature that determines how reliable data is to make decisions. Expresses the value of qualitative or quantitative variables.

Operational Data (or “OD”): It is recognized as an important data source for enterprise data warehouse (EDW) and operational reporting. OD is a database designed for processing and integrating data from multiple sources for operational decision support, reporting, and controller.

Organizational Strategy: Strategies in which an organization should be located and in which areas to operate in order to achieve its goals and objectives.

Procedure: These are all the ways and methods that must be followed by the attitudes and behaviors of the employees in the organizations. A procedure is designed to describe who, what, where, when, and why by means of.

Software: A set of coded commands, also called programs, that manage a computer to perform certain functions, telling the computer what to do.

Chapter 13

Mutual Relationships Between Digital Transformation and Leadership

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ABSTRACT

Organizations have taken various steps and transformed to adapt to digital technologies that change and evolve over the years. There is a need for leaders specialized in “digital technology and digital transformation” within the organization in order to be able to manage this transformation with appropriate decisions and strategies. There is a change in the titles given to leaders, their job descriptions, and qualifications during the process of digital transformation. The tasks of these leaders are to cooperate with other departments in the organization in a harmonious and supportive way to develop and implement innovations in the organization, to systematize the workflow processes, to quickly adapt technological innovations to the organization, and to contribute directly to its values. This chapter discusses supportive leader behaviors and types for change and transformation, supportive leaders for digital transformation, and the changing roles of leaders in digital transformation and digital leadership.

INTRODUCTION

In today's highly dynamic working environment, organizational leaders must quickly adapt their existing approaches to digital transformation. Due to the latest technological developments, organizations are faced with major changes in job design and leadership. Therefore, digital transformation has become

DOI: 10.4018/978-1-7998-1125-1.ch013

a critical management issue and has led to the need for new managerial thinking. The management of tomorrow supported by digital transformation is faced with internal and external resources, honesty and verticality in organizations and decision-making in a short time (Liu, Chen, Chou, 2011). According to the World Economic Forum, the digital transformation of industries is expected to bring a combined value of USD 100 trillion (for both industry and society) by 2025 (<https://www.manipalprolearn.com/blog/top-3-examples-smart-digital-leadership>).

Organizations have taken various steps to explore and benefit from the latest digital technologies regardless of what sector they operate in. These initiatives often influence the transformation of very important business operations, products, processes, organizational structures and management concepts. To manage these complex transformations, organizations must create new management practices compatible with them (Matt, Hess & Benlian, 2015). Change is necessary for continuity of organizations. However, change efforts do not always result in success. Processes of change that are not well-managed, as well as weak strategic decisions and inappropriate technology choices, are seen as important reasons for the failure of change. Thus, leadership is accepted as one of the most important essentials in the success of change in studies about ways to ensure the success and sustainability of change (Karp, 2006; Miller, 2002).

A forward-thinking leader must be open to innovation at all levels in order for an enterprise to undergo a successful digital transformation. While most companies understand what a leader in digital transformation should do, there is still no universal understanding of what traits the leader should possess. A study conducted by MIT Sloan Management Review and Deloitte University Press researchers examined business leaders and experts on leaders in digital transformation. Digitally maturing organizations were looking for leaders who could inspire cultural and organizational changes. The research study described ideal characteristics of leadership, including such having a transformative vision and a changing mindset. As said by respondents, leaders are more likely to invest in innovation and use data to make critical decisions (Lerner, 2018). The content of this chapter includes supportive leader behaviors and types who attribute importance to transformation, leaders supportive of digital transformation and finally digital leaders.

SUPPORTIVE LEADER BEHAVIORS AND TYPES FOR CHANGE AND TRANSFORMATION

Leaders must adopt and realize different approaches and practices by going beyond the understanding of traditional leadership in order to perform huge changes that will be considered revolutionary in the organizations, enable individuals to adopt change, produce new and creative ideas and make them feel like a part of change (Sabuncuoglu, 2008:78). The personal characteristics, values and beliefs, experience and knowledge of the leaders support them in this process (Uzkurt, 2008: 140). Leaders define the goals and problems of the organization and the solutions of these problems and shape the tasks that the employees undertake.

There are many factors that facilitate or complicate change and transformation in organizations. One of these factors is leaders who drive change and transformation. Leadership approaches that will be applied to carry out transformational practices require being more different and even sometimes out-of-the-box compared to traditional approaches. During the process of transformation in organizations, it is important that leaders exhibit leadership behaviors which can positively affect the performance of employees.

Figure 1.

Box 1.

Nordstrom: Nordstrom, Inc., renowned for its elegant and luxury customer experience, has started to adopt the mission of investment in digital technologies, which serve customers and further strengthen its customer-focused employees, in the late 1990s in order to maintain its market position. Following the creation of its web sites, it developed a new point-of-sale system that included personal book software so that salespeople could track individual customer requests and needs. This was also followed by the launch of an innovation lab that allowed the acquisition of a social media lab, mobile checkout, salespeople texting and then a cloud-based men's personalized clothing service. This process of digitalization not only facilitated shopping, but also provided customers with a seamless customer experience. Nordstrom strictly integrates technology with personalized customer data and regular business process, thereby enabling revenues to increase more than 50% over the last five years.

The success or failure of these processes depends on the leader's activities and behaviors (Atkinson & Mackenzie, 2015: 42). Moreover, the leaders' ideas and skills are manifested in actions, structures and processes that facilitate or hinder change (Gilley et al., 2009: 78). It is an important issue of concern that leaders are involved in the process by adopting whichever type of leadership in the behavioral context. When the change and transformation of organizations are examined in terms of leaders' behaviors to drive and facilitate change, different types of leaders are observed to be effective. The literature shows that the types of leadership expressed as effective leadership and opinion leadership can be effective in driving change (Hao & Yazdanifard, 2015, Gray, 1997), but change leadership and transformational leadership are seen to be the subject of considerable research about achieving success in change.

The abilities of leaders to coach and support the capacity for renewal and change in the organization, to provide the necessary information about targeted change and innovation to the employees, to motivate the employees for change, to be involved in the change process and to establish teams and support them in this process have a significant impact on the leaders' ability to drive innovation and change (Gilley et al., 2008:165, Gilley et al., 2009:87). Leaders who are able to lead innovation and change must have as much intellectual knowledge, a strong intelligence, a prediction that will prepare the organization for the future and a solid personality as the managed employees at least. These leaders who have a long-term perspective direct the organization to transformation by setting a consistent, challenging but realistic vision (Durna, 2002:180). Moreover, the success of leaders to drive and facilitate change in organizations is also possible through the creation of an appropriate organizational climate. Change begins with the adaptation of climate. Leaders who help to identify and shape the problems that pave the way for innovations, to facilitate to interaction between organizational staff and to encourage participation in innovative activities enable employees to be more involved in the decision-making process and obtain the funds necessary for change (Curry, 1992 cited in Gray, 1997).

Higgs and Rowland's (2005) study of *effective leadership* behaviors in achieving success in change demonstrated that the framing change factor of the leader, who exhibits behaviors that set forth the starting point for change, design and manage the change journey and carry out the communication to guide it, has an important impact on the success of both large and long-term changes. Another type of supportive leader type for change is the *opinion leader* who can influence the attitudes and behaviors of other employees about a particular innovation. These leaders are part of the social system. They have technical skills to influence other employees and are socially accessible. Organizations should therefore strive to ensure these informal opinion leaders support change. Opinion leaders can increase the openness of organizational staff to change and support the organization (Gray, 1997).

Leadership is the most important of the key factors that must be taken into consideration for the success of a change process. This type of leadership, which is also known as *change leadership* in the literature, has become the subject of a very large number of studies (Graetz, 2000; Higgs & Rowland, 2001, Karp, 2006). Gill (2003) states that leadership which provides the success of change should have five main factors. The first factor is vision that determines the direction in which change efforts will advance. A clear vision that is meaningful, ethical and inspiring provides a sound basis for change. The second factor is common values and culture that the leader must identify and support. The third factor is strategy. It is impossible to ensure employees believe in the vision and lead them without any strategy. The fourth factor is the empowerment of employees in a way that ensures they perform what is required during the process of change. Finally, the fact that leaders motivate and inspire employees to change significantly contributes to the success of change.

Miller (2002) examined which conscious or unconscious behaviors leaders exhibit in managing and carrying out change during the process of change and focused on some behaviors. It is of great importance for leaders who manage change well to focus on change. They delay the initiation of the change process until it is well understood and accepted that change is mandatory, because they know that the process of change requires systematic and uninterrupted assessment. They are personally involved in the process and manage it; they know their behaviors are very critical in managing change, so they pay attention to be an example for employees, thereby keeping peer to peer communication at a high level (Miller, 2002). Higgs and Rowland (2000; 2001), on the other hand, set forth eight leadership competencies to manage change. These are change initiation, change impact, change facilitator, change leadership, change learning, change execution, change presence and change technology. Change leadership includes the ability to influence and mobilize employees by revealing and advocating the vision of change, as well as the ability to provide access to necessary resources for change.

Change refers to passing anything from one level to another, while transformation means converting anything into another form or situation different from what it is. Change may occur in the parts of the whole or in the whole itself. The changes to the whole can cause its transformation. However, every change does not have to involve transformation. Therefore, it is necessary to differentiate between change leadership and transformational leadership (Ulgen & Mirze, 2004:378).

Burns (1978, cited in Bass and Riggio, 2006:3) studied political leaders in his thesis and divided leadership into two categories as transactional and transformational. Transactional leaders are leaders who use their authority and lead others through reward and punishment. However, transactional leadership is not as effective as transformational leadership, when change is needed (Gradoboeva & Koskimaki, 2017: 26). Hacker and Roberts (2004) defined transformational leadership as “the comprehensive and integrated leadership capacities required of individuals, groups, or organizations to produce transformation as evidenced by step-functional improvement”. The charisma/idealized influence dimension of transformational leader characteristics corresponds to the leader’s determination of a clear vision to mobilize their employees, being a role model in the ethical sense and the identification of employees with the vision of the leader. Intellectual stimulation involves the leader encouraging their employees to interrogate the problem-solving methods that have been tried before and to think about new approaches. Individual consideration also means that the leader understands the needs of each employee and supports them to realize their potential (Avolio et al., 1999; Arslantas & Pekdemir, 2007).

The efficiency of leaders who can drive transformation is possible when they provide the energy to mobilize both themselves and the individuals they work with. Therefore, the energy of the leader refers to having a positive attitude towards transformation. Moreover, it is effective that these leaders have high

Figure 2.

Box 2.

LEGO: In the 1990s, the Danish-based LEGO toy company hosted as a children toy manufacturer for a world-renowned organization, theme parks, clothes, books and video games. After years, the LEGO Group executives restructured the organization to re-focus on key construction products, reduce costs and engage children in digital technology. Despite its success from construction sets and two successful movies, digital space has become an area created for the future of the company. Søren Torp Laursen, President of LEGO Systems Inc., expressed his opinion on this matter as follows: "You cannot create an attractive property for children without playing in the digital space. So pretty much everything we do has a digital connotation to it." Lego developed Nexo Knights line, which is a theme focused on a medieval kingdom set in a futuristic world. It developed the ability to scan knight shields from the physical toy sets using a mobile device which allows users to download the powers they are able to use in their applications. Such digital initiatives combine programming and physical structure, and attract the attention of children, the target market.

level of self-confidence on the path to success, be determined and find creative solutions to problems (Atkinson & Mackenzie, 2015:42). Transformational leaders are those who encourage and inspire their employees to both demonstrate outstanding performance and develop their own leadership capacities. Transformational leaders empower their employees and meet their needs and help the followers to improve by aligning the goals of employees, leaders, teams and the entire organization (Bass & Riggio, 2006:3). According to Bloch (2001), these leaders are leaders who are not ordinary and are uncomfortable about it. Unlike conventional leaders with the same skills and qualifications, these leaders also have high emotional intelligence, and are seen to have behaviors such as coaching, providing space for their employees to take initiative and an environment for them to learn from their mistakes.

Transformational leaders are successful in changing the status quo by demonstrating proper behaviors at appropriate stages, while the process of transformation is taking place in the organizations. Without the presence of problems due to the status quo, transformational leaders prefer to guide employees by putting forward a possible vision of the future rather than focusing on the current problems in the organizations (Eisenbach et al., 1999). Transformational leaders are considered to be more successful and effective in dynamic/ever-changing conditions and when there is a need to follow innovative policies (Sabuncuoglu, 2008). As a result, leaders, the foundation of development, who are able to provide openness to change, initiate change in the required situation and time, maintain dynamic willingness in the organization during the process of change, assess the developments in line with the vision and keep the motivation of the employees at a high level continuously, can contribute to the sustainable competitive structure of today's organizations based on all information summarized in this chapter.

SUPPORTIVE LEADERS TO DIGITAL TRANSFORMATION

In recent years, physical and virtual dimensions have become increasingly intertwined and an ecosystem has developed where there is more interaction between people, machines and digital technologies, which began to emerge in order to serve the needs of the society. The diversity of digital technologies has increased incrementally in almost all human activities. Digital tools have become part of global professional

culture and professional life (Zupancic et al., 2018:642). Digitalization has become indispensable for organizations especially in recent years. The most important reason for this is that organizations become open to great innovations along with digital technologies. The ways the organizations communicate with their customers, do marketing, deliver their products and execute their business processes are greatly influenced by digital technology (De Waal et al., 2016:52). Advancements in digital technologies are one of the fastest developments among industrial revolutions. The speed of these advancements also necessitates the provision of up-to-date training about technological knowledge, skills and equipment required by industries (Zupancic et al., 2017:292). Therefore, every person needs to use limited digital skills in today's society which is progressing towards digitalization. It is of vital importance for individuals, who cannot keep up with digitalization and cannot use basic digital tools, to gain digital skills to avoid difficulties they will experience (De Waal et al., 2016:56).

The goal for Industry 4.0, where Internet and cloud-based digital technology dominates, has today become the locomotive of digital transformation in the companies (Mihardjo & Rukmana, 2018:832). Digital transformation involves reshaping the functioning and structure of organizations. This has strong impacts on leader's skills and leadership practice and theory about how they apply this change. Most organizations are not experts in digital issues, but those who achieve success in this field can lead to digital transformation and change. Leadership skills and operationalization and implementation of digital transformation are emphasized as two important points for success in digital transformation (Khan, 2016). Developments in digital transformation have also considerably changed the way in which leadership is applied in organizations. Additionally, decision-making, one of the most important functions of the leaders, has changed with digitalization. There is now clever analysis of big data rather than experiences and insights during the decision-making process. Consequently, more and more employees working at home or on virtual teams means that modern-day leaders may need to have much different skills and behaviors than they had a few years ago (Schwarz Müller, Brosi, Duman & Welp, 2018).

In the case of digital transformation, leaders must update themselves with new skills in all processes. The key to these skills is the ability to create a good team very quickly and put this team to work at high speed. Nowadays, the team must have the strategic capabilities and synchronization of a racing team as the time to market for new products and services has shortened. This ensures perfect coordination for all functions. The leaders involved in this process both force and support their teams just like challenging sports trainers (Deschamps, 2005). The skills of successful leaders supportive of digital transformation are expressed as the ability to set flexible goals that encourage their employees to reach their potential (Bazigos, Gagnon & Schaninger, 2016), create a transformative digital vision, support employees, focus on digital governance and create technological leadership (Westerman, Bonnet & McAfee, 2014). In addition, supportive leaders understand and perceive how the individuals they work with feel. They show sincere attention to these individuals they work with, build trust and support them to overcome difficulties. Leaders support transformation and also encourage productivity. Moreover, they maintain order by getting involved in the work of the teams in order to eliminate fears of external threats and prevent the energy of the employees from turning into internal conflict (Feser, Mayol & Srinivasan, 2015).

The Mastercard / Eurocard created by an independent partner bank network illustrates the power of a new system-business concept. System businesses are typically created either purely in the service sector or, in a system approach, often by combining tangible products and services. They require close alignment between different partners, each providing an overall system piece or ensuring the combined system's customer attractiveness. Since setting up a partnership network involves complex negotiations – something that usually exceeds individual managers' authority – this type of innovation effort will

Figure 3.

Box 3.

Burberry: Burberry, a worldwide fashion leader, has stepped into the digital world with the recruitment of its CEO (Angela Ahrendts) who has a forward-looking digital perspective. When the company was under the control of Angela Ahrendts, digitalization was at the center of its strategies. The emergence of a social media site that allows the users of the Art of the Trench whose customers wear its special trench coats to interpret, like and share what is shared in an optimistic digital democracy is shown as an example of digital progression. Other innovations include an e-commerce catalog that matches with the company's in-store inventory; easy-to-navigate mobile technologies for smart phones and tablets; creative and interesting content, and in-store RFID chips showing product videos as customers are passing. Burberry showed a 68% increase in revenue from £ 1,501.3 million to £ 2,523.2 million in 2011-2015 thanks to the strategies it developed for digital market, strengthening its reputation as a digital innovator in the fashion industry.

rarely occur in a spontaneous, bottom-up mode. It is, for the most part, the result of a top management voluntary strategy and a top-down process. Indeed, the ability to defend the disruptive model or system from established ways of doing business within the company is a crucial leadership skill associated with developing a new business model (Deschamps, 2005).

Leaders in information resources and technology should help others to understand that their job now includes the responsibility to manage and leverage information and technology assets within their remit (Hawkins, Rudy & Wallace, 2002). If the process of change requires reorganization, management should be aware that such a process of change requires considerably more effort to deliver: (1) strong facts to support changing needs and (2) a climate that is emotionally encouraging. Management can only gain credibility and support from the rest of the organization through such measures (Wallin, 2006).

Members of the top management team of a company must believe in and decide to support the potential of new technology and/or product. They do not hesitate to leverage their influence within the top management group to support, fund and ultimately guide innovative teams through the usual corporate decision process and investment hurdles. Traditionally, some companies, like 3M, have put a lot of emphasis on their executive champions' role. Lewis Lehr, the iconic former CEO of 3M, described this kind of champion of the executive when he said: "I follow the fellows who follow a dream" (Deschamps, 2005).

CHANGING ROLES OF LEADERS IN DIGITAL TRANSFORMATION

Today's business world has a very dynamic structure. So, it is very important for the leaders of our age to adapt to innovation. The need for leaders to have the capacity to transmit the right information to the right people at the right time and in the right place requires strong horizontal connections in the digital age (Wilson, Goethals, Sorenson & Burns, 2004). As information technologies (IT) are applied to realize innovations in businesses, the IT functions must proactively collaborate with other departments of the organization to develop and implement such innovations together. IT functions are increasingly being demanded to transfer technological innovations proactively and quickly as well as ensuring the order of operations, thereby directly contributing to the values of the organization (Urbach et al., 2017).

There is a need for a new type of leadership with new capabilities throughout the organization. Therefore, digital resource managers and the IT department should undertake new roles (Hawkins, Rudy & Wallace, 2002). Digital transformation affects not only the products, services and business models of the organizations, but also the internal organizational environment including leadership roles

and responsibilities. Many organizations are aware of the need to transform themselves together with their processes and cultures to achieve their digital goals. This leads to the restructuring of organizations and the creation of new executive roles such as Chief Information Officers (CIOs), Chief Digital Officers (CDOs) and Chief Technology Officers (CTOs) (Haffke, Kalgovas & Benlian, 2017). Units new to taking such a proactive role in digital innovation are not necessarily based on the IT profession's institutionalized principles, values and approaches (Tumbas, Schmiedel, & vom Brocke, 2015). As cited by McClure, the Information Technology Management Reform Act of 1996 established the position of CIO in the executive branch agencies. The CIO of an executive agency shall provide advice and other assistance to the head of the executive agency and other executive staff to ensure that IT is acquired and the executive agency's information resources are managed in a manner that implements its policies and procedures (McClure & Bertot, 2000).

CIOs help organizations to take advantage of new capabilities in the information age with all the changes the Internet brings. In some cases, innovative CIOs have to lead the organizational strategy, but in other cases, CIOs and relevant IT functions are not responsible for strategic decision-making in the organization and can be considered as a cost center for the organization. The interdependent execution role of the IT expert and CIO is an institutionalized area that is often empowered with innovation in digital technologies (Tumbas, Berente & Brocke, 2018). CIOs are at the core of the digital transformation phenomenon. The responsibilities of a CIO are subject to significant changes due to the nature of the new role. CIOs are expected to choose from a wide range of opportunities, determine the right path for their business and make sufficient and timely changes in their new roles. Therefore, digital transformation brings many uncertainties for CIOs. The approaches to old-style information technology management are no longer valid, whereas new-style management approaches are not yet well-established. In addition, any transformation effort by a CIO not only will influence the IT function, but also has an impact on the whole organization, their customers and partners. Obviously, CIOs are cautious about making radical changes, because "getting it wrong" can have a very high price (Bongiorno, Rizzo & Vaia, 2018).

CIOs often enjoy dealing with the issue of digitalization, because the department of which they are in charge is responsible for information technologies in the organization and digitalization commits to expanding their business line or empowering their roles at least. However, many CIO and IT managers are faced with problems in this process. The IT departments are often seen as simple service providers without any specific innovation skills. Other departments in the organization generally act independently from this department while developing IT-based business and process innovations. In some cases when CIOs cannot extend their role from technologists to business strategists, organizations create a CDO position to direct digital transformation and exert an additional pressure on the IT department (Urbach et al., 2019). The organizational actors often use digital technologies to promote innovation through ways beyond the conventional capabilities of the IT department. For example, organizations transform their products into digital products and integrate their technologies with physical-based products and analyze "big data" for the customer profile (Tumbas, Berente & Brocke, 2018).

Digital transformation forces organizations to update their IT systems that have been used for years. This is usually done by highly qualified specialists who do not have the luxury of turning off the system or loosening safety rules. CIOs find it increasingly helpful to recruit more and more CDOs to help overcome these difficulties when they progress with digitalization. CDOs many of whom pursue a different career path and often come from digital innovative industries, empower their teams by contributing new perspectives, opinions and solutions. CIO gets the final word, because s/he has the responsibility to integrate new applications and processes into the information technology of the company safely and

reliably. Despite the need for innovation, the daily work of the CIO is of vital importance for the company's effort to create value (Abolhassan, 2016). Some CIOs have difficulty in adapting to the extended areas of responsibility which seem to have reached a level of complexity that makes it increasingly difficult for a person to deal with it on their own. As a result, more and more organizations have recently established CDO as an additional position at the senior management level. This phenomenon was first observed in MTV Networks which recruited the first CDO in history in 2005. Since then, the number of CDO has incrementally increased. CDO is one of the fastest-growing C-level positions, and is a global phenomenon, although 88% of CDOs around the world have been recruited in the United States (Horlacher and Hess, 2016).

CDOs, as corporate entrepreneurs, play an important role in the two following issues (Tumbas, Berente& Brocke, 2018):

1. To express and develop the emerging "digital" action logic
2. To apply this digital logic with strategies such as instilling, bridging and separating to guide the tensions between existing and emerging approaches to digital technologies and innovation.

Unlike CIOs, the most senior IT managers in an organization, CDOs do not have responsibility for functional information technologies. They are mostly not responsible for profit and loss and have a broader general institutional perspective than CIOs. Even if CIO offers digital business innovation and broader strategic business value, CDO focuses on mobilizing the entire company at hierarchy levels and encouraging the organization to digitally transform the entire company. While CIO assumes the role of a strategic IT expert, CDO is the digital transformation specialist of the organization. This is the distinctive factor between CDOs and CIOs. Furthermore, transformation is not an additional responsibility to others, but is at the core of the role of CDO (Singh & Hess, 2017).

In general, CDOs help organizations to use digital technologies to create business value. They benefit from various digital technologies successfully to develop digital skills in the relevant areas and create value. They must constantly focus on taking new opportunities. The CDO of an organization is responsible for evaluating customer focus by using a wide range of data to inquire about the existing business model and obtain information. Successful CDOs need to actively perceive the environment for emerging digital technologies and then try to develop digital capabilities in their organizations. CDOs should make use of various technologies such as mobile applications, social media, the Internet of Things or other emerging domains to achieve goals associated with any digital capability (Tumbas, Berente& vom Brocke, 2017). The effective integration of technology into organizational strategy is crucial to the success of technology-based industries. CTO has a critical role in this integration. CTO is the highest-ranking technology manager in the organization and this position is called "Vice President of Technology" in some organizations (Medcof, 2008). Many companies have addressed their needs by appointing a Chief Technology Officer (CTO) whose responsibilities include: monitoring new technologies and assessing new products or services; supervising the selection of research projects to ensure that they are capable of adding value to the company; providing reliable technical assessments of potential mergers and acquisitions; explaining company products and future plans to commercial media; participating in government, academic and industry groups where opportunities are available to promote the reputation of the company; and collect valuable data. Integrating these technology-based activities into the corporate strategy requires the CTO to foster effective relationships with key people across the

company. These include the CEO, board members, chief scientists, research laboratory managers, and marketing leaders (Smith, 2003).

Uttal et al. proposed three roles that could be taken by the CTO of increasing strategic importance; *functional*, *strategic* and *supra-functional*. The *functional* leader manages the R&D department, follows R&D project budgets and schedules, and ensures coordination within the organization between R&D and other departments. The CTO's main objective in *strategic leadership* is to integrate R&D strategy with corporate strategy. The CTO ensures that the core technical skills align with the strategy of the organization. The CTO also changes the direction of R&D if the organization changes its strategy, mission or focus. *Supra-functional leadership* involves formulating and executing organizational strategy to ensure that technology plays an appropriate role. The CTO also acts as a consultant to the CEO when acquiring new technology (Cited in Medcof & Yousofpourfard, 2006). CTO is solely responsible for all technical issues that were once dealt by the CIO. These responsibilities include operations, telecommunications/networking, office automation and information center. Besides, CTO has the duties in relation to modern technological functions such as technology assessment and working group authorization. The senior executives responsible for these functions report to the CTO depending on the new organizational structure (Beatty, Arnett & Liu, 2005).

DIGITAL LEADERSHIP

If an organization aims to transform from a manual process into a extensive digital platform, this involves a successful leadership approach which can be powerful and impactful in the long-term advancement of this type of change. Several other leaders absence the technological ability or desire to screen this type of transformation. Their input, however, is critical and requires flexibility. They also need to acquire new tasks and knowledge in the process or this change can result in significant cost overruns and poor performance (Matt, Hess, & Benlian, 2015).

Thanks to the widespread use of the Internet, the point at the world has currently reached is referred to as the "digital age". The digital age, sometimes referred to as the information age or computer age, plays an active role in many sectors (Polney, 2018: 21). The word "digital" is also used to describe people as well as the concept of "age". Prensky's (2001: 1-2) study explained the generation born in 1980 and later with the concept of "digital natives". According to Prensky, digital technologies have a large place in the lives of digital natives and they have different learning methods than previous generations. This generation, who likes to reach information quickly, has an e-life by creating blogs, playing online games, downloading music, buying and selling online and using social media networks and they have digital literacy. According to Ng (2012: 1066), digital literacy refers to the majority of literacy related to the use of digital technologies. These technologies are the subset of electronic technologies that includes the hardware and software people use for social and leisure purposes at school and home. More specifically, digital literacy is the ability to find, create, share and use information by using the Internet and information technology. In addition to technical knowledge, critical, cognitive, creative and social skills are also required for this skill (Sullivan, 2017). Along with rapid change and development of digital technology, there are many terms about literacy in the literature. These terms are expressed as information and communications technology (ICT) literacy, information technology (IT) literacy, media literacy, net literacy, online literacy and multi-media literacy (Ng, 2012: 1066). Nowadays, leaders need to have the ability to manage this digital native generation. Bennis (2013:635) stated that leaders would fall behind their

Mutual Relationships Between Digital Transformation and Leadership

Table 1. Skills, competencies and roles of effective CIO, CDO and CTO

CIO	CDO	CTO
- Encourages the organization to use IT to create a set of value expectations that are shared across all business areas in relation to IT - Influences key stakeholders - Develops a leadership team of your own - Consideration of options and opportunities - A supporter of new technology - Holistic view of the company - Contributes to strategy discussions - Achieves credibility with both <i>business</i> and <i>technical</i> - Maintains cost efficient IT operations and services - Manages risk - Meets expectations - Collaborates with colleagues to achieve "win-win" - Builds personal networks across the organization - Creates the right impression - Expresses empathy, listening, and is passionate - Uses the marketplace appropriately for sourcing - Commercial acumen - Understands risk - Networking	- Helps their organizations to use digital technologies to create business value - Responsible for questioning the existing business model - Needs to actively sense the environment for emerging digital technologies - Builds digital capabilities for intense experimentation - Establishes capabilities for providing intense focus on relationships with the organization's customers	- Must rely on an internal network of technology - The CTO is a corporate manager who handles strategic decisions about the company's future direction - Must decide which technologies are most likely to produce the highest yield rate - Thinks of technology as an asset that makes money, not as an exploration field for its own sake - Must be able to communicate clearly and effectively with people from all backgrounds - Spends a considerable amount of time explaining the company's vision to make sure everyone is heading in the same direction

Source: (Peppard, 2010; Smith, 2003; Tumbas, Berente & Vom Brocke, 2017)

competitors if they did not know how to use the digital world and its tools due to changes and developments that have occurred in the digital age. Therefore, leaders must have comprehensive knowledge of their own skills and capabilities in the digital area as well as those of the individuals they work with. Basically, the digital agenda is about people. The implementation of a successful digital agenda begins with a change of mindset that places greater emphasis on people and social systems for positive and sustainable change (Ure, 2018).

Digitalization leads to a great transformation in production, logistics, communication and human resources management. Organizations must keep up with Industry 4.0 about competitive power and in-

Figure 4.

Box 4.

Sephora: The leading beauty retailer, Sephora's customers often want to try beauty products before they buy. From this point of view, Sephora established an innovation lab to brainstorm, develop and test a wide range of digital experiences. Based on the ideas from the innovation lab, the "Sephora to Go" app, a mobile application that combines Artificial Intelligence (AI) and Augmented Reality (AR) tools, was launched and the artificial intelligence (AI) component matched the customer's skin with shades and recommended related products. The Augmented Reality (AR) component also allowed customers to put on make-up almost. Sephora increased customer satisfaction thanks to its digital experiences designed in accordance with consumer needs.

novativeness to cope with the challenges of change. Digitalization, which affects not only information technology but also leadership styles and regimes of businesses, promotes the development of Industry 4.0 leadership culture in organizations. Digital leadership is also used for the concept of “Leadership 4.0”, which means leadership during the period of Industry 4.0. This does not mean that each leader is a digital leader (Oberer & Erkollar, 2018:407-409). Organizations that take more advantage of digital technology for operations and innovations, and their access to digital resources is greatly increased and facilitated. Organizations demand e-talented professionals (e-leaders, digital leaders) to learn to manage and implement their digital infrastructures more efficiently and effectively (Hüsing et al., 2013:67-68; De Waal et al., 2016:52). Tanniru (2018:94) explains digital leadership as follows: *“a process that is essential to developing and sustaining a culture of innovation by bringing ideas to fruition quickly using an agile IT and business architecture”*.

The term “digital leadership” is not widely used within organizations and synonyms such as business-IT alignment, IT governance, e-leadership or information management are used. Digital leadership is considered a subset of all IT (information technology) areas that cover higher level innovations. Examples of digital leaders within an organization can include a chief marketing officer, CIO (chief information officer), a relationship manager between IT (information technology) and business or the founder of an organization that relies heavily on IT (De Waal et al., 2016:56). According to El Sawy et al. (2016:141), digital leadership means thinking differently about strategies, business models, information technology (IT) function, perspectives and skills. Another study defined digital leadership as the whole culture and competency of the leader in bringing the use of technology to the desired level to add value to firms (Mihardjo & Rukmana, 2018:833). According to Toomey (2016), digital leadership is the capacity/ability of leaders to identify and realize opportunities for growth and value with the effective, efficient and acceptable use of digital technologies (information technology - IT). Digital leadership are looking for opportunities for technology due to reasons such as innovation to business and expanding markets, etc. Digital leaders pay attention to how different stakeholders and their competitors use technology to improve their own interests and update their business from a wide range of sources (De Waal et al., 2016:53).

Digital leaders are also expected to have comprehensive knowledge and skills that enable innovation and the development of the use of advanced digital tools and digital media in their sector and relevant areas as well as conventional leadership capabilities (Zupancic et al., 2017:292). According to Valentine and Stewart’s (2015:4514) study, the competencies required for digital leadership were expressed as having the ability, knowledge and experience to manage technology for strategic advantage, making decisions about technology and managing risks, and using technology to obtain positive results and feedbacks. Bennis (2013:636) considered that a person must learn the qualifications required to be a digital leader, and digital leaders need to have a flexible and open perspective toward innovation. Digital leaders create public relations platforms and positive branding by using social media tools (Sakurai, 2017:14-15). According to Toduk (2014:19-25), innovation/entrepreneurial ability/skill, digital skill, strong networks, participatory engagement and vision are characteristics required for digital leadership. Digital leadership, as a very common movement/trend, is a new concept that will greatly increase the performance of creative industries/many industries to produce sustainable, effective and meaningful solutions (Zupancic et al., 2017:289). Digital leadership (leadership 4.0), which is a fast, cross-hierarchical, team-oriented and collaborative approach, plays a major role in innovation (Oberer & Erkollar, 2018:412). Toduk (2014:23) defines “digital” as an age of new technology-oriented leader styles and different ways of thinking, but not as a new tool, because not only the way of working, but also customer relations, customer demands, service types, product-service forms and skill perception are changing (Yucebalkan, 2018:2). The 4.0

Figure 5.

Box 5.

British Airways: Having more than 40.000 employees, British Airways launched an employee suggestion scheme called "talent scout" instead of waiting for the right talent in order to find out digital talents. As it is difficult to find skills such as data science and analytics, British Airways set up an innovation lab called UnGrounded to give its employees the opportunity to improve their skills and discover new ideas. Besides, the airline hired external specialists with digital expertise to work on specific projects. The airline allowed these experts to transfer their information to one of its own employees to expand the internal talent pool.

Deloitte: Deloitte Digital created a flexible and modern working space and also offered the opportunity to collaborate in order to attract digital locals. The company established a series of different working spaces and collaborative technologies instead of providing its employees with individual offices and permanent desks. Thus, Deloitte became successful in creating a culture of cooperation which aims to demonstrate employees how they are wanted to work, to increase agility and speed, and is marked by digital maturity.

leadership style mentioned for digital leaders is comparable to the democratic style. For the democratic leadership style, the leader encourages the participation of employees in decisions taken or to be taken, and actively works with them. The leader of 4.0 leadership style encourages employees to produce creative ideas and ensures active participation and works without any leader-centered approach and with the leader's less active participation. Thus, employees are considered to be more active, independent, creative and innovative (Oberer & Erkollar, 2018:413).

Oberer and Erkollar (2018:414) organized a matrix that divided into four parts, helping to select the most appropriate 4.0 leadership style according to the degree of innovation and technology orientation and the situation of the leaders. Each section represents a different type of leadership. The X-axis focuses on the individual's ability in relation to technology and innovation (elements such as education, expertise, skill and motivation are effective), whereas the Y-axis defines the person's ability to interact and communicate with people ("people concern" of the person). For example, a person with high level of education in technology is likely to fall into the category of 4.0 technological leader (TL) or also 4.0 digital leader (DL) if s/he has good communication with her/his employees. The employee-centered leader, who does not have much knowledge of technology but ensures that employees make decisions about the organization, falls into the category of 4.0 social leader (SL) in this matrix. If the leader has a weakness in terms of both technology education and employee communication, s/he falls into the category of 4.0 freshman leader (FL).

CASE STUDY: KOÇ HOLDING

Digital transformation requires the full support of a company's top leaders. In 2016, CEO of Koç Holding Levent Çakıroğlu, launched a digital-transformation program with his top team. They supported and encouraged their company leaders and experts to work in collaboration about these subjects. They built a new culture with the full support of the CEOs of their individual businesses right from the beginning. Levent Çakıroğlu, CEO of Koç Holding, and Özgür Burak Akkol, director of HR, described in an interview with McKinsey how a leadership development program prepared the company for a digital future. Digital transformation requires full support from the top leaders of a company. But how do you instill in leaders who believe they are already at the top of their game a sense of urgency and purpose? At Koç

Holding, that was the case, The Turkish conglomerate of \$ 27 billion is divided into energy, automotive, finance, consumer goods, retail, food, tourism and other sectors. A digital transformation program was launched by the CEO to restore each of Koç's 25 major companies; most of them have already been major players in their various different fields. Digital transformation was needed because, according to CEO Levent Çakıroğlu, Koç has been a leader in Turkey for decades and has always adapted to change.

But now, thanks to the mobile-phone revolution, Artificial Intelligence, robotics, and other technologies that cause disruption, everything is changing faster than ever before. So, they needed more than adaptation this time around. They needed a comprehensive transformation. Koç was unable to slip into the follower's position. Rather, they have to lead the change. They needed a group-wide assessment to begin the transformation in order to understand where they were in terms of their digital maturity. To define the endeavor, they needed to establish custom-made road maps for each business based on their own aims and fundamentals in the sector, and to ensure that they all used the same language across the group.

Each company had a clear vision at the end of the first year, a road map, and annual goals for the transformation initiatives. They also structured four key initiatives — such as advanced analytics and Industry 4.0—which were relevant to most of their businesses, not specific to the industry. They supported and encouraged their company leaders and experts to collaborate on these topics. All of this helped them and all the group companies to start the journey together. It wasn't a simple task. The key to starting the transformation was to build a new culture that they needed the full support of their business CEOs right from the start. They needed them to take over the transformation, and they were very strong. Their performance may have been the biggest barrier to change, but instead, the CEOs became the primary drivers of this transformation.

They requested their group firms to identify and nominate managers, directors, and others from their parent companies to change the transformation plan from inside leaders and advocates to ride more change. The CEO emphasized the need for this to be a multidisciplinary approach. To do this properly, they needed to have sales, marketing, manufacturing, purchasing, finance, supply chain colleagues — not just IT. They thought that achievement would involve something more than just acquiring new abilities in tech or digital. The new business problems they face have different and new fundamentals and in many different ways they have an impact on people. They wanted to get their leaders to know themselves in the first place.

Unless they built up a digital leadership program that encouraged them to understand themselves and their purpose better could they develop the skills they needed. Ultimately, this is how they determined that their leadership program would focus on the top 200 leaders across Koç Holding. They felt that in order to communicate the need for change, the program needed to get as far as possible from “expected,” break away from what the leaders had experienced before. Cuisine, venue, culture, rules, leading indicators of performance, all the follow-up needed to be compared to what people expected. They created the program to take place over the course of several months in three separate stages. The first stage was focused on helping leaders build self-awareness so they could see what being a supportive manager means. The first step was to extend to digital change what the leaders had learned — work on skills such as agile thinking, thinking about design, managing big data, etc. Eventually, they chose to specifically get the leaders to adapt in a new way to uncertainty — so they had the program that culminated in five days of Alps and Norway wilderness experience. This phase was aimed at helping leaders test their boundaries, working together as a team, overcoming challenges and inspiring them to lead.

They truly think that the leaders' qualifications in the mountains are linked directly and the skills needed to lead in a worldwide enterprise. They have to provide strong individuals who are willing to take

initiative and support each other. They want individuals who are not afraid to challenge and measure top management ideas in a productive manner — and then work very hard as a team to achieve a shared goal once we align. Their colleagues, their people have always been the core of their strategy. The real factor behind Koç Holding's success will always be its people. In terms of processes and new technologies, some business people think of transformation. But that's not how they look at it. The most intelligent way to invest in their people is a digital transformation. If they do that, if they value them correctly, they will be the drivers of success regardless of what type of change they encounter.

FUTURE RESEARCH DIRECTIONS

Digital transformation has become a requirement all around the world that can not be ignored by any industry. The visions that determine the ways with which businesses wishing to adapt to this transformation should be in line with the visions of the said businesses' entrepreneurs and leaders. Topics concerning the way how the leaders will give direction to digital transformation, how they will expedite the structures that have already initiated this process and how they will attain success are the focal points of digital transformation and it is important for future studies to reveal the mechanisms that would support or hinder leaders that give direction to digital transformation. Approval and further improvement of the information presented in this chapter that bears the quality of a review can only be possible through empirical researches. In this context, the interaction between digital transformation and leadership function is one of the essential points that needs to be focused in order to make digital transformation easier.

CONCLUSION

Today, organizations have to make significant changes in their business operation processes and leadership styles due to the rapid developments and transformations in technology. Digital transformation has become a very important management process and senior executives are looking for ways to be successful in this managerial process. It is necessary to integrate new digital technologies into current business operations and to realize this integration at every stage of the organization in order to be successful in this process. During this period, leaders are faced with enormous pressure to make digital transformation a strategic priority and embrace the opportunities offered by the latest digital technologies.

As a result of digital transformation, organizations have started to use the term “digital leadership” to reduce the pressure on leaders and make operations more successful. Along with digital transformation, new senior digital leaders such as chief information officer, chief digital officer and chief technology officer, have been recruited to produce solutions to the role conflict that occurred, especially among senior management. These leaders need to cooperate with other departments in the organization in a harmonious and supportive way to develop and implement innovations in the organization. Supportive leaders for digital transformation systematize the work flow processes and quickly adapt technological innovations to the organization, thereby contributing directly to its values.

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KEY TERMS AND DEFINITIONS

Big Data: Huge amount of information sets that can be computationally analyzed to disclose patterns, trends, and associations, particularly with respect to human behavior and related issues.

Digital Goal: The goal that companies want to achieve on the digital platforms.

Effective: Successful in achieving the desired or intended outcome.

Innovation: New invention ways, creative ideas, fresh device, or method imaginations.

IT: IT or information technology relates to computer software, systems, and networks being developed, maintained, and used.

Organizational Climate: Organizational climate is a notion that staff perceive. The organizational climate has an impact on productivity, motivation, and conduct of employees.

Technology Orientation: Companies are committed to the acquisition of fresh and developed techniques and the development of fresh procedures, products, and services.

Chapter 14

Fintech Ecosystem and Banking: The Case of Turkey

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ABSTRACT

In this study, Fintech platforms are compared to the traditional banking system. This comparison is based on the banking activities offered by Fintech platforms and the results of these activities. In the study, firstly, a general evaluation is made in the comparison of the Fintech platforms to the banking system and then the situation in Turkey is analyzed. It is clear that Fintech platforms have developed financial markets. Moreover, banks have the potential to adapt to the digital innovation advantage of Fintech platforms. In this study, the banking system and Fintech platforms are considered as competing institutions as well as supporting and transforming each other. Services within the scope of banking activities change as a result of digital innovations. As a result, it is clear that the financing system enters into a revolutionary process. This study contributes to the literature in terms of the analysis of the relationship between banking and Fintech, which is based on Turkish Fintech Ecosystem.

INTRODUCTION

Banking activities, which can be seen as one of the most important actors in the financial markets, have started to differentiate significantly from the 80s. Banking activities have made changes in both deposit collection and funding transactions. The reasons for these changes can be counted as follows: i) increasing risks in the financial markets, especially the exchange risk, ii) rise of competition, iii) deregulation of capital movements and iv) revolutionary movement taken place in technology.

Increasing risks in financial markets allowed new financial products to enter the system. Because the increased risk pressure in the markets led investors to tools such as financial derivatives to hedge the risks. How much these instruments protect investors from risk has become debatable after the global financial crisis.

DOI: 10.4018/978-1-7998-1125-1.ch014

One of the reasons for the increase in risk in the banking system is that many banks operating on a national level have started to operate on an international level since the 80s. This led to the acquisition of international competitors by local banks. Thus, banks have been forced to manage a global fund flow as well as to fight a global risk wave. Banks that do not operate at the international level try to stay in this race with limited funds.

The start of international activities of local banks was realized by the liberalization of capital movements. The abolition of barriers to capital has made a big effect, not only on the banking system but also on the entire financial system. Developing countries such as Turkey thus faced more systematically with concepts such as the stock market and capital market. The abolition of barriers to the foreign exchange regime has improved trade and expanded the banking system's activity. For example, there were major restrictions on foreign exchange transactions in Turkey until 1983. Although liberalization of capital movements improved the banking system, it also significantly increased the risks.

Technological innovation is perhaps the most important driving force of the financial system and therefore the change in the banking sector. Since the 80s, the changes taken place in technology have enabled information to be obtained quickly. Banking activities were also greatly influenced by technological innovations. Banking activities and the way these activities are carried out have rapidly moved away from being staff oriented. Banks continue to use technology in a growing number of major business areas, such as accepting deposits, crediting and credit rating.

Changes in technological innovations have created extraordinary effects in many different sectors. For example, communication activities have been differentiated by many companies, such as Yahoo, Hotmail, and Google. In the same way, users have been able to create their own media through channels like YouTube. This also applies to retail companies. No matter what sector, companies have to design their activities according to technological changes. For example, the publicly supported PTT company, which has an important place in the communication sector in Turkey, had to establish the PTTCell brand as a mobile phone line. The same applies to other sectors.

This rapid transformation in technology has evolved into the Industry 4.0 process. According to Industry 4.0, information coming from the market will be included in the decision-making process through intelligent robots (Türkmen, 2018: 275). From a financial point of view, this means that financial decisions will be made by intelligent robots. Intelligent robots will collect information from the market fastly and then process this information very quickly.

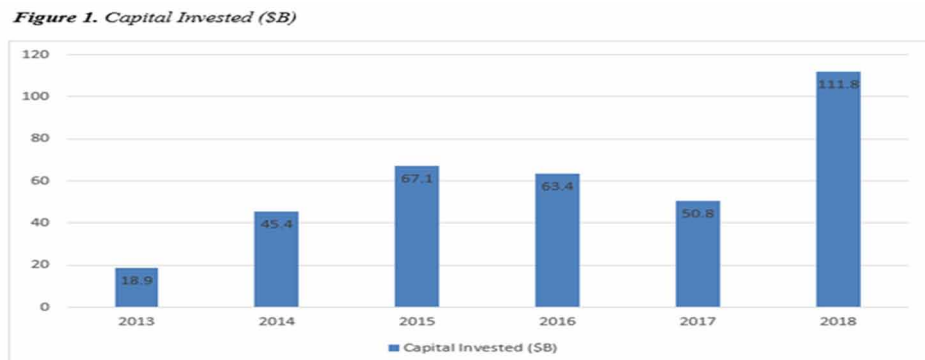
The changes in the field of technology have also had a challenging effect on the banking sector. As a result of this compelling effect, Fintech has emerged, which are performing some of the banking activities. The emergence of Fintech has been realized at the end of a series of evolutionary processes in the field of technology. Electronic commerce and e-business technologies are developing digital technologies that bring out Fintech platforms (Gimpel et al., 2018: 245).

The World Economic Forum defines the concept of Fintech as institutions that will demolish traditional financial institutions equipped with destructive, revolutionary and digital weapons (World Economic Forum, 2017). This definition contains striking claims. Perhaps the most important of these claims is that Fintech is defined as organizations that break down traditional financial institutions.

Fintechs are more softly described as the acquisition of financial services and products through the use of digital technologies. According to the Financial Stability Board Fintech, new business models, applications, processes or financial markets and institutions and financial services have a significant effect on the presentation of products that may result in a technologically effective financial innovation (<http://www.fsb.org/work-of-the-fsb/policy-development/additional-policy-areas/monitoring-of-fintech/>,

Figure 1. Capital invested (\$B)

Source: Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International (data provided by PitchBook) January 4, 2019.



Source: Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International (data provided by PitchBook) January 4, 2019.

15/03/2019). Despite this importance of Fintech platforms, we see that our knowledge of this subject is still very limited (Cai, 2018: 986).

In the definition made by the Financial Stability Board, the concept of “new business model” draws attention. Fintech platforms use a business model that is different from the business models used by traditional banks. This business model is based on customer focus. Fintech platforms have designed a digital-based business model that takes customers to the center especially in terms of payment and lending services (Anagnostopoulos, 2018: 10).

Figure 1 shows the Fintech investments in the world between 2013-2018. According to the graph, Fintech’s investments increased to \$ 111.8 billion in 2018, compared to \$ 18.9 billion in 2013. This shows that the Fintech investments in the world are expanding with great acceleration. The increase in the services offered by Fintech platforms is one of the most important reasons for this development.

Fintech’s main objective is to provide consumers with new products through digital technologies at the lowest cost. For this reason, Fintechs are interested in all kinds of institutions, activities, and processes in finance where digital technologies can transform. However, the field of application the Fintechs; i) operational activities, ii) fund management and iii) we can generalize it as insurance. Fintech innovation areas in specific to Turkey; a) back-office operations, b) digital banking, c) e-commerce, d) identity management, e) payments and f) it could be counted as an insurance business (Deloitte Turkey, Fintech Ecosystem Report, 2017).

The increase in the popularity of Fintech platforms in the fields of activity mentioned above was due to the global financial crisis. The legal and institutional situation, especially changing from country to country, has been effective in the size of Fintech activities. Fintech platforms have created access to capital, especially to new companies. While implementing these activities, the most important advantage of these new institutions seems to be technological innovations.

Banks can be considered immensely successful institutions in adapting to technological innovations. However, Fintechs can offer some of their bank activities to its customers at a faster and lower cost, at least for the time being. The digital platforms of Fintech are also expanding customer pools. However, the fact that Fintechs are not subject to certain regulations, the competition seems to be a distorting factor.

Fintechs are platforms that perform the activities of banks in a different way. This different method has emerged as a result of digital innovative developments. As a result of this different method, Fintech activities are based on short-term relationships, activities are carried out over a digital network, the debtor-creditor relationship is established without intermediaries, and therefore risk-maturity adjustments are not made. Here in terms of Fintech customers, there is more risk emerging than according to bank customers. This situation, especially in countries with high market fluctuation and fragility, such as Turkey, it restricts the activity areas of Fintechs.

Fintech's outstanding banking-related activities are crowdfunding and payment systems. Crowdfunding platforms combine account owners and funding need. Therefore, they convert savings like banks into credit and investments. As another Fintech activity, payment systems are realized with the support of banks. For example, the PayTR company in Turkey is Fintech which performs payment activities. Fintech contractually works with many banks such as Ziraat Bank, Akbank and İş Bank. At the same time, many payment systems, such as Visa, Troy and Mastercard, partner with the program and receive support. Here, banks support Fintech activities because they have lost some of their income but have developed their customer portfolios.

The fact that banks offer many services together, such as crowdfunding and Payment Systems, provides a significant competitive advantage. Bringing these activities together requires a stronger economic structure. From this point of view, it seems impossible for Fintech to compete in the banking system with limited activities only in the short term. However, Fintechs may be a “coercion” to the traditional banking system if they can bring together certain services (Navaretti et al., 2017: 11).

On the other hand, as Fintechs become compatible with the banking system, they can lose a significant portion of the cost advantage. Fintechs may lose their competitive advantage if they start operating within the framework of the regulations to which banks are subject. For this reason, Fintechs stand out in countries where banking regulations are more stringent. The possibility of Fintechs being subject to banking regulations could create serious obstacles to the activity. On the other hand, the regulations regarding the activities of Fintech platforms have a positive effect on the risk perception of the customers. In other words, the activities of Fintech platforms are considered to be less risky as regulations increase.

It is well known that there are some disadvantages of the banks presenting financial products and services in packages. Banks may not be able to specialize in any of these services compared to Fintech. At the same time, banks may not be able to offer personalized products because they identify standard business processes. In addition, the Fintech platforms are capable of providing the services they are experts in 7/24 (Anagnostopoulos, 2018: 10).

Although Fintech platforms operate in some developing countries, it rapidly spreads its activities in specially developed countries. However, the digital platform called M-Pesa in Kenya and the Digital India platform in India show that Fintechs are rapidly spreading in developing countries (Bapat, 2018: 210).

All in the circumstances, it is clear that Fintechs will have a significant impact on banking operations. This situation is seen as a “revolutionary” especially for a sector whose entry conditions are very difficult. However, as mentioned earlier, banks have a high capacity to respond to technological innovation. Therefore, banks are going to take advantage of more digital technology to protect themselves. This competitive environment increases the tendency of both Fintechs and banks to converge in their operations (Drasch et al., 2018: 36).

In the next part of the study, Fintechs and the banking system will be compared in terms of actual and potential joint activities. Then, Fintech activities and banking activities will be analyzed in terms of their basic outputs. In the final part of the study, information about the Turkish Fintech Ecosystem will be

given. The aim of this study is to determine the effects of digital innovations on the banking system and evaluate the results of these effects in Turkey. The contribution of the study to the literature is to present the opportunities and risks of the banking and Fintech system on the basis of the situation in Turkey.

FINTECHS AND BANKING ACTIVITIES

In the field of individual and institutional banking, financial services are provided, while technological innovations are increasingly utilized. These financial services include new market segments, channels, and products, payment methods, digital credit, and reporting (Anagnostopoulos, 2018: 8). Fintechs are seen as a digital platform that makes banking activities in different ways. Banking activities are based on two principles. These: i) collection of the deposit, ii) and credit. Banks have to take certain actions in order to carry out these activities.

First of all, banks perform the transformation of financial assets and liabilities. Banks convert their short-term funds to meet their long-term loan needs. With this process, depositors will transfer liquidity risk to banks by short-term funding rather than providing long-term loans. Those in need of financing have provided long-term funding for their investments.

Secondly, as a result of this activity, banks have specialized in providing payment services to their customers. Banks provide payment services to their customers for repayment of the loans they offer. Some of them are in the form of collecting long-term loans while others are in the form of debt recovery of credit cards. Nowadays, Fintech is trying to take over these functions of banks. But since this requires expertise and great economic power, Fintech generally performs payment services with the support of the banks (Alt et al., 2018: 237).

Finally, banks are institutions that specialize in collecting and processing information. In this way, they collect a variety of information about their customers. This information relates to the client's behavior, financial preferences, debt discharging solvency and risk-return preference. This information requires a very big database and cost. It is a matter of debate whether the Fintechs have the ability to make a large organization on this scale (Navaretti et al., 2017: 13).

Fintech platforms offer the services offered by banks in the form of high added value products. In this situation, financial products and services, as in derivative products, "financial function separations" has been performed. In this way, the existing risks of financial products and services can be separated. Behind this success of Fintech companies are innovations in information and communication technologies that significantly reduce costs (Nomakuchi, 2018: 3).

As mentioned above, banks have the capacity to present all these services simultaneously and in combination with the scope economies. This is the reason why banks exist. In order to analyse whether Fintechs can perform these banking activities, basic banking services should be examined individually in this section.

Risk and Maturity Transformation Function

As explained above, the basis of the banking activities is to change the characteristics of financial assets through maturity conversion. While performing this function, banks are primarily based on short-term funds collected from depositors. They convert these funds into loans for those in need of long-term fi-

nancing by allocating a certain provision. Another benefit of this service is that banks protect depositors against possible liquidity shocks.

When banks convert short-term deposits into long-term loans, they remove their responsibilities on the amounts that Deposit owners refer to investment. Fintech platforms make a peer-to-peer matching with crowdfunding activities. Therefore, these platforms do not take risks in the debt relationship. Thus, the risk of depositors increases. However, the Fintech platforms, especially as the number of branches of the bank continues to decline, increase their effectiveness in the unsecured consumer loans market (Jagtiani and Lemieux, 2018: 53).

Lending activities of Fintech platforms started during the 2008 financial crisis. These lending activities can occur in three ways: crowdfunding, market lending (MPL) and peer-to-peer lending. Considering the online structure of Fintech platforms and the products and services they create, it is clear that the financial system is a new phenomenon (Jagtiani & John, 2018: 2). Fintech platforms share in the credit market between 2007-2015 from 3% to 12% is one of the most important indicators of this situation (Buchak et al., 2018: 482).

Fintech platforms can also create a deposit pool by collecting funds from depositors like banks. However, they need legal arrangements to collect deposits and thus provide liquidity services. For example, deposit collection and cash lending transactions in Turkey are organized in accordance with banking law. Therefore, arrangements must be made in order for Fintechs to be able to perform the liquidity functions of the banks. In this case, Fintechs will also have to be subject to partial reserve conditions such as banks.

In addition, the fact that banks are subject to minimum capital adequacy and deposit insurance liabilities protects depositors against risks. The fact that Fintech platforms facing such obligations will increase their costs. In addition, both traditional systems and banking regulations ensure that banks are primarily responsible for some asset owners. These liabilities include the payment of priority to the holders of deposit and debt instruments (bonds and bills). In this case, it gives banks a significant advantage over the Fintech platforms (Navaretti et al., 2017: 14).

Another issue that needs to be addressed here is whether the credit risk is paid by the intermediary institution. Banks keep some of the risks related to the loans they have given in their balance sheets. In contrast to this situation, Fintech leaves the risk either in the customer or in the insurance company. Therefore, Fintech platforms have to produce new solutions for the credit risk of depositors. For this reason, it is observed that the parties who wish to provide credit through Fintech platforms intensify their activities in two cases. These situations; i) Areas where traditional banks operate less, ii) local economic conditions are more challenging areas (Jagtiani & Lemieux, 2018: 53).

Fintech platforms use the “agency model” when performing crowdfunding activities. Because they do not take risks during this activity. In addition, platforms receive commission income from the parties but the transaction price is determined between the parties (Anagnostopoulos, 2018: 10). In this case, investors will apply to Fintech platforms with high-risk perception and therefore an expectation of return. In addition, those in need of funds who want to take advantage of these platforms are expected to have relatively low credit ratings. Therefore, the products and institutions in which Fintechs are trading seem to be riskier than the banks. According to all these explanations, banks dominance in the field of deposit collection and lending does not appear to be a threat in the short and medium term, given their capacity to adapt to digital innovations.

Payment Services

The basic functions of the banks are deposit collection and lending, as explained in the previous sections. It is also known that banks provide a combination of many services, unlike Fintechs, when performing these functions. Therefore, banks have specialized in payment services while performing these activities. Because banks have developed payment systems so that depositors can pay from their accounts. In addition, the system has been designed so that credit and credit card customers can pay.

These payment services can be performed in many different ways, from ATMs to POS devices, from cash payments to transfers of funds between accounts. Today, mutual funds transfers between accounts have become prominent in payment services with the help of technological innovations. Aforementioned, most of these transactions are carried out by banks. Recently, they started to provide payment services in institutions outside the banking system. However, unlike traditional banking services, these services can be performed with a password and biometric verification via Fintech via a quick and single platform (Kang, 2018: 14).

There are various obstacles in the way platforms outside the banking system specialize in payment services. The first of these reasons is that the permission to open deposit accounts in some countries, such as Turkey, depends on strict rules and is usually given to banks. Therefore, the failure of non-banking institutions to provide deposit accounts to their customers will result in failure of payment services to perform effectively. The second is due to the high risk of institutions other than the banking system, depending on the first reason. For this reason, customers with high credit rating may prefer banks that are considered to be less risky. Finally, only banks are authorized for interest payments in countries like Turkey. Therefore, keeping money in a system that does not pay interest will have no meaning.

In terms of payment services, platforms other than the banking system also have some advantages. One of these advantages is that Fintechs are more flexible in adapting to digital innovation. Therefore, these platforms gain the advantage by taking advantage of technology faster thanks to their flexible structure. Second, Fintechs can perform payment services at a lower cost. This is because of Fintechs act with intensive technology and less labor potential. However, banks use similar cost advantages in part. For example, when certain banking products and services are performed with internet or mobile branches, more advantageous opportunities can be offered for the customer. Finally, according to the obligations of banks, Fintech is faced with less legal obligations (Navaretti et al., 2017: 16).

Local authorities will determine the impact of legal arrangements on payment services. However, the flexibility of local authorities in regulations for Fintechs will allow them to maintain their regulatory arbitrage advantages. Otherwise, Fintechs will lose their competitive advantage.

Perhaps the most important competitive advantage of Fintechs in payment services is the technique. Fintechs can act faster in compliance with technological innovations than other financial institutions. Especially since banks are subject to restrictive legal regulations, the process of adapting to innovations is prolonged. This can create an advantage for Fintechs in the short term. However, as understood from the practices so far, banks are capable of using the same or similar tools as Fintech. Therefore, banks can overcome this disadvantage in a short time.

Another issue that needs to be examined within the scope of payment services is the situation of companies that make their commercial activities digital. In the international arena, such as Amazon and Apple, Turkey is exclusive N11.com a comprehensive economy emerged between e-commerce sites such as Hepsiburada and platforms that provide payment services. Such companies may be able to use

consumer credit for purchases. It should not be forgotten that banks with a wide customer database are more effective in the instant lending process.

It is useful to use the N11 sample to explain the effectiveness of Fintechs and banks in shopping. The N11 company offers its customers various payment options. These payment options are a credit card, debit card, virtual card, BKM Express, Masterpass, GarantiPay, Paycell, İşbank instant shopping credit, Garanti shopping credit, and Akbank direct payment. Apart from traditional payment systems, consumer credit and Fintechs are studied here. These systems enable the emergence of a comprehensive economy between consumer firms and digital platforms.

Within the scope of payment services, the payment of consumer loans is performed by one or more banks. To use this system, it is necessary to scan and process the customer database very quickly and effectively. Otherwise, delay and complexity in transactions may result in the failure of sales. At this point, one of the most important problems may arise in relation to the processing of personal data.

Another payment service is provided by the company N11 via Paycell. Turkcell, a market leading communications company in Turkey, has been investing in Fintech, offering customers three different payment methods. These are; payment by credit card, payment by Paycell card, and payment by digital money. Therefore, digitalization in international and Turkish payment services is realized through both Fintechs and traditional banks.

In this Section, Fintechs and banks are compared based on payment systems within the framework of the explanations above. As a result of the discussion, it is considered that it is possible to follow the advantages of Fintechs in payment services by banks in the medium and long term. However, it is seen that the effects of Fintechs on commercial life are progressing at an increasing rate.

Data Collection and Processing Activity

Information is the most important tool for the financial system and the institutions in the financial system. All financial institutions perform information collection and processing activities within the framework of their activities. Technological innovations have made major changes in the collection, processing, and transfer of data. Data is stored at high capacity and low-cost thanks to technologies such as cloud computing. The data required for financial institutions has become more accessible thanks to the increased technology. And finally, the data is transferred at lower costs through digital networks.

The most outstanding aspect of digital platforms compared to the banking system is the effective use of Information Technologies. Changing the consumer profile is also effective in this regard. The consumer profile is now composed of the X and Z generations. The most important feature of these generations is that they grow together with technological innovations. For this reason, they tend to use digital platforms instead of traditional tools such as banks and ATMs (Anagnostopoulos, 2018: 10).

The process of collecting, processing and distributing information for Fintechs are different from other financial institutions and especially banks. However, it should not be forgotten that banks and Fintechs are information-based structures, as in other financial organizations. Unlike banks, Fintech platforms benefit from alternative data and complex algorithms as well as big data (Jagtiani & John, 2018: 2). Therefore, any change in the information field of digital technologies will affect these institutions. In particular, it is clear that Fintech has changed the structure and presentation of the services provided by the platforms.

Nowadays, the digital universe has become the most valuable ‘‘thing’’. Nowadays, financial products are produced within the framework of the information. It can represent a situation in which the ‘‘just in time production-JIT’’ model is used in these financial products. Because financial institutions can anal-

use their customers risk-return profiles, behavior patterns, and their needs through information. For this analysis, “machine learning” is sometimes used. As a result, appropriate financial products are produced and sold in accordance with the resulting profile. The intelligence work of financial institutions such as banks is of course not new. However, the new digital information is only exceeded the financial limits and a wider set of data is used. At the same time, the rate of data collection, processing, and distribution has reached a point that can be expressed in seconds.

In this framework, Fintech platforms combine buyers and sellers in the digital environment. Since both the buyer and seller’s properties and financial product preferences are determined by the platform, information effectiveness increases significantly. At the same time, there is a positive correlation between the effectiveness of the transactions on these platforms and the number of processors naturally. Fintech platforms can also earn credit ratings by means of their user profiles. This situation also provides efficiency in price differentiation to platforms.

It is clear that the tool that provides Fintechs with this efficiency is a rapid change in technology. So technological innovations not only reveal the Fintech platforms, but also the tools that feed these platforms. It is a known fact that financial institutions conduct intelligence activities about their customers with basic statistical information. But it is possible that these activities become fast, reliable and cost-effective with more advanced technologies. This is where machine learning is involved. Now through learning computers, customer evaluation, profiling, rating, and pricing are realized in a very short time. This technique also allows categorizing customers according to certain standards. Thus, products and services can be offered quickly by customer categories (Navaretti et al., 2017: 20).

There are some problems with accessing data and converting data into information (Navaretti et al., 2017: 19). The first of these problems is which person or organization can access such a big repository of data. Extracting financial profiles of customers requires a lot of knowledge. Of course, it seems that companies such as Apple, Amazon, AliExpress can easily access data of this size. However, it is very difficult for smaller companies to have access to such data with their own facilities. However, there are graphics-based applications that are built to handle big data with graphics. These applications, which are especially important for investment banks, are also provided by Fintech platforms (Qi & Xiao, 2018: 69).

For this reason, digital platforms generally offer the products and services they offer through mobile applications. Services based on big data analysis are extremely rare. Services provided by Fintechs can be listed as follows (Nomakuchi, 2018: 3):

- **Payment Services:** Fast and secure mobile payment
- **Remittance:** Through mobile applications
- **Investment:** Social Lending
- **Funding:** Cloud Fund
- **Credit Intelligence:** Using Big Data
- **Asset Management:** Asset management services for households
- **Asset Management:** Automatic investment with artificial intelligence
- **Fraud Detection:** Fraud detection through machine learning
- **Security:** Authentication technologies such as voice recognition and fingerprint detection
- **Virtual Money:** Cheap transfer abroad using virtual Money

The most advantageous institution for financial profiling is the traditional banks. The larger the customer portfolios of banks, the wider the pool of data. Therefore, data acquisition functions for banks and

other financial institutions as well as for customers financial returns have become extremely important. Nowadays Fintech platforms do not have the opportunity to access information as much as banks. This raises the cost of information for Fintechs. However, the information obtained by Fintechs is known to be higher than that of their flexible structures.

If Fintechs want to have large-scale knowledge, they can go on to establish new business partnerships. They will be able to obtain this information with the support of traditional banks. Legal arrangements in some countries also force banks to share information they have acquired. Therefore, Fintech platforms can access the information that banks have.

The second major problem is the problems that occur in obtaining and using this information. The risks to information security, issues related to the privacy of private life, and inappropriate methods in collecting and processing personal data constitute the basis of the discussion. In particular, recent cyber frauds and investigations into data collection, processing and sharing on social media platforms such as Facebook reveal the seriousness of the issue.

In recent years, legal arrangements have been made in many countries concerning the collection, processing, and distribution of such data. In this context, the Personal Data Protection Act in 2016 in Turkey has been removed. This law gives individuals the right to protect their data. In this context, it is considered that institutions that are kept under supervision by regulatory and supervisory authorities, such as banks, are more likely to have access to information. This can give banks a competitive advantage in information.

The third problem is whether or not traditional credit assessment models can be replaced by models such as machine learning. In traditional credit assessment, a credit officer makes an assessment with the basic information of the customer. In the machine learning model, the financial and non-financial information of the customer needs to be taught to the computer and evaluated according to the results. Although there may be a resistance to this new model, it is considered that these two models will become complementary elements over time.

Finally, traditional banks and Fintechs have different tendencies to process and update customer data. Banks make some changes in liquidity and credit risk as described in the previous section when establishing a debt relationship with their customers. They also keep some of the risks in their balance sheets. Since this is explained in the previous section, this section will not be mentioned in detail. Fintechs do not take over liquidity and credit risk. They usually leave it on the client or transfer it to an insurance company. This situation brings Fintechs to a disadvantaged position compared to banks in order to monitor and gather information.

If this section is to be considered for collecting, processing and distributing information, Fintechs are faster in comparison to banks. However, banks may have lower cost data, especially because they have big databases. Supervision of banks by supervisory and regulatory agencies creates a competitive advantage in this regard. In the light of all these discussions, Fintech's ability to digitize and use the data, despite the speed advantage of accessing the data and the cost of data can be said to have a disadvantage.

COMPARISON OF FINTECH AND BANKING SYSTEM

In the second part, Fintech ecosystem and banking activities were compared. Fintech platforms have determined that banks will affect each other in many fields of activity. This enables Fintech platforms to think that banks will play a complementary role in their activities. In this section, Fintechs and banking

system have been compared in different ways. First of all, Fintech platforms and banks were compared with the size of finance and income structures. In the next part, the competition situation between these two institutions was analyzed. In the last part, it was compared with the banking system based on the regulations that Fintechs are likely to be subject to.

Financing and Income Structure

Banks are dependent on the system based on traditional models in terms of finance and income structures. This model can be called a “wholesale model”. In this model, banks lend their funds through deposits through lending. One of the most important factors that enable banks to be preferred by their customers is a credit risk. Banks keep part of the return risk of the financing they provide in their balance sheets. Fintech platforms usually perform a matching transaction between the creditor and the financing party. In this matching process, the credit risk remains at the institution providing financing. This model used by Fintech platforms is called the “agency model”.

According to the explanations, banks are more advantageous in financing compared to Fintech platforms. However, there are situations to be considered here. First of all, the direct matching service provided by Fintech platforms can offer cost advantages compared to the credit service provided by banks. Second of all, Fintech platforms can serve customers in a wider range of credit rating ranges. Banks may be more sensitive to the choice of customers because they take over part of the credit risk. Finally, Fintech platforms may be subject to more flexible regulations than banks. This provides a wider credit portfolio compared to the banks on the Fintech platforms.

There are significant differences between Fintech platforms and the methods of generating income between banks. As explained earlier, banks obtain a significant portion of their income from the interest margin. This margin is based on the difference between the interest rate of the banks to deposit and the interest rate they obtain from the amounts they have used as credits. The Fintech platforms usually rely on the matching method of crowdfunding. Therefore, they do not perform activities such as collecting deposits and lending. For this reason, both sides of the debt relationship, the fund offers, and the fund demands, fees are paid.

The most important condition for ensuring that the wage income of Fintech platforms is sustainable is that its activities continue to expand. Because the fixed costs of the platforms are quite high. On the other hand, their marginal costs are low. Due to the fact that digital platforms charge for each transaction, the width of their activity will be proportional to the size of their revenues. For example, 90% of the income from lending clubs operating in the United States of America in 2017 is based on the wages they receive as a result of the activities (Navaretti et al., 2017: 22).

Another important factor for Fintech’s income to be sustainable is the correct determination of the funding supply and demand segments. The objective of the activity should be to bring both sides together within the framework of the highest transaction income. For this reason, the highest income should be targeted when selecting the parties. It should not be taken into consideration that any of the parties offer a low price, nor should it be considered that they offer a high price. The important thing is to determine the optimal income.

When these two elements are evaluated together, it is considered that the most important source of problems that may arise within the scope of platform revenues is the obligation of the platform to agree with more parties for higher wages. This may reveal the problem of information asymmetry. Because the parties competitiveness and market forecasts will not be the same. For this reason, it is likely that negative

selection problem will arise during the transactions taking place on digital platforms. Blockchain technology is expected to be used to solve the information asymmetry problem. (Cai, 2018: 986). However, one of the ways Fintech platforms can solve this problem seems to be to use traditional banking methods.

The Effect of Competition

The rapid development of Fintech platforms has a variety of effects on financial markets. These effects occur both in traditional financial structures and in new financial institutions and instruments. Traditional brokers in the financial markets are beginning to use new techniques, while the market is also familiar with new financial instruments. Therefore, while traditional financial institutions and digital platforms develop competition, they try to adapt to this new situation (Cai, 2018: 986).

Competition between the traditional banking system and digital platforms will make it easier to understand the collection of the subject under various headings. Accordingly, the subject will be examined under the headings of financial products and services, customer and digital information. While determining these topics, the most common contact points of banks and digital platforms are taken into consideration. This framework will make it easier for both institutions to present the impact of competition more effectively.

The first element to be examined when analyzing the impact of competition on traditional banks and Fintech platforms is the products and services offered. One of the most important advantages of the traditional banking system compared to digital platforms is that it offers financial products and services as a complimentary package. In contrast, Fintechs usually specializes in a particular product and service. However, while offering these products and services, the most important advantage of digital platforms is that they are exempt from regulations that banks are subject to.

Fintech platforms currently have no effect on the banking system's products and services. However, the point to be considered here is the capacity of Fintechs to provide products and services to customers who do not take the bank's portfolio. This also increases the potential of Fintechs to generate higher income. In this way, the risk of banks being certain and offering lower income products and services should be taken into account in the long term.

In spite of these advantages, Fintechs have not been able to dominate the financial products and services market in the short and medium term. There are several reasons for this situation. First, banks have high public trust. Therefore, it is a very low-cost financing source for large segments of the market.

A significant disadvantage of Fintechs against banks is that they are perceived as relatively high-risk institutions. This is likely to increase supervision and regulation on digital platforms. Nowadays, the regulations that the Fintechs face are different from country to country. Finally, especially banks with a wide operating network attract attention to the tendency for digital innovation. Banks tend to use the digital business models used by Fintechs in a short time. In this case, Fintechs and banks can be expected to become complementary institutions in the future.

The second important factor in the competition between the traditional banking system and the Fintech platforms is the customers. Digital platforms for customer selection show different approaches from country to country. In some developed or developing countries, platforms incorporate customers outside the banking system into their portfolios. In this way, while offering products and services of digital platforms, costs are reduced and revenues are rising. Especially in developed countries, Fintech platforms try to compete against banks by using advantages such as speed, information technology and quality of service (Navaretti et al., 2017: 24).

When looking at the customer selection criteria of the banks, certain standards are generally observed. Banks tend to provide services to their customers that have met certain standards by analyzing their client's information. One of the reasons that drive banks into this situation is the regulations they are subject to. Fintech companies are flexible to choose customers because they do not keep the risks on them. However, high digitization forces Fintech platforms to create and use certain standards. This reduces the operational costs of Fintech platforms and increases the operational speed.

As in all sectors, customer-focused activities are highlighted in the sectors where businesses operate in the finance sector. Although banks try to be customer oriented, as described above, they have difficulty meeting the changing customer needs because they cannot perform product personalization activities and adhere to certain standards. This creates a significant competitive advantage for Fintechs, a more flexible and customer-focused business (Anagnostopoulos, 2018: 10).

Another important factor in the competition between Fintechs and banks are digitalization. Fintech companies differ from the information management systems used by traditional banks. Because Fintech platforms use different sources of information, such as social networks, when performing their activities. Banks mainly use information obtained from traditional intelligence methods in information systems.

On the other hand, it is clear that digitalization also brings cybersecurity risks. However, in recent years, especially the technologies developed by companies such as ApplePay and Google can be said to have eliminated this vulnerability. This has created an important advantage in providing Fintech platforms with its products and services (Anagnostopoulos, 2018: 10). This advantage has affected all services, including lending services. Platforms such as Apple Pay and Samsung Pay have emerged as non-financial institutions that perform traditional financial services and have laid the technical foundations for Fintech (Yoon & Jun, 2019: 181).

Banks use more relationship banking methods when conducting their operations. Fintech platforms generally provide peer-to-peer loans. Today, it is seen that firms are turning to peer-to-peer credit as a strong alternative. This situation not only as an alternative, but also the competition between banks and digital platforms is becoming profitable for companies.

Regulations

As stated in the first part, Fintech platforms can be defined as organizations that carry out banking activities with new techniques. Fintech platforms take advantage of digital innovations while carrying out these activities. However, one of the important advantages of these digital platforms compared to banks is, at least for now, the regulations that it is subject to. Thus, these platforms have the potential to serve faster and easier (Jagtiani & John, 2018: 2).

Fintechs have a significant cost advantage because they are not subject to legal procedures compared to traditional banks (Anagnostopoulos, 2018: 10). As an important indicator of this situation, the operating expenses of the banks compared to the credit volume were around 5-7%, while this ratio remained at only 2% level for Fintechs (McKinsey, 2015).

It is obvious that Fintech platforms have a competitive impact on financial markets. These platforms operate without being subject to some of the regulations of the banks. In this case, entering a sector that is extremely difficult to increase competition. However, the fact that Fintech platforms operate without being subject to regulations causes serious concerns about financial stability. This increases the risk of customers and raises certain doubts about the activities. However, it is clear that a balance between

competition and financial stability should be established in order to avoid the competitive impact of Fintech platforms on the banking system.

In making arrangements regarding Fintech platforms, the advantages and disadvantages of the activities of these platforms should be taken into consideration. As mentioned above, financial stability and therefore consumer protection should be taken into account when making this assessment (Jagtiani and Lemieux, 2018: 53). For example, the fact that Fintech platforms continue to operate in a digital environment raises the question of the data breach. Studies on this subject reveal that stability cannot be achieved without a balanced regulation on the data breach (Yoon and Jun, 2019: 183).

The parties who have business relations with Fintech institutions want reasonable assurance both in terms of financial security and information security. First of all, the parties serving from Fintech platforms expect the institutions where they deliver their money to be financially secure. On the other hand, those who have business relations with these platforms want to know that their personal data is safe. In both respects, countries are looking for solutions to the security problem by making different legal arrangements. For example, Fintech activities were organized within the scope of Law numbered 6493 on Payment and Securities Reconciliation Systems, Payment Services and Electronic Money Institutions, which effectuated in 2013 in Turkey.

Establishing a regulatory framework in the activities carried out by Fintechs may prevent banks from performing these activities from performing transactions like digital platforms. In this case, it may be assumed that platforms must be subject to regulations according to business volume in order to achieve effective competition. In this case, platforms performing certain activities in a specific volume of business will not be faced with all banking regulations. Thus, the competition will continue in the sector. On the other hand, a progressive regulatory framework for Fintechs will be able to help keep the risk at a certain level. In this case, there is a certain balance between financial stability and competition. Table 1 includes the comparison of traditional banking and Fintech platforms from various aspects.

TURKISH FINTECH ECOSYSTEM

This part of the study in Turkey will be given information about the status of the Fintech ecosystem. Fintech investments in Turkey are increasingly expanding. According to the Deloitte company's report published in April 2017, Fintech investments in Turkey increased from \$4.6 million to \$29 million between 2012-2016. In this period, the total investment amount was realized at \$52 million (Deloitte Turkey, Fintech Ecosystem Report, April 2017). Figure 2 shows this situation.

This increase in Fintech investments has led to an increase in competition. However, competition in the sector did not prevent the development of cooperation. For example, in 2012, BKM Express managed to implement the digital wallet application with the merger of leading e-commerce firms and banks. This shows that there is a tendency for convergence between Fintech platforms and traditional banks in Turkey, similar to the situation in the world.

When Figure 3 is examined, it is clear that Fintech investment in Turkey is low compared to the global scale. Mention may be made of Fintech investment in Turkey is low compared to the global scale. However, this situation shows that the expansion potential of Fintech investments is also high. Deloitte's "Connecting Global FinTech: Hub review" report highlights that in countries where economic growth is limited, Fintech has high growth potential and therefore innovation opportunities (Deloitte Turkey, Connecting Global Fintech: 2017 Review of Interim Huber).

Table 1. Comparison of Fintech platforms and banking

FACTORS	FINTECH PLATFORMS	BANKING
RISK	They don't take the risk. They leave the risk on the customer or the insurance company with one-to-one matching.	They keep part of the risk on their balance sheets. They are also subject to minimum capital adequacy regulations.
MATURITY TRANSFORMATION	The maturity of Crowdfunding loans is determined between the parties.	They convert short-term funds into long-term financing instruments.
PAYMENT SERVICES	They offer fast and single platform payment services with a password and biometric verification.	They use mobile payment methods in addition to payment methods such as debit cards and credit cards.
DATA COLLECTION AND PROCESSING	In addition to big data, they use alternative channels and complex algorithms.	They use big data. They tend to use traditional methods while obtaining data.
FINANCING MODEL	They use the agency model. They don't take the risk. On the other hand, they offer a cost advantage.	They use the wholesale model. They keep part of the risk on their balance sheets.
INCOME METHOD	They receive fees from both sides of the credit relationship.	Gain a significant portion of their income from the interest margin
REGULATIONS	Although this varies from country to country, most of the activities are not regulated yet.	All activities are subject to legal regulations.

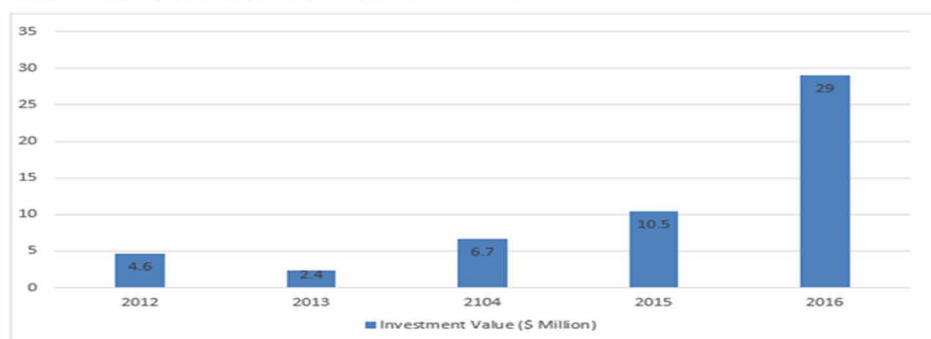
The factors affecting the expansion of Fintech investments include innovation, expertise, foreign capital, proximity to customers and regulations. The situation of these factors is promising in Turkey. This reveals the potential for expansion of the Turkish Fintech Ecosystem. One of the reasons for the rapid growth of Fintech investments in Turkey is the sound structure of financial institutions, especially in the banking sector. The robust structure of the banking system can be seen as an important advantage given the country's young population and its predisposition to digital innovation.

The main areas attracting Fintech investments in the world are payment methods, mobile banking, asset management, lending, InsurTech, crowdfunding, and Blockchain-Bitcoin. In Turkey, Fintech focuses on payment methods, mobile banking, asset management, capital markets, and digital currencies. Therefore, activities in this area are realized in areas such as prepaid cards, wallet applications, payment

Figure 2. Invested value in Turkish Fintech ecosystem

Source: BKM, The Turkish Fintech Ecosystem Progress Report 2016.

Figure 2. Invested Value in Turkish Fintech Ecosystem

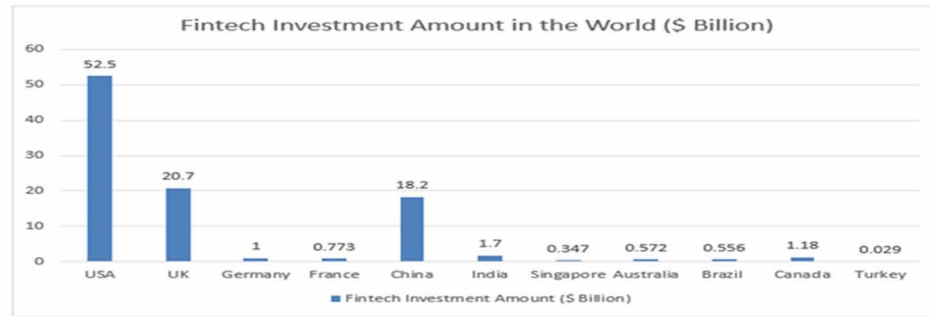


Source: BKM, The Turkish Fintech Ecosystem Progress Report 2016.

Figure 3. Fintech investment amount in the world

Source: Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International (data provided by PitchBook) January 4, 2019.

Figure 4. Fintech Investment Amount in the World



Source: Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International (data provided by PitchBook) January 4, 2019.

tracking, offline payment, money transfer, discount and loyalty cards, budget management, collection, POS management, pre-accounting, VPOS, cash register, banking software, and credit scoring (Deloitte Turkey, Turkish Fintech Ecosystem Report, April 2017). In the Turkish Fintech Report published by Ernst&Young company in 2018, four main headings affecting the Fintech ecosystem and the factors of these headings were determined as shown in Table 2.

The factors affecting the activities of Fintech organizations operating in Turkey will be evaluated briefly within the framework of the four main headings above. Considering the demand factor, it is seen that the financial services sector in Turkey has been organized very strongly as a result of the crises. This shows that the demand for Fintech services will be high, given the young population and the population's tendency to digital innovation.

The demand for the activities of Fintech establishments operating in Turkey is not only due to domestically. Institutions with a specific intensity of activity can also be opened to the Middle East, the Balkans and Central Asia. Similarly, there are Turkish Fintech platforms operating in developing countries such as India (23 Proposal for the Sustainable Development of Turkish Fintech Ecosystem, Ernst & Young, 2018: 17).

As stated in section 3.3, Fintech activities of the organizations are regulated in Turkey under the No. 6493 Payment and Securities Settlement Systems, Payment Services and Act on Electronic Money Institutions. In addition, a new and more comprehensive arrangement is expected to be made concerning the transfer of money between spouses in Turkey.

The law no 6493 stipulates the obligation to obtain operating permits for payment, e-money institutions, and system operators. At the same time, under this arrangement, Fintech establishments have also been required to comply with certain processes. The obligations imposed by the said law have increased the trust in the activities of Fintech organizations. However, it is considered that this situation will lead to a certain decline in the competitive strength and cost advantage of Fintech platforms.

Turkey is trying to provide support to the Fintech ecosystem through TUBITAK (Türkiye Bilim ve Teknik Araştırma Kurumu in Turkish- The Scientific and Technological Research Council of Turkey) and the EU (European Union) funds. On the other hand, Fintech platforms are shy about the support of these organizations. These platforms tend to attract more angel investors, venture capital and bank incentives

Table 2. Four headings of Fintech ecosystem and affecting factors

HEADING	FACTOR	EXPLANATION
DEMAND	Country Market Structure	The current structure of the financial services industry in Turkey and the position of the fintech's
	Competition	The competitive environment in the FinTech industry and the FinTech industry with other financial institutions
	Consumer Behavior	Consumer perspective on the FinTech industry
	Customer Experience	The benefits and advantages of FinTechs in customer experience
	Opportunities and Threats	Opportunities and threats in FinTech's areas of activity
	New Markets	New markets in the financial services sector
REGULATION	Trust and Security	The public's confidence in the information security and financial sense provided by FinTechs
	New Regulations	Design and implementation of new regulations to regulate financial markets and affect FinTechs
	Activity Permit	Activity permit specifically applicable to payment and e-money areas
	Restrictions and Obstacles	Restrictions and obstacles on FinTech faces offering specific services
CAPITAL	Public Funds and State Support	Public support and incentives provided to FinTechs
	Banks	Investments and financial support provided by banks to FinTech
	Investors	Factors affecting angel investors, venture investors and IPO investors investing in FinTech
	Business Model	New and creative business models of FinTechs to attract new investments
HUMAN RESOURCES	Quality, Quantity and Cost	The quality and quantity of human resources available on the market and the costs of the new human resources
	The Role of Financial Institutions	The role of the organizations operating in the financial services sector in raising human resources
	The Role of Universities	The ability of universities and other educational institutions to train human resources in the FinTech sector
	In-house Entrepreneurship	Perspectives of institutions on entrepreneurial ideas

Source: Ernst&Young Report 2018, 23 Recommendations for the Sustainable Development of Turkish Fintech Ecosystem.

for capital needs. One of the biggest obstacles in front of Fintech platforms in Turkey is conjecturally considered to be difficulties in attracting foreign capital to the country (23 Proposal for the Sustainable Development of Turkish Fintech Ecosystems, Ernst & Young, 2018: 19).

Turkey Fintech ecosystem also faces certain challenges in finding human resources. Fintech platforms have a disadvantage compared to banks considering salary and other additional conditions. Fintech institutions have intensified employment opportunities for transfers from universities and other Fintech companies.

When the Fintech ecosystem of Turkey is evaluated as a whole, it is seen that it carries a potential open to development and is expanding every year. Although there are some problems in front of the Fintech ecosystem, it is clear that the solution suggestions for these problems are also being developed. Turkey has the advantage of offering Fintech products and services to developing countries with its geopolitical position. Turkey's young and dynamic population, human resources and investor Fintech platforms for both the customer and seems to be at the point of becoming valuable. At this point, it is considered that

the Fintech ecosystem of Turkey has a great potential for the future of the country with the steps taken by both the public and private sectors.

CONCLUSION

Financial markets and institutions are constantly changing and evolving structure. Nowadays, technological innovations play an important role in the dynamics of this change. Developing technology has significantly affected the financial resources of companies. The most important result of this technological impact is that Fintech platforms are emerging. These platforms are also the result of digital innovations that make electronic commerce and e-business models possible.

Fintech platforms have developed a more innovative and digital business model instead of traditional financial companies business models. Fintech platforms have developed a digital business model that takes customers to the center especially in terms of payment and lending services. Back-office operations, digital banking, e-commerce, identity management, payments, and insurance are the main areas of these platforms.

Within the scope of the study, Fintech platforms and banking activities were compared in various ways. In this comparison, in addition to the activities performed by the traditional banking system, the outputs of the activities obtained as a result of these activities were also taken as a basis. Fintech, which operates in Turkey, is mainly based on the study comparisons. In the last part of the study, information was given about the Fintech Ecosystem of Turkey. The reason for this is that there is not much work done in the literature on the Turkish Fintech Ecosystem. In this context, the study contributes to both the comparison of Fintech and its banking activities and outcomes and to the literature on the study of the Fintech ecosystem of Turkey.

Within the scope of this study, traditional banking activities were evaluated as part of risk and maturity conversion function, payment services and information collection and processing activities. Banks serve their customers by converting risk and maturity. While banks convert the funds they collect from their customers into loans, they keep a portion of the risk in their balance sheets. Thus, the customer is protected from credit and liquidity risk to a certain extent. Fintech platforms provide peer-to-peer loans to their customers. In this credit relationship, the risk is left on the customer or transferred to the insurance company. Therefore, Fintech platforms do not assume the risk in any way. However, it should not be overlooked that Fintech platforms are considered as an alternative for the parties who have difficulty finding credit. The most concrete example of this situation is that the Fintech platforms emerge as an important factor in the credit market after the financial crisis.

When Fintech platforms and banking system are evaluated on the basis of risk and maturity conversion function, the platforms have advantages of speed and flexibility in the face of the assurance services of banks. However, when the bank's susceptibility to digital innovation is evaluated, Fintech platforms are considered not to pose a threat to the banking system in the short and medium term. Within the scope of payment services, it is seen that Fintech platforms create alternative and competitive channels. However, at this point, a significant portion of its activities are carried out either by cooperating with banks or by entering into the banking system. A significant reason for this is that payment services and deposit accounts are closely related. As banks can provide these services as a package to their customers, it is obvious that they have an important competitive advantage.

With Fintech platforms, banks collect information when performing their activities with their customers. They process the information they collect in order to use it both in their current activities and in the future. In this context, banks are considered more reliable in society as they face supervisory and regulatory practices. This situation can create an information asymmetry problem between Fintech platforms and banks. Fintechs can be considered as an important disadvantage in terms of this situation can be eliminated in order to make arrangements can be reached. However, this will negatively affect the cost advantage of Fintech platforms.

It is obvious that Fintech platforms have an innovative impact on financial institutions, vehicles and activities, especially banks. Fintech platforms affect the manner and structure of banking activities. Banks now operate as institutions that benefit more from digitalization and are in cooperation with Fintech platforms. However, it is clear that Fintech platforms cannot be a threat to the banking system at this time. Instead, it is more likely that Fintech platforms and banks will transform into another form of business in cooperation. The recently discussed concept of “TechFin” is a clear sign of this.

The activities of Fintech platforms are commonly observed in developed markets. Recently, however, Fintech investments have been also increasing in developing countries. Turkey has found an important place in these countries. The reasons for this include the dynamic young population and growth potential of Turkey capital markets. In this context, Turkish Fintech Ecosystem has attracted significant investment almost every year. On the other hand, as a result of the close historical and sociological ties, Turkey has the potential to become a Fintech center for Middle East countries. In 2013, Turkey made a regulation covering Fintech activities. In general, Turkish Fintech Ecosystem has high development potential and needs investment.

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KEY TERMS AND DEFINITIONS

Big Data: Big data is an extremely large set of data that allows computational analysis to reveal particular human behavior, trends, and relationships.

Blockchain Technologies: Blockchain is a scattered database consisting of blocks of chain structure and provides encrypted process tracking. Blockchain technology is a digital technology used primarily in crypto money.

Crowdfunding: Crowdfunding is the transfer of certain amounts of capital from a large number of people, in particular to fund a business venture through Fintech platforms.

Fintech Ecosystem and Banking

Digital Banking: Digital banking is the presentation of the products and services offered by the traditional banking system through digital platforms.

Digital Business: Digital business is an innovative business model created by combining physical and digital methods. Digital business models range from e-commerce and e-business applications to Fintech platforms.

Fintech: FinTech describes a business that aims at providing financial services by making use of software and modern technology.

Chapter 15

Digitalization in Accounting Through Changing Technology and Accounting Engineering as an Adaptation Proposal

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ABSTRACT

When the historical process of accounting is looked at, it is seen that there are revolutionary turning points such as development of double-entry bookkeeping method, uniform accounting system and international accounting standards practices, and use of computer software in accounting. Technology has initiated a radical transformation process by enabling the transfer of accounting to the digital platform. Involvement of accountants in this digital change process, their adaptation, and responses must be simultaneous. Students who are receiving accounting education should also be trained in this direction so that not only accountants but also future accountants will be able to adapt to digitalization. Accounting engineering is a model developed as a solution offer at this point. In this study, the concept of digital accounting and accounting engineering which emerged through the adaptation of accounting as an information system with new technologies will be discussed.

INTRODUCTION

“Accountancy is running after even insignificant amounts like 36 kuruş”, this is a statement used by Halid Ziya who is one of the important Turkish writers to describe the life of an accountant in his novel called “Ferdî ve Şürekası” (Ferdî and His Associates) that he wrote in 1984. Undoubtedly, this is a striking sentence that draws attention to the difficulty of accounting procedures which was executed manually

DOI: 10.4018/978-1-7998-1125-1.ch015

before digitalization. Because, the “recording function” which is included in the traditional accounting definition at that time caused considerable loss of time for accountants. Information technologies which develop in time and evolve continuously have brought radical changes, new facilitators as well as new duties and responsibilities to the accounting profession and accountants just like the all other areas of life.

When accounting history is taken into consideration, it is seen that the biggest steps regarding the development of accounting are taken in the digital age. In this context, it would not be wrong to classify accounting as “before the digital age” and “after the digital age”. The major development in accounting until the beginning of industrial revolutions before digitalization was the introduction of the double entry method. However, after the 1900s, the technological developments that occurred continuously after the industrial revolution brought many innovations and facilitators to accounting.

The development of accounting and the need for accounting types occurred due to the emergence of the needs in this area. As a result of the development of the company culture and especially the expansion of joint stock companies, the need for corporate accounting has emerged.

Accounting historians also claim that cost accounting is a consequence of the industrial revolution (Yükçü & Atagan, 2014, p.145). The mass production which is the cause of this revolution has led to the need to find the unit and total costs of the products or the cost accounting in other words. The growth of transport business, the increase in the distribution companies, the increase in production between the years of 1850 and 1925 as well as the need for accounting systems with the aim of planning and control in the American Railways in the 1860s and 1870s have had a significant impact on the development of administrative accounting following the cost accounting (Yükçü & Atagan, 2014, p.154).

Following the first and second Industrial Revolution, third Industrial Revolution started with the development of computer and automation followed by the fourth Industrial Revolution (Industry 4.0). What makes this revolution different from the previous “industrial revolutions” is the speed of developments and the change it brought through affecting the production, management and governance systems in all major industries (Serçemeli, 2018, p.372). Many social and economic benefits began to be produced in a short time with the internet which was made available to the use of the world in 1990s.

Continuously developing and changing “information technology” and the concept of “digitalization” which is a result of the use of information technology has brought the concept of “digital accounting” into the field of accounting.

In this study, information technologies and digitalization will be mentioned briefly and the impact of these concepts along with the innovations that they brought to accounting profession will be explained.

The impact of all the information technologies or one or more IT tools on accounting, auditing and tax draws the attention of the academicians, because the dynamic aspect of technology brings new applications and changes with itself. Some of the academic studies on this subject are as follows:

Aytekin et al. (2016) stated that cloud computing which hosts services such as software, hardware and data hosting in a remote server and provides services as if they are close in order to increase their competitiveness should not be ignored. The accounting systems combined with the cloud computing services formed a new business model called Cloud Accounting. Some accounting softwares which can be considered important in Turkey have started to provide this service.

Serçemeli (2018) investigated the place and importance of artificial intelligence in the future of accounting and auditing professions and argued that these professions will not disappear completely in the future but there may be a decrease in the number of employment. It is envisaged that the professional roles will change and become more dependent on information technologies. They will continuously develop and form different strategies based on this information. As a result of this transformation, it has

been proposed that a new title called ‘Accounting Data Strategist’ should be given to the accounting profession. It has also been suggested that businesses should invest in adapting to these new technologies.

Moorthy et al. (2012) examined the relationship between IT and management accounting and stated that accounting standards remain for many years despite the frequent changes of IT, IT-based management accounting practices are acceptable for many companies and technology is very beneficial to use in terms of costs when the benefits of the paperless environment are taken into consideration. In addition, it has been stated that the selection of appropriate system and technology is of vital importance for prevention of money and resource waste.

Krahel and Titera (2015) stated that audit standards should be arranged in a way that it enables adoption of broader and deeper data availability and analysis of the modern age to create a better and more comprehensive audit and control in view of the increasing automation.

Yürekli and Şahiner (2017) stated that the concept of Industry 4.0 affects accounting and examined the relationship between integrated accounting and accounting education. They stated that accounting educators should add the technologies that will affect the accounting processes to the curriculum.

Türker (2018) stated that accountants who have a responsibility to be creative in order to shape the future of the accounting profession at a global level should focus on the public interest taking ethical values such as honesty, trust, impartiality, accuracy and professional technical qualifications as the basis and learn the new technologies and innovations so that they can serve their customers by leading new generations of businesses.

Tektüfekçi (2012) stated that business enterprises need Enterprise Resource Planning ERP systems which constitute software (having strong hardware) part of information technologies of the enterprises in order to achieve the successful establishment of accounting information system based on information technologies. In addition, they also stated that computers are used as tools for performing the decision-making and control functions of enterprises and all basic functions such as integrated purchasing, production, sales-marketing, accounting-financing, human resources management etc. are carried out with this tool.

With this rapid change in information technologies, adaptation of accounting to this change and expectations related to the accounting for the future will continue to be the focus of academic studies.

WHY INFORMATION TECHNOLOGY?

“The future will belong to those who cooperate best with the computers” (Isaacson, 2017, 435). This sentence which was said by chess grandmaster Kasparov in 1997 after being defeated by a computer called Deep Blue may be one of the best results that can be obtained regarding the adaptation of the for human to information technology and digital age.

Computers were invented at the beginning of the 20th century, developed towards the end of the century and have become an indispensable part of businesses and personal use. Since people both feel curious and keep themselves aloof from the innovations at the same time by nature, invention of the computers and their use in every area of life, especially in businesses, triggered the concern that computers will replace people. Kasparov’s chess competition against a computer is the result of this curiosity. Kasparov who was defeated by the computer in the chess competition said “computers are strong in the things where humans are weak and humans are strong in the things where computers are weak” (Isaacson, 2017, p. 435) after this defeat and he sought an answer to the question “ what kind of a game can

come into the picture if a human does not play against a computer but play with it or the forces of the human and machines are combined in other words? In a way, this perspective constitutes the philosophy of information technology and human relations (<https://www.endustri40.com/kasparov-satranc-oyunu-makineye-karsi-insan/>).

Computers exist to facilitate the lives of the people; one is the complement, not the maintenance of the other. Neither people nor computers can be taken out of the system. Since actions that humans perform in a long period of time can be carried out by computers in a very short time, it has been concluded that it is possible for people to make strategic planning instead of spending a lot of time in calculations; therefore, people can achieve the highest level of creativity. (Isaacson, 2017, p. 435)

The concept of computer has also brought the concept of “information technology”. Information technology (IT) can be defined as “forming all the complex structure intended for creating, changing, keeping, using, duplicating, sharing, developing and improving the information as well as making it integrated and interactive based upon a computer” (Sevim, 2009, p. 7). Information technologies are needed to ensure that information is adequate, transparent, accessible and reliable, and creates a benefit and value for the users of information.

Undoubtedly, internet is one of the most important discoveries in human history and the Industry 4.0 environment which is the consequence of technological revolution is completely surrounded by the internet infrastructure and its components. Everything is related with everything enough to form a network. All kinds of processes and elements are under the influence of smart (artificial intelligence) information technologies, such as buildings used, production machinery, logistic activities, information / data security, business environment and social networks (Firat & Firat, 2017). Big Data, Intelligent Robots, Simulation, Internet of Things (IoT), Cyber Security, Cloud Data Processing, Additive Manufacturing (3D Printing), Augmented Reality are the most basic information technology tools.

ACCOUNTING AS AN INFORMATION SYSTEM

Accounting which has a long and different history is an important component of organizational and social life. That is to say, accounting is a technical practice because it involves recording, measuring and interpretation. Since these measurements and interpretations affect the goals and related behaviours of individuals and create desired and undesirable effects on organizational and social functioning and development in this process, it is also a social practice (Carnegie, 2014). This situation also indicates that accounting has a dynamic structure.

Transforming the data into information utilizable within the logic of the system through processing reveals the concept of information system. In addition, data processing for presenting the information produced by accounting in a meaningful and sufficient manner to the related parties within the system logic reveals the “accounting information system”. “The term system in accounting can often be referred as the computer system” (Simkin et al., 2012). Therefore, accounting information system can be defined traditionally as “gathering the accounting practices which are carried out in accordance with generally accepted accounting principles with modern information technological facilities (Sevim, 2009, p. 9). Thanks to the widespread use of information technologies and internet, transactions in businesses are defined and recorded in the electronic environment by the accounting information system shortly after they are performed (Kılıç & Anadolu, 2018). In this way, financial information is provided to be presented in a shorter time and the accuracy and efficiency of accounting information increases at the same

time (Ghasemi, 2011, p. 114). A well-established accounting information system has a great important for businesses.

ADAPTATION OF ACCOUNTING TO INFORMATION TECHNOLOGY

Accounting which is a discipline related to the disclosure and providing assurance of correct financial information has been influenced by dependence of its functions on technologies in business transactions (Pan & Seow, 2016, p. 168). As a result of this interaction, “accounting has undergone tremendous developments with the growth of information technology” (Ghasemi, 2011, p. 114). These developments, of course, did not happen at once, because accepting the new technologies and adapting them to accounting is a process that develops in time.

It is possible to divide the course of this relationship occurred between accounting and information technology over time as follows (Tektüfekçi, 2012, p. 52):

- **Period 1 - First Kiss:** Before the 1960s; businesses enterprises tried to make transactions dependably in a short period of time by utilizing information technologies in the routine operations of accounting. This period was called as the “first kiss”.
- **Period 2 - Separation:** Information provided through information technologies has begun to be used since the late 1960s and in the 1970s; after that, a short-term separation occurred between information technologies and accounting. In the 1980s, fear and problems began to emerge regarding the reliability of the information. For this reason, the aforementioned period was expressed as the “separation”.
- **Period 3 - Dating and Marriage:** Starting from the late 1980s; business enterprises have begun to develop and apply information technologies in order to support the simultaneous management of providing information and operating activities functions of information technologies. Thus, the period of “dating and marriage” which represents a coexistence emerged with information technologies has begun.

Information technology which makes it possible to obtain the information generated by accounting faster and more accurate has affected financial accounting, management accounting, taxation and auditing process and applications or all aspects of accounting in other words. This interaction is shown in Figure 1 (Simkin et al., 2012, p. 14):

Changes In Financial Accounting

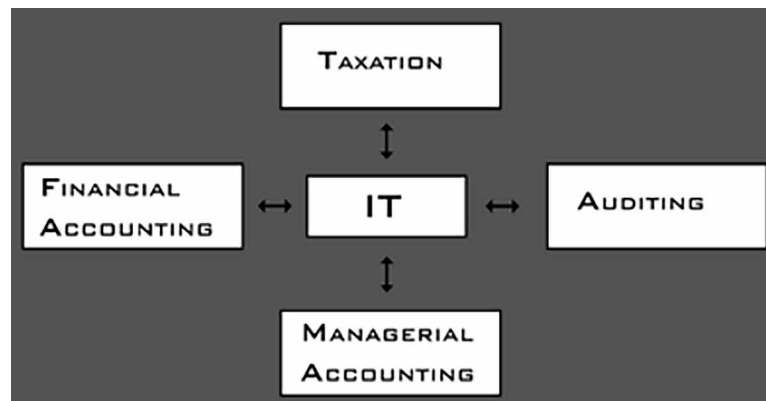
Technology transforms production process and almost everything from the customer to the supplier.

Information technologies which have been renewed fast and continuously since 2000s as well as Industry 4.0 have made it compulsory for accounting to apply information technologies.

The necessity of Industry 4.0 applications with respect to accounting can be summarized as follows (Kablan, 2018, p. 1567):

1. Accountants cannot allocate sufficient time to the production, sales and other cycles of the business with its traditional function.

Figure 1. IT and accounting



2. They cannot find sufficient time to review the activities of the company in detail except for dealing with the completion of transactions arising from legal obligations such as tax declaration in time.
3. A member of the accounting profession cannot participate in the system at the stage of managerial decisions due to preparing the declarations.
4. Since the recording function of the accounting will be planned and executed through the smart softwares with the changes of business enterprises in conjunction with Industry 4.0 and the concept of smart factories-smart systems, members of the accounting profession will be able to focus on strategic and managerial decisions.
5. Industry 4.0 is a process that will significantly affect the functions of members of the accounting profession, financial analysts, investment auditors, credit auditors, financial auditors, professional investors and consultants.
6. Business enterprises are moving away from paper and pencil period and adapting to the developments such as recording the transactions carried out through the Internet in integrated online systems and preparing the accounting documents within the electronic environment. This process is defined as the e-accounting. Electronic applications such as e-document, e-invoice, e-signature, e-declaration are the series of these solutions (Hacırüstemoğlu 2009, p. 24). One of the elements of this series of solutions is the e-archive. E-archive is the process of saving the invoices (e-invoices) which are prepared within the electronic environment again within the same electronic environment.

Another element is e-book, i.e. electronic book. It is the process of preserving and presenting the journal and ledger in the electronic environment which should be kept on paper. All other elements were created with the same logic. This set of solutions has led to the creation of virtual enterprises (e-business) as a whole.

E-business or e-commerce is the process of executing an economic activity with the use of information technologies and internet without the necessity of coming together with the suppliers, producers, distributors and consumers in a physical environment. The formation of e-business processes has become a communication tool for the exchange of accounting and financial information. Accounting and finance functions that support the sales and distribution of products and services began to be executed through the internet. Therefore, accounting and financing processes and workflows have been redesigned by

using computer networks and digital information and digital accounting applications began to be used within this environment (Kılıç & Anadolu, 2018).

Another expected effect of the change in technology in terms of accounting is that the “making provision” system in accounting will change as well. For example, the operation of the “doubtful receivables” account will change in the near future; thus, doubtful receivables will be automatically followed without going into the “execution and bankruptcy” stage.

FIFO, LIFO, and average cost methods make inventory tracking bearing the high costs in order to calculate the cost of inventories in the simplest way through inventory. Radio frequency identification technology (RFID) which is a new technology reduces these costs. (Krahl & Titera, 2015). This method also allows real-time stock tracking by making valuation method of inventory outdated. But is this technology suitable for keeping track of the actual stock quantity of each product? For example, is this application suitable for a gas station? Is it possible to calculate the period-end stock amount of gasoline bought at different prices and amounts by this method? Should the stock tracking with the traditional system not be completely ignored? Or should the future accounting system be used in combination with the traditional system? Encountering with these questions during this transition process is the natural result of the adaptation.

Rapid technological changes may also shorten the amortization periods and enable amortization with fair value. The weight of tangible fixed assets may decrease within the fixed assets.

Since communication can be possible between the machines as smart systems takes more effect by means of integration, instead of determining the amount of all products purchased separately, the opportunity to calculate all of them at one time can be provided. Monitoring sales and costs at the same time makes it possible to make instant profitability calculation even if there are price differences and profitability calculations can be made per basket (Can & Kıymaz, 2016). In the future, the documentation and reporting function of accounting will decrease and the valuation and analysis function will gain importance. The weekly, monthly, annual reports of accounting will be replaced by real-time reports. Technological developments arising from Industry 4.0 which expresses the integration of technologies such as information, communication, internet, automation, data collection and dissemination of data with new production opportunities, have changed and will continue to change the operation of accounting along with the duties and responsibilities of the accountants.

Changes In Cost And Management Accounting

While management accounting is the internal reporting method of accounting information through contributing to the decision-making and audit functions of the business enterprise, it also plays a role in the external reporting of the business enterprise. (Bushman & Smith, 2001, p. 317). Although there is a difference between the internal and external reporting system, there is a positive relationship between the management accounting information reported to the internal management and the financial accounting information reported to the external users (Akgün & Kılıç, 2013, p. 26). Accounting is meaningful with the combination of these two systems.

IT applications have changed the perspective of traditional management accounting. Management accounting has become more prominent for internal users and decision makers within the business enterprises. Today, new technologies support management accounting as well as financial accounting (Moorty et al., 2012, p. 9). User friendly financial and analytical softwares and availability of technological tools such as e-mail, Internet, Intranet and as well as intense business competition may cause challenges for the

management accountant. In addition to information and production technologies, environmental trends cause changes in management accounting. (Zainuddin & Sulaiman, 2016). The changing management accounting will interact with environmental factors as well as economic and social factors.

One of the positive effects of the changes in digital technology on cost and management accounting applications is that transactions are carried out in electronic environment and they make significant contributions to the business in terms of time and cost management (Akdoğan, 2018). In order to achieve it, accounting systems to have complete management accounting module incorporated, which include budgeting system, investment-planning system, standard costing system and stock control system packaged in one (Moorty et al., 2012, p.9).

In the near future, management accountants will benefit from big data as direct users of the accounting information. In addition, with the integrated use of other information technology tools and rapid production, different and customized production can be made with flexible production.

Although activity-based costing technique is a technique which was developed in 90s, its usage has become more widespread since it enables computerized systems to monitor costs. In addition, these systems can lead a business to new strategic directions, enable company managers to examine basic business processes and reconfigure their way of doing business. Activity-based costing systems can also play a strategic role in establishing a successful e-commerce business and maintaining its operations. This is because managers can easily answer questions about production costs. They can also help system managers to allocate resources more effectively. (Simkin et al., 2012, p. 18). As it can be seen, usability of the current costing technics can be released by means of electronic applications. Insufficient or criticized aspects of these technics can be eliminated.

Changes in Auditing

Auditing which can be defined as the social control mechanism that assures the responsibility of accountability is a warrant of the reliability of the information provided by the accounting (Ittonen, 2009, p. 20). In addition to accounting practices, technology also affects the operation and process of auditing. While increasing the quality of the audit, it reduces its costs.

The understanding of auditing as well as the duties and responsibilities of the auditor have been effective and will continue to be effective at every stage from the beginning of the auditing process to the completion of the process. Now, the traditional control approach is replaced by a continuous control approach. Continuous control can be considered as the control performed in the digital platform.

Developing technology will change many procedures in traditional auditing and control in the near future. For example, there will be no need for sampling method, real-time data can be accessed at any time thanks to big data and validations can be made through internet of the objects and sensors. In this way, “the reasonable assurance” understanding which is the acceptable guarantee limit for traditional auditing will be replaced by “absolute assurance” understanding. In addition, the financial information of the audited firm will be kept with cloud computing and this information can be accessed through a password at any time and the possibility of this information being lost and changed will be reduced.

Changes in Tax

The use of information technologies is not only limited to business enterprises. Due to factors such as globalization, information and rapidly growing communication technologies, increasing impact and

cost reduction, and increasing information sharing, electronic tax management practices have become widespread all over the world. An important part of tax revenues is collected electronically via e-tax payment (e-payment) (Güney, 2014). The application will provide the registration of the informal economy.

The main purpose of the transition to the electronic environment in terms of accounting is to establish the appropriate infrastructure for international remote control and provide voluntary adaptation to tax within the process of compliance with international standards (Sençiçek, 2013). Voluntary compliance with taxation is a result of information technologies.

Declarations which are prepared within the electronic environment (e-declaration) are used as tools in digitalization applications for raising awareness regarding tax and voluntarily compliance with tax. The advantages of the e-declaration system are as follows (DBS, 2018):

- Recording the tax and commercial transactions from anywhere in the internet without the necessity of an accounting program.
- Reducing paperwork.
- Not needing the book certification.
- Reducing bureaucratic procedures and compliance costs regarding the liabilities as documents such as invoices and receipts can be prepared electronically and there is no need to make any expenses to maintain books.
- Effective prevention of informal economy.
- Increasing voluntary compliance levels related to tax.
- Making the transactions related to tax in the electronic environment will lead to electronic audit in the near future.

DIGITALIZATION AND DIGITAL ACCOUNTING

Digital/digitalization words are frequently used in every aspect of life. Because of their connection to information technology, they can be used interchangeably in everyday life.

Digital, which is a word, used in contrast to ‘analogue’ means ‘activities conducted on computers’ while the word “analogue” refers to “activities conducted without computers” (Fischer, 2011). Today, almost all business transactions are conducted by using computers or in the digital environment in other words.

As a result of the introduction of digital technologies, the issue of digitization has gone beyond tools such as computers which are considered conventional now and transformed into the common use of online, interactive, fast, reliable, easy and accessible platforms that are connected to each other from multi-point, easy to learn and have sensory features (Erdoğan, 2017, p. 747). This transformation has also greatly affected enterprises.

Digitalization also appears as a concept that triggers a “radical transformation of the production environment” (Kagermann, 2015). Digitalization is not only a technological innovation, but also a different philosophy that directs the work and processes of companies (Mancini, 2017). Because all kinds of processes and transactions carried out by means of computers lead to analysis, archiving and storing of data under the name of digitalization. This affects the structure and working environment of companies. This interaction is also reflected in accounting which is one of the business functions and reveals the concept of digital accounting.

Although there is no standard definition of digital accounting, it refers to changes in accounting due to computer and network technologies (Deshmukh, 2006, p. 1). This change makes accounting dynamic.

Digital accounting involves both the submission of accounting information in electronic format and its manipulation and transmission in the same way. It is related to all accounting cycles, processes and transactions in a business using financial accounting information (Genete & Tugui, 2008).

When the question asked by Kasparov “what kind of a game emerges when the forces of the human beings and the machine are combined?” is adapted as “what kind of a scene do we get when forces of accountant and the computers?”, the answer will be “digital accounting”. The key to the digital transformation of accounting and finance is to match people and machines to each other to make them contribute to the areas in which they are most useful (Marr, 2018). This transformation will mean increased productivity.

In this respect, the definition of accounting can also be updated. According to this, ‘accounting is a science that records the events creating economic value that can be expressed with money occurring in real and digital environment on a full-time basis in digital environment and provides possible algorithms which are classified by smart machines, summarized, analysed and interpreted through the internet of objects to help users to make decisions (Erturan, 2018). Although digital accounting practices seem to be an alternative to traditional accounting practices, they are in fact an evolutionary follower of one another.

The first thing that accountants need to do in the digital world is to recognize technological trends to determine what changes are affecting their profession. These trends are classified into three groups as “data”, “interaction” and “financial technologies”. The awareness of the accountants related to this matter plays an important role while determining which one to prioritize. These trends based on this classification are explained briefly below (ICAEW 2015, p.5-6):

1. **Data:** Accounting is traditional the recording, classification and interpretation of the financially qualified data which can be expressed with money. Changing technology determines where to get this data. For example, big data, use of artificial intelligence techniques, cyber security services, data standards (Table 1):
2. **Interaction:** Accountants interact with many other parties both internally and externally, such as auditors, filing authorities, investors, standard setters and customers. Changing trends also change the way people interact with each other. For example, storing data in the cloud instead of a computer makes it easier to share data with other users. These trends can be classified as cloud computing, mobile technologies, online services, social media (Table 2):
3. **Financial Technology:** Accountants are primarily related to financial resources and financial technologies can have a significant impact on the way they access, transfer and manage these financial resources. Digital currencies such as Bitcoin and digital book systems such as blockchain can be given as the examples of these technologies. These technologies and their features are presented in Table 3:

Digital accounting is the result of technological developments as well as the adaptation of international standards in this field. Digital accounting relates to all accounting cycles, processes and functions in a

Table 1. Trends related to data

Trend	What is It?
Big data and analytics	It is storing and processing large amount of data which is obtained from a number of sources (unstructured data coming from non-physical objects when they are connected to the Internet, open data and internet of things) and combining them with other data to obtain new information. Insight typically comes from the use of analytical tools and techniques that focus on identifying correlations, outliers and exceptions and also the creation of prediction models.
Automation	Using artificial intelligence techniques to perform a wide variety of tasks which were previously performed by humans such as automated tools, automated customer services and e-discovery in legal situations.
Cyber security	It is the protection of the confidentiality, integrity and availability of information with extending the traditional security practices. Cyber security reflects wider risks caused by complex attackers.
Data standards	Electronic labelling of elements based on standard definitions, providing easier comparison, data analysis and more data flow automation. The XBRL which is the data standard for financial reporting is an example of this.

Source: (ICAEW 2015, p.5)

Table 2. Trends related to interaction

Trend	What is It?
Cloud computing	It is a service model that is accessed over the internet and maximizes efficiency by sharing resources between different users instead of making infrastructure expenditures related to information technologies. It is not standard and there are different cloud models.
Mobile	Using mobile technology such as smartphones and tablets, to access internet-based services at any time and place. It also includes improving the video and conferencing capabilities which provides flexible working and new ways of communicating.
Online services	Providing services through internet by reducing face-to-face communication or communication on the telephone and minimizing the use of paper-based transactions as much as possible.
Social media	Providing connection between the users through internet-based applications. It allows users to connect, share information and richer content and follow each other's activities.

Source: (ICAEW 2015, p.5)

Table 3. Trends related to financial technology

Trend	What is It?
Cryptocurrencies and distributed ledger systems	Bitcoin which is a digital currency and systems such as blockchain which is an accounting application which takes this currency as the basis. These systems work without the need for a centralized authority, their transactions are recorded in public records through cryptology and verified.
Payment systems and mobile money	Various innovations that make money transfer possible using the digital infrastructure. Online payments, mobile money and digital wallets are among these innovations.
Platforms	They are platforms that link financial service providers and users such as trading platforms, personal wealth platforms.
Analytics-based financial services	There are various innovations in financial services. These innovations are based on new data and analytical capabilities. Credit references, capital markets and insurance services are among these innovations.

Source: (ICAEW 2015, p.5)

business enterprise. The conversion of accounting processes from traditional to digital involves not only a rigorous analysis of costs, but also the inclusion of costs that are difficult to predict or measure (Genete & Tugui, 2008, p. 59). Therefore, digital accounting emerges as a more realistic operating language.

Some obstacles may be encountered in the transition to digital accounting, which can be summarized as follows (ICAEW 2015, p.5-6):

1. Existing digital infrastructure can cause problems even in developed economies. It can have weak band connections in large geographic areas and severely limit cloud-based activities. In less developed economies, bringing all-in-one technology together and move directly to cloud-based and mobile services can create tremendous opportunities. However, a basic link is still tried to be acquired in many areas.
2. Another specific challenge of accounting is the complex eco-system of stakeholders including investors, regulators, standard setters, auditors and others. Big changes may require actions throughout this ecosystem but it may be difficult to get all the right incentives to perform multiple actions.
3. Wide eco-system can make it difficult to achieve technology-oriented change. Individual enthusiasm and actions may not be sufficient to guide change and widespread acceptance can only be achieved through coercion.

ADVANTAGES OF DIGITAL TECHNOLOGY WITH RESPECT TO ACCOUNTING

Reducing the time which is required for presenting financial information and obtaining accurate and efficient information at the same time thanks to IT (Ghasemi, 2011, p.113) is one of the main advantages of information technologies.

The increasing developments in statistical software and the increasing power of computer hardware provide smarter predictions about the value and possibility of the future events. It provides advanced analytical and large amounts of data storage when requested thanks to the convenience of computing power and remote accessible servers which is usable everywhere such as mobile smart phones and tablets computers (Kraheil & Titera, 2015). In this way, accounting can evaluate this data according to its needs. For example, the accounting data is automatically entered into the system with cloud accounting and remote access can be provided. Legislative changes can be followed from the system and the declarations can be filled automatically. Business managers are able to access the system whenever they want (Aytekin et al., 2016, p. 10).

The benefits of digital accounting practices can be listed as follows in general terms: (Sevim, 2009, p. 36-41), (Deshmukh, 2006, 10), (Kılıç & Anadolu, 2018, p.65), (Genete & Tugui, 2008, p. 59), (Trigo et al., 2014, 123):

1. Wider geographic access. Continuity of service and 24/7 access
2. Decrease in error rate (less incorrect operation).
3. Use of electronic accounting.
4. Real-time access for users. Accessibility to required documents from other computers
5. Better cash management, efficiency and productivity in payments and collections.
6. Effective and productive cash management.
7. Sending bank transactions to online accounting automatically.

8. Cost saving through the elimination of paper documents.
9. Reduced pre-accounting procedures.
10. Developing audit methods and increasing reliability.
11. Increased effectiveness in internal control and supervision.
12. Decrease in the number of accounting personnel and increased productivity.
13. Elimination of physical office structure.
14. Continuity of work in case of holiday, sick leave and absenteeism of personnel.
15. Reduced routine accounting works and time allocation to high-level analysis.
16. Saving time for the accountant to advise the tax payer.

Although accounting is still in a transition period, the increase in the weight of information technologies in the system increases the quality of accounting practices.

BENEFITS/ COSTS OF DIGITAL ACCOUNTING

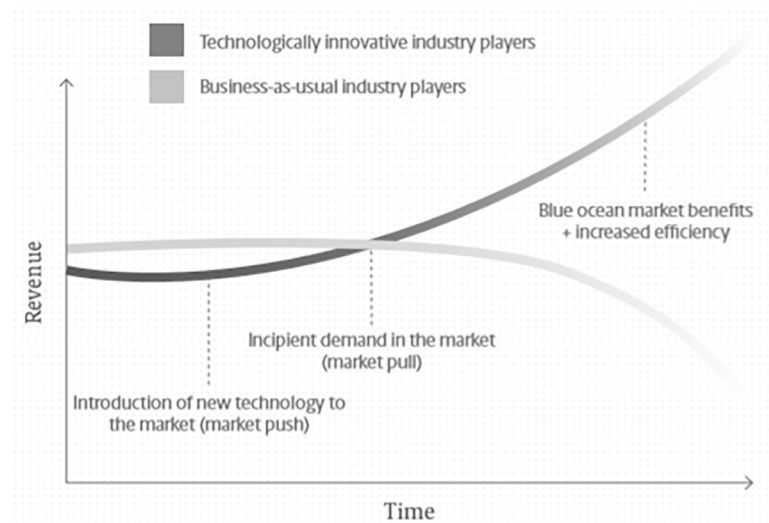
The economic success of a business depends on its information and successful use of this information. In particular, the information which is only used by the business enterprise itself and cannot be copied by the competitors provides a sustainable competitive advantage to the business enterprise. Communication opportunities today have facilitated the circulation of information learned in a business enterprise among other users, businesses and even different geographies. Extending this information to other applications also provides a sustainable competitive advantage to the enterprise (Hacırustemoğlu, 2009). Providing competitive advantage is a requirement for all sectors.

Transformation in the information society occurred as a result of global developments brought the concept of “digital society” into the forefront. Artificial intelligence dominated by robots was explained by Bill Gates with the idea of “digital nerve”: “In order to carry out activities in the digital age, it is necessary to create a new digital infrastructure. This infrastructure is a “digital nervous system” which is similar to the nervous system of humans. The digital nervous system consists of digital processes that enable a company to perceive its surroundings and react to it, determine the dangers caused by competitors and needs of the customers and take the necessary decisions when needed. The digital nervous system which requires both hardware and software enables companies to conduct business smoothly and trouble-free, respond to emergencies and opportunities without losing time and provide transfer of the necessary information in a timely manner to those who need it (Türker, 2018). It is clear that competition will not be a problem for businesses enterprises that have this understanding. This understanding is also required for the accounting profession which is in the process of adaptation to digital transformation.

The costs and benefits of digital accounting decisions are closely related to the targeted accounting processes, the information technology used and the information needs for the proposed solution; therefore, each decision is unique” (Deshmukh, 2006). In an environment in which digital practices are constantly changing, even though the awareness and response of the accountant/accounting to towards changes vary from accountant to accountant, it generally arises from the obligation. This obligation may be a legal obligation as well as competition-based obligation.

In any case, there will be a cost for this transformation. Although it does not seem to offer financial benefits due to initial investments in the comprehensive digital transformation of accountants, those who are ready for technology will increase their revenue over time and the others will experience a downward

Figure 2. Blue ocean strategy



curve. This can be illustrated with a graphic shown in Figure 4. When the figure is examined, it is seen that the incomes of business enterprises using traditional systems decrease in time while the income of business enterprises investing in technology increase gradually which brought a benefit and an increased productivity as a result. This increase is called as the “blue ocean strategy” (FSR, 2018, p. 82).

The expression of the blue ocean refers to the industries which have not emerged yet; that is, the markets which have not been discovered yet because of competition. There are wide range of opportunities for both profitable and rapid growth in the blue oceans which find new demands instead of fighting against competitors. Companies that follow the blue ocean strategy are interested in opening up new business areas for themselves and their customers with actions that make competition meaningless instead of taking part in defensive moves against competitors (Ağraş et al., 2017, 128).

All small or big businesses need more data analysis support, consulting services and full service solutions than their accountants. This will help accountants develop their skills to meet the needs of their customers. SMEs are not large-scale buyers of consulting services and for the time being, accountants can adopt the “blue ocean strategy” as long as there is a desire and enthusiasm for business and use endless opportunities to increase it (FSR, 2018, p.16)

According to the “blue ocean strategy” which is a business strategy, companies can increase their service standard higher than the average and provide more opportunities than competing firms. According to the strategy, differences can arise from the use or replacement of existing technologies in a particular area. It is thought that technological advances will lead to an increase in productivity and an opportunity to offer more products and services to the market compared to the past (Ağraş et al., 2017, p.128). It is also possible for accountants to increase their service standards and productivity by following technological developments. Therefore, the cost of new technologies will affect the quality of the work carried out by the accountants.

As it can be seen, in this global environment where it is not possible to be indifferent to information technologies, a number of models have been developed related to determining the cost of having these technologies. One of these models is the total cost of ownership (TCO- Total Cost of Ownership). The

model is intended to determine how much infrastructure expenditure will occur to have the necessary information technology. According to the model, the actual cost of owning new technologies includes hardware, software and installation costs in addition to ongoing costs such as training, hardware and software updating and maintenance costs. The total cost of ownership (TCO) model can be used to analyze these direct and indirect costs to help firms determine the actual cost of specific technology implementations. (Laudon and Laudon 2014, p.227). Costs incurred in digital accounting practices include predictable and unpredictable elements. Costs can vary from one business to another depending on the infrastructure of the organization, applications and activities. Some of these costs can be listed as follows (Genete & Tugui, 2008, p.59):

- Investments in hardware and software resources;
- Costs required for redesigning the processes;
- Personnel trainings and guidance requested from experts outside the company;
- Costs generated by extra safety measures;
- -Unexpected costs due to application failure or human errors.

If this model is applied to the accounting area, accountants should take all these costs into account when adopting and using new technology, but they should not ignore the competitive advantage of having this technology in the medium and long term. In terms of competitive advantage, technological approval can be given even if the initial investment is high considering the blue ocean strategy.

THREATS TO DIGITAL TECHNOLOGY

While all kinds of technologies which are developed provide a lot of convenience and opportunity for people, it also brings a number of risks and threats. For example, while using cloud computing to reduce the cost of data storage is a great opportunity; unauthorized access to this information stored in the cloud is risk. It is simply because while today's technology makes it easier to access data, it also makes it more difficult to store data.

The process of technological transformation led to the change in risk perception in a way that it includes information technology risks as well. It is necessary to evaluate the risks arising from information technologies such as systematization of individual errors, failure of identifying the person conducting the transactions, changing the data by unauthorized persons, data loss and disclosure of confidential or personal information and effects of these risks should be correctly analysed (Kayrak, 2012). Virus attack, hacking, access to data by unauthorized persons, fraud in the digital environment (Tarek et al, 2016, p.240) are some elements of these risks and threats. The first thing to do is to control the information technologies that businesses use to find security vulnerabilities and to ensure data security.

Businesses must protect not only their own information assets but also those of customers, employees, and business partners (Laudon & Laudon, 2014, 338). Otherwise, unsuitable data storage will give rise to ethical problems.

Information systems are used to generate, store, and transport such data, the legislation requires firms to consider information systems security and other controls required to ensure the integrity, confidentiality, and accuracy of their data. Each system application that deals with critical financial reporting data requires controls to make sure the data are accurate. Controls to secure the corporate network, prevent

unauthorized access to systems and data, and ensure data integrity and availability in the event of disaster or other disruption of service are essential as well (Laudon & Laudon, 2014, 339). Information technologies and risks should be at the centre of every business regardless of the size of the business enterprise. (Türker, 2018).

The use of IT, new methods of corruption, violation of rights, irregularities and crime definitions has created new control requirements. In developed countries, legislative regulations having various levels of sanctions have been introduced related to subjects such as personal data protection, corporate data security, e-commerce, copyrights, IT control environment, cyber-crimes and internet access. (Kayrak, 2012). The fact that countries have different legal regulations regarding data privacy and control may cause problems for service providers while fulfilling the services such as cloud computing to comply with different legal regulations (Aytekin et al, 2016, p.58). Therefore, global solutions and standards should be established. As the conditions change, these standards should be updated if necessary.

ZEROth LAW AND ACCOUNTING ENGINEERING

The widespread use of digital technologies and their impact on business enterprises change the future accounting practices and the competencies expected from professional accountants (ACCA, 2016).

Future accountants who will spend a major part of their time advising customers about the data infrastructure and analytical setup should be competent in matters such as computer science and computer engineering etc. accordingly and they should have the ability to read large data volumes for the company management (FSR, 2018, p.61).

As it can be seen, a great transformation is expected in the accounting profession.

A transition to accounting engineering will take place with this transformation of the accounting system (Kablan, 2018, p. 1568). Accounting engineering is a model suggestion in this transformation.

Before moving to the concept of “accounting engineering”, it would be appropriate to mention the study called “Zeroth Law” which was conducted by Melih Erdoğan in 2017. In his study, Erdoğan stated that the final point of technological developments that shape and change our world is robotics and in line with these developments, it is necessary to discuss the future of accounting profession and accounting education. He expressed that management knowledge system has transformed into management information system and has interlaced with artificial intelligence studies and robotics and three propositions could be made for adaptation to this new situation. In the first proposition depending on the “the zeroth law” of Asimov, “manager robot” has been defined. In the second proposition, Asimov’s three laws of robotics have been adapted to manager robot and integrated with educational model. In the third proposition, an educational model that provides the formation of “Accounting Engineering” has been proposed.

The manager robot mentioned in the first proposition has been defined as “a technological structure which is designed to make all business processes efficient and reliable with flexible softwares and sophisticated according to the ability to take operational decisions at different levels through providing autonomy with data exchange from the environment as well as the ability to learn and apply them” (Erdoğan, 2017, p.755).

The second proposition was inspired by Asimov’s three laws of robotics. These three laws are 1.A robot may not injure a human being or, through inaction, allow a human being to come to harm. 2.A robot must obey orders given it by human beings except where such orders would conflict with the First Law. 3.A robot must protect its own existence as long as such protection does not conflict with the First

or Second Law. These three laws can be adapted for the manager robot as follows: 1. A manager robot may not injure a business enterprise or, through inaction, allow a business enterprise to come to harm. 2. A manager robot must obey orders given it by human manager except where such orders would conflict with the First Law. 3. A manager robot must protect its own existence as long as such protection does not conflict with the First or Second Law (Erdoğan, 2017, p.755).

This adaptation must have at least the following components for each law: 1. Management information system at full software-level, the basic concepts and principles of accounting at software level, general controls, application controls, profit modelling, contracts, security software. 2. Decision support systems 3. Decision support systems and security softwares. This structure can also be taken as the basis for determining the educational approach. However, this new situation should not be considered to be solved by conventional educational approaches. The educational approach model that will be taken as the basis should deal with events and facts in an interdisciplinary format and it should include elements such as scenario, fiction, case study and design. Components of the implementation should be used for both forming and benefiting (Erdoğan, 2017, p.756).

Erdogan's third proposition is "accounting engineering". Accounting engineering can be considered as a proposal related to the adaptation of accounting to these developments. The starting point of this proposal is the fact that it is no longer possible to apply accounting without technology and accountants should approach this technological adaptation with the logic of an engineer. This proposition will be examined under another title.

Digital accounting includes much more than an effort to use a digital system (Tekbaş, 2019, p.124) because digital accountants of the future should have knowledge of finance, technology and accounting in addition to being a digital user. They should also be able to make interpretation and analysis, solve problems with creativity, intervene in accounting information system in chaotic situations, make changes on the system if necessary and have the other necessary skills by specializing in managerial and technical fields. These features that an accountant must have are very similar to the engineering profession.

Engineering in general terms is to identify, analyse, solve the problems and report them which refers to the expression of the situation in written and verbal form. When we look at the generally accepted definition of accounting, we see the same processes. Both sciences consist of input-process-output steps (Yükçü & Atagan, 2010, p.22). In other words, the scope of work in both occupational groups is about building a system.

Engineering is a profession that emerges with the need to provide solutions to a problem. In order to meet the needs of the people, the engineers who try to find the ideal solution among the multiple solutions offered are experts in their fields. Although engineering is considered as a technical field, it also has a social aspect. Today, a wide range of engineering fields has been developed such as electrical engineering, computer engineering, mechanical engineering as well as food engineering, marketing engineering, medical engineering, management engineering, Research and Development engineering, social engineering and risk engineering. From this variety, it can be concluded that the engineering profession does not have a limit. Accounting engineering has recently been mentioned as one of the engineering types that can be added to this list.

It is a multidisciplinary field that includes accounting engineering, engineering methods, mathematical tools and programming practice (Tekbaş, 2018). According to the definition;

1. Accounting engineering is different from software engineering which makes new software and updates the existing ones.

2. It is a different area than the computer systems manager and computer programmer who manage technological processes such as creating and installing systems.

It is because the social responsibility aspect of accounting from past to present day has turned accounting engineering into a multidisciplinary field rather than being only engineering methods and mathematical discipline.

For example, it is a fact that environmental problems are increasing day by day in the world. These problems affect not only one or a few countries but the whole world. Business enterprises should be aware of these problems while adapting to technology. The accountant of the future should include environmental accounting in accounting information systems taking into account environmental costs and revenues. In this direction, accounting engineers should organize accounting information by supporting it with the engineer logic through vision and accumulation of knowledge by taking not only financial information but also non-financial information into consideration. Moreover, the philosophy of accounting should not be ignored.

Tekbaş (2018) defines accounting engineers as individuals are experts in their field and integrate their theoretical and practical knowledge with philosophy, mathematics and other disciplines in parallel with technological developments.

According to the International Federations of Accounts (IFAC, 2017), the qualifications of the accounting profession in general may consist of three qualifications (Karasioğlu et al, 2017):

- The first one is the “professional knowledge” competence formed by the vocational courses that will provide professional competences.
- The second one is “personal knowledge” competence formed by courses which will provide the candidates of this profession with the abilities to communicate with other people or a group of people such as communication ability, planning, managing, organizing and team work.
- The third and last information quality is the “analytical knowledge” competence formed by the courses which will provide the candidates of this profession with analysis skills such as problem solving and establishing cause-effect relationship.

It will not be sufficient for the future accountant to have only strong analytical skills as they also need to have awareness and strong communication skills. These changes will also affect the education required for new roles of future accountants (Wessels, 2004, p. 223). The concept of accounting engineering is a concept which has been developed to meet this need. Therefore, the education of the future accountants should be structured accordingly.

“Today’s methods, programs and practices are no longer sufficient for an accounting education that can handle all aspects of the changing world not only due to the technology. It is inevitable that the departments of Accounting Engineering should be opened at universities and the education should be dealt with a new and contemporary approach. Accounting Engineering education should have an approach that increases the desire of the students to learn and develops their adaptation and learning skills through cooperation and it should have an aim to create students who are investigative, questioning and analytical (Erdoğan, 2017, 757). In this respect, it has been suggested that the graduation of the students from the accounting department with the basic accounting qualifications are not sufficient for the digital transformation and accounting engineering departments should be opened at undergraduate and graduate levels at universities for the ideal solution (Tekbaş, 2018).

Yükçü & Ataçan (2017) stated that accounting engineering activities should consist of process management, system management, computer program software, management of budgeting processes, management of quality cost information, management of costs in the process of change engineering, eliminating non-value adding business activities, etc. and the concept of accounting engineering should be included in the literature now.

The dynamic structure of information technologies has significantly changed and will continue to change the functioning of the accounting profession. For example, the use of virtual currencies such as Bitcoin and virtual ledgers such as blockchain make accounting more dynamic. Accounting is now kept in a paperless environment as digital accounting records. In the near future, the use of artificial intelligence and robotic systems in accounting will necessitate the transition from accounting to auditing. The accounting researcher of the future should do his researches in this direction.

CONCLUSION

Digital accounting practices have emerged with the transfer of financial and non-financial data to a different platform through benefitting from the industry 4.0 tools. Digital accounting has enabled the computers to do the recording function instead of humans, which is the starting point of traditional accounting. This function is important because it initiates the flow of accounting and demanding because it involves too many processes and takes time. Therefore, digitalization has lifted the heavy burden of accounting and brought the interpretation and analysis function into the forefront.

Digitalization brings digital awareness with it. It is no longer enough that the accountants are only digital users. In addition to accounting and finance information, they must have technical knowledge and skills in information technology and have the foresight to follow technological developments simultaneously. In the light of these expectations, the concept of accounting engineering has been developed as a model proposal.

Accounting engineering is based on the principle of handling accounting with an engineering perspective. Its aim is to prevent accounting profession from disappearing completely within the technology world of the future and move accounting to an interdisciplinary platform. In line with these expectations, it is recommended to revise accounting education and to open future-oriented, technology-based accounting engineering departments at undergraduate and graduate level.

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KEY TERMS AND DEFINITIONS

Accounting 4.0: Adaptation of the Industry 4.0 to the historical development of accounting.

Accounting Engineering: A solution which offers that accounting and engineering professions should be considered together for updating the accounting profession based on the developments in information technologies.

Blue Ocean Strategy: It is a process in which businesses pursue the innovations and differentiate from their competitors so that they can gain value.

Digital Accounting: It is conducting all accounting transactions in electronic environment instead of using papers.

E-Accounting: Electronic accounting. Application of accounting on the internet.

Total Cost of Ownership (TCO): It is one of the methods used for calculating the cost of information technologies. It consists of updating, maintenance and technical support costs in addition to purchase cost.

Zeroth Law: Adapting of Isaac Asimov's "three laws of robotics" to "manager robots" and integrating them with educational model as robots have started to do all kinds of work that people do every day.

Chapter 16

The Control of Transfer Pricing of Corporations by Blockchain Technology: Challenges and Solutions

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ABSTRACT

The globalization movements that had emerged in the last century have not only influenced the world's social, political, and cultural structure, but also have influenced its economic structure as well. The globalization of the world economy makes locations and economic units between countries or regions interdependent on one another. The primary driving forces of this process include technological change and multinational enterprises. Thus, intercompany transactions are important for multinational enterprises. In recent years, discussions regarding the applicability of blockchain technology, or more commonly referred to as crypto coins, for the public sector have emerged. This study therefore attempts to explain the applicability of blockchain technology in relation to transfer pricing, and it clarifies (1) how blockchain technology represents a new approach to transfer pricing, (2) how blockchain technology reduces transfer pricing evasion, and (3) how blockchain technology increases both transparency and accountability.

INTRODUCTION

Globalization has led to the concentration of economic activity of multinational corporations. These development has let multinational corporations to shift their profits across borders to reduce their tax bills. In other words, this development has made it more challenging for governments to raise revenue from corporate income tax. In recent years, policy-makers have become increasingly concerned about this issue as the extent of profit shifting has intensified. Multinational corporations use different instruments to shift their profits. One of the most important key instruments for these corporations is transfer

DOI: 10.4018/978-1-7998-1125-1.ch016

pricing. Multinational corporations manipulate transfer prices they charge on transactions between related parties within their groups. Multinational corporations, to reduce pre-tax profits, can charge a lower price while selling to a related party in a low-tax country. Tax-motivated transfer mispricing can take place in trade in goods as well as in services, and in particular in the form of royalty and licensing payments on intellectual property rights held abroad. For this reason, tax authorities worldwide started to search for new way to control transfer mispricing of Multinational Enterprises (MNEs). Each country in its global network subject accounting, finance, transfer pricing. The cross-border intercompany transactions of MNEs are complex. For this reason, these transactions are subject to various regulation, compliance and audit of Regulatory Authorities in each jurisdiction (IBM, 2018). The United Nations data shows that intra firm trade makes up %30 of global trade (Frankovski et al., 2017). MNEs has a certain amount of discretion in determining how to apportion expenses and returns to its subsidiaries in different countries. Transfer pricing, a price that applied when an entity transferring its assets and intangible assets to associated companies, has a positive meaning. However, if there is a significant difference between the price used in the commercial and financial transactions among the subsidies and the price to be decided among the independent entities which are parties to the same or similar transactions, such pricing will be named as “artificial transfer pricing”. In this context, the concept of transfer pricing becomes negative (Yaltı, 1996). Although transactions between intra-group companies in the same country only concern tax revenues of that country, the pricing of goods and services transfers on international level is closely concerns the national income and tax income of more than one country (Aktaş, 2003). Artificial transfer pricing, which refers to tax free profit shifting to a particular subject and/or to a certain geographical location through pricing, is a phenomenon that law is trying to prevent. For example, Turkish Corporate Tax law assumes that private law contracts where artificial transfer pricing applied in transactions between associated parties, are misused. The law also recognizes that such contracts are “disguising contracts” (Yaltı, 2007).

The rapid development of information and communication technologies (ICTs) that has taken place in recent decades has brought about new approaches in the field of public administration. Indeed, since the early 1980s, public administration has been increasingly influenced by ICTs. Certain concepts, such as accountability, transparency, effectiveness, and productivity, which the private sector was already familiar with, have also become important tools for the public sector. It is certainly true that the accession of reliable information has become increasingly important in recent times. Further, the development of ICTs has increased the number of digital public services (e-governments). In these days, a word called “blockchain” become a buzzword for researchers to bring solutions for many fields. Some researchers claim that blockchain is an emerging technology for business revolution. Although the technology is still in its early stages, many are excited about its potential to fundamentally transform business (Slemmer, 2018). Blockchain owes its reputation thanks to Bitcoin. But it is important to be aware that blockchain and Bitcoin are not same things. Blockchain is a system that Bitcoin transactions run on it. Blockchain technology has distributed ledgers as it is also known “Distributed Ledger Technology”. Unlike traditional ledgers, blockchain technology records cannot be altered secretly (Slemmer, 2018). The companies record their transactions by ledgers. These ledgers are secure, controllable and peer to peer oriented. Thus, once you record a transaction it is impossible to delete it. These features make easier to control and trace frauds.

The technology also has potential to enhance the reliability of transactional records. For this reason, some researchers claim that blockchain technology has a potential to reduce tax burden and to control transfer pricing transactions.

In this paper, we examine transfer pricing and the potential of blockchain technology to challenge with it. For this reason, the challenge between transfer pricing and tax authorities and advantages of blockchain technologies clarified. It is concluded that blockchain technology will make easier to follow transfer pricing transactions. Thus, the tax authorities will control transfer pricing with less challenge.

BACKGROUND

MNEs started to build inter-connected global supply chain with associated parties across many jurisdiction, transacting properties and services with one another (Zhang & Chopra, 2018). The size of inter-company transactional flow become larger within the context of globalization. For example, the global headquarters of General Motors is in Michigan, USA. However, it manufactures cars and trucks in 35 countries. The value of intercompany transactions between General Motors and its associated party was approximately \$143 billion for 2015 (Zhang & Chopra, 2018).

Transfer pricing has become even more important due to e-commerce that will be realized through online connections. For example, under the assumption that a global financial services company dealing with the trade of goods has an office that sells commodities in a country, an office of a buyer of this goods in another country, and an office in a third country, each of these office will gain a portion of profit from these transactions. But what will be the profit share of each office? The rules during these transactions led to the development of certain methods in transfer pricing. While there are many pricing methods determined by the OECD, none of them are better than the other to reach the appropriate price, and each one may be superior to the other depending on the nature of the transaction. OECD provides five transfer pricing methods (OECD, 2017). These are; comparable uncontrolled price method, resale price method, cost plus method, transactional net margin method, and transactional profit split method. Nearly all tax authorities accept these methods. However, in practice, transactional net margin method is the most used of all five transfer pricing methods.

Within the same group, a valid internal price (transfer price) is determined for products transferred from one center to another center with separate personalities. For example, if a multinational company headquartered in Japan sales TV parts that are produced by its associated company in China but set up by its associated company in USA, the prices used for the transition from China to USA will be transfer pricing. However, the company's showing transfer pricing artificially higher and declare less profit in China more than in USA due to higher tax rates in USA, and thus reducing the total tax burden would be the abuse of transfer pricing (Erdel & Okumus, 2002). It should be stressed that transfer pricing is not a statement of a tax evasion. Transfer pricing is a pricing system that occur between associated parties. It is unquestionable that the price determination for transfers between these companies is an economic requirement. The growth and mergers of the company, which spans the world like spider webs, have focused on this issue. The factor that led the tax authorities to pursue and investigate the issue is nothing but the use of this system for misleading purposes. Governments will suffer significant revenue losses if the price between companies is changed for tax evasion. Changing prices except economic necessity is accepted as tax evasion. that is, a violation of the tax laws of countries (Beylik, 2004). For this purpose, the taxation powers, indication of the sovereignty of both developed and developing countries in which the transfers are made, are subject to conflict while MNEs act for this purpose. In this case, sometimes, a MNE and a state's tax administration may face because of "tax inspection or two states may face because of double taxation.

Tax authorities intend to scrutinize transfer pricing of MNEs. For this reason, the associated party of MNEs should have a proper documentation, exercise proper controls in the whole process. The transactions and supporting documents can be traced end to end and the source and nature of each transaction can be accounted. Blockchain can help tax authorities to reduce transfer pricing complexity (PwC, 2017). It is easy to track the flow of transactions and identity of involved parties with distributed ledger technology (Frankovski et al., 2017). Blockchain offers a new possibility for agencies, including tax administrations, to share financial information by using a common technical platform (WU Net Team, 2017).

TRANSFER PRICING METHODOLOGY

Transfer pricing is defined as the pricing applied between related parties of an intercompany transaction (e.g. parent companies, divisions, branches, subsidiaries, sales of goods and services or other similar commercial transactions within the same business organization). The transfer pricing is mostly used to increase global profit after tax income. When related parties are required to transact with each other, a transfer price is used to determine the costs. Transfer prices directly affect the allocation of taxable income. Hence, the transfer pricing of companies can directly affect their after tax income to extend that rates differ across national jurisdictions. The companies mostly aim to reduce taxes on foreign trades, to receive more tax refund in export, to hide or reduce the tax deduction base, distributing head office expenses in a way to reduce tax burden and to reduce the tax burden indirectly by exceeding foreign trade and profit transfer restrictions. In tax literature transfer pricing is defined a way of concealed gain distribution. In other words, if entities purchase or sell goods or services at a price that they determine against arm's length principle with their related parties, earnings are deemed to be wholly or partially concealed gain distribution through transfer pricing. The arm's length principle is an internationally accepted standard adopted for transfer pricing between related parties. The principle requires that transfer prices between related parties are equivalent to prices that unrelated parties would have charged in the same or similar circumstances. Article 9 of the OECD Model Tax Convention is dedicated to Arm's Length Principle. The article 9 says that the transfer price between the corporate entities should be in such a way as if they were two different entities. The primary objective of concealed gain distribution through transfer pricing method is to prevent the loss of treasure. The main purpose of concealed gain transfer ban is the protection of shareholders' rights. Nevertheless, companies for the reasons mentioned above are trying to find new methods to get concealed gain through transfer pricing. For this reason, transfer pricing is an important issue between companies and tax authorities. The companies try to increase their global profit after tax income by concealed gain distribution methods through transfer pricing while tax authorities try to not let companies to apply a price against arm's length principle. According to United Nations data, intra firm trade makes up around 30% of global trade altogether. The laws regulating transfer pricing are different for each country, requiring that cross border transactions between related parties comply with arm's length price. Simply put, this price should mirror the proposed or applied price between non-related parties in an open market. The main purpose of transfer pricing is to maximize the total profit by minimizing global tax burden. Therefore, countries can renounce their tax revenues and lower their tax rates, allowing transfer pricing for attracting foreign direct investments. The definition of transfer pricing includes not only the departments of the same entity, but also the units that are associated with the financing units such as subsidiaries or affiliates, as well as the pricing applied in the provision of goods and services between the indirect units which are under the control and manage-

ment of income-expense and profit sharing. Besides international transfer pricing is a global tax issue, it has emerged together with globalization. Because the world has started to support MNEs which are the architects of the transfer pricing along with the globalization process.

The rapid advancement of Information and Communication Technologies has changed the service delivery structure both in public and private sector. The new technology advancement provides opportunities for both sides. Recently, there is a buzzword named Blockchain. The financial services industry has already begun using it to facilitate transactions, speed up trade settlement, cut out the need for intermediaries, and increase the traceability through transaction chains (PwC, 2017). It is stressed that, with its properties, Blockchain can help reduce transfer pricing complexity. In other words, the use of Blockchain technologies will help both companies and public sector to monitor transfer pricing transactions. Tax authorities try to maximize revenues for the states while companies try to maximize their profit. These two goals are clash with each other. For this reason, there are disputes between tax authorities and taxpayers. In other words, disputes between tax authorities and companies as taxpayers may arise in many areas. Also, increasing documentation requirements resulting from international developments and specific transfer pricing inspections based on risk analysis make it mandatory for companies to manage their transfer pricing policies strategically, in conformity with both the relevant legislation and their operational structures.

To summarize, transfer pricing is an arm's length charge between related parties such as a parent corporation and a controlled foreign corporation. For this reason, transfer pricing has a potential area of high-tax-compliance risk for multinational corporations and carries important implications for tax planning and financial reporting. Determining an arm's-length transfer price typically requires identifying where value is created and transferred; analyzing such factors as assets used, risks assumed, and functions of the respective parties; and correctly applying an appropriate economic method provided in Treasury regulations and other guidance. Transfer pricing issues often give rise to uncertain tax benefits. The transfer pricing force tax authorities to find new way to challenge with it. In recent years a new technology named Blockchain technology has become popular for many transactions.

Transfer Pricing Methods

MNEs and tax authorities can use several methods to determine accurate transfer pricing for transactions between related enterprises. In selecting a transfer pricing method, it is always intended to find the most appropriate method for a particular case. OECD proposes five main methods for transfer pricing. In this section we will explore these methods (OECD,2017).

Comparable Uncontrolled Price Method (CUP)

CUP method compares the price charged for property or services transferred in a controlled transaction to the price charged for property or services transferred in comparable uncontrolled transaction in comparable circumstances (OECD, 2017). The difference between these two prices will indicate that conditions of the commercial and financial relations of the related enterprises are not arm's length, which means the price in the uncontrolled transaction may need to be substituted for the price in the controlled transaction. For this method, one of two conditions should met (OECD, 2017); i) None of the differences /f any) between the transactions being compared, or between the enterprises undertaking those transactions could materially affect the price in open market ii) reasonably accurate adjustments can be

made to eliminate the materials effects of such differences. This method is the most direct and reliable to apply the arm's length principle in where it is possible to locate the uncontrolled transactions. In other words, in such cases, this method is preferable over all other methods mentioned below. In order for this method to be reliably applied to commodity transactions, the economically relevant characteristics of the controlled transaction and the uncontrolled transactions or the uncontrolled agreements represented by the quoted price need to be comparable.

In case the price of transactions with related parties is different from the prices in transactions with unrelated persons; Accepting that transactions between related parties are not in accordance with the arm's length principle, the price in transactions with unrelated parties shall be substituted for the price in transactions with related parties. The comparable uncontrolled price method will be applied where the properties or services and the conditions of the transaction are similar in the transactions between related parties and in transactions between unrelated parties. If there are small measurable differences between these processes, it is possible to apply the method by correcting these differences. However, it will not be possible to implement this method if the differences are big or the differences cannot be measured.

Resale Price Method

The application of the resale price method is started on the basis of a price applied if a product purchased from a related entity is resold an independent enterprise. This price (the resale price) is then reduced by an appropriate gross margin on this price (the "resale price margin") representing the amount out of which the reseller would seek to cover its selling, and other operation expenses and, in the light of the functions performed (taking into account assets used and risk assumed), make an appropriate profit (OECD, 2017: p.108). This method is based on a price applied when a product purchased from the related parties is resold to an unrelated natural person or legal entity. A reasonable gross sales profit will be deducted from this price (resale price). Reseller's sales, other operating expenses, risks and assets used shall be taken into consideration in calculation of reasonable gross sales profit. In other words, reasonable gross profit refers to the profit determined by an objective rate that can be applied immediately during relevant transactions and determined by taking into account the identified and undertaken functions and risks in accordance with market conditions. After deducting this profit, it will be reached to the arm's length price that should be applied to the sales of properties and services to related parties. This method, which can also be used for transactions in which different products are involved, provides reliable results especially in transactions where properties and services purchased associated company, in particular marketing and distribution activities, sold to unassociated companies. In the implementation of this method, the process under control must be comparable with uncontrolled process. For example, research and development expenditures can be shown in operating costs or in the cost of sales. However, it will be possible to compare these two transactions if in one transaction relevant expenses shown in operating expenses while in other transactions relevant expenses shown in cost of sales and correction is made for both transactions. On the other hand, in cases where this method is applied, the person or organization that resells properties and services usually does not make any value-added contribution to the goods bought for sale, and does not physically change the structure of the product. In this context, packaging, labeling and small-scale installations will not be considered as value-adding additive or physical change. However, it would not be possible to use this method since it would be difficult to find an arm's length price when the product lost its first feature due to the fact that too much value was added

or combined with another product before it was resold. The method is probably most useful where it is applied to marketing operations.

Cost Plus Method

It begins with the costs incurred by the supplier of property (or services) in a controlled transaction for property transferred or services provided to an associated purchaser (OECD, 2017; p. 111). The gross profit margin applied by taxpayer in the transactions made with the unrelated parties related to these properties or services will be used as profit margin to be added to the cost. Direct and indirect expenses for the production of properties and services shall be taken into account in determining the costs of companies. On the other hand, where operating expenses are required to be included when determining costs, these expenses should be taken into account in calculating the gross profit margin. In this context, it is certain that operating expenses in cost elements, proved that they are related to respective transaction, will be associated with costs according to the most appropriate criteria. Therefore, the calculation of the gross profit margin requires that the cost base be the same both in controlled and uncontrolled transactions. In other words, since more or less cost base will not affect gross profit margin, costs should be the same both in controlled and uncontrolled transactions. In the comparison of an uncontrolled process with a controlled process to apply the cost-plus method; if there are differences, the corrections should be made by taking into account the differences between the risks undertaken by the parties and differences between costs to eliminate the material effects of these differences. In addition, if there are differences between the accounting methods used in both controlled and uncontrolled transactions, appropriate corrections should be made in the information used to ensure consistency and there must be continuity in the use of the same procedures and principles. Compared to the comparable uncontrolled price method, more emphasis should be placed on other factors of comparability analysis than product differences in the implementation of this method, other factors of comparability analysis should be more emphasized rather than product differences. Consequently, this method finds application areas especially in the processes related to the goods manufactured with raw materials and semi-finished products, in subcontracting and in-service procurement.

Transactional Net Margin Method

These method, a process under the control of the taxpayer; is a method based on the determination of net profit margin on a relevant and appropriate basis such as costs, sales and assets. The implementation of the method based on net profit margin is similar to the implementation of the cost plus and resale price method. The difference between these methods and the net profit margin method is that the net operating profit margin is calculated in net profit margin but not in other two methods. Comparability analysis shall be done in this method as well. However, even if there is a difference in functions, the net operating profit margin is less affected compared gross profit margin which is taken into consideration in the cost-plus method and resale price method. In determining the net operating profit margin, firstly the net operating profit margin applied by the taxpayer in a comparable uncontrolled transaction will be taken into consideration. If this is not possible, the net operating profit margin applied by an unrelated entity in a comparable uncontrolled transaction is taken into account. Functional analysis of the associated companies is required in the implementation of the method. In cases where the net operating

profit margins of the enterprises that are not related to each other are used, it is necessary to determine whether the transactions are comparable and how much correction is needed to obtain reliable results.

Transactional Profit Split Method

These method, in particular, should be used where there are no comparable transactions and the transactions between related parties are an integral part of each other. This method aims to eliminate the impact of the conditions in a controlled transaction on profit by taking into account the transactions of the unrelated companies or the profit they derive from this transaction. In the profit split method, first of all, the profit emerged from the transactions of related companies is determined. This profit is then shared among the related companies. Profit distribution should be based on strong economic justifications, as predicted and reflected in arm's length principle agreements. In this context, the total profit from the transactions under control is shared in two stages. In the first stage, the profit margin of each related company is determined by considering the profit margin obtained by unrelated companies from similar types of uncontrolled transactions. In the second stage, if there is any remaining profit from the total profit after the profit distribution to the related companies in the first stage, the remained profit is redistributed among the related companies in accordance with the functions and risk they undertake. Thus, the profits of related companies gain from the controlled transactions are recalculated. Consequently, as a result of the necessary corrections, the appropriate price is determined for the related entities for the controlled transactions. The value of the contribution of the related parties to the formation of profit is performed according to the function analyzes and these contributions are evaluated to cover reliable information obtained from the external market. Functional analysis is an analysis of the functions performed between related parties, taking into account the risks and the assets they use. In this method, it is of utmost importance to take into account the circumstances of each case when implementing arm's length principle. In particular, the split of the remainder profit between should include the exact figures to the extent possible during the process of profit split. For example, where research and development expenditures are included, differences between R & D expenditures may need to be taken into account.

In this framework, the following factors are taken into account when applying the profit distribution method:

- Expenditures for the acquisition, production or sale of a product or for the provision of services,
- The required capital, assets used or assumed risk degree during the development of a product or service delivery,
- The relative importance of the functions performed at each stage of the process,
- Other measurable factors.

BLOCKCHAIN TECHNOLOGY

Technology is a phenomenon that facilitates the work and power of people. In other words, technology is a pioneering in people's lives. The first industrial revolution (1.0) emerged with mechanical production system by using water and steam power. The second industrial revolution (2.0) introduced mass production by electrical power. In the third industrial revolution (3.0) also named digital revolution, production was further automated with the use of electronics and development of IT Information Technologies). The

fourth industrial revolution (4.0) is a collective system that includes many modern automation systems, data exchanges and production technologies.

In 2008, Satoshi Nakamoto, whose true identity remains unknown, published a white paper entitled “Bitcoin: A Peer-to-Peer Electronic Cash System.” In the paper, he claimed that he had created a solution to the problem of double-spending digital currency via distributed databases, which combined cryptography, game theory, and computer science (Nakamoto, 2008). The increasing value of cryptocurrencies, especially Bitcoin, has caused researchers and investors alike to consider the logic of the associated process. Blockchain technology relies on the process being characterized by trust and openness. Although discussions concerning blockchain have increased in recent years, studies of blockchain actually date back to the 1990s. The logical concept of blockchain was first mentioned in 1991 in an article entitled “How to Time-Stamp a Digital Document Block,” which was written by Stuart Haber and W. Scott Stornetta. In their article, Haber and Stornetta described the concept of a cryptographically secured network of blocks. According to them, the customer sends a document to the timestamp server to receive a timestamp, and the server then signs the document with the current timestamp. The server also links the document to any previous document (Haber and Stornetta, 1991). This model of recording digital documents using the timestamp method has two important features. First, one must find a way to time-stamp the data itself, without any reliance on the characteristics of the medium on which the data appears, so that it is impossible to change even one bit of the document without the change being apparent. Second, it should be impossible to stamp a document with a time and date different from the actual one” (Haber and Stornetta, 1991, p. 1).

Although cryptographic studies have been conducted since 1991, it was the invention of Bitcoin that really maximized the recognition of blockchain technology. Nakamoto’s (2008) paper claimed that such technology provided a solution to the problem of double-spending in digital currency by using a peer-to-peer network. The main purpose of the study described in Nakamoto’s (2008) paper was hence to create a peer-to-peer digital currency that allowed people to spend directly, without having to go through a financial institution. Such an invention represented a major innovation that enabled users to operate without the need for a third party to establish trust.

Nakamoto (2008) intended blockchain to serve as a transaction book for the Bitcoin cryptographic currency. One of the key features of blockchain is that it has a self-governing autonomous structure rather than a central structure. In other words, blockchain technology is based on “Decentralized Distributed Ledger Technology”. In this system, the data is entered. After the data entry, the accuracy of the data is determined and the data entered blocks are linked to each other to form a chain. Thus, data in each block is linked to each other and saved. As a result, the process forms a structure that cannot be recycled and deleted. As it seen, the infrastructure provided by such a system offers opportunities for many areas in the future. In particular, it is stated that smart contracts with block chain will be made in the future and thus, the transactions between people will be more reliable and faster. Furthermore, it is argued that the violation of the rights arising from the contract between the persons will be eliminated by the smart contracts. The researchers state that the blockchain technology will cause a serious change in the field of taxation in the coming years. According to OECD (2018), a blockchain is a decentralized distributed ledger technology that can store any type of data, including financial transactions. Blockchain offers a secure method for registration and authentication of taxpayers, or the recording of transactions.

The idea that the integration of blockchain technology into the tax system would be a positive development is due the various features that such technology offers. The key blockchain features that will affect the tax system and transfer pricing are (PwC, 2017):

- **Transparency:** Blockchain provides a transparent structure by allowing the provenance of transactions to be traced.
- **Controllability:** The permissions accession network is restricted to identified users.
- **Security:** Once digital data are entered; nobody can alter or tamper with the digital ledger. It is easy to trace fraud using blockchain technology. Thus, blockchain helps to prevent fraud.
- **Real-Time Information:** Everyone in the network can see updated information at the same time. In other words, if information is updated, then the update is available to everyone.

Although its obvious benefits, blockchain technology is not a “pure solution” that can eliminate all contentious and complex issues arising from globalization and mass-digitalization (WU Net Team, 2017). Blockchain technology represents an evolution of Internet from the “Internet for Information” into an “Internet of Value” (Ainsworth, 2017). Although encryption provides a superior safety solution, it still doesn’t mean that it guarantees an absolute protection of data against cyber-attacks (UK Government Scientific Chief Adviser, 2016). But it does eliminate the possibility of tampering and develops transparency of transactions for related parties. It also reduces costs and provide trust between peers.

The Features of Blockchain Technology

Blockchain has numerous features that makes it to use in various fields. In this context, we will try to explain some features that makes it important in using of transfer pricing.

Blockchain as a Data Structure

Blockchain is a customized version of a linked list structure. In the standard single-link structure, each elements of the list points following elements by a pointer routine. In this way, all elements from the starting element of the list to the tail element are connected to one another (Cormen et al., 2009). In the blockchain structure, each element (block) not only points to the next block but also hide the hash value of that block. In other words, the block chain is a special linked list structure created with hash-pointers (Narayanan et al., 2016). The hash pointer structure does not allow changes. In other words, it can be understood easily if such a change is made. Because the hash value of the newly added block will be different from the value indicated by the hash pointer that pointing to the new block. This feature is one of the important factors that make the block chain a safe structure.

Immutability and Tamper Detection

According to Webster’s dictionary immutable as a word means “not capable of or susceptible to change”. When considered in terms of blockchain, it means” the inability of a block to be deleted or modified once it is in blockchain”. In other words, a verifiable, traceable and an immutable log system is required to establish “trust” among participants (Pourmajidi & Miranskyy, 2018). Once the transaction in blockchain has received a sufficient level of validation, some cryptography ensures irreversibility and non-replaceable of it. Thus, the information cannot be edited or deleted. Block chain technology uses computational algorithms and approaches in order to ensure irreversibility of stored records (Iansiti & Lakhani, 2017). The information in blocks cannot be tampered. Without corrupting the chain, it is impossible to change and/or alter the information in a block, and if it is corrupted, it becomes visible within all nodes. Once

digital data are entered; nobody can alter or tamper with the digital ledger. It is easy to trace fraud using blockchain technology. Thus, blockchain helps to prevent fraud.

Data Protection

Despite even more secure financial systems can be hacked, numbers of computers called nodes that confirm the transaction on blockchain network provide the security of blockchain. There is not a single way of shutting down the system. Blockchain is a data structure that is sorted by time and is constantly growing. The blocks hold the transaction (s) and the address of the previous block. The recorded transactions cannot be changed. Thus, blockchain is mostly defined as a ledger that the list of transactions is recorded.

Decentralized Ledger Technology

Blockchain technology is a distributed database structure (Iansiti & Lakhani, 2017; Xu et al., 2016). The database is distributed between nodes. While some researchers state that they are a computer, some researchers evaluate them as a part of the system as a general definition. Nodes in the block technology system are accessible to the entire database, but a single node cannot control the data stored in blockchain. Every new record entry in the blockchain (transactions) is verified by all nodes in the system without any intermediaries. In other words, the blockchain is decentralized ledger feature eliminate the necessity of third parties in transactions. Each user can directly access to the system form the web and store their assets. In other words, the system does not need any governing authority and each user have a direct control over transactions. Thus, blockchain's decentralized structure gives people their rights back on their assets.

Peer to Peer Network

Instead of using any centralized structure for communication between the parties, individual nodes transmit and store information to each other in a peer-to-peer network (Nakamoto, 2008). Because of the consensus between nodes in the block chain system, there is no need of intermediaries. The information in the block chain is stored by all nodes in BitShares (Iansiti & Lakhani, 2017). Some authors claim that the block chain is not stored by all nodes but can be used by all nodes (Satoshi, 2008). They also note that new processes do not have to reach all the blocks, but that the process must reach in sufficient number in nodes so that it can be included in a block over time.

Transparency

The concept of transparency in block chain technology is realized when all blocks can see all operations which means that it is more transparence than a centralized structure that managed by a third party. The block chain is the structure that allows the digitized information to be recorded on different nodes on a network and that the information recorded can be validated and transparent by sharing with other nodes. The transactions can be seen by all users of the system. Consequently, Blockchain provides a transparent structure by allowing the provenance of transactions to be traced.

TRANSFER PRICING CONTROL BY BLOCKCHAIN TECHNOLOGY

Although the laws that regulates transfer pricing are different for each country, the cross border transactions between related parties should comply with arm's length principle. In other words, this price should mirror the proposed or applied price between non-related parties in an open market. Researches show that technological development brings a variety of applications for blockchain-smart based contracts, including their relevance to transfer pricing. Blockchain as a system based on consensus. In other words, the information is only added to the blockchain when everyone or a certain number of participant on condition that they determined in network agree on the accuracy of the information. The blocks are also cryptographically locked in the chain. This makes it impossible to change or delete information stored in the block. In the block chain there are blocks that store a wide range of information. Each block is connected to the previous block so that the chronology of the information entered into the block chain is generated. Moreover, every information contained in the block chain is digital and eliminates the need for paper documentation (Frankovski et al., 2017). The most important advantage of block chain technology is its distributed structure. In today's capital markets, the transfer of value between the two parties often requires centralized processors such as banks or credit card networks. Transacting parties rely on this system to execute transactions accurately and safely. The intermediaries are also charged a certain fee for these transactions. In contrast to this system, the block chain allows the parties to trade directly with one distributed notebook, thus eliminating the need for centralized processors. The processes of a blockchain in a computer environment is as following steps (Frankovski et al., 2017);

- Operation is performed (transaction from a peer to other peer)
- All the peers in the blockchain are informed.
- Members control all transactions-related information
- Members shall confirm the accuracy of the information. Each new block is confirmed.
- The approved new block is added to the chain.

The integration of block chain technology into tax systems is a new phenomenon and has not yet been fully established. The success of the system depends on the states' development their databases according to this model. The development of databases will increase transparency of transactions.

The research claim that the blockchain technology can be applied to transactions between parties. If so, the transfer pricing can be controlled as well. Transfer pricing can be defined transactions between related parties. In traditional transfer pricing, the intra-firm agreements are executed manually. For this reason, it is heavily reliant on intra-firm documents and correspondence to define the role of each involved party and the entire system is reliant on paper documents and data stored on many servers to track the supply chain. There is a high risk of falsification of transaction documents. In blockchain based transfer pricing, it is easy to track the flow of transactions and identity of all involved parties by distributed ledger. The agreements are written into a self-executing smart contracts. All movements on the Blockchain are time-stamped and cryptographically sealed, eliminating the possibility of tampering. Each information is stored on the blockchain and visible to parties that have access to the Blockchain. The payments are executed by a smart-contract if they meet the specified conditions. Taxation is a double edged sword. It has two sides; tax authorities and tax payers. The most important issue between both sides is trust. Tax payers do not trust tax authorities and vice-versa (Sim et al., 2017). It is same for both companies and countries. In summary, it can be said that the lack of trust is a common problem for many areas.

SOLUTIONS AND RECOMMENDATIONS

One of the best things about the blockchain is that it saves you time and conflict. Because, blockchain is a decentralized system which mean it exists between all permitted parties. In other words, there is no intermediaries to pay. That feature makes blockchain faster, undeniable, more secure and cheaper than traditional systems. In 1997, Szabo has introduced the term “smart contract”. A smart contract is a computer code running on top of a blockchain containing a set of rules under which the parties of that contract agree to interact with each other. The agreement is automatically enforced while the pre-defined rules are met. The smart contract code is a simplest form of a decentralized automation that facilitates, verifies, and enforces the negotiation or performance of an agreement or transaction. If a smart contract is deployed on a blockchain network, it can send message to the other contracts. This message is composed by the address of sender, the address of recipient, value of transfer and a data field which contains the input data to the recipient contract to other contracts (Karamitsos et al., 2018).

Smart contracts are pieces of software that extend block chain’s utility from simply keeping a record of financial transaction entries to automatically implementing terms of multiparty agreements (Ream et al., 2016). Due to related parties to an agreement of this sort would main separate databases, these kind of smart contracts was impossible before blockchain technology. “With a shared database running a blockchain protocol, the smart contracts auto-execute and all parties validate the outcome instantaneously and without need for a third-party intermediary (Ream et al., 2016, p. 2). The smart contracts can be a worthwhile option where frequent transactions occur among a network of parties, and manual and duplicative tasks are performed by counterparties for each transaction. The blockchain act as a shared database to provide a secure, single source of truth, and smart contracts automate approvals, calculations, and other transacting activities that are prone to lag and error. The benefits of blockchain based smart contracts are;

- **Speed and Real-time Updates:** The smart contracts can increase the speed of a wide variety of business processes.
- **Accuracy:** Automated transactions are less prone to manual error.
- **Lower Execution Risk:** The execution is managed automatically by the network rather than an individual party. Therefore, the decentralized process of execution virtually eliminates the manipulation, nonperformance, or errors risk.
- **Fewer Intermediaries:** Smart contracts can eliminate or reduce reliance on third party intermediaries that provide “trust” services such as escrow between counterparties.
- **Lower Cost:** This process requires less human intervention and fewer intermediaries and will therefore reduce costs.
- **New Business or Operational Models:** Because smart contracts provide a low-cost way of ensuring that the transactions are reliably performed as agreed upon, they will enable new kinds of businesses, from peer-to-peer renewable energy trading to automated Access to vehicles and storage units.

Smart contracts can be public and private contracts. The usage of smart contracts in transfer pricing will build a trust between tax authorities and MNEs. Thus, the transactions between associated parties will be tracked easily and tax evasion will be prevented.

CONCLUSION

The researches shows that cryptocurrencies are one powerful application of blockchain technology. Nevertheless, blockchain has a potentially significant application in other areas. For example, global banks are experimenting with blockchain to streamline processes and reduce costs. They also use blockchain to create new competitive advantage through modified business models. Also accounting firms facilitating innovation and application. At the present, blockchain technology is relatively new. Despite it owes its reputation to the bitcoin, blockchain has the potential to be used in many areas. In other words, it could revolutionize the business. The researches shows that it could be a game changer for transfer pricing by providing tax authorities a more reliable audit trail. A blockchain is a record of transactions, similar to a ledger. It can be used to record sales of goods. As mentioned above, unlike traditional ledgers, in blockchain technology it is impossible to secretly alter those records and it is easy to trace the all transactions. The most important feature of blockchain technology is to have a potential to eliminate that lack of trust. The researches claim that blockchain can be use in the field of transfer pricing. As mentioned above, transfer pricing is a price that implemented between associated parties of a company. OECD explores different methods for transfer pricing. The most important thing in transfer pricing is to pricing between associated parties in accordance with arm's length principle. Transfer pricing commonly used in international transactions. It is hard to control all transactions by tax authorities. There must be a reliable, secure, transparency and controllable system. Blockchain has these all features. Tax authorities will be able to trace all transactions by blockchain technology. In other words, blockchain technology with its features build a trust between MNEs and tax authorities. So that, tax authorities should not have to worry about tax evasion in transfer pricing.

The other features and advantageous of blockchain technology using in transfer pricing are;

- A Blockchain distributed ledger that makes it easy to track the flow of transactions and identity of all involved parties.
- The agreements are written into a self-executing smart contract
- All movements on the Blockchain are time-stamped and cryptographically sealed, eliminating the possibility of tampering
- Each information is stored on the Blockchain and visible to parties that have access to the Blockchain.
- The payments are executed by a smart-contract if they meet the specified conditions.

To summarize, blockchain technology is not an absolute solution for all problems in transfer pricing. But it is obvious that it makes easier to trace transactions. Thus, it develops transparency, controllability, and eliminates the possibility of tampering. All involved parties can be tracked easily. Blockchain also eliminates the third parties in terms of its decentralized feature. So that, people get their rights back on their assets.

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KEY TERMS AND DEFINITIONS

Blockchain: A distributed ledger technology that makes transactions secure, more reliable, transparent, and trackable.

Decentralized Ledger: A blockchain's feature that eliminate the necessity of intermediaries in transactions.

Multinational Enterprises: A whole of enterprise that is formed by a head office and its affiliated branches that are under control of head office.

Resale Price Method: A transfer pricing method that explored by OECD and refers to a reasonable gross profit for the price to be applied in the transactions that the appropriate price is sold to the real or legal persons whose transaction subject goods or services do not have any relation between them.

Smart Contract: Processing in the form of applications in which the flow of a work has already been planned and programmed and once created no one can intervene for changes.

Transactional Profit Split Method: Division of total profit and loss among associated parties in accordance with their risks and functions.

Transfer Pricing: A price that implemented between associated party of a MNEs.

Section 3

Changing Labor Force Attributions and Business Culture During Industry 4.0

Chapter 17

The Impact of New Technology on Society and Workforce in Production in the Era of Industry 4.0

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ABSTRACT

The industrial revolution, which took place in the 20th century, is the first step of similar developments in the ongoing centuries. In the first steps of this century, the use of steam machines in production is the first steps of a more serial and systematic production structure. With the advancing developments up to the industrial revolution or Industry 4.0, a structure quite different from the initial stage was formed. In the most general sense, the Industry 4.0 structure, defined as the internet of objects, emerges with a more systematic and self-functioning structure discourse in its production activities, but its effects are not only related to production activities. As a matter of fact, the use of Industry 4.0 at the point reached, human resources, employment, social classes, communities, and so on. It is thought to be effective on the structures. In this context, in this study, the effects of the social impacts of these processes and the ways in which Industry 4.0 can create a social structure have been explained.

INTRODUCTION

An effort to meet the needs of humanity arising from the will of communal life within the permanent settlement made changes necessary of certain organizations on production. In the early agricultural societies, people produced every material they need on their own and again, they evaluated these productions

DOI: 10.4018/978-1-7998-1125-1.ch017

by themselves. Afterward, the emergence of the needs of different areas and meeting them from different settlements resulted in trade through exchange and/or medium of exchange. After the continuation of their commercial activities, people who became economically stronger began to focus on the commercial activities which were performed as production and selling of the products because of these benefits of commercial activities. While these production activities and the income obtained in the continuation of these activities increase the concentration of people in the commercial activities, these commercial activities to be presented to the products to be produced faster ways were sought on the one hand.

As a matter of fact, until the 18th century, the products based on production in small hand looms or workshops were not enough for people to get the economic income they wanted. However, it is not mentioned that production activities can be made to meet the increasing consumption due to population. In the 18th century, humanity began to increase its production activities in light of some new developments and by the end of this century, a number of technological advances that began to be seen all over Europe of which center was England took the first step in the radical changes in existing production systems around the world. In this process advancing from small workshops to factories, from part production to wholesale production, people began to mass production, including the machine in their production activities. In the early periods, mechanization in the production of steam machines enabled the creation of the desired structure such as obtaining more economic income both individually and nationally. As a matter of fact, the share of mechanization in production, which became widespread in Europe with these developments, paved the way for establishing superiority over different states with both economic development and improvement. This process, which started at the end of the 18th century, is called “Industrial Revolution” or “Industry 1.0 in the literature (Ege Bölgesi Sanayi Odası [EBSO], 2015).

When the basic factors in the emergence of the first step of the Industrial Revolution, which has such an impact socially, the effect of technological advances that humanity has progressed for thousands of years is seen. This leap, which emerged in England and which first affected Europe and then the whole world, is seen as the greatest economic and technological revolution ever seen on earth till that day.

When the literature is examined about the fact that the process which is described as the 1st Industrial Revolution started in England, it is seen that this situation is not discussed as a coincidence. As a matter of fact, having rich reserves in terms of mines and coal as of the period and the dominance of a democratic government in the country are listed as main factors triggering the beginning of the Industrial Revolution here. However, in the literature related to the England connection of Industrial Revolution (Soylu, 2018);

- It is seen that factors such as:
- England, having a powerful economy,
- Elimination of structures that prevent the environment of free competition from production,
- Having colonies which can be used to meet the needs of raw materials and manpower,
- Easy transportation thanks to the strong fleet of trade in England,

Due to its geographical location, Britain’s ability to avoid political chaos and wars are listed.

When the social effects of the Industrial Revolution emerged in the mentioned period are examined, it is possible to mention the beginning of a period in which the social structure was redefined and significant developments took place in this field. Indeed, the “factory” formations which were the structures that did not exist until then and that these were centered on the lives of people who had their own daily lives. However, the rapid transformation of developments in urbanization structures and economic life also resulted in the transfer of buildings seen in rural areas to city life in the social structure. In this context,

it is possible to mention that the economic power symbols which are so-called “rural landowner” and predominant in the countryside and after the Industrial Revolution, it emerged as “city landowner”. One of the main reasons for this transformation is indicated as economic activities and developments in this field and another reason can be indicated as the migration activities carried out to get more prosperous life in cities. Another effect of migration or one of its most prominent effects is the dominant role in the changes taking place in the social fabric. Migration activities from rural to urban, inter-regional and even inter-country and similar directions brought about the formation of a mixed structure in the social sense and differences in the settlement patterns. In addition to these changes that can be described as “internal” in the social structure, issues such as increases in production need for raw materials and market requirements resulted in environmental societies being affected by these activities in areas where production is focused (Soylu, 2018).

When the technological developments in the ongoing process after the Industrial Revolution are examined, due to the need for increased speed in production activities towards the middle of the 20th century, it is seen that electric machines were replaced with steam machines. Again, depending on this, it is seen that electricity was initiated to be used in the internal works in the factories and also in the bands at the factories. Along with the beginning to use electricity, the desired speed in production has been obtained but is also possible to see those different modes of production occur. Indeed, along with a technology developed by Henry Ford in electrical technologies and started to be used in automotive production, both the change in production mode and the acceleration of production have been discussed. In this type of production, which is called “band type serial production”, the completion of production by bringing parts together in the moving mechanism and qualified as “band” was evaluated as a highly effective development and has been up to date for a long time. With the introduction of electricity in production activities, it is indicated that the 1st Industrial Revolution ended and the 2nd Industrial Revolution started. Accordingly, the inclusion of electricity in the production activities revealed the “Industry 2.0” structure (Alçın, 2016).

Although the duration from the steam machines to the use of electricity in production is considered to be longer, shortly after the use of electricity in production, in the period corresponding to the last quarter of the 20th century, developments that could be described as a new leap in production activities emerged. In this period, machines that can be programmed by making use of electronics were started to be used in production activities. These developments have led to the emergence of structures considered as automation systems for production activities. At the time of the emergence of automation systems, in the last quarter of the 20th century, it was observed that micro computers were included in the production activities, which were more suitable for use than normal computers. However, the incorporation of so-called “digital technologies” into production activities is considered the end of the Second Industrial Revolution (Industry 2.0). In this context, the inclusion of digital technologies in production is considered to be the Third Industrial Revolution or the beginning of Industry 3.0 (Taş, 2018).

When the process from the emergence of the 1st Industrial Revolution to the present day is examined, it is possible to see a development step in the field of technology and production in almost every century starting from the 18th century that in some centuries, these movements took place more than once. When the present and recent past are examined, the internet technologies that developed with the transition to the 21st century and the widespread use of these technologies resulted in the adaptation of these technologies to production activities. With the adaptation of steam machines, electronic and digital structures to production activities, an increase in production was achieved, while the decrease in

the need for muscle strength decreased to a minimum with the inclusion of the internet in production activities (Deloitte, 2014).

In this period, which can be considered as the new leap period, it is seen that there are events that attract more attention than the production activities and developments in these activities throughout the world. Indeed, it is observed that along with the increasing production and the increase in carbon emission, a global warming problem that causes climatic changes in the world has emerged. In addition, the globalization of commercial activities led to countries having an impact on the economies of different countries. As the most obvious example of this, it is possible to indicate the British Prime Minister Margaret Thatcher and US President Ronald Reagan jointly pushed the Russian economy into bankruptcy. In addition, the globalization of commercial markets and the people in different countries were used as a labor force. Indeed, the fact that the upper bourgeois class in Europe or the United States used about 3.5 billion people in the East as cheap labor corresponds to this period.

This development brought about the relocation of the production facilities in the factories. However, the shift of labor force to different centers in production has led to a decrease in purchasing power among people included in the income class, which is considered as middle class and led to a decrease in revenue in Europe and the US which are the centers of wealth. This resulted in the debt of a particular class in the social structure. When the issue is discussed on behalf of Europe and the USA in the context of neighboring countries, it is seen that the situation is in the opposite direction. As a result of the participation of middle-class members in neighboring countries with global structures, there was an increase in income levels. However, although certain improvements have been observed in the labor class, it is also noted that the situation has not improved much compared to the previous periods (Türkiye Sanayici ve İş Adamları Derneği [TÜSIAD], 2016).

This new period in which all these developments took place and all the constructs including the planning process in production was transferred to the machines is considered as the IV Industrial Revolution or Industry 4.0. One of the most obvious features of this revolution redounding on the production is the decrease in the need for manpower, in other words, the responsibility of people encumbering to the machines.

CONCEPTUAL STRUCTURE OF INDUSTRY 4.0

The concept of Industry 4.0 was first introduced by a project which was carried out by the Germans and of which the main theme was the advanced technology. In this project developed by the Germans, the idea of carrying out all stages of production by computers was put forward. First of all, this structure has taken the point of simple tools used in the early periods into consideration and from this point of view, it is based on the idea that the production can be carried out by computers. It was thought that this leap period to be discussed as a new period will be named as “Industry 0.4” or “Industry 4.0”. It is understood that the concept of industry 4.0 that emerged in this direction was first used in 2011 (Banger, 2016).

The first use of industry 4.0 concept, which was introduced through these stages in practice, was carried out by Kagerman and his colleagues in a study published in 2011 when this concept came into view. The concept, which was first used with the study named “Industry 4.0: Internet of Objects” in the literature, emphasizes that the world has entered a new industrial revolution and that this period should be called as industry 4.0 in the content of this study (Kagerman et al, 2011).

The formalization of the concept or first being published in an official publication was carried out by a report published by the German National Academy of Science and Engineering. In the name of the report published in 2013, with the concept of industry 4.0, it was considered that both the subject was dealt with in an institutional structure and this institutional structure gained an official qualification (Deutsche Akademie der Technikwissenschaften [ACATECH], 2013).

When the basic structure of Industry 4.0 concept is examined, it is observed that there is an autonomous communication between all the components in its content and it is a concept which expresses the organization of a production process based on technology and devices. The main argument of this organization is that production or factories are under the control of computer-controlled systems. Physical processes carried out with computer controlled systems will be the basis of production activities. Developing technologies, changing customer expectations and competitive conditions have pushed product and service providers to look for different solutions at each term. The best example for this can be the Industrial Revolution. The first industrialization process known as industrial revolution was carried out between the 18th and 19th centuries. In this period when coal and steam were used as energy sources, the machine use began to become widespread. Water, oil, and chemicals were started to be used in the electricity and production as a source of energy in the 2nd Industrial Revolution and in this period when industrial development gained momentum, Henry Ford introduced the first serial production line. The 3rd Industrial Revolution has lasted as of the 1970s to the present. In the post-World War II period, developments in electronics, information and communication technologies, and development of computers and PLCs initiated the automation cycle in production (European Parliament's Committee on Industry, Research and Energy [ITRE], 2016).

Today, the concept of the 4th Industrial Revolution has emerged from a need again. In recent years, the development of the East's production technology, the increase in production figures and its strengthening economy has become a threat to the West and this threat led Western countries, especially Germany, to look for models with a faster production rate, a more flexible production structure, capable of producing personalized products and increasing production efficiency. Smart manufacturing and smart factories have been the concepts used in this quest.

Smart manufacturing is defined as a manufacturing structure that aims to optimize the productivity of all actions, energy use and economic performance, having situational awareness, real-time decision-making, flexible behavior, having the ability to diagnose and treat their own environment and other systems, while Industry 4.0 is able to define the whole of technologies that make "Smart Manufacturing" possible (Lee et al. 2015).

Smart factories can also be expressed as a centralized structure of production by means of industrial computers in the field and as a whole of systems that can remotely control and manage their own management. The most important difference of smart factories from the traditional system is the elimination of errors in manual operations carried out by manpower and the production of high-quality products in every phase of production thanks to the automatic controls carried out by the machines. Nowadays, smart factories are rapidly replacing traditional factories. It aims to keep customer satisfaction at a high level by using less manpower and by reducing the costs by minimizing the working areas, by increasing profitability along with production, by producing high quality products. It is the period in which production is now carried out through information processing systems. The period can also be called the computer age. This period is a period of time when there are serious fluctuations due to the weakening of production following the two major world wars. It can be said that the direction of production has changed with digital technologies that developed after 1950. Especially, the production of the calcula-

tor named 'Z1', which was produced in the period, supported the increase in productivity by spreading computer and computing concept. In addition to this, the strengthening of communication networks is a factor that will lead to further increase in productivity in production (EBSO, 2015:6). In this process, demand for muscle strength also declined. Because on platforms where machines and people take part, instead of people, there is a mode of production in which it takes over the whole business in a holistic sense. Human takes place here as human capital and its share is very small. It is only the person who directs the machine. It can be said that the error in production is reduced considerably. In order to make sense of the process, unemployment rates in the world will help us.

It is possible to state that unemployment is gradually increasing if we exclude rock-bottoming in times of crisis. While the world unemployment rate was 6.1 percent in 1995, it is possible to say that today is 5.94 percent (Bangladesh Water Development Board [WDB], 2017). Especially with the full expansion of the global economic order and the flexibility of production, the tolerance to labor power is considerably reduced. The reason for the situation is that the productivity of the production is increased by means of machines and perfected. While fast delivery of the requested products to the masses with the established technology and network system increases the welfare, the decrease in the share of the demanding masses in production and the rapid increase caused the reserve unemployed army to increase.

The movement of capital movements with full freedom continued with the exacerbation of global competition. These two classes, which are separated as East and West industries, aim at a more efficient and effective way of racing production. In recent years, the fact that the eastern industry produces much cheaper and faster with the flexibility of labor has caused the West to act. Germany's first movement has aroused all over the world. The West has mobilized to provide efficient and cheap production anywhere and to direct it from virtual power plants. With Industry 4.0, it is likely that the waiver of muscle power will increase considerably and companies will need only human capital. The system, in which technical personnel can be employed, will save the majority of labor and thus increase productivity. At the same time, the system in which perfection is targeted is capable of reducing the error to zero. When the discussions on the current situation of labor with technology are examined together with the relation between labor and technology, it is seen that labor is a melting structure against technology. However, it is emphasized that effective management of the division is also very important. As a matter of fact, when the goal of capital owners to increase their residual value and to make less cost is supported by technology, this resulted in a further growth of the reserve industry army (WDB, 2017).

One of the two biggest concerns about Industry 4.0 is the security, while the other is the loss of work as a result of the spread of robotic systems. In fact, it would be enough to look at the third Industrial Revolution Period to see that this concern is not realistic. During this revolution, especially while automotive automation increased unemployment did not increase. On the contrary, the economic growth that came with the Third Industrial Revolution led to the emergence of new and innovative business fields, the emergence of new professions (such as maintenance / repair of robots and machines in automation), and increased job opportunities. Therefore, it would be logical to enter into the same expectation for Industry 4.0. Every development recorded worldwide brings with it a process of change. But in this process of change, new opportunities are always born. It is foreseen that Industrial 4.0 investments will increase 6% in the short term and in the long term demand for qualified labor force, especially in the fields of information technologies and mechatronics, will increase significantly. It is seen that these expectations will change the expectations of both states and individuals from the education system (Bulut & Akçacı, 2017).

The other side of the medallion is that the axis of the IV. Industrial Revolution, the benefits of digitalization and the benefits of smart production will of course be much greater than in previous periods. The issue of Industry 4.0 will lead to a major decline in employment constitutes the agenda of the business and industry circles. By putting production processes in a spiral of communication, the loss predicted in employment with Industry 4.0 applications, which will maximize the yield obtained, is expressed in abundant zero figures. Foreign-originated research that puts Industry 4.0 at the analysis table supports the claim that there will be a decline in employment. In fact, Deutsche Welle, Germany's leading publishing company, the industry's giant name, reports that 490 thousand will be lost against 430,000 new jobs in German factories, based on the research of the Institute for Employment Market and Occupational Research (IAB). With simple mathematics, the loss is close to 60 thousand. (Doğru & Meçik, 2018).

Some commentators who evaluate the subject within the scope of Industry 4.0 concept think that they are on the verge of a development that will completely change the definition of human labor. Automation will become widespread as machines have the capacity to perform routine, repetitive tasks more efficiently than humans. This development will pave the way that the employees will not be fired but they will focus on studies that require more creative, higher skills as free. However, more systematic research, such as a comprehensive scenario study performed by Martin Ford in 2009 on employment opportunities and the effects of the widespread use of cyber-physical systems and computer technology on the regulation of work indicates different results. According to this analysis, artificial intelligence, learning machines, and software automation applications will now affect university graduates including engineers, who are more educated and equipped with higher levels of education than those of low-wage, uneducated employees. Increasingly, commercial robots will reduce opportunities for low-skilled workers. We must not forget that robots and supercomputers presented to us as cute beings are directed by big capitalist corporations like Facebook, Google and Amazon in the real world. Looking at history, it is seen that the system has managed to open different business doors against technological sorting. Otherwise, the increasing income and wealth distribution disorder is decreasing the request for consumption. The problem of realization is experienced in the form of the inability to find a buyer for the capitalist goods and services and the system is dragged into crisis (McKinsey Global Institute, 2016).

EFFECTS OF INDUSTRIAL 4.0 ON WORKING LIFE AND EMPLOYMENT

The impact of Industrial 4.0 Revolution on human and employee sustainability is undoubtedly a major dynamic of the roof philosophy in terms of both economic and social sustainability dimensions. Two important effects of technological innovations on employment can be underlined. First, the replacement of the labor factor of capital with technological innovations is a negative situation in which workers lose jobs, and second, because of the increase in demand for new products and services, the creation of new jobs creates a positive situation for workers to settle in new business areas.

The Fourth Industrial Revolution prompts companies to combine a variety of technologies and leads to a complex mechanism of innovation. In other words, it prompts companies to transform traditional methods of business realization and to produce constant innovation. Companies which can transform traditional methods of performing business and create an environment of innovation maintain their status and also improve their profitability. However, companies that cannot offer an innovation environment face the threat of disappearing.

Information is one of the most important sources of decision-making of companies. The information, which has become more important than before with the fourth Industrial Revolution, should be assimilated through companies and this information should be applied efficiently during the decision-making process. However, company executives looking to see if their company has the potential to learn and make rapid investment decisions in the capacity to transform or not is seen as an obligation. Within the scope of the researches on the expectations about the developments and requirements, the demands for tasks such as software and application, data analyst and data scientists, social media experts and e-commerce will increase in the future. At the same time, it is foreseen that the demand for tasks in the areas of sales and marketing, customer service, especially where human competencies stand out will increase. Depending on the progress of the technology, individuals who specialize in the fields of automation, large data, user experience, artificial intelligence, information security and human machine communication will be required. On the other hand, it is expected that the need for people in routine tasks such as accounting, cashier and data entry will decrease gradually.

The report “The Future of Jobs” published by the World Economic Forum (WEF) in September 2018, also includes a study on new job opportunities and roles that will emerge in 2018-2022. According to this report, the professions that are at the forefront in the future are listed as follows:

- New technology specialist
- Large data specialist
- Data analysts and scientists
- Sales and marketing professions
- Information Technology Services
- Software and application developers
- Organizational development specialist
- Artificial intelligence and machine learning expert
- Operations and general managers
- Digital conversion specialist

According to the report “The Future of Jobs 2018”, machines will have more workloads than people in two areas by 2022. One of these areas is the sector-related information research and collection tasks and the other is the field of information and data processing. Also, 71% of all tasks were done by people as of 2018 according to the study which examined 12 sectors. It is predicted that this ratio will decrease to 58% by 2022, namely 42% of all tasks will be undertaken by the machines (World Economic Forum [WEF], 2018).

KEY FEATURES OF INDUSTRY 4.0

Although the structure called Industry 4.0 is compared with other structures and has similar aspects, it is also known that it has its own characteristics. As a matter of fact, this structure has come into existence in a different period from other structures and with technologies not found in previous structures. In this context, the unique characteristics of Industry 4.0 are listed as follows in the literature (Bulut & Akçacı, 2017:52; Alçın, 2018; Aydın, 2018):

- The structure of Industrial 4.0 was first expressed in the USA in 2006 and then in Germany in 2011.
- It is based on Henning Kagermann's 2011 essay for the beginning of the structure in a theoretical sense.
- In 2013, the German National Academy of Science and Engineering (ACATECH) published the issue as a "manifesto", Industry 4.0 was given a theoretical framework.
- It is also known as a project of German origin, based on the principle that the German government is equipped with high technology by encouraging production processes in the direction of computerization.
- It represents a new paradigm in terms of production activities.
- The main feature which distinguishes the period of Industry 4.0 from other industrial revolutions, Cyber-Physical Systems (CPS) started to be used in this period.
- CPS represents complex structures in which machines communicate with other machines via the internet and can perform production.
- The concept of the Internet of Things (IoT) refers to tools that talk to each other, to the "smart factory" that communicates with each other through the Internet, plans and performs production.

In the background of the Industrial 4.0 revolution, there are demographic and economic reasons rather than technology. Europe and Germany have targeted the blue collar business power, which is the most powerful area in China, rather than increasing its population to gain dominance over the ever-growing Chinese economy. The employment rate on the blue collar will decrease with Industry 4.0 but will increase on the white collar (Firat, 2016). It is expected to change the management types and labor profile via Industry 4.0. The next generation of intelligent robots will be able to work with people as they will have a human-like avoidance behavior thanks to their intelligent sensors. In the future, professions such as mechatronics, robotics, information technologies, and auto-bionics will come to the forefront.

In addition to these transfers, the basic features of the Industry 4.0 structure that are evaluated and subdivided into sub-branches are as follows. When examining Industry 4.0, it is seen how comprehensive are the points that are to be reached with this structure. In this context, it is useful to state that the structure of the concept is not very numerous but is comprehensive in terms of content. The main characteristics of industrial 4.0 are as follows in the literature (ITRE, 2016).

1. Ensuring Human, Machine, Product Cooperation: It is possible to say that a basic cooperation is aimed at reaching Industry 4.0. While this cooperation includes all the structures involved in the process, it is also necessary to make sure that the structures work together and in a holistic way. In other words, in the process of production, structures such as machinery, people and products are provided to work together (Türkiye Odalar ve Borsalar Birliği [TOBB], 2016).
2. Creation of Virtual Production Facilities: It is possible to create a virtual copy of the factories that will be produced with Industry 4.0 and to create new structures that can meet the expectations with these formations (TOBB, 2016).
3. Providing Real-Time Production: At the point reached with Industry 4.0, it is possible to obtain production data, analyze them and present the results of the analyzes immediately. One of the most obvious examples of this is the possible fault detection systems that are being used in today's cars. With this system, the system taking into account the wear levels of the parts warns the driver before failure occurs (Schwab, 2016).

4. Modularity: This structure is one of the most functional features of Industry 4.0. Modularity refers to the updating of every part of the system in such a way as to meet the needs of the system.

The listed features refer to the fundamental differences between systems which existed before the structure of Industry 4.0. In addition to these, industrial 4.0, which can be mentioned about its features, is capable of making a big difference in the social sense, such as previous industrial revolutions.

SOCIAL EFFECTS OF INDUSTRY 4.0

It is seen that another important effect of industry 4.0, which has a very advanced effect in many areas such as production, marketing, technological developments, and digital systems, is the formation of social structure. The basic structures laid down in terms of the social impact of Industry 4.0 are grouped under two headings. The first is social inequality and the structures that the middle class is exposed to, and the other is the formation of communities on digital media. It is possible to examine these structures as follows.

Social Inequality and Change in the Middle Class

Although it is not written in countries where the industry is developed around the world, it is known that some rules apply. One of these unwritten rules is the so-called “bargaining”. This rule refers to the sharing of profitability and benefit with the person in case the person contributes to the success and profitability of the workplaces he / she owns. However, it is seen that the bargaining issue has been broken for a single enterprise or for any structure of society. For this reason, it is thought that the developments in the digital sense, which is called as Industry 4.0, will make the collapse of the social structure worse. In addition to this idea, there is a predominant view that this plight could spread to the world and eliminate middle-income individuals who are considered middle classes (Thomson, 2016). The term of elimination here should not be perceived as the destruction of this social structure in the sense of being. The transformation of this structure into different structures represents a class-wise destruction. As in all developments before Industry 4.0, which were described as a leap or revolution in the field of industry, it is essential that the differences from industry 4.0 are to be used for the benefit of society. It is clear that certain segments of society will experience a number of positive or negative changes in the structure that develops with Industry 4.0. Therefore, it is accepted that governments’ responsibilities go beyond workers and communities, as in the past beyond those who carry this responsibility or are involved in the administration. However, the cultural responsibilities of fundamental significance and the need to focus again on international businesses are among the main ideas of this process of development (Thomson, 2016). Indeed, the structure that comes with Industry 4.0 and envisages more emphasis on a machine or digital systems in production is perceived as a social problem because it does not reveal the fate of the individuals that exist in the system in this process (Thomson, 2016). The takeover of the work done by the people by the machines brings to mind the question of what the individuals working on the production line will do next. In addition, as self-constructing systems take the place of individuals working in this field, it seems to be a different mystery to which these individuals will be transferred. For this reason, there is a need for a solution to how to solve these problems that may arise within the scope of Industry 4.0.

The mentioned- risks can be addressed in the context of the risks faced by individuals with a middle-income level in the areas of activity specified in the general sense. Studies have shown that in the first half of the 23th century, the number of individuals in the middle class will increase all over the world. It is pointed out that this increase will be higher especially in Asian countries where the population is crowded. Indeed, this increase will result in an increase in the needs of the middle class and hence the demand for products as a result of the increase in the number of the population or members of the middle class. In addition, the increase in demand will not only be limited to foodstuffs or consumer goods, but will also cover higher-level requirements such as cars and households. However, the demands, which are not limited to material needs, will increase the democratic demands of individuals and will pave the way for changing social and political elements in the social sense. At this point, in terms of the opportunities offered in their cities, with the change of the structure, as in the past, the attraction of the cities and the migration of individuals from the countryside to the cities may cause the migration phenomenon to be experienced again (Firat, & Firat,2017).

In order to prevent any problems that may arise from the mentioned issues before they occur or to find solutions to these problems in a short time, it is useful to spread the developments in the digital field in Industry 4.0 and beyond to the whole society. However, the basis of this spread is to ensure that society is aware of new developments and to adapt them to the requirements of the age. As a matter of fact, it is inevitable that the groups who cannot adapt to the technological developments prevailing in society will play social dynamics and create social problems, this is a dual structure that shows that both the developments and not being aware of the developments cause certain problems. It is inevitable that governments should implement policies that can address the entire society and ensure that all changes reach the largest segments of society. In these policies, it is not possible not to consider the structures expressed as middle class. Indeed, the middle class, which covers a large part of society, is one of the dynamics in the social changes and transformations (WEF, 2017).

Creating Digital Media-Based Communities

The digital developments that have taken place with Industry 4.0 have brought some practices, which are also called new media, and which essentially cover the elements of media in digital environments, into the life of society and individuals. At this point, it is seen that digital media structure, which is reached with industry 4.0, is one of the most dominant guiding factors on societies and individuals. At this point, it is possible to talk about the fact that digital media and applications on this media have a significant influence on the shaping of societies, communities and individuals both in terms of structure and in terms of environment.

Considering the subject in the historical process, it is undeniable and known that the media have an impact on societies and individuals in all periods of history. However, in the traditionally described media, this impact is an effect that can be reduced to certain boundaries such as regional, national and local. Even if the issue goes beyond the border or transnationally, it cannot be said that the borders have expanded. Although there are international activities within the scope of the traditional media, there are very few communities between the two countries affected by each other's Media tools. However, the fact that the media elements added to the digital structures and thus the new media structures have a high level of accessibility, the increasing effects are the most important factors. However, factors such as being cheaper in terms of cost, having a boundless structure in terms of geography, and the possibility of access of all kinds of individuals from all over the world are also important in the point of increasing

this effect. In this regard, it is possible to say that the new media elements are effective in all structures that cost cultural, social, political, economic, political, religious and similar individuals and society on individual and social life and can achieve this effect because they are open to international interaction (Schwab, 2016).

With the use of new digital technologies created with Industry 4.0, it is possible to say that individuals are experiencing changes or differences in many ways. However, as a result of the use of these new digital systems by big structures such as states, enterprises or different interest groups, it is stated that both in terms of individual and community structure, there is both a strengthening and being pushed out of the society. At this point, it is underlined that the elements in the social media structures, especially manipulated by interest groups, are mistaken in the decisions taken in terms of individual and community, and therefore constitute a risk factor for the structure which is described as civil society (Schwab, 2016).

DIFFERENT VIEWS ON INDUSTRY 4.0

Although it is regarded as an advanced industrial revolution in terms of societies, it is possible to evaluate industrial 4.0 in terms of social life and its benefits. After this evaluation, it is possible to see that this structure, called the new industrial revolution, was subjected to a number of criticisms. The basis of these criticisms is that sometimes the changes experienced in the past are based on the most sourced experience and sometimes on the interpretation of the developments in the future. One of the most remarkable view on this subject belongs to Gorz. Gorz has determined the effects of technology on production activities in his studies, which he has written before the establishment of the Industrial 4.0 structure. At this point, from an overview of the use of technology, the subject can also be conveyed to Industry 4.0 through comments (Gorz, 1985).

Gorz described the crises experienced in developed industrial societies as an “industrial crisis” and according to him, these crises affect structures that have penetrated almost all areas of life, such as economic, political and social fields. Again, Gorz mentions that this crisis and the devastating effect caused by this crisis have some negative effects on social relations, labor relations, moral values, production systems, economic structures and many other areas (Gorz, 1982). According to him, the main reason for the emerging crisis is that the developments in the industrial and economic sense now reach natural limits. In this regard, he considered it impossible to establish and maintain the control of people on nature through the use of technology in order to achieve economic growth, and he has stated this impossibility as the most concrete proof of the crisis experienced (Gorz, 1985). Gorz states that the restructuring of capitalism and the implementation of market logic in this area at the point of public services are a problem. In this respect, the reduction in social costs is based on the creation of new markets or the production of new products. At this point, he emphasizes that new technologies based on electronics play an appropriate role at the transition point, which also allows for a number of different social options. According to him, the cost of production decreases with the inclusion of new technologies into production activities. For this reason, by using technology in production, suitable consumers are formed by providing suitable products to consumers (Gorz, 1985). However, given the current structure or the first steps of the building mentioned, it is possible to say that it did not develop in this way. As a matter of fact, the production of products for each individual is quite positive at the very first point and although it is perceived as a movement towards society, the main aim of this development is to show the fact that capitalism is making an eye for the income of every area of society. It is possible to say that the fact that

the individuals who cannot be included in the consumption activities continuously are going to have access to products that are in line with their budgets since they are low-income at this point.

It is not difficult to integrate these structures, which are suggested by Gorz as the main foundations of capitalist or socialist societies at the industrial level, into the Industrial 4.0 structure. As a matter of fact, since each individual has insufficient economic power to buy each product, it is possible to address a certain segment of the products in the market. In this regard, if luxury consumption is set aside, the fact that individuals cannot buy certain items which we can talk about in everyday life, means that their market share in economic terms is reduced. However, the production of products specific to each individual or the general population in the production line and reducing them to a cost that people can buy them in fact, rather than aiming to provide a benefit to people at the point of production of the product, it is the work of paving the way for each individual to become a consumer. In other words, the activities in this area do not go beyond the effort to produce a consumer with the preparation of the products to be consumed.

Gorz also considers the use of new technologies in production activities as a threat to the capitalist system's production structure. According to him, this threat is caused by a number of negative effects of new technologies on structures such as job and labor employment. Indeed, the use of new technologies makes flexible automation possible. This is a positive situation with the use of new technologies in production such as reducing production costs, increasing production quantities, saving labor and raw materials. In this case, the increase in production and the decrease in costs in this production are in question. However, the decrease in the labor force in production will result in a decrease in the number of those who make economic income (Gorz, 1985). This also means that consumers are reduced because of the decrease in economic income. At this point, no matter how much the cost of the produced products falls, due to the disappearance of the economic earnings of individuals who lose their qualification to obtain economic income or are forced to have a limited structure in this regard, it may reveal as a result of the loss of consumer characteristic.

At this point, with the new technologies, the people involved in the production process and working as qualified personnel are pushed out of this band, it is also possible to say that they have problems in terms of job satisfaction and consequently the quality and employment position of the so-called working class is weakened. At this point, the business matter for individuals or for many individuals will become a structure that does not require great qualifications due to the inclusion of technological tools in production. For this reason, the fields of activity that will be worked will be transformed into activities that will provide very little satisfaction in the professional sense and will only earn enough wages to live. As a result of this transformation, it is also possible that the profession or field of study loses its status as an activity meaningful to individuals (Gorz, 1985). This is a condition that can cause deterioration in the emotional state of individuals, which can be termed as "being useful", which can also be the basis of the psychological problems of individuals.

In terms of employees, the use of technology in production that can lead to the situation such as disregarding the mentioned labour or ignoring the quality, losing its importance creates a completely different structure for employers. Indeed, while considering the production aspect of the issue, it refers to a group of employees who do not have any salary expectations for employers, who can be operated as much as they wish after the installation of the required software, who only need periodic maintenance, but who do not need extra time between meals and tea breaks, and who provide the highest productivity. This can be referred to as an unattainable blessing for the employer. In addition, the reduction in the

number of personnel employed leads to a maximum increase in the profitability rate as it reduces the current expenses of the entity to a minimum. This is another important aspect of the issue for employers.

FUTURE RESEARCH DIRECTIONS

With regard to Industry 4.0, we believe that the current intensive use of technology will leave its place to a system that makes production with technology completely in the future. Although this system is a system that can be developed, it may be a system that may have problems in practice due to the negative effects of employees and problems in finding a job. However, it is thought that a completely unmanned production process can be started by adding the machines that maintain the machines and eliminate the faults into the unmanned models to be formed, but the main problem is to reach the expected technology and to balance the social interaction with this technology.

Concerning the future arrangements on this subject, researches can be made at the point where the present situation is revealed by the industrial 4.0 and production companies and comments can be made at the final point. However, it is possible to investigate the effect of industry 4.0 studies on the growth rate of the world population and the necessity of providing the needs of the population.

CONCLUSION

With the increase in needs, the increase in production activities, which have come into the agenda, paved the way for people to experience leap periods in production. With the developments in this field, with the use of steam engines in the I. Industrial Revolution, the adaptation of new technologies to production activities in the ongoing process, it has progressed to the IV. Industrial Revolution or to the so-called industry 4.0. This structure is based on the fact that non-human elements take part in the production activities within themselves and that they plan and construct the production themselves and conduct the production activities autonomously.

Developments in industry 4.0, which at first glance are very useful and appear to maximize production, it is not seen as a structure that will have positive results with the studies made on this subject. As a matter of fact, the most important issue in this regard is the problem of how to direct the existing manpower and therefore the labor force for all countries.

In the literature, in this respect, it is mentioned that with Industry 4.0, people will be able to create environments where they can be directed to jobs that are defined as qualified rather than doing muscle-based work and that involve certain knowledge and skills. However, this can be considered impossible because of the fact that the whole population can be brought to the point mentioned in a moment or in a very short period of time in terms of the existing human potential. As an example, it is possible to give Turkey. Before the introduction of Industrial 4.0 applications in Turkey, the first issue that comes to mind was where the current workforce would be directed by the use of robots in production. As a matter of fact, although there is a need for individuals who will direct the tools or robots to be used in the activities in this field, this need can be met by so much more number of people under the current labor force. However, considering the possibility that these machines will construct their own production and plan their own production at the point that will be reached in time, the fact that the required labor force consists of a very small number of people means that an inevitable employment problem occurs.

Although it is mentioned at the point that people who are qualified or have good hardware level in terms of knowledge will work with more returns, it is worth mentioning that this is not very consistent. Again, due to the need for more qualified employees to carry out the developing structures at this point, it is mentioned that even the retirement age of the already experienced individuals will be postponed and this is touted as a positive employment provider. (Bozlar, 2018). However, the number of individuals in this age range is incomparably comparable to younger employees.

There are also some studies suggesting positive views on employment. The main basis of these are the developments in the field of employment problems and the increase in the economic income of people along with the quality of life of the people, although the concerns about the problems in the field of employment as a result of the industrial revolution in the past have been heard. However, two questions that are considered as inevitable in the common denominator of all studies are emphasized and the first is the decrease in the working time of the individuals and the other is the necessity of having a well-equipped structure in order to have a better job or career. However, it is emphasized that the competition in production activities will increase positively in societies with the inclusion of technological developments in production (Açan, 2018). As a matter of fact, increasing production activities and placing a certain quality is an advantage for businesses, but the fact that quality is placed by machines means that production will not be sold from the standard.

However, there is an issue that is expected to occur in business life with Industry 4.0 and that is inevitably evaluated as positive when machines are involved in business areas where people can experience health problems and the risk of health problems for people is now beginning to disappear. As a matter of fact, although it is known that individuals working in chemical activities, mining, construction, etc. sectors are physically damaged in these areas, the allocation of machines to jobs in these areas will decrease the rate of damage to people from these activities to the minimum level (Bozlar, 2018).

Another structure that can be regarded as negative in the fact that digital life is now becoming like a real-life itself and roboticization of production and greater involvement of people in the digital environment with Industry 4.0 is seen as creating more free time for people by the digital structures involved in human life and thus taking over production activities. In fact, this is not considered a situation that is perceived as a problem of leisure. Indeed, when individuals cannot find time to socialize due to their working hours, weakening of human relations, even family relations coming to a breaking point and almost everyone complaining about this situation, it can be seen as a positive development that people have more free time with Industry 4.0. However, with the introduction of industrial 4.0 into human life, the rise of digitalization will be the front foot of a situation that separates individuals from traditional socialization structures, pushing them to socialize on more virtual structures. What kind of damages socialization will cause interpersonal relations in a virtual sense is manifested on many structures both in the social and individual fields.

In this regard, it is useful to focus primarily on the impact of virtual formations originating from social networks on digital structures. As a matter of fact, on these structures, individuals have to meet with people they see in accordance with their own interests. The socialization of individuals with different people from anywhere in the world through the social communities they have formed as a result of this gathering is one of the most common developments. However, at this point, with virtual socialization, individuals break away from social life in real life. However, introducing oneself to the people with the ideal identity of the individual on the social structures involved, not only with the real identity, but also by increasing the self-confidence level of the individual, leads to the formation of a human model that is more confident in the virtual world and afraid to break away from this world.

In addition, groupings on virtual structures and the effects of these groupings on the social structure can be talked about the virtual communities created in virtual structures. Although these communities act with the logic of community in general, it is worth examining the infrastructure. As a matter of fact, the structures described as virtual communities and the belief system of society have changed, and individuals have become virtual followers of the communities that exist in real life, as well as the new religious lives of the communities created on virtual buildings, as well as the new religious lives have begun to shift. This issue enables the adoption of new rules with new religious structures on individuals and thus the emergence of the human model which adopts the developments at the highest level. When the issue is evaluated in general, the impact dimension of Industry 4.0, which can be considered within the special structure of technological development, is to cover the whole society. This scope includes material structures such as employment, decrease in material income, decrease in purchasing power, increase in production, as well as spiritual or abstract structures such as personality, religion and culture. In this context, it can be said that the effect of Industry 4.0, which starts with influencing the material structure of the individual, and which connects with production, extends to personality traits, traditions, customs and even religious effects.

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Chapter 18

Digital Era and New Methods for Employee Recruitment

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ABSTRACT

The ever-increasing digitalization in today's business processes—and incredibly fast-growing markets—have created a more competitive business environment. And, this more competitive business environment has led companies to be more demanding regarding the employee qualifications as well as the quality of tasks carried out by these employees. Moreover, this change process has rendered the traditional human resources management methods inadequate, further digitizing the field of human resources. In this study, the authors examine the handling of recruitment functions within human resources management and the digitization process. Furthermore, they discuss both the basic dynamics of the e-recruitment processes, the tools of e-recruitment, as well as its advantages and disadvantages.

INTRODUCTION

Amazingly, in the last few decades, and primarily as a result of developments in the digital age, significant changes in the business environment have taken place, and been experienced both in the technological environment and information technology. International competition and the globalization process direct working norms, while management and human factors direct us towards new targets and policies. The new needs created by industrialization and technological changes have necessitated enterprises to renew themselves, to adopt new working and production techniques, and to apply modern business and personnel principles. These changes have not merely influenced the tasks related to information management but also caused important developments in many other unrelated areas. Among these managerial areas that have been affected by these developments, human resource management processes have lived through noteworthy transitions, as well, new technological trends have gained enormous importance in human resource management processes. While companies try to adapt to changing conditions and a new global order, the concept of human resources management, which is based on the principles of meeting and developing the capabilities, knowledge, creativity and needs of individuals, has started to be

DOI: 10.4018/978-1-7998-1125-1.ch018

used instead of the narrow concept of personnel management, a principle which expresses all activities related to employees. E-human resources management has gained momentum due to the increased use of in-house computers and communication technologies and the accumulation of knowledge in in-house networks. In addition, rapid changes in communication technologies, new regulations, and an increasingly competitive environment in our economic lives have led enterprises to seek new solutions (Güler, 2006). These developments in the business environment enabled the creation of real-time and interactive business technologies that had not existed before the 1990's when classical methods of recruitment were prevalent. Especially, web based technologies and online business processes have become popular among both practitioners and academicians- especially after the 1990s with the popularity of e-trade that had increased in the markets.

Owing to the developments in IT processes, the last few decades have witnessed the intense and dynamic development of IT and its impact in various human resource jobs (Berber, Dordević, Milanović, 2018). Electronic Human Resource Management, namely, e-HRM have come about as a process that involves the use of web-based technologies for providing services regarding human resource management. Generally, the concept of e-HR refers to the application of strategies, policies, and practices related to human resources in organizations with support or full reliance on web technology (Ruel, Bondarouk & Looise, 2004:365). The application of IT technologies and its innovative solutions changed the manners that HR professionals carry on within their different HR activities. Mostly activities such as collection, keeping, and updating of employees' data, employee training, and performance management underwent changes (Berber, Dordević, & Milanović, 2018). And, activities in the field of recruitment and the selection of candidates are among the activities that drastically changed, attracting the attention of modern companies of the digital era. E-HR technology has begun to be used by multiple sectors including employees of the HRM department and other employees in the organization, potential employees, and as well as the management of the organization (Dorel & Bradić Martinović, 2011).

In fact, the term e-HR has its origin in the 1990's, with the idea of the emergence of e-commerce (Lengnick-Hall & Moritz, 2003). As in the case with e-commerce, the prefix "e" was used in HRM, which resulted in the name of e-HR or in some usages e-HRM concept (Ha, 2011: 20). Later it became popular to use e-HR in explaining all HRM functions involving the use of internet and the latest technologies. In fact, E-HR can be explained as a way of conducting HR strategies in companies through a willing, conscious, and direct support of full use of internet based technologies (Ruel et al.'s; 2004). As in the case in the term e-commerce, e-HR refers to conducting human resource transactions with the help of the Internet. The use of the Internet ensured human resources would function with the ease to reach and use information at any time. (Lengnick-Hall & Moritz, 2003). And as an important function of HRM, the recruitment function has experienced many changes in this period.

Technologically speaking, the antecedent of e-HR was human resource information systems. These systems were focused on automating the human resources management systems. Although, Human resources information systems were not successful in creating the ideal internal virtual value chain. Indeed, E-HR has evolved in three stages. The first stage was the most primitive and widespread one including implementation of e-HR in publishing information, routine reports, and news related to all kinds of human resources activities. It is both the simplest form of e-HR activities and also the most restricted one since it includes one-way communication and a top-down information flow from human resources management department professionals to the rest of the employees in the organization. And, companies mostly prefer their intranets as the basic information delivery tool. In this method, generic content information is published from HR to employees like policies, procedures, and daily company

news etc. The second stage encompasses the automation of human resources processes that encompasses the simultaneous use of intranets with extranets. Different digital applications are combined in this human resources mode and paperwork is replaced by mostly digital input. In the third stage, the transformation of human resources to a fully electronic mode is seen. In addition, this fully electronic mode is largely composed of online tools used with the help of online web applications that are useful in tracking tasks for recruitment, performance management, wage management, and career management.

In this paper we have discussed recent trends that have become popular as a result of the changes in working habits of the HR professional within the modern digital era. First of all, one of the latest trends, namely outsourcing of recruitment processes, will be explained in detail since it has come about as a new dimension- workforce management for recruitment and selection in modern era (Anthony et al., 2013). And then, we will focus on e-recruitment, as well as its benefits and different mechanisms that e-recruitment can be applied through. We will focus on the web-based recruitment process as one of the most prominent novel recruitment methods of the 21st century.

We will later focus on another recruitment method that become popular using social networks and social media. Social networks and social media represent a rich source of information that in most cases is not available any other way (Berber, Dordević, & Milanović, 2018). In the last five years, it has not only become quiet normal to collect information about candidates via Yahoo or Google but also through social networks such as Instagram, LinkedIn, Facebook, and Twitter- based on the networking of individuals. In these social media networks, people often place information about their personal and professional information that many Human resources managers find valuable in evaluating candidates. Mostly, this information is the kind of information that is impossible to detect during the selection processes, such as job interviews, exams and reference controls (Gatewood, Feild, & Barrick, 2008).

As in the examples mentioned above, in this paper, a comprehensive analysis of new employee recruitment methods will be covered. In the design of this paper, the benefits of the latest technology, digital trends, and the effects of these trends on modern employee recruitment processes have been taken into consideration. In the study, we have adopted an approach that views recruitment as a purposeful practice activity wherein modern scientific and technological achievements are applied in modern enterprises. Additionally, confirming the effects of new digital habits, new technological tools, and modern methods of attracting and selecting potential candidates has been targeted by showing both their advantages and disadvantages for candidates and enterprises.

E-HUMAN RESOURCE MANAGEMENT

Benefiting from technology and digitalization is a novel area of study in management. Regarding this, Orlikowski and Scott (2008) claim two main schools of thought regarding the technological orientations of organizations. The first one is technology determinism which reflects a positivist perspective wherein technology is viewed as an independent and qualitative variable resulting in positive organizational outputs. The latter views technology as a novel concept changing over time and reflecting a rather post-positivist approach. In the previous approach, technology can be considered a deterministic entity interacting with various organizational factors (Orlikowski & Scott, 2008, p. 439) and having a considerable effect in an organizational climate at myriad levels: an individual level, group level, enterprise level, and inter-organizational level. Furthermore, in this approach technology is considered something effective on several organizational results. It is an independent variable encompassing efficiency, organizational

agility, organizational resilience, and productivity (Orlikowski & Scott, 2008). This deterministic approach views technology as a causal variable creating theoretically-determined outputs such as efficiency, productivity, competitiveness, or market orientedness. For instance, the quantity of IT projects carried out in a certain company, the quantity and quality of technical tools utilized, and the qualifications of IT professional in an organization can be regarded as independent variables in research existing in the first stream of thought. The latter stream of thought in management literature concentrates on dynamic relationships between people and technological variables. This stream of thought is less deterministic in comparison to the first one. It considers technology as an element of “complex process in which organizational structure is created.” But in relation to this point, technology should not be approached with a bounded framework. Technology is no longer a discrete entity affecting some organizational outputs in a certain direction, thus it should not be understood as a quantifiable variable as it is much more complex and confusing. In fact, it is an emergent organizational factor which cannot be completely understood with certain basic formulazations. Several factors and complicated interrelations can be useful in understanding the impacts of technology on organizations.

By embracing e-HR, companies direct their HR function to a more systematized, mode-digitalized, and more convenient state. In e-human resources management, most of the human resources management functions performed by the human resources departments within the enterprise have been transferred to the web environment. In companies using e-HR, transactions are held with a higher speed, lower levels of information errors are seen, and the tracking and control of human resource functions are handled more professionally. Thus, with the help of e-HR companies, organizations can improve their human resources management service delivery (Lengnick-Hall & Moritz, 2003). Also, they can more efficiently and satisfyingly serve their interior and exterior customers. Priorities, such as saving time, reducing bureaucracy and reducing costs, are prioritized. First of all, e-HR is a cost saving way of conducting human resource functions. In organizations wherein e-HR is used, fewer human resource professionals and lower working hours are required due to the fact that e-HR eliminates the need for the HR middleman. In companies using E-HR mechanisms, most functions are computerized and automatized, thus most HR departments need fewer people working in their services after embracing e-HR. A quite significant part of the activities are held by computers, and tasks are carried out much more conveniently. In companies using e-HR, transactions are held with a higher speed, lower levels of information errors are seen, and the tracking and control of human resource functions are handled more professionally improving the speed and quality of HRM service delivery (Lengnick-Hall, & Moritz, 2003). Moreover, embracing e-HR may also create alternative revenue sources for organizations. Through e-HR, HR professionals gain the ability to direct their energy to new realms in doing their business more effectively and professionally. For example, with the help of e-HR, companies can increase productivity, employee motivation, and adopt more developed decision-making processes (Lengnick-Hall, & Moritz, 2003). On the one hand, different e-HR activities can contribute to different organizational capabilities, such as automated HR processes, easy data processing and analyzing, communication with stakeholders, and easy access to external sources (Marler & Parry, 2015), thus allowing companies to gain a competitive advantage in the long run. In fact, the use of e- HR is a planned strategic activity regarding the provision of HR activities through modern technologies (Marler & Parry, 2015). Moreover, e-HR tools help companies keep up with the newest developments in the area, and urge HRM departments to detect and absorb the most updated know-how and technologies. Companies feel compelled to adapt new trends, trends which can lead to the adoption of the latest technologies in various functional areas, including human resources management.

In fact, e- HR is found to be more pervasive in those kind of companies wherein a more sophisticated and complex HR functioning is prominent. As Voermans and van Veldhoven (2007) suggest, in the kind of organizations wherein there is a system of HR strategic partnerships, there is more likely to be an inclination towards e- HR since they need to have close relationships with them. In these companies e-HR makes HR functioning more effective for multiple stakeholders, such as potential candidates, existing employees, middle and top managers and line managers. Strategic partnerships necessitate closer contacts and relationships with the related business units. E-HRM ensures this close contact and creates a continuous communication link between the HR and related business units. E-HR can confer many advantages for organizations, such as a more efficient and strategically oriented HR functions and an increased competitive advantage (Lazaaara & Galanaki, 2018). That is why E-HR often results in an improvement in HR's strategic orientation, and namely with the help of e-HR, human resources functioning can better accommodate itself. Using these systems, e-HR systems increase efficiency and ensure a change in HR that creates a shift to a more strategic level (Parry & Tyson, 2011). With the help of e-HR mechanisms, companies can attain five possible goals: efficiency, high quality human resources service delivery, long term strategic orientation of the company and more empowered and satisfied employees, and the standardisation of human resources work flows (Parry & Tyson, 2011).

In fact, the task characteristic in the human resources department is, the inclination to have more paper-based or less stationary tasks predict the level of technological adoption, and the extent to which the company prefers to adopt e-HR mechanisms. Excessive paperwork, having various business units in different locations, high turnover rates, and crowded and complicated organizations give way to higher levels of technology use in HR departments. It is much easier for huge multilayered and hierarchical organizational structures to ensure inner communication among stakeholders with the help of these applications. And similarly, organizations too frequently recruiting and having complicated HRM processes often benefit from technological applications and mechanisms in carrying out their daily activities since it is a factor easing their daily jobs. An organization's scale is also significant to the extent the company resorts to e-HR. That is to say, personnel number, number of different hierarchical levels in the organization, and the extent to which the organization is structured in different strategic business units effect the use of e-HRM adoption. Furthermore, organizations with highly qualified employees tend to be more successful in e-HRM adoption (Lazazzara & Galanaki 2018). As well, isomorphic pressures at the market, namely pressures applied by rivals, also make players resemble each other that can effect the use of e-HR. That is to say, if in an industry embraces e-HR tools, the rest will also engage in e- HR.

To sum up, it is more advantageous to carry on human resources functions through online portals and technological communication tools. It makes HR functioning more effective in the relationship among multiple stakeholders such as potential candidates, existing employees, middle and top managers and line managers. Namely, e-HR contributes to higher efficiency, high quality HR service delivery, long term HRM strategic orientation, more empowered HR professionals, and standardisation in HR processes (Parry & Tyson, 2011).

RECRUITMENT

In an increasingly globally competitive environment, enterprises recognize that employees are a major source of sustainable competition. Significant changes in terms of form, quality, and quantity of work seen as a result of technological and scientific developments, has resulted in the emergence of new

fields of work and the need for different types of personnel in these areas. No matter how satisfactory the financial resources of an organization are, companies cannot realize its purpose if it does not have the human resources to operate these structure and effectively use financial resources. It is critical for enterprises to have unique resources in order to maintain their competitive advantage. In other words, they must have a well-equipped workforce, be able to retain them, and use them in line with their business objectives (Gözen, 2016). In this challenging and demanding atmosphere, finding the right employees is very important. And, in order to find the right kind of employees, HR must use the proper methods in order to attract and select job seekers. In fact the recruitment process serves an important function since it encompasses looking for and attracting a pool of qualified job seekers using various complementary methods. As conventional recruitment tools, companies use referrals, headhunting, written media, ads, etc. to attract candidates.

Generally, recruitment can be explained as the process of attracting, selecting, and hiring the most suitable applicants for vacant positions based on a candidate's individual properties and their person-organizational fit (Melanthiou, Pavlou & Constantinou, 2015). It is a unique process wherein a considerable number of job seekers are evaluated according to their suitability as an employee for the company. Most frequently, in large corporations, recruitment processes with more formal and structured procedures are embraced; whereas, in small companies rather informal, unstructured and ad-hoc methods are adopted in recruiting new employees (Jameson, 2000). Turnover rates and the number of new personnel recruited each year affects the quality and methods used in the recruitment process. In larger companies, since the frequency of recruitment and selection is higher, companies tend to engage in more structured and more convenient ways of recruitment- as in the example of e-HR. In fact, recruitment can be considered the first step of effective competence and talent management. Attracting applicants with high qualifications and suitable competencies is mostly possible through carrying out a successful recruitment process, and through a successful recruitment process, companies can get access to successful, eager, ambitious, and competent new employees.

In the recruitment process, ending up with the right candidate at the lowest cost possible is important in creating effective and efficient employees and earning competitive advantage in the market. Without a doubt, finding the right candidate is easier if the candidate pool of the company is larger, and namely, if the company can come across higher number of job seekers. Traditional recruitment methods involve applying personality tests, talent tests, technical capability tests, one to one interviews, panel interviews, and reference checks. And, correct planning is significant in carrying out a successful recruitment process. Namely, the planning process is the antecedent of the recruitment process. In the planning process the HR department plans the required number of employees that should be hired in a certain time period. In planning this number, previous numbers of employees hired, the work load of existing departments, newly emerging tasks, business units, and yearly HR budgets are taken into consideration. When the planning process is completed, the recruitment process, which is defined as a process of creating a group of qualified candidates for the vacancies within the organizations, starts. In both professional and non-professional areas, recruitment will include an attempt to locate a diverse applicant pool with the necessary qualifications and potential, and communicating to them the available employment opportunities (Raghavi & Gopinathan 2013).

Selection is also a widely confused process in recruitment. In fact, selection is a more complicated process compared to recruitment. In the recruitment process we are talking about an activity that is targeting establishing a written contract between the employer and a new employee ; however, selection refers to a set of complicated and integrated activities that aim to attract more competent and congru-

ent applicants for the company. On the other hand, the main objective of recruitment is encouraging a large quantity of candidates for a certain vacant position; whereas, selection targets rejecting unsuitable ones and selecting the most proper and most competent job seekers. Namely, recruitment is a positive approach wherein the candidates do not have to strive past many hurdles, but selection is a negative approach wherein the job seeker should go through a difficult set of processes in order to be selected for the vacant position. In fact, recruitment is the step preceding the selection process. In the selection process, the most qualified applicants are chosen to fill the vacant positions. In fact, the company cannot be successful if it fails to select the right candidates since the main target of the hiring process is finding the most congruent applicant. On the one hand, it is also significant to carry out the selection process in an ethical and transparent manner since poor selection would result in poor performance and organizational commitment. That is why, before the selection and recruitment process, each company should previously designate its selection criteria and make them known to the candidates. In selection, there are a lot of criterion that the candidate should be compatible with, and the features that the job seekers should possess is predetermined. Therefore, a good selection criteria often includes multiple factors: ability, motivation, intelligence, diligence, appropriate risk, and reliability. On the other hand, the time interval that the human resources professionals spend for the selection process vary between weeks and months. It can be quick but mostly takes at least 2-3 months. In principle, the longer period is reasonable since there are a lot of sequential steps in carrying out this process. First of all, the company should attract the attention of candidates. Furthermore, the interests of the candidates should be compatible with the features of the vacant position. In order to understand this compatibility, the applicants should review the job characteristics from the job ad. Later, if the job seeker finds the job suitable, he should fill the job application forms. After that, the recruiter of the intermediary recruiter company or the recruitment professional of the related company should filter the most proper CVs. Next, some specific tests regarding the related position are applied to the applicants. And then, the applicants that are most successful in their competency and talent t interview with the recruiter (and sometimes panel interviews with all related parts including the human resources professional and line manager) are conducted. Following that is testing and the final interview, checking the accuracy of the information, the feedback and job offer, a medical examination, and deployment and implementation at the workplace. election is a more time and money consuming process compared to the recruitment process. In the selection process, the recruiter should work effectively so that no one wastes time, money, and energy during the process.

In the recruitment process, the recruitment tools, mechanisms, and workflows can change in complexity from company to company; in addition, the degree of difficulty according to the goals and sources of the process can be chosen by the related company. The most commonly used sources for external recruitment are newspaper ads, private and public employment agencies, Internet job boards, career websites, corporate websites, employee referrals, career centers of universities, intermediary consultant firms, and job fairs, etc. (Ployhart, Schneider, & Schmitt, 2006, p. 280). Interior recruitment is another method of filling the vacant positions in a company. Sometimes firms prefer to fill their vacant positions with people that are already working for the company but try to change their departments or positions. Interior recruitment is an effective tool for motivating existing employees. Employees feel empowered when interior recruitment is preferred in filling vacant positions. However, e-recruitment, the kind of recruitment we will elaborate in the next section, is mostly preferred when carrying on external recruitment process- namely attracting and evaluating candidates that are not working in the related company.

E-RECRUITMENT

In addition to radically changing our social and economic life, the Internet has significantly influenced the governance of institutions (Stone et al., 2006: 229). According to Tong and Sivanand (2005), due to the increase in global competition, business life has become more skill intensive, and recruiting and attracting the right applicants at the right time has also become more important and tougher than ever. In fact, the conventional recruitment processes cannot meet the needs of timely and effectively attracting qualified candidates (Yoon Kin Tong, 2009). Thanks to the integration of the developments in communication technologies and computer architectures, data transfer and sharing studies have revealed the structures, called networks by computer networks or working networks, are widespread use in business applications. With the development of information technologies, great changes have occurred in business and technology, and job applications and human resources recruitment processes are affected by these changes. An important human resources function that institutions use effectively from communication technologies is recruitment.

As mentioned before, e-recruitment mechanisms started to become more and more popular owing to their advantages in allowing human resources professionals to target a great number of candidates at a small cost (Faliagka, Tsakalidis, & Tzimas, 2012). The use of technology has taken an important place in the recruitment and selection of personnel. The development of the number of users on the internet has been reflected in the number of companies that provide parallel personnel selection services. The increase in the number of CVs in the candidate database is one of the important reasons for this development (Peters, 2001). Nowadays, many corporations are using online platforms such as job-boards, corporate recruitment sites, and social media websites in their recruitment practices (Allen, Mahto, and Otondo, 2007). Online recruitment is preferred since it is both cheap and flexible (Capelli, 2001) but also can be utilized as a tool for image management (Girard & Fallery, 2011). Without a doubt, organizational websites help form first impressions for applicants (Braddy, Meade, & Kroustalis, 2008), and the information provided on these websites are effective for candidates' attitudes regarding the firms (Allen, Mahto, and Otondo, 2007). If the job seekers come across as neat, transparent, and appealing they tend to react more positively towards the employers and their demands. The first contact with the company for many employees is the recruitment process and the interview process. Moreover, recruitment portals used for many companies (as intermediaries for catching new CVs) are also helpful in saving time and money for the applicants. They can get in touch with the employers without spending much money, compared to the cases wherein classical methods of job search are preferred by the applicants. Moreover, they do not spend money for transportation, they are often user-friendly, and they give enough information which is convenient for reaching a bigger pool of candidates.

In fact, e-recruitment refers to an umbrella term involving all kinds of recruitment activities carried out by using various electronic means and the Internet (Holm et al., 2014). It implies publishing job posts (namely open positions online), having an online fill-in form available for applicants, and a web-based database existing to store the resumes of applicants (Brandão, Silva, & dos Santos, 2019). E-recruitment encompasses three main stages: attracting, sorting, and contacting applicants. The first stage covers all the processes regarding the suitable design of online portals and tracking potential candidates. The next stage encompasses screening candidate profiles through sophisticated on-line mechanisms and tests. In the last stage, in getting in touch with applicants, e-recruitment tools are quite successful, owing to the fact that they provide efficient communication mechanisms to be automated (Holm et al., 2014). In fact, e-recruitment allows candidates to have contact with more job opportunities and reach a greater

flow of information (Sylva & Mol, 2009). They can learn more details about the vacant position and the job characteristics of that position through job ads. With the help of e-HR systems, organizations can be seen in myriad career portals and can attract astronomical quantities of applicants with a myriad number of qualifications. In most e-recruitment processes, companies use an automated system wherein candidates are ranked according to the scores they get after being evaluated by a set of objective and credible criteria (Faliagka, Tsakalidis, & Tzimas, 2012).

Moreover, in the e-recruitment process, specialized selection tests, such as knowledge tests and personality tests that can be applied through internet, provide online feedback to the recruitment professionals about the qualifications of the candidates. That is to say, in e-recruitment, myriad preliminary online procedures can be utilized ensuring the elimination of candidates that do not fit the demands of the vacant position (Brandão, Silva, & dos Santos, 2019). For example, computer-based tests, the design of technology-based assessments, multivariable feedback with computers, design of descriptive interviews for the Internet, use of technology for supplying and eliminating candidates, are all important applications. In the development of tests and evaluations, interpersonal correct decision-making scale, situational decision-making inventory, personality assessments and measurement of their validity are included. In fact, for many organizations, utilizing the internet in administering job applications is very beneficial in comparison to traditional methods, owing to lower costs, reduced hiring cycle period, and non-stop access for job seekers to the related job advertisements- despite their physical location (Sylva and Mol, 2009). In companies using e-recruitment, the location of applicants and the company become irrelevant in the recruitment process.

Most businesses incorporate e-recruitment technologies into their bodies through recruitment sites or human resources pages on corporate websites. However, as recruitment sites attract more attention from the candidates, many enterprises prefer to use the candidate pool of these sites. They can easily reach members of career websites, online job seekers, and people from different locations.

Although the internet is a good source of choice for those who are just starting out, it brings with it a number of problems in finding executive candidates. Since the number of applicants is too high in e-recruitment, sometimes it becomes more difficult for a unique job seeker to be chosen for a face-to-face interview after they surpass filters. The people who are in managerial positions use their friends, consultants or private recruitment agencies such as headhunters instead of online recruitment portals when they are looking for work (Mornell, 2000: 262). It is regarded as an unprestigious way of looking for jobs in upper-hierarchical positions, and it becomes a matter of ego to be compelled to apply for a job as a newly graduated or inexperienced candidate.

CORPORATE WEBSITES

Corporate websites are important arenas for self-expression of companies and useful in reaching the exterior and interior customers of a company. Corporate websites have become an important source of information in the job application process (Cober et al., 2003: 158). And, they are significant communication channels between companies and job seekers (Araújo & Ramos, 2002). Sometimes companies prefer using merely their corporate websites to attract new applications. Corporate websites are important tools in E-recruitment applications in both reaching a large area of workforce and informing candidates about the institution. In the job advertisements published on websites, institutions give many messages about themselves, as well as the job, and the characteristics of the candidates to be placed in this position. All

information in the advertisements gives important clues about what kind of employee can be employed. These clues can significantly affect the candidates' application to a institution.

On the one hand, corporate websites have the function of representing the organization. Therefore, the content of the web site should be prepared in accordance with the values, norms, and goals of the company and should be constantly updated so that possible problems can be easily resolved. Corporate websites have the potential to provide applicants with real-time feedback about person-organization fit (Pfieffelmann et al., 2010). Namely, job seekers can effectually compare their own properties, job characteristics, and demands of the employer company through the information given in online job ad and through their examinations of the related corporate websites.

Private Employment Agencies

Private employment agencies are also important vehicles for online recruitment. They attract millions of candidate resumes through their websites and online employment platforms. And, through these portals and their own websites, thousands of employers are announced for vacant positions. Special employment bureaus use all the HR services: telephone and face-to-face interview techniques (which are traditional methods), collecting the resumes of the candidate, sending emails to the candidate for email applications, and applying to the employer. Candidates earn many advantages in job searches with the help of private employment agencies. Through these agencies, it is possible for vacancies to be offered automatically by the site; in addition, the vacancies can be searched according to various criteria, the job application and evaluation process can be taken continuously, and candidates can get consultancy services. Private employment agencies function in almost all sectors in employee recruitment, they have a mediating role in the recruitment staff in many sectors. And, these offices are involved in recruitment at all levels and positions by submitting ads through the online employment platform- or through their websites in lower and mid-level recruitment. Finally, they use headhunting methods for recruiting candidates for upper-level positions.

This "third-party" e-recruitment companies have become the second most popular online traders in both the United States and Europe (Tong, 2008). They act as intermediaries between job seekers and employee seekers. These third-party recruiter companies give services to organizations that prefer to utilize online job advertisements for attracting and screening potential candidates' CV's at lower costs compared to more conventional recruitment techniques. In fact, in most countries e-recruiter companies serve the job seekers free of charge in posting their CVs online (Galanaki, 2002). Owing to free CV sending opportunities, it is inevitable that job seekers freely send their CVs to different intermediary e-recruiters; thus, creating bigger and bigger candidate pools for organizations, and making it more advantageous to work with these intermediary e-recruitment firms. Therefore, the rapid growth of the third-party e-recruitment web sites has altered the way jobseekers are looking for jobs.

USE OF SOCIAL MEDIA

In human resources management, social media, its structure based on advanced internet technology, and its many different and new features have had an ever increasing effect. In the recruitment processes, social media has become an important alternative for attracting applicants. Social media can be considered an important tool for recruiting new employees. It is a proper baseline for presenting the newest

job opportunities, information regarding companies, vacant positions, and challenging alternatives for candidates. With the help of social media, companies can adopt more speedy, efficient, and strategic recruitment processes. Social media increases the ability of companies to target the most meaningful and congruent candidates from a wide range of job seekers.

For example, in the United States, 98% of companies control the social media profiles of their applicants in their personnel selection processes. According to this research data, Twitter ranked third with 49%, while Facebook ranked second with 51%, and LinkedIn had the highest rank at 98% (Cülcüoğlu, 2013). This is why companies also look at social media profiles as well as normal resumes. Social media acts a supplementary tool in the recruitment process. For instance, LinkedIn is also an alternative channel for professionals who are not actively looking for work but are open to new opportunities. Seeing social media as just a resume repository means insufficiently using this channel. Most businesses can also use social media to check their CVs with candidates. This is considered a more effortless method of reference control but is sometimes considered to be more reliable. On the one hand, search robots such as Google, Yahoo, and Yandex also provide the opportunity to get extra information about candidates that can be added to the information already given by the candidate in his/her CV. The increasing use of social media in a person's life has reached a level where human resources units must deal with this reality. First of all, merging the career pages of the institutions with social media pages should be listed as the first steps towards socialization. The fact that corporate career videos are given to Youtube is one of these examples. In social media and networks, organizations not only use the brand identity as a user, but also actively use and follow these sites. At this stage, organizations have started to manage new communication platforms by creating a new team or using external sources (Bora, 2011).

At this point, there are also scholars studying different methods to evaluate candidates according to their social media data. For example, Faliagka et al., (2012) developed a method of ranking candidates by utilizing machine-learning algorithms for evaluating applicants that makes linguistic analysis of candidates' blogs and creates objective criteria that draw data from a candidates' LinkedIn account. For example, in Caers and Castelyn's (2011) study, the recruitment and selection habits of Belgian human resources professionals have been examined with an aim of understanding whether LinkedIn and Facebook are important tools in making selections, regarding candidates. In the study, about 393 human resources professionals were examined from various sectors and organizations and an online questionnaire concerning the use of Facebook and LinkedIn in recruitment processes has been applied. The results of the study showed that both facebook and LinkedIn act as supplementary tools in understanding applicants and are used for finding additional information about applicants in order to to decide whether it is meaningful to invite them for the interview.

However, sometimes the data received from social media may not be so clear or may not realistically reflect the the candidate. When creating these data, users of the social networking site mostly do not have an initial intention of preparing knowledge about themselves for recruiters, so this data may not ensure necessary information has been productively portrayed for the recruitment process. And sometimes, it may cause unlawful discrimination since the recruiter can find out information about the applicant's race, ethnic identity, age, political identity, sexual orientation, religion, and disabilities (Pate, 2012). Since this type of searching occurs without the knowledge of the job seeker, the recruiter can freely discriminate without the applicant's knowledge, thus deteriorating the fairness of the process and relevance of the search with the recruitment process.

ADVANTAGES OF E-RECRUITMENT

Doherty (2010) claims that as an indirect effect of e-recruitment for companies we should take into account the positive perception created by the company as a modern and technology-friendly organization. With the help of adoption of e-recruitment, the company can create an image wherein e-recruitment creates an image that the company is innovative and open minded. That perception helps the organization to attract young talent, high potential, successful candidates with high expectations from their organizations. Namely, companies gain prestige through the use of the latest technology. With the help of e-recruitment systems, companies may utilize their job ads to create a favorable brand and company image in the eyes of their potential candidates. Typically during job searches, job seekers are often curious about who they can work for and what are the properties of these potential employers. That is why an elaborate job advertisement will positively shape the candidates' decisions (Kaur, 2015).

In companies, mostly applicant tracking systems are used by companies in order to manage the recruiting process. Through these systems, job seekers' job applications and companies' vacant position openings are held electronically. And, these systems are often provided by web-based applications. Job openings from companies' applicant tracking systems are often aggregated by "job board" services tracking millions of job advertisements, and these services let candidates perform simple keyword searches for finding vacant positions. Job seekers typically apply for vacant positions by uploading CVs that are mostly manually examined and evaluated by expert human resources professionals (Faliagka et al., 2012). And unfortunately, only a small fraction of all candidates receive an offer for a one-on-one job interview. Sector leaders, such as JobVite and Monster, have added a degree of automation in their candidate screening process that is integrated with the widely known applicant tracking functions (Faliagka et al., 2012). This automation makes it a bit easier for human resources professionals to track the applicants and to filter the most suitable candidates. The automated version also makes it easier for candidates to come across the kind of job advertisements that are most suitable to their qualifications.

Applicant personality traits are crucial for applicant selection in many job positions but are generally overlooked in existing e-recruitment systems. Normally, applicant' personality and individual characteristics are evaluated during the face-to-face interview, which is only applied to the applicants that can pass the online pre-screening stage (Faliagka et al., 2012). But, in the automated version of e-recruitment, clues from all applicants' personality can be obtained through their online applications. By using web mining techniques, these automated systems gather preliminary data regarding an applicants' personality that can be important in the pre-screening stage. Previously, this task has been undertaken by human resources professionals manually, which is both time and effort consuming. Recruiters, which are widely acclaimed to perform background checks on prospective employees, take advantage of their web presence. However, in the automated e-recruitment processes, it is much quicker and easier. For instance, in these systems the candidate can be asked to share a link to his personal blog, owing to the fact that personal blogs encompasses a wide range of information and linguistic characteristics reflecting the realities of the blogger's personal characteristics (Oberlander & Nowson, 2006).

JobVite (2012) claims that social media can also be considered a very significant tool for employee referrals, reducing time spent in this process and an important part of costs incurred during hiring. Since potential applicants of a certain company can reach the related job post without, we can talk about a greater number of applicants. And, the applicants can access the related job post via many different kinds of electronic devices including smartphones, tablets, laptops, and computers- enabling them to apply for the job.

Moreover, e-recruitment processes serve as an enhanced user experience allowing an entire recruitment process which can be managed from one central point, allowing recruiters to post vacant positions, accept CVs, search and screen applicants, filter CVs, and contact applicants when necessary (Kaur, 2015). In the same way, applicants can track their applications' progress at each step of the recruitment process from their own personal account. They can manage their own account and they can update it whenever it is necessary. Thus, this enhanced user experience creates satisfaction for both the employer and job seeker, encouraging quicker and more satisfying recruitment process. Furthermore, the employer or the recruiter full control during e-recruitment. He/she can contact job seekers directly, does not need a middleman for searching, filtering, assessing or selecting the most suitable applicant (Kaur, 2015). And, the recruiter can give instant feedback regarding the updates made by the job seeker. For example, when an update is made on a job seeker's CV, the recruiter can easily get the newest version of the CV and can reevaluate the CV instantly.

DISADVANTAGES OF E-RECRUITMENT

During the e-recruitment process, job seekers generally upload their CVs in a loose format to the related e-recruitment portal, making it necessary to be considered by an experienced and qualified recruiter; thus, creating a great asymmetry of resources needed by job seekers and e-recruiters and mostly increasing the quantity of unqualified job applicants (Faliagka et al., 2012). It is so easy to apply for a job via this online system that many people apply to several jobs without much considering the details of the job advertisement. Sometimes, they even apply to jobs without even reading the details of the job advertisement, or even worse, people sometimes apply to the ads they even would not prefer to go to its if they were invited. The fact that most of the career sites do not request membership fees from the candidates, the applicants do not pay any fees for the application, and there is no sanction for the applications made with a serious intent can lead candidates to apply for jobs that they do not really want. This means unnecessary confusion for the recruiter, as many CVs are incongruent with the position and a lot of candidates are eliminated after they are filtered. Thus, less serious applicants are also a problem in the e-recruitment system. Owing to easy and free access to job ads, many job seekers apply to a lot of irrelevant job ads in order to learn their own market value since it is nearly impossible to test whether the job seeker is serious or not. That is why, only if the job seeker is invited to the interview can the recruiter understand whether he really wants the position or not. But, if it turns out that the job seeker is not serious; unfortunately, it means some serious ones have been missed and have not been invited to the interview (Kaur, 2015). And, this is something very difficult to prevent due to the general working principles of e-recruitment sites. However, people, especially elderly employees who are not accustomed to using technological tools may avoid providing applications via internet due to their technology bias. That is to say, an e-recruitment applicants' reactions to the online system and job advertisements in this systems are affected by the perceived efficiency and perceived user-friendliness of the e-recruitment system. Namely, it is affected by whether or not the applicant views the job advertisement as easy to conceive and apply for (Sylva & Mol, 2009).

On the other hand, related research indicates that use of social media, internet, and web based information search techniques that are generally preferred in e-recruitment may sometimes create bias in the recruitment and selection process. Unfortunately, drawing conclusions based on web-based information, social media comments, or photos- making deductions from unrelated data- may mislead possible job

performance or person-organization fit expectations (Purkiss et al., 2006; Caers & Castelyns, 2011). On the other hand, in today's technology, corporate information is served to job seekers at lower costs that can cause misleading or negative information from company-independent information sources that are impossible to control (Caers & Castelyns, 2011). Furthermore, the candidate might come to the interview with all inaccurate knowledge about the company that may result in a negative impression on both sides.

Furthermore, since the user-friendliness of the recruitment portal creates a positive or negative impression about the professionalism of the company and the importance of the job in the related ad (CapPELLI, 2001), it is important to build a positive image through corporate web sites and online recruitment pages. A sloppy corporate web page, a job posting with erroneous information, or oversimplification can lead the candidate to underestimate the job and decide whether the company is a very attractive place to work. Similarly, problems such as continuous errors in the online recruitment portal, or corrupted data can hinder the progress of the user, and may cause the job seeker to stop applying from this portal. When the related websites are designed properly, candidates can perceive the company as a much more attractive one (Turban et al., 2001).

Possible outdated job ads are another possible disadvantage of e-recruitment. Sometimes, recruiters forget to remove old job posts that have already been filled by a candidate- sometimes by mistake or miscommunications between the human resources manager and the recruiter. And, job seekers continue to apply for this position and the company gets flooded with unnecessary CVs (Kaur, 2015) making things unnecessarily complicated and problematic. The job seekers applying to this nonexistent vacant position become more anxious in time and start to embrace negative emotions regarding the company. This makes it risky for the company to attract CVs of these applicants for real vacant positions in the future.

CONCLUSION

E-recruitment is defined as the actions and practices of the institution by using various electronic tools to fill open positions effectively and efficiently (Lee, 2005). It is a technology-based process wherein many recruitment applications such as online job vacancies, online interviews, and online tests (Öksüz, 2011) are utilized. E-recruitment provides speed and cost advantages for organizations to design their websites, not only to receive job applications but also to make evaluations online. For example, online business interviews and online tests are some of the applications that can be included in this process.

Despite all the positive results achieved through e-recruitment, some companies are still hesitant to adapt to these new practices. Lack of expertise, the high costs of adoption, lack of knowledge of the system, and reluctance to leave traditional approaches are among the reasons for hesitation. However, beyond the above, the fact that many organizations have prevented e-path tracking (Melanthiou, Pavlou and Constantinou, 2015) and prefer to continue manual candidate tracking results in e-recruitment system avoidance.

Of course, there are some points that cause both applicants and recruiters pause about e-recruitment. First of all, social profile screening used by most companies during e recruitment process, is a debated issue. Some experts claim that it should be illegal to pursue information this way. And, it can result in problems that end up in lawsuits (Melanthiou, Pavlou and Constantinou, 2015). Applicants can feel disturbed and they may be uncomfortable if they find out that their social media accounts are secretly followed. This can be perceived as a violation of privacy. For example, if a recruiter figures out some private aspects of an individual, like his ideological preferences, and during the interview if he implies

that he knows something about his ideological preferences, the candidate could be disturbed and choose to sue the company as a result. On the other hand, it is also possible that the information derived from social media is false or outdated. In fact analyzing and reviewing applicants' social network profiles, their posts, comments, and photographs on the internet can both help to understand the persona attributes of applicants and figure out if they fit the company culture or not (Kluemper & Rosen, 2009). But, these attempts may also mislead the recruiter as Slovensky and Ross (2012) suggest, as social network activities may sometimes distort reality. Individuals may behave differently in social media and they may behave differently in the work environment. They may willingly comply with the values, norms and regulations of the company they are working for, despite their own personal realities.

In spite of its disadvantages, e-recruitment has positively affected the job search process and the recruitment process and revolutionized the modern business life. Thanks to the time, space, and money saved it has become a preferred recruitment method for many companies and has made the recruitment processes of companies more modern. And it has made things easier for many job seekers to reach their potential employers more cogently.

SOLUTIONS AND RECOMMENDATIONS

The modern era necessitates more technologically friendly and more proactive players in the market. As a result, demanding employers and employees created new ways for dealing with job searches and the recruitment process. In order to keep up with their rivals, companies should engage in e-recruitment processes to attract more demanding, younger, proactive, and qualified candidates who are more prone to use technological applications and portals in their job searches. And similarly, in order to reach a greater number of employers with higher prestige and recognition.

FUTURE RESEARCH DIRECTIONS

In this study, we aimed to make a comprehensive conceptual examination of the novel recruitment style, namely, e-recruitment. In further research, the advantages and disadvantages of the e-recruitment process can be examined with the help of an empirical study. And in the research model, the effects of the e-recruitment process can be analyzed for the efficiency and effectiveness of the recruitment process. As well candidate satisfaction or employer satisfaction can be analyzed with the help of this model. And, the extent of technology adoption in the e-recruitment process should be analyzed regarding its effects on positive organizational outcomes.

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KEY TERMS AND DEFINITIONS

E-Application: The act of applying to jobs through computer based and web-based technologies.

E-Recruitment: It is the activity of using internet and web based technologies in order to attract job seekers and find the right kind of new employees for companies and organizations.

Employee Selection: It is the process of interviewing and evaluating the candidates for a specific job and selecting the most suitable one for employment based on specific criteria including his qualifications, skills, experience, and expertise.

Recruitment: It is the process of the process of employing new people to work for a company or organization.

Chapter 19

The Effects of Industry 4.0 on Labor Force Attributes and New Challenges

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ABSTRACT

Unmanned factories became a topic of discussion after the concept of Industry 4.0 was first introduced in the Hannover Fair in 2001, and increasing the computerization level in business life and supporting the production processes with advanced technology were determined as targets. In this regard, artificial intelligence and increased automation are expected to create new kinds of jobs in the coming years; however, a significant problem is predicted considering that these changes will invalidate a high number of job types exist today. Thus, the workforce will face a severe unemployment threat. As a result of all of this, radical changes in the work methods, along with means of seeking employment, are now considered. The qualities of the work and the workforce are being transformed along with the organization methods of the production. While on the other hand, it becomes evident that education also has to adapt to this transformation. In this study, the issues the labor might have to face during this period will be discussed, along with what could be done to solve these problems.

INTRODUCTION

The concept of the industry has ever been changing and evolving throughout the historical process. The methods and tools used in the production, along with the management models of the production processes, also continue to change with each passing day. The effects of these changes have influenced not only the characteristics of the production processes, but also the population structures, cultures, and economic conditions of the countries, and have even led to the reshaping of country borders. This change was initiated in England first, which then spread throughout Europe and then to the world.

Before the industrial revolution, the economy was based on production factors of humankind, animals, and soil, and the priority was on agriculture, animal husbandry, carpentry, and smithing sectors. With

DOI: 10.4018/978-1-7998-1125-1.ch019

the Industrial Revolution and the impact of new inventions on the production, along with the creation of steam-powered machines, the mechanized industry became capable of mass production. These developments lead to the replacement of manual handling with mechanical power (Schwab, 2017). Three industrial revolutions took place until now (Drath & Horsch, 2014).

The first industrial revolution (Industry 1.0) began in England and was influential between the mid-18th century and the beginning of the 19th century (Jänicke & Jacob, 2009). The discovery of new machines and increased efficiency in the textile sector, the introduction of steam machines, and the development of iron production are the most essential factors that started the first Industrial Revolution (Coleman, 1956). Thanks to the new textile factories established in England, the producers in the country began to produce an increased amount of products with more efficiency, which increased their need for new markets and raw materials. This was a situation which also brought with it exports of products to overseas countries. This Industrial Revolution led to an increase of capital in the United States of America and Europe, bringing with it an opportunity of improving the welfare in these societies.

The Second Industrial Revolution (Industry 2.0) is also referred to as the technological revolution and covers the period of the mid-19th and mid-20th centuries (Jänicke & Jacob, 2009). The primary factor that laid the foundations of the Second Industrial Revolution was the further development of railroads, facilitating the ease of access to distant markets and raw materials. Furthermore, the change in the utilized energy sources and raw materials, along with the development of technology with each passing day, were the foundational keystones of the Second Industrial Revolution (Jänicke & Jacob, 2009). The iron utilized in the industry was mostly replaced with steel during this period, and the use of chemical materials became widespread. Furthermore, the substitution of electricity and petroleum as energy sources instead of steam and coal made it possible to increase the speed of production. This, in turn, triggered the beginning of mass production. During this period, Henry Ford started the use of moving production lines in factories and emerged as an important actor in the transition to mass production (Alizon et al., 2009). Development of communication tools like telephones, radios, typewriters, and cheap print paper enabled faster and more efficient communication methods. Thus, the distance between people decreased even further. Societies' living standards and lifestyles underwent significant changes. Centralization became prominent. Migration from towns to cities gained speed, and politically and economically powerful central states were established. The Second Industrial Revolution spread to many regions of the world, primarily to America, Germany, and Japan.

Under the influence of the developing technology throughout the 1970s, the automation became widespread. The reason why the Third Industrial Revolution took place after a longer gap compared to the preceding one was the time required to overcome the effects of the Second World War and the great depression. That being said, while it's true that these events, particularly the Second World War, delayed the emergence of the Third Industrial Revolution, they also acted as the foundational causes of it. Technologies developed in line with the needs of the war shed light on the beginning of this period. Communication, correspondence, and technology developed as a result of the Second World War, making the use of automation in the production processes possible. The machines also underwent specific changes as the software sector developed during this period. Besides these, the development of nuclear, bio-agriculture, telecommunication, laser, fiber optic, microelectronic, and computer applications carried the production processes to a whole new level. Globalization gained speed due to the ease of communication and access. There was no more distance between individuals. An individual became capable of reaching within seconds to another individual on the other side of the world.

Furthermore, as was observed in other industrial revolutions, an attempt at changing the utilized energy source used was made. While a 100% success wasn't achieved in this goal, a new tendency to use renewable energy sources began due to the risk of depletion of existing energy sources, and these tendencies were supported by government aids. An attempt was made to popularize solar, wind, hydro-thermal, and geothermal power facility utilization. The concepts of sustainability and sustainable growth gained great importance as the essential concepts of the era (Redclift, 2005).

Looking at recent years, however, it is possible to see that the concept of Industry 4.0 as coined by Germany is gaining ever-increasing attention. Industry 4.0 is accepted as the Fourth Industrial Revolution (Alexopoulos et al., 2016) and is believed to usher in significant changes in numerous sectors.

INDUSTRY 4.0 AND SMART FACTORIES

Industry 4.0 emerged in official documents in 2011 for the first time and became the harbinger of a new industrial revolution (MacDougall, 2019). In its core, this system was developed to meet the new requirements, but the developments technological capabilities acted as a strong basis for it as well. It is instrumental in evaluating the period and the studies that took place in Germany to understand why this is being called Industry 4.0. This movement was born and sprouted in Germany and is now gradually spreading all over the world. At first, German Ministry of Education and Research evaluated the existing situation of the country and created ten projects that were envisaged to contribute to the advancement and development of it, and these projects were published under the title "Advanced Technology Strategy: Future projects of 2020". The majority of the content of these projects were on sustainability, utilization of new energy sources, and smart technologies. One of these published projects was the "Industry 4.0," and it was first presented at the Hannover Fair (MacDougall, 2011).

The foundations of the Industry 4.0 concept are based upon: all units partaking in industrial production communicating with each other, having real-time access to all relevant data, and being able to provide the highest amount of added value by using them (Brettel et al., 2014). A comprehensive and descriptive definition of Industry 4.0, in general, is provided in the platform as the following: "Industry 4.0 defines the Fourth Industrial Revolution, which is a new level of value chain management and organization for all life cycles in the products and production systems. This cycle focuses on the customer demands that are ever growing and becoming more individualized and covers all the services from the idea phase to the product development and the production orders, and including the distribution of a product to the end-user and the recycling process for it."¹ Literature also contains similar descriptions (Gilchrist, 2016). As can be deduced from the definition, Industry 4.0 in general defines the improvement of all the processes in the value chain, including the procurement of raw materials, production, distribution to consumers, and reclaim procedures for reasons like recycling and malfunctions etc., by making use of the developing technologies (Soysal & Pamuk, 2018).

It wouldn't be wrong to say that every development has emerged in line with a need. This is a phenomenon present in human nature and the structure of the market. The emergence of industrial 4.0, given the other industrial revolutions studied above, has also been in line with the primary needs. Due to the developments in technology and communication networks, access to raw materials and markets has become almost trivial. There are advantages to such progress, as well as disadvantages. The fact that there is only a degree of demand against the supply created by the ever-increasing production capacity is causing severe problems today. It is possible to say at this point that the markets are about to reach their

saturation points. Particularly in Europe and America, production and demand have almost reached their saturation limits. As a result of this, and under the influence of globalization of the markets, competition has reached very high levels.

As the competition increased, and the markets reached their saturation limits, Europe and America who had lead previous industrial revolutions adopted a series of practices in order to reduce costs and transported their production phases to countries like Brazil, Argentina, Turkey, India, Indonesia, Taiwan, Thailand, and China, where the production costs are relatively lower. Developing countries also gained from this situation, as they previously couldn't find a place for themselves amongst the already established industrial giants. Developing countries saw the transfer of production phases to their countries as an opportunity to carry the capitals and know-how of industrialized countries to their own. Besides this, developing countries, particularly China, stood forth as new markets for the industrialized countries just as the markets were reaching saturation. That being said, China launched a massive initiative in this regard. The state took place amongst the industry giants as an important actor by renewing its product range through re-engineering. Also, countries like India and Brazil participated in the competition by developing their own industries and took their own places amongst the important actors of today's competition.

At this point, the countries that are developed in terms of industrial and technological facilities initiated the Fourth Industrial Revolution under the lead of Germany to gain competitive advantage and reduce their costs even further. The expectancy is that the shift of production stages of numerous sectors towards Far East due to the lower labor costs will gradually fade out, as these sectors will decrease their labor costs even further and reduce their dependency on the unskilled workforce. Another cause for the Industry 4.0 implementation was the change observed in the consumer demands. Consumers today need to access new products faster than before due to the increased product amount and variety in the globalized world. Therefore, the introduction of new products to the market as quickly as possible has become vital for businesses. Besides these, the need to meet the individualized customer requests has been accepted as one of the triggering elements of the latest industrial revolution.

In short, gaining competitive advantage in the globalized market, reducing the dependency on unskilled labor, rapidly producing fault-free products for the market, increasing the flexibility, and reducing the costs can be considered as the main points of origin for the Industry 4.0. Besides these factors, depletion of the utilized resources, the fact that the life expectancy of the world getting shorter, and increasing sensitivity of society in the subject, acted as the driving force behind Industry 4.0. With the technology and developments it will usher in, it is expected that Industry 4.0 will contribute significantly to the concept of sustainability, which has become the most popular concept of the modern era (Soysal & Pamuk, 2018).

There were changes in the production processes of factories after each industrial revolution, and the role of the human factor in production changed gradually as the automation was implemented. Economic growth and increased employment are among the main objectives of Industry 4.0. It is expected that new production processes will emerge and the profile of the labor required will change accordingly as part of Industry 4.0. It is also believed that, with the advent of smart factories and cutting-edge technology automation systems that will accompany them, the need for unskilled labor will decrease. The new line of production also aims to reduce the fault rates in production, to increase the production process, and to reduce the production costs even further.

The main tools for the emergence of smart factories are the automation systems mentioned above. Establishment of Machine to Machine (M2M) communication will ensure the synchronization in production will become perfect and punctual. To create this environment, the implementation of internet systems for the objects needs to be perfect, and the communication between the machines need to be

supported with sensors and software. Furthermore, cyber-physical systems also play an essential part in this process.

Amongst the benefits of the smart factories is the mass-individualization, where the consumers will become able to issue individualized orders even before the product reaches its final stage, or during its prototyping phases. They will also be able to create their own designs (Tuominen, 2016). Another critical factor is flexibility. Establishment of M2M communication and cyber-physical systems will add flexibility to the production processes and will make it easier to implement certain changes to the process.

It is also essential that the systems inside these smart factories gain the capability of analyzing the big-data and implementing proper practices. Besides, the benefits of such a system will not be limited to the factory itself but will help the supply chain to access more information as it becomes necessary (Shrouf et al., 2014).

The areas that Industry 4.0 is expected to show itself effectively are the production and manufacturing areas. It was the aim of gaining increased flexibility, efficiency, speed, and quality in production that brought along this approach in the first place (Rüßmann et al., 2015). Machines and robots that are communicating with each other will enable efficient serial production and will make it easier for flexible factories to emerge. Advanced automation (unmanned production lines) and use of data and simulation techniques will increase the production speed and reduce the required stock amounts, which will lead to increased efficiency. The sensors that will be used will make it possible to monitor the production process in real time and to intervene in potential production errors. This, in turn, will provide increased quality. The expectation is that the demand for unskilled labor will decrease as part of this process, whereas the demand for labor with different skill sets will increase. At this stage, it is possible to say that manufacturers will prioritize investments in these areas.

It can already be seen that international companies are taking serious steps as the transition to Industry 4.0 starts. The Adidas company established in Germany in 1924, for example, has been conducting its production in China as this was providing a cost advantage due to the availability of cheap labor options. Yet, in 2015, they built a factory named “Speed Factory” in the Ansbach, Germany, where 3D printers, computer-assisted kneading process by robotic arms, and a small human workforce began working together. With this move, the world-famous sports equipment giant returned its home. Similarly, the production in the Speed Factory facility of Adidas Company in Atlanta, America performs its completely human-free shoe production entirely by machines since it started its services in 2017. The company explained that their primary objective with this factory in which the robots are the main elements of production was to meet customer demands as fast as possible. Furthermore, Adidas announced that it would increase its product range to new dimensions with the novel technology they will utilize here. Aside all these, it is envisioned that this facility will be able to transition to personalized product design in time.² For example, the facility will produce rain-resistant products that are easy to spot in dark and rain conditions for London, products that make it easier to perform sharp turns for New York runners, heat and ocean resistant products for Los Angeles, and products that are more suitable for indoor activities for Shanghai (<https://www.wired.com>). This is considered as a sign that production may shift from Asia to America as part of the transition to Industry 4.0.

PROFESSIONS AND LABOR FORCE AS INDUSTRY 4.0 APPROACHES

The internet of objects (IoT), one of the carrier pillars of the Fourth Industrial Revolution, called Industry 4.0, can support systems that have become smarter on their own, with an algorithm that can work without human supervision, over time - forming the basis for itself. It is natural that such a revolution has favorable and unfavorable aspects, as is the case in all revolutions (Greengard, 2017). It is expected that artificial intelligence technology will reach newer dimensions, resulting in many jobs to fall prey to automation, while it will also create new business branches. With the advances in technology, human actions, behavior patterns, and social norms will be redefined.

Will Mechanization and Robotization Increase the Unemployment Rate?

Since the Industrial Revolution to this day, every new wave of change in the industry had severe effects on the labor market. The wave of development in the industry has first introduced machines to our daily lives, whereas it introduces artificial-intelligence robots today. Computers and robots increase efficiency in production and contribute to the increased amount and type of goods produced. This effect of machines of robots on the production process has also brought with it certain changes in the demand for the workforce. For this reason, the questions “is the need for manpower in production disappearing?” or “Will machines and robots increase unemployment?” have become topics of heated discussions in every wave of development in the industry. Numerous famous philosophers, from Karl Marx to J. M. Keynes, have participated in these discussions at various points.

As the increased utilization of machinery in the textile sector with the Industrial Revolution in Britain has caused workers to become unemployed, the working class revolted at the beginning of the 19th century, and has declared the machines that save manpower as “enemies of the human society and of all workers” as part of the movement called “Luddism”. This particular event which occurred during the Industrial Revolution reveals the tension regarding the dilemma between mechanization and employment: After the British priest William Lee invented the kneading machine, he was shocked by the reaction of the Queen Elizabeth I. as he visited her to receive the patents for his invention. As she refused to grant him the patents, the Queen remarked: “Thou aimest high, Master Lee. Consider thou what the invention could do to my poor subjects. It would assuredly bring to them ruin by depriving them of employment, thus making them beggars.” (Acemoglu & Robinson, 2013). A similar concern was experienced in the Ottoman Empire regarding the use of printing machines. It has been stated that one of the main reasons underlying the use of printing machines in the Ottoman Empire in 1727 after a long delay -nearly 250 years after Europe- was to prevent the unemployment of calligraphers, whose numbers are estimated to be around 100 thousand at that period. A comprehensive study on the subject highlights that the main reason for this cultural resistance to technological development in the British and Ottoman empires was the concern that potential unemployment due to the mechanization of production could have caused political instability (Acemoglu & Robinson, 2013).

The spread of socialist thought shaped by Karl Marx and Friedrich Engels amongst the working class in the second half of the 19th century prompted attempts of prevention by industrialized countries. Parallel to the development of the welfare state system for which the foundations were set during this period has resulted in at least partial improvement in the working conditions and wages of the workers. The welfare state system of industrialized countries, particularly that of Germany and Britain, improved

the conditions of workers to prevent them from reacting to the current economic and political structure by embracing the socialist currents (Gür, Unay, & Dilek, 2017).

The tension between technological developments and employment showed itself at the beginning of the twentieth century. The spread of the serial production aided by the electrical energy, and the rise of unemployment following the economic devastation of the 1929 great depression, further fanned the flames of the discussions claiming that the technological revolution of the industry was not employment friendly at all. As we can see, the talks of “technological unemployment” was a term discussed even back then. John Maynard Keynes wrote the following regarding the “technological unemployment” (Keynes, 2010):

We are being afflicted with a new disease of which some readers may not yet have heard the name, but of which they will hear a great deal in the years to come --namely, technological unemployment. This means unemployment due to our discovery of means of economizing the use of labor outrunning the pace at which we can find new uses for labor.

Similar discussions about the effects of industrial development on employment continue today. Many pieces of research evaluate whether the industrial-technological transformation in particular, led by artificial intelligence robots and digital technologies, will create a considerable amount of pressure on unemployment. Under the influence of the global economic crisis that erupted in 2008, unemployment gained a worldwide tendency to increase, which is especially true for the developed countries, making potential adverse effects of industrial-technological transformation even more critical. Rapidly-rising and widespread unemployment has also consumed educated young people and has been one of the reasons behind the recent disturbances, from social events such as the Arab Spring to mass-strikes in countries such as Greece and France. The publication of research and findings on the rise of unemployment as a result of current industrial-technological developments in addition to the existing situation in practice causes the concerns of the public about unemployment to increase (Gür, Unay, & Dilek, 2017).

According to data from the World Robotics Report released by the World Robotics Federation, industrial robot sales worldwide reached to 245,000 units in 2015 (World Robotics, 2015). Although robot sales declined sharply after the global crisis, robot sales reached its pre-crisis level in 2010. Robots used worldwide are expected to develop not only in quantity but also in quality. It is expected that by 2025, robots with higher IQ than 90 percent of the US population will be produced (David & Malone, 2014). As a result of all these developments, machines and robots will be able to significantly reduce the need for manual labor in many different areas of the economy, from production to distribution and sale.

Potential Changes in Various Occupational Branches

As the utilization of high-tech machinery and robots in production processes increase, the need for certain forms of labor and individual occupational branches is decreasing daily. The beneficial facilities of digitalization will gradually eliminate the need to employ intermediate level employees in some routine jobs. While the opportunities provided by industrial-technological transformation bring with them significant cost advantages in production, they also cause unemployment of certain types of employees, which will seemingly be the case for a while. On the other hand, the emergence of technology-oriented original job positions will create a certain amount of additional employment opportunities for well-educated individuals. It is, therefore, necessary to take a closer look at the net impact of the recent industrial technology

wave on the labor market, where jobs are being lost on one side, and job opportunities emerge on the other as a result of the structural transformation in the economy.

There are different views and predictions regarding the technological developments - employment issue. Optimistic observers argue that employees who lost their jobs in the first place can find jobs again by keeping up with the new developments in the industry after a certain time. Optimistic experts also argue that in combination with the professional opportunities, the new wave of the industry will reduce unemployment for a short period, but its impact on employment in the medium term will be neutral. In a study supporting this view, it was concluded that the negative effects of technological developments on unemployment lasted for three years, after which this effect disappeared (Feldmann, 2013).

While on the one hand new technological developments in the industry have the potential to increase unemployment, some compensatory mechanisms triggered by new events may cause employment growth on the other. US President John F. Kennedy expressed his belief that the innovations will compensate for the growing unemployment with the following words ³:

We believe that if men have the talent to invent new machines that put men out of work, they have the talent to put those men back to work.

How do these mechanisms that will compensate for the rising unemployment and create new employment opportunities work, then? The mechanisms that can compensate for the increasing unemployment in parallel with the technological transformation in the industry can be listed as follows (Ansal & Karaömerlioğlu, 1999):

Employment increases occur in sectors where the machinery and robots are being produced.

Together with the opportunities that technology provides, the decrease in labor costs and an increase in production efficiency lowers the prices. Lower prices increase the demand and result in increased employment in that sector.e

In the industries where the level of profit rises parallel to the demand, investors spend the resources obtained for the production of newer products which in turn provides new business opportunities.

After a certain period of prices falling, nominal wages also fall. Falling wages increase employment.

On the other hand, experts who look at the impact of industrial-technological transformation on employment with a more pessimistic note claim that especially those with low education and skill levels, and those who are at advanced age, will fail to adapt to innovation successfully, and therefore it is a small possibility that these people can return to employment markets that quickly. Pessimists also argue that the job opportunities offered by new business areas will not be suitable for the general public, as they will not be abundant and they will only concern people with certain properties. In a data survey covering the period between 1990 and 2007, significant findings on how robots have affected the employment market in the United States were reached (Acemoglu & Restrepo, 2017). The results of the study are quite interesting. According to these results, there is one robot for one thousand workers, and each robot causes six workers to lose their jobs, besides reducing the labor fees for the workers. The researchers are not optimistic about the chances of workers who lost their jobs finding new jobs either. In an interview with the press regarding the findings of his study, Acemoğlu has expressed his beliefs that the market economy will fall short in creating new job opportunities with the following statement (Miller, 2017).

If you worked ten years in Detroit, you won't have the skill set required to move onto the medical sector. The market economy alone will not create jobs for the workers who carry the burden of change.

The Effects of Industry 4.0 on Labor Force Attributes and New Challenges

In their fourth report, titled “The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution” the World Economic Forum (WEF) presents several predictions regarding how the Industrial Revolution might affect labor markets by 2020 (WEF, 2016). WEF has based this study on a survey study they performed in companies from 15 different countries. The total population of the countries in which the survey was conducted was 1,86 billion, while they represented 65% of the global labor market. This study has a high sample size and representative power and is worth taking into consideration in terms of its revelations regarding how the wave in the industry will influence the labor market.

The findings from the survey study indicate that a total of 7,1 million people might lose their jobs because of the technologies, machines, and the robots that will be provided by the new wave of industrialization. Emphasizing that the Fourth Industrial Revolution not only has the potential to break down existing business opportunities but also to create new business opportunities, the report predicts that the new wave of the industry could employ nearly 2 million new jobs by 2020. The evaluation of the foresight provided by the study, as a result, reveals that the Fourth Industrial Revolution might cause a net balance of 5,1 million people losing their jobs.

As can be predicted, the impact of the Fourth Industrial Revolution on the labor market varies based on the sector. It is estimated that there might be 4.759.000 jobs lost in office and administrative affairs sector until 2020, while 1.609.000 jobs in manufacturing and production, 497.000 jobs in construction, 151.000 jobs in entertainment, sports and media, 109.000 jobs in law, and 40.000 jobs in assembly and maintenance sectors might be lost. On the other hand, 492.000 jobs positions are estimated to emerge in business and finance operations, while 416.000 jobs for management, 405.000 jobs for computer and mathematics, 339.000 jobs for architecture and engineering, 303.000 jobs in a sales-related occupation, and 66.000 jobs in training and education sectors are estimated to be created. Office and administrative positions are expected to decrease the most in terms of staff requirements in the upcoming period. There is an assumption that the engineering, computer, and architecture sectors will require more labor in the future. The report highlights the negative impact of technological developments like artificial intelligence on the employment but also presents the optimistic expectation that big data, mobile networking, the Internet of things, and robot technologies -while causing employment losses- will also provide new job opportunities. According to the results of the survey in the report, social skills such as persuasion and emotional intelligence will be on demand in the modern era, as well as the ability to solve complex problems.

For example, the need for sales representatives in the retail sector will continue, but specialized sales representatives who are familiar with the technological features and technical details of the products will be required. Smart inventory management, which will develop through the internet of things and sensor technologies, will reduce the need for individuals who practice these functions with classical methods, while it will also increase the demand for employees with high technical knowledge and skills. Industrial-technological developments will lead to the elimination of routine works in certain sectors as they will expose many stages of production to automation. Business areas that will continue to live outside the influence of automation can be divided into two categories (İnan, 2012). The first category includes occupations based on scientific and artistic development. The second category consists of the jobs in various service sectors like tourism and health, where individuals will want contact with a real employee for multiple reasons. However, even these areas are not beyond the danger limits in terms of unemployment.

Developments in the health sector can be set forth as examples of this issue. Various medical analyses in the health sector can be performed easily and rapidly for a long time now, thanks to the innovations introduced by technology. Today, medical tests are interpreted by doctors, and the necessary treatments are provided accordingly. It is currently being discussed that the computer systems in the future will also prepare the appropriate treatment procedures based on the analysis results. There are certain views that analysis results of millions of people, treatment methods, and patient courses will be transferred into big data pools, and the ability of automated systems to deduce which kind of treatments or medicines are more effective in which kind patient will reduce the need for doctors in certain medical sciences. Similarly, the need for human labor and experience for surgical operations may be reduced in time due to improved surgical robots (Gür, Unay, & Dilek, 2017).

With the further development of unmanned vehicle and transportation technologies, millions of commercial drivers may face the risk of unemployment. Thanks to the quadrillions of bytes of data provided by the big data technology, translation works will become much easier to perform for computers. In such a case the employment demand for various linguistic experts and interpreters, from book translators to simultaneous interpreters, may also decline. Big data technology may become a rival for the people who work as white-collars but perform routine works. For example, the systems which are capable of reaching any data from anywhere in the world may reduce the need for people who work as data analysts in the financial sector.

As can be seen, the new wave of technological development in the industry will affect numerous sectors and will seemingly change the dynamics of the economy, and therefore, of the labor market. According to the author of the world-famous book “The Rise of Machines,” what separates this new industrial revolution from the previous ones is that the new wave will affect numerous sectors at the same time and that it will be much harder for things to settle back after the transformation.

Potential Effects of the Revolution on Labor Market

It is believed that, with increased automation, many jobs available today will be performed in a much shorter amount of time with less cost and with improved quality in the future. The current estimation is that this situation will lead the profit-oriented commercial units to gravitate towards automation to perform even more intensive production. According to the “Jobs Lost, Jobs Gained” (2017) report of the McKinsey Global Institute -which is a New York-based consultancy company- robots are going to cast certain occupational groups (fast food personnel, gardener, machine operator, installers, and caretakers, etc.) unemployed. The report claims that 75 to 375 million employees will face the risk of unemployment by 2030. Accordingly, it is possible that robots will take over 60% of the existing workforce. That being said, besides the danger of existing jobs being changed or completely lost, it is also envisioned that the developing technology will create new occupation groups (Degryse, 2016).

In addition to the positive effects on human life, developing technology also has financial and sociological aspects that threaten the status quo, and influence certain segments of the society. Industry 4.0, which we are on the verge of, will undoubtedly cause changes that will rock the foundations of the current production structure. As the computerization in the production industry is maximized and the technology evolves intensely, a new production structure that has less need for human labor and that minimizes human errors is aimed for. With the advent of Industry 4.0, the dependency on labor will decline as the workforce will be replaced with robots, the need for blue collars in production facilities that run on robots will vanish, and in the new period, employment opportunities for individuals who can

create robots and design and use programs will increase (Eğilmez, 2018). Industry 4.0 will undoubtedly make its impact as a revolution that will increase unemployment.

In spite of possible scenarios for the workforce, many new profession groups that were never heard of and can't be imagined with today's knowledge may emerge as a result of the developing technology. For people to become employed in this new profession groups that will appear as a result of remarkably fast technological developments, they will undoubtedly have to gain more than the sum of their knowledge and skill sets they have today. In the labor market, the employees will be on demand based on their adaptation levels to the new period, and those who fail to meet the requirements of the new era may have to face the unemployment problem.

All of these points emphasize that the dependence on labor will decrease in the global scale and that the labor force will have to adapt to the new period in absolute terms. This transition period is not an easy process but requires complex measures.

With the new industrial revolution, individuals with different skills will be needed in the future. For this reason, governments should support training in areas that develop with the new industrial revolution and should contribute to the preparation of labor accordingly.

Repositioning of the Labor to Adapt so that it may Adapt to the Changing Conditions

In a study performed by two academicians from Oxford University, approximately half of the jobs in the current USA employment sector were determined to be facing severe risks under the influence of the technological developments (Frey & Osborn, 2013). It will be quite a challenge to impart the skills required in the future to the people who will become unemployed as a result of such a change that will influence all the sectors of the economy and to employ them in suitable positions. In such a process, all international establishments, governments, private organizations, and other actives should have active roles, ensuring that the labor does not go into this new period with serious disadvantages (Öcal & Altıntaş, 2018). In that regard, the report "Eight Futures of Work" prepared by the World Economic Forum remarks the following: (World Economic Forum, 2018):

- **Workforce Reskilling:** Training programs that will impart the skills required by the new period to the three billion people existing in today's global labor market should be designed, and the workforce should be articulated into the labor market during this period.
- **Education Systems Reform:** From primary and secondary education to vocational training and higher education, a foundational educational reform should be realized. This foundational education program should provide for the individuals the workforce education they need, while also having an updated curriculum that will impart them cooperation, problem-solving, creativity, critical thinking, self-awareness, and development motivation skills.
- **Enhanced Digital Access:** Regardless of the speed of the technological changes in the future, access to communication technologies shall be expanded upon, and more opportunities should be provided for everyone to work in cooperation, to work in virtual environments, to access information, and to access different markets.
- **Agile Safety Nets:** Using agile, portable and sustainable safety nets, short- and long-term benefits and services, as well as income security, should be provided for the workforce.

- **Job Protection Incentives:** Temporary financial incentives -like a “robot” tax- can be designed to protect the labor against the negative effects of the technological developments, and to aid the transition of the labor to the new period. In this way, the tax that will be collected for each robot can be used for the benefit of the segment under the risk.
- **Smart Job Creation Incentives:** Governments should employ proactive policies to support the development of new occupational branches based on automation.
- **Support to Mass Entrepreneurship:** Entrepreneurs should be supported in terms of their access to the market and the financial system to ensure that new jobs are created.
- **Governance of Online Platform Work:** Policy-makers should support the development of environments where people who provide their knowledge and skills through online platforms can work in safe and fair conditions.
- **Mobility Management (of the Labor):** Skills of the workforce within the countries should be recognized and accredited. In this way, the path to working in different environments and states should be opened for the workforce. These studies should be performed by ensuring social integration of workers, making necessary visa arrangements, and supporting modern recruitment processes.
- **Participation Incentives:** New industries should be supported using methods like introducing more flexible work hours and incentivization of women in the workforce.

The Fourth Industrial Revolution is the most significant revolution in human history in terms of its scales. So much so that this revolution has the impact force that can transform all human activities. Our ways of producing things, for example, and using the resources we have, communicating with other people, learning, working, managing, and doing business will change radically (World Economic Forum, 2018). These developments might create an unfavorable environment for humanity in the short term. According to the Mckinsey Global Institute’s report for 2016, one million jobs are expected to disappear in the United States by 2026 (Mckinsey Global Institute, 2017).

In the last 30 years, the proportion of unionized workers in the US workforce has decreased from 20.1 percent to 11.3 percent. Collective agreements fail to provide workers with job security in the face of a new wave of computers. There are various pieces of evidence supporting the idea that the 2008 crisis has caused employees to lose their jobs to the computers. Why should companies pay salaries when they can just buy technology at a much lower cost (Markoff, 2015)? The 2014 report by the National Bureau of Economic Research confirms this trend as well⁴ (Miller, 2014).

Estimates of the U.S. Bureau of Labor Statistics predict that the most effective factor that will influence the employment in the United States will not be the technological advances that cause unemployment and create new job types, but instead, it will be the aging of society. The bureau estimates that of the 15.6 million new jobs to be created by 2022, 2.4 million will be in the health and elderly care sectors. Technology and innovation-related jobs will constitute only a small fraction of the employment increase. Software development will provide the highest employment amongst all the technology-related positions, and by 2022, only 139,000 new jobs will be created in software development, and the employment rate increase for it will be on the 26th place. According to the estimations of the Bureau, technology will not be one of the sources of economic growth; on the contrary, besides the routine jobs, it will also pose a threat to skilled workers such as doctors, journalists, and stockbrokers who use different types of cognitive skills (Bureau of Labor Statistics, 2013).

Barrack Obama, the former President of the United States, led the creation of an “advanced production partnership” in 2011. With this initiative, the aim was to ensure cooperation between universities, industries, and the federal government to participate in high-tech investments as required by Industry 4.0 (White House report, 2011). In this period, Germany has also taken steps in line with the requirements of the new revolution like the USA, and smart factories were built in Germany by industry-public cooperations (Schwab, 2017).

The Changing Education Paradigm and Lifelong Learning

While the roots of the labor force training -which is a requirement for the economy model- as a concept dates back to the Industrial Revolution, as a result of recent developments at the global scale, there is now a much closer link between education and employment. This is to the point of emphasizing that the sole function of the modern education system is to provide the labor the quality that the new economy needs⁵.

In the knowledge economy, where education and learning are synonymous with earnings and status, the idea of investing in education to achieve a high-income job is predominant. However, it is difficult to claim that information acquired in the age of knowledge economy can be used forever. For this reason, learning must be continuous and not limited to formal education. Therefore, while the formal education process is being reshaped with the reforms implemented to bring the labor qualities to the global level, the workforce population should realize that this process will never end, and they should understand that they have to adapt to the new situation immediately, at least in parallel with the changing production organizations and technology (Buyruk, 2018).

After the technological developments, long-distance education is gradually substituting formal education, and homes or workplaces become the new educational units. Industrial developments require a new type of “human” and new education policy is being developed using IT technologies to train these people. Another remarkable point at this stage is that individual education units, organized within the framework of neo-liberal policies and controlled by capital owners independent of public authority, are becoming more and more widespread (Özdemir, 2011).

In general, all learning activities that continue throughout life to develop knowledge skills and competencies are grouped under the title of “lifelong learning” (Kaya, 2014). In parallel with the changes in production organization and technology, the qualities sought in the workforce also changed significantly, and training became important and necessary to meet the requirements this change brought with it. (Uzunyayla & Ercan, 2008). Lifelong learning is seen as a way of gaining the shifting labor qualities, that is to say, as a way renewing the employee itself according to the demands and expectations of the changing labor market. This is important since being able to cope with the competition, to adapt to technological changes rapidly, and to stay in line with the rapidly changing conditions of the working environment is only possible through a workforce that is aware of how important is to “learn how to learn.” This is especially true now, as the shelf life of the skill in the modern economy is quite short. Henceforth, the workforce needs to be re-educated when the period requires it to (Sennett, 2009). The establishment of a lifelong learning approach based on the education-employment relationship, and the emergence of lifelong learning as a necessity to ensure employment, give the responsibility of staying unemployed to the individuals who fail to meet the basic requirement, which is the lifelong learning (Kaya, 2014).

On the other hand, the developments that can be summarized shortly as “globalization,” and the advances in communication and information technologies, along with the economic crises and the rising importance of enterprises in social life, have caused the attention to shift towards enterprises, business

managers, and institutions which educate them. This is because the enterprise management programs were being cited amongst the causes of the economic crises. Being counted amongst the causes of the crises that took place in the USA in particular which then spread to other countries are the structure, contents, and the emphasis of MBA programs, as the managers of companies that were influential in the markets mostly were MBA degree graduates of such programs. These managers were acting in line with the philosophies and decisions imparted on them by the programs they were thought, which then played a role in the crises as mentioned above. An interesting view on the subject is that several management academicians like Henry Mintzberg agreed with this opinion and contributed to the criticisms towards the MB-based programs. These criticisms had positive effects on business schools. In some U.S. business schools, new deans were appointed to realize the changes that would cast the schools compatible with the new conditions, and significant changes were made on their curriculum (Koçel, 2017).

Our era is being called the “informatics century” or “the information age,” and knowledge is the primary source for the new industrial transformation wave, which represents a new type of production relationship where knowledge production and sharing is ever increasing. People who work in knowledge production and sharing are becoming the majority, casting lifelong learning and enlightenment and technological development essential (Balay, 2004). Training processes should be restructured in terms of the criteria required by the industrial revolution we are now facing. In the transition from the “industrial society education model” to the “information society education model,” fundamental changes are required in various factors like the teaching methods, learning processes, educational content, and success criteria. While developing policies that meet the requirements of the Fourth Industrial Revolution era, the standard education policies and policies for the masses that are at the center of education in industrial societies are becoming questioned more (Toffler, 2008).

General Features of Next-Generation Jobs

In today’s world where international competition is increasing, productivity and economic returns are put in the forefront of many other values, and transportation and access opportunities are much more readily available than ever, economic coexistence has become more important than ideological differences. As it became more active, the international capital gained strength against labor. It also went beyond national levels and reached a global scale in terms of labor use, gaining the opportunity to choose the labor force that will be the most efficient for its own ends. At first, companies which aimed at reducing their costs and maximizing their profits wanted to gain access to cheaper raw materials, but later they tried to achieve these goals using cheap labor, and they turned to the countries where they could provide it from. It is now only appropriate to talk about an international scale of labor for the capital, instead of a local workforce.

While cheap labor still maintains its value, increased competition and advanced technology caused a shift of value from low-education workforce towards well-trained and highly qualified workers. Organizations are now required to employ personnel with higher qualifications to achieve their goals. The term “blue collar” was used to define the employees who performed the works based on physical power, and the term “white collar” was used to define the personnel performing the desk jobs that required intellectual labor; but a new term is now added to these, which is the term “gold collar”. In truth, Gold Collars are higher-level white collars who are well trained, highly-qualified, and capable of using the technology skillfully. The essential feature of those included in this class is the ability to use high-tech communication facilities, computers, and all kinds of tools that work on advanced technology. Gold col-

lars are transferred and employed in areas where technology is used at the highest level, or in businesses experiencing problems in these areas, where they receive good wages and usually work autonomously. It can be said that companies have to convert their blue and white-collar employees to gold-collar personnel to survive in the technological structures brought by the new age (Yılmaz & Aktaş, 2018: 54-55).

In today's world, job descriptions, job styles, working hours, workplaces, financing models, and occupations are changing dramatically thanks to the new opportunities offered by information technologies and globalization. It is now possible to use a mobile phone or a tablet for work when an internet connection is available. This mobility has changed many habits we know about ways of doing business. Now, the concept of the workplace has undergone a foundational shift and the idea of "Home Office" has started to find its place in practice, and people have seen the opportunity to offer their services to the whole world from the comfort of their homes. However, to be able to work in this new generation, new skills and equipment are also required. In the recruitment processes of the future, personal characteristics, creativity and novelty, technological perception and multidisciplinary thinking and practice, and knowledge of foreign languages are the main features required. It is possible to say that in the future the ability of people to use their skills will be the main criteria instead of where they got their diplomas from. The skills to be sought after in the candidates who strive to find an excellent job in the near future can be summarized as critical thinking and problem-solving skills, creativity, digital literacy and entrepreneurship (Tezcan, 2016). In the next generation of employment, people who develop and enrich their skills instead of focusing on a particular profession will be the priority choice of enterprises. These people will be qualified workers of a large number of micro jobs instead of being affiliated to a single boss, and they will be well paid (Dizik, 2017).

Many professions will be lost or will lose their value, and almost all of the occupations of the future will be related to the digital age, in connection with the developing technology. Amongst these, 3D production engineering, robot technology, AI teaching, biotechnology engineering (DNA programming), climate engineering, data analyzing, industrial design engineering, digital rehabilitation consultancy, drone pilotage, personal privacy consultancy, nano-technology engineering, technical ethics specialization, nano-medicals, and vertical farming are the first to come to mind (Degryse, 2016).

Next-Generation Job Search Platforms and Features

The change in IT technologies, the emergence of new professions and Industry 4.0 applications will also reshape job search processes. The job search process is particularly difficult for newcomers to business life. Where to start, how to find a job, and conditions of work are the primary subjects that keep people's minds busy. Even though efforts to achieve results in this regard sometimes yield results, they often end in disappointments. In order to ensure that their struggles do not go to waste, job seekers must first determine the work they want to do and the area they want to work. It is essential to focus on the jobs that will meet the expectations by setting real and realistic goals. A good field survey and the analysis of opportunities in the labor market will contribute to the accuracy of decisions that will be taken. Whereas newspapers and professional magazines, affiliate references, individual applications, and private or public employment bureaus were utilized when seeking employment, today's technologies have offered various novel platforms for finding new jobs. Today, almost all businesses have web sites, and corporate relations, various company notices, and recruitment announcements can be accessed more easily and quickly through these web sites. The fact that all information about open positions can now be announced through the internet and social media provides an excellent convenience to the jobseek-

ers and the institutions alike. In the IT age, business search activity has become a cheaper and easier endeavor (Tutar, 2015).

The process of employing people through internet-based announcements and CV applications is called electronic recruitment. One of the main reasons for the rapid adoption of this practice is that it allows companies to carry out their labor force activities at much lower costs. Companies can make an unlimited number of business announcements through their websites and obtain a large pool of candidates at meager prices. A survey conducted in the United States showed that 50% of the candidates are more interested in working a given institution when they visit the website of the company as they apply for a job. The content of the web sites of institutions, the presence of presentations, and their overall quality influence the candidates as they apply for the job (Young and Foot, 2005). LinkedIn - one of the companies providing employment intermediation services over the internet- has more than 500 million members, which is a number higher than the population of numerous countries. In the new period, it is possible to both reach the open positions in the world and to find the appropriate candidate without being limited to the political borders using employment intermediation companies (Yılmaz and Aktaş, 2018).

Industrial revolutions and their effects in working life materialize in different forms today compared to the past. The new era, beginning with Industry 4.0, reformats the business search models and our ways of doing business. The essential nature of the technology and its core position at the center of life force people new to business life to think in a technology-oriented manner and to be able to use technology at its highest level as they perform their businesses/professions.

Brain drain was a term which emphasized the physical relocation of human beings. Now, with its developing structure, technology enables people to exercise their intellectual powers, know-how, and competencies at any location over the world without the need to change the geography they are in. Today, the competitors to people in the business markets are not just the people that live in the same geography/region but are people from other countries. It is an inevitable necessity to show an effort to acquire the skills and competencies that will enable a person to hold on to this new competitive environment, and to do that it is necessary to realize this paradigm shift.

THE WORLD ECONOMY ON THE VERGE OF INDUSTRY 4.0

To understand the impact of the Fourth Industrial Revolution on the world economy, it is necessary to acknowledge that the wave of change that we are on the verge of is a natural consequence of technological characteristics and advances in computer technologies. The exchange of production tools and, consequently, production relationships as a natural result of technological developments was coined under the term “Industry 4.0” the first time in 2011, but concepts such as “smart reduction”, “smart manufacturing” and “smart factory” were being discussed in European, Chinese and US production sectors for a long time (Yılmaz, 2014).

An industry needs innovative leadership in machine stocks and information technologies to adapt to the innovations brought by the fourth generation industrial revolution, and the workforce with the qualities that can achieve the superiority and sustainability of these two elements. Given these characteristics, it is clear that no country has sufficient infrastructure for such a target, with the exception of a small minority of developed and developing countries like the USA, Germany, Japan and China (Yılmaz, 2014). Behind the initiatives of the governments of developed countries to finance and develop Industry 4.0 are causes like losing their global competitiveness and the aging of their populations. When the

contribution of countries to global manufacturing added value between 1991 and 2011 is examined, it is clear that production has shifted from developed countries to developing or less developed countries. The contribution of countries other than Western Europe, North America and Japan to global manufacturing was 21% in 1991, while this ratio increased to 41% in 2011. On the other hand, the rate of production in China and Brazil increased by 39% and 23% respectively, while in Germany it decreased by 5%, in France by 20%, and in the UK by 29% (Çeliktaş et al., 2015).

The decline experienced by traditionally industrialized countries in the global economic system regarding their contribution to the value-added production index is mainly due to three factors. These are, respectively, the developing or less-developed countries reaching the high-efficiency increase ratios in the economy, developed countries losing their market shares in areas closer to their production areas, and their choice in procuring the logistics, facility management, maintenance, and personnel services from external sources due to increasing labor costs. This procurement process leads to the orientation of production technologies to production facilities outside the country and to the emergence of supranational companies that are increasingly managed by global consciousness. This transformation threatens the economies of developed countries, forcing them to accelerate a new wave of industrial change by using the knowledge and high-tech production infrastructure that they have (Çeliktaş et al., 2015).

Countries that want to get more shares of the future global market and have the infrastructure needed for the new industrial revolution are funding the private sector for the development of Industry 4.0 with a variety of policies and supporting R&D activities. Developed countries such as Germany and Finland in Europe are expected to provide education support of EUR 140 billion by the end of 2020 (EBSO, 2015; Siemens, 2015). For the rapidly aging continental European countries -like Germany- the new economic model is vital where the smart factories will shoulder the burden of physical labor (Kagermann, Wahsler, & Helbig, 2013).

Apart from the developed countries in Europe, Japan, South Korea, and the United States are now developing policies to have a say in the new industrial revolution. The United States plans to allocate a budget of around \$ 1 billion for the establishment of a National Research Institute and a network of companies (Çeliktaş et al., 2015). It is natural that developing countries with sufficient technological and physical infrastructure are not remaining unresponsive against these initiatives by developed countries. China's realization of the Smart Factory 1.0 project is a serious response to Industry 4.0 drives of other, developed countries (EKOQ, 2014).

Developed countries, especially Germany, see Industry 4.0 as a path to overcome the lowered competitive power, unemployment, and other macroeconomic problems of European countries caused by the shift of permanent capital investments towards Asian countries to gain access to the low-cost labor in these locations (Türk VD. 2014: 2-3). 77% of the companies in Europe invest in digital factories to adapt to the new production style, while 5% of the firms in Eastern Europe also make similar investments. In Asia, however, the ratio of companies investing in digital factories to adapt to the new production style is 7% (Geissbauer et al. 2017: 13). In 2011, Germany brought together economists, academics and industrial manufacturing companies under a study group, and has prepared the Industry 4.0 strategy document. A budget of EUR 200 million is allocated for these applications in this document which specifies the preparations Germany has to undertake during this period, which in turn will be executed under the coordinating role of the German Federal Ministry of Education and Research. In addition, Germany plans to invest around EUR 20 billion each year to related infrastructure works until 2020 (TOBB; 2016:16-27). In the UK and Finland, a budget of up to EUR 800 million has been allocated for use in the necessary harmonization studies for Industry 4.0 applications (Türk et al., 2014).

SOLUTIONS AND RECOMMENDATIONS

It is evident that the new Industrial Revolution, called Industry 4.0, will not only reduce production costs but will also help ensure that the quality of production and the individualized forms of customer preferences are quickly met. However, this revolution is likely to cause several problems, especially in traditional structures and on labor and employment processes, as all other revolutions have caused. Countries such as Germany, the United States, the United Kingdom, Japan, and China have started training and infrastructure efforts to pro-actively overcome these problems and to meet the future in a more prepared way; however, it is a subject matter for a separate assessment to determine how adequate these studies can be in creating individual awareness, and the importance of preparing the population and young workers in the education process is still a concern needs keeping an eye on. In this context, the contributions of lifelong education institutions and systems have to be increased.

FUTURE RESEARCH DIRECTIONS

This study aims to examine the potential effects of the approaching new Industrial Revolution on the labor. Loss of certain job types and employees working in these jobs becoming unemployed seem to be the most serious problems that will be faced during this period, which are situations that are already being experienced by a portion of the workforce that is expected to expand rapidly. We believe that our study contributes to the literature by drawing attention to the fact that radical precautions need to be taken to prevent the unemployment phenomena reaching even larger scales. That being said, we still believe further studies will be beneficial in order to help create the awareness level for all the actors in labor and the education processes so that they can handle the transformation better.

CONCLUSION

While preparing for the new production style, the need to utilize human roles and potentials in the factories which make productions based on the workforce is also worth paying attention to. Being “human-oriented” is the most crucial factor in production processes. The necessary preparations should be made for the continuous improvement of the skills and competencies of factory employees, taking into account the new information and distribution mechanisms. In this process, a new generation of the highly skilled and more equipped labor force is aimed for, who will also be equipped with the know-how and communication technology they will need to address workers that are old, disabled, or from other cultures as they aid them and transfer their skill sets. Interactive e-learning tools will also be used as part of this process to facilitate the development of students, apprentices, and new workers who can use information and communication technologies well but are having difficulties in adapting to advanced production processes. Thus, mobile and accessible information and communication technologies will make it possible for the employees to plan, program, operate, and maintain production systems safely, remotely, and without any space and time dependencies, and will give the means to control their production activities. With the new security systems that are part of the original production methods, the competitive power will increase, and a fully aligned worker-robot cooperation will be achieved, which will compensate for

employee failures due to age or inexperience. Therefore, developing and supporting the cognitive skills of employees to create human-centered workplaces will become increasingly important (Bağcı, 2018: 132).

In this context, the answers to three basic questions are sought to accurately define the role of people in the management and organization of the workplaces in the new production style. The first is “how do people learn how to work and how do they work in new production processes?”. The second is “how do people communicate with technology?”. Finally, the third is “how do people add value to production?”. The creation of new educational methods and e-learning systems suitable for the new production system are the most important preparations for this process. However, innovative training methods and systems should be developed for production by supporting lifelong training of skilled workers in order to ensure effective and active participation of aged or disabled workers, proper implementation of new production know-how, and occupational safety (Efra; 2013).

Individuals whose labor will no longer be required due to technological developments need to seek employment opportunities in other sectors and businesses. Expecting that the market mechanism will provide these people with jobs after a certain period is an idea that is being considered unrealistic. Although technological innovations cause new business areas to be created, these business areas tend to prefer people who are highly educated or have different skills. While other business opportunities may be available in sectors that are not as technology intensive, the information, and experience of the people who lost their jobs to technology may not be suitable for them to be employed in those areas. Therefore, individuals in business life must renew themselves to be re-employed. Two issues are important here. The first is the availability of educational programs where unemployed people can adapt themselves to grasp technological innovations. The second is the cost of these training programs. The training required for unemployed people to become capable of finding positions in other areas should be economically viable. Otherwise, new technologies may have devastating effects on the labor market by resulting in a decrease in existing jobs and the inability of the unemployed to find new employment opportunities (Mortensen and Pissarides, 1998).

When companies change their production technologies, they need to transfer the necessary knowledge and experience through in-house training to the people they don't need in their old positions anymore, so that they can be employed in new jobs. However, there will always be a group of employees that are no longer needed as long as further production technologies develop, even in other positions within the company. In this case, education opportunities offered by the state to unemployed individuals in the context of social policies are essential. One thing that should not be neglected here is that there might be individuals whose age is suitable to receive training and change their sector, and have become unemployed as a result of the new technological wave rising with the driving force of industrial-technological changes. These people, who would typically have difficulty in finding employment in a new sector, need to be provided with social assistance to the extent of the welfare state capabilities.

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KEY TERMS AND DEFINITIONS

Industry 4.0: Refers to the improvement of all the transactions/processes taking place in all stages of the procurement cycle, from obtaining the raw materials, to production, delivery to final user, and recollection of products (due to reasons like recycling or malfunctions), by utilizing the opportunities of digital technology to their utmost levels.

Labor: A concept that expresses the supply of labor in a country in terms of the number of people. This term refers to the population segment that is capable and willing to work.

Life-Long Learning: A concept that expresses continuous learning from childhood to retirement. It refers to making more investments to people and knowledge, incentivizing necessary know-how and skills including digital literacy, and expansion of flexible and novel education opportunities.

New Generation Work Forms: Refers to the changes that occur in workplaces and locations, and interaction between these changes and occupations, along with the opportunities provided by globalization and developments in information technologies, particularly by the internet.

ENDNOTES

- ¹ Endüstri 4.0 platform, <https://www.endustri40.com/endustri-4-0-ile-gelecege-bakis-ve-beklentiler/> Access Date: 27.02.2019.
- ² <http://news.adidas.com/us/Latest-News/adidas-will-open-atlanta-based-facility-to-make-shoes-in-america/s/4d105d93-794c-4282-9382-d50032585cc1> Access Date: 15.01.2019
- ³ For Kennedy's speech in West Virginia on September 27, 1962, see "JFK's Speech in Wheeling, West Wirginia (September 27, 1962)", Youtube, 19 Nisan 2014, <https://www.youtube.com/watch?v=8hQrZnS30Ps>, Access Date: 09.04.2019.
- ⁴ One of the authors of the report, Henry SIU, a faculty member at the University of British Columbia, commented the subject of unemployment with a Keynesian perspective and said: "the technological advances, in the long run, will benefit everyone." He proposes that "Not everyone will profit from this transition in the short term," however.
- ⁵ The documents published by the OECD and the World Bank emphasize that education should be shaped in line with the needs of the economy. For publications in this topic, please see World Bank, 2005; OECD, 2013-2015.

Chapter 20

Industry 4.0 and Its Impact on Working Life

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ABSTRACT

The natural development of history of humanity confronts the societies with a new industrial wave making use of the opportunities of the information and communication technologies. While the concept of labor depending on muscle force that produced the emergence of modern societies withdraws from production process, the gap is filled by intelligent machinery which automatically decides by itself by employing machinery automation and internet technologies. In the new social order, people determine their own standing according to their intellectual build-up instead of muscle power. Industry 4.0 brings a lot of advantages together with the reduction of source consumption, energy productivity, production efficiency, stabilization of rising workforce expenditures, and prevention of the impact of aging societies on production. Although problems come up on the issues of setting the intelligence of machinery and accomplishing workforce market that fits the industrial revolution, technological developments and the subsidies draw the actualization date of the process forward.

INTRODUCTION

Great transformations that take place in technology and new changes that globalization generated in the structure of management and organization brought new discussions about the future of working life at the same time. The process of Industry 4.0 is expected to affect the development level of countries, to cause distinction at the level of activity branches by the concept of internet of things (IoT), and even to change labor markets directly. Countries that can adapt to Industry 4.0 process which is qualified as intelligent production systems will increase their compatibility at global level as they have flexible and lesser cost production that is transformed according to the demand process. These improvements, on the other hand, in the market of the workforce will increase the necessity for qualified workers increasing the unemployment of unqualified workers (Kutal, 1997). The concern and stress of being unemployed lead to exhaustion which is another problem of working life (Özbucak Albar, 2017). It is asserted that the

DOI: 10.4018/978-1-7998-1125-1.ch020

idea that Industry 4.0 will contribute to employment, new profession types and employment areas will emerge with compare to the lost professions. These profound changes have also affected trade unionism and collective bargaining. Trade unions have rapidly lost members in some countries. In addition, serious changes have occurred in the level and content of collective bargaining. The most effective means of protecting and developing the rights and interests of the unions is collective bargaining. The level of collective bargaining and its content varies according to country-specific conditions. Today, there is multi-level collective bargaining in European countries. Collective agreements are carried out at various levels from negotiations between confederations to workplace regulations. In some countries, collective bargaining is done on the basis of business, while in some other countries, it is done at the level of the workplace. The most important reason for collective bargaining to reach the firm level is that in a world where globalization and Industry 4.0 are becoming increasingly competitive, business management needs to make more flexible decisions. For these reasons, companies prefer collective bargaining at the workplace level to make quicker decisions. Today, individual labor law has become important in the face of collective labor law. Besides the perception of syndicalism will also change and a transition process will be lived that ranges from wage syndication towards social movement syndication (Kutal, 1997).

The intense application of industrial 4.0 and Microelectronics Technology in production has affected the field of industrial relations and has changed the structure of the workforce. In the face of these developments, trade unions faced new challenges and had to produce new policies. Trade unions have to adapt to the requirements of new technology. Innovations have been observed in the working areas of the unions. As a result, they cooperated with the employer. The collective bargaining scheme was affected by these developments. Collective bargaining has emerged at the level of business. Also, the practices of participation in management are discussed. In addition, strikes and lockouts have decreased (Kutal, 1997).

At the same time, both global and technological developments brought growing and spreading poverty which are the main current issues of arguments. Poverty is experienced in contrary to increasing wealth as the consequence of the rising unfair distribution of income. The conditions are self-explanatory. While polarization between wealth and poverty, rising method and managing problems are among the main arguments topics. Poverty and its new types will appear in the near future due to the new conditions with different characteristics. In this study, Labor Economics deals with different aspects of the matter which are in relation to labor and wages by taking care of the gradual increase of impoverished worker.

Now, with the increase of unemployment in many sectors both in developed and developing countries, the widespread application of social welfare and its practice are on the agenda of Western countries.

New types of impoverishment arose due to the adjustability of employment, working conditions, decrease of wages and salaries, weakening of family interrelations as a consequence of individualism and the state which restricts social expenditures. In this study, the transformation of impoverishment in parallel with the changing conditions will be analyzed. The most important aspects of poverty in the information society, together with the degrees and reasons of poverty will be explained.

THE CONCEPT, IMPORTANCE, AND SCOPE (EXTENT) OF INDUSTRY 4.0

The concept of Industry 4.0 was first announced as the modernization of the German government in Hannover fair in 2011. This concept states the fundamental changes that will affect all activity branches deeply and cause a lot of changes in workforce structure. From this point of view fundamental changes that may take place, technological attempts which shelter improvements such as darkened factories,

internet of things, escalated reality which humanity has not confronted before are denominated (Shwab, 2016; EKOIQ, 2014; Vardar, 2016). Industry 4.0 comprises the fast conversion of the production systems and production design, during the production process, management and services (Çakır, 2018).

The fourth industrial reformation incorporates changes in a lot of areas from economic paradigms to production processes, from labor markets to working conditions. Production where demand centered, flexible production form is actualized, in production processes a model in which predictable arrangements take place is anticipated (Berger, 2016). It can be argued that the internet has the first place as there is an increase both in quantity and information speed due to the development of communication technologies. Consequently, in some certain technical parts like technology utilization and educational internet, new professions appeared in various countries. This situation is also accompanied by the number of people who needs the necessary know-how (Aksoy, 2012).

Information society covers huge topics of management of technologies and the process of information at all levels. The globalization and technical changes appeared after the 1970s and it caused typical and structural changes in production. Now the production systems leave the Fordist production structure and flexible working hours or non-standard working types emerged and become widespread. The characteristic of the era is the new term called as “New Economics”. New Economics means mentality change and learning both micro and macro levels compared to previous modification of laws (Soylemez, 2001; Kocabaş, 2004; Keser, 2004).

By means of information technology, the increase in new production types, new sales and management techniques causing to drop unemployment on the one hand, it also created unprotected employment of deactivated employees, on the other hand. Now, technology while creating new demand and consumption patterns, it transformed lifestyles (Aksoy, 2012).

The globalization period continuously drops workers’ wages which are disadvantageous on the wage contracts as the works are part-time or temporary and there is no protection of workers and this situation even increases the poverty (Kesgin, 2011).

THE DEVELOPMENTS GENERATING 4TH INDUSTRIAL REVOLUTION

First Industrial revolution started by the end of the 18th century by the use of steam power in machinery. Following the first Industrial revolution, until the end of the 19th century, the second Industrial Revolution started by the utilization of electrical energy based on labor division and serial production. Starting from the early 1970s, the automation of the production processes and the use of information technologies opened the doors of the Third Industrial Revolution which used digital systems. The continuous development of technology, widespread use of the internet, the use of microcomputers in industrial production, was the informer of Fourth Industrial Revolution of which physical virtual world reflected to the cyber-physical systems, brainstorming decision making processes and smart systems are placed in production processes have initiated a new era. (Gabriel, 2016)

The strategy of the Fourth Industrial Revolution was initiated by Germany to gain superiority for competitive advantage in international markets and it was targeted at combining industrial production and digital technologies. In the context, it contains a diversified amount of artificial intelligence, internet of robotic objects, self-directed vehicles, 3D printers, nanotechnology, biotechnology, material science, energy storage, and quantum computer science. In a short time, Industry 4.0 has become a system which leads to discussions about the future and influences the interests of other countries (Schwab, 2016).

German Government made researches about Industry 4.0, officialized the project in the Fair held in Hannover, in 2011 (EBSO, 2015:12). Industry 4.0 aims at increasing the productivity by transforming centralized production processes into a de-centralized production period. The industry needs rapid development to increase resource productivity via digitalization and flexibility. In order to reach the target, the global competition must be increased and 4.0 Concept must be shared in the fairs and it has to be on the agenda of commonly shared projects. Industry 4.0 is the concept which taps into the life of society, will irrevocably cause transformations (Berger, 2015).

RESOURCES OF INDUSTRY 4.0

Industry 4.0 which replaced the traditional production model, will cause to bring the newest variations in labor work and production period by combining communication and internet technologies with the workers and internet technologies. The transition from the steam power industrial factories to smart factory systems will be realized by cyber-physical systems and objects of internet. Hence, enormous number of innovation and technological factors will be included in establishment of industrial plants while initiating Industry 4.0 System. These innovations can be summarized as follows:

1. **Three Dimension Printers:** Process covers printing of serial objects in hard format with 3D Printers. By this method, anything can be manufactured with 3D Printers in scientifically areas.
2. **Internet of Objects:** It will connect every location and the device to each other using technology everywhere and it will make the manufacturing process easier and it will maintain to increase the productivity and the profitability.
3. **Smart Factories:** The cost will be less by using robots and internet in small manufacturing plants.
4. **Cyber-Physical Systems:** Changes in the complicated production systems can be controllable by means of physical production information and digital modelling.
5. **Big Data:** Production quality can be protected by recording enormous number of data into the system.
6. **Autonomous Robots:** Cooperation and continuation in the production will be provided by manpower and robots.
7. **Simulation:** Production processes to be shortened and the quality to be improved by preparing simulation of production processes followed by testing.
8. **Integration of System:** Providing global data integration enterprises will work in harmony with each other.
9. **Cloud Information System:** It can be easy to access the recorded information in the enterprises by means of Internet.
10. **Increased Reality:** By the application of the information technology the productivity will be ramped up and real-time information will be provided.

The above mentioned ten sources are the main technological driving forces of Industry 4.0. We can say that each source forms major keystone of industry 4.0 as each source have connection with each other. Moreover, while digitalizing the production processes labor force market and labor conditions will also be affected by these developments.

MAJOR EFFECTS OF INDUSTRY 4.0

Industry 4.0 has major characteristics of mutual communication of men and smart factories which leads to common activities, self-decision making of cybernetic Systems having production capability via 3D Printing technology; analysis of data to be collected in real time, adaptation of smart factories. Industry 4.0 creates the innovations in labor power and employment, investments, policy and legal regulations, protective working relations and education. (Çakır, 2018:99) These innovations can be summarized as follows (OECD, 2015):

1. **Production:** Manufacturing possibilities are targeted at realizing personally privatized unique products by using smart factories with increasing flexibility in production and increasing variety in manufacturing.
2. **Investments:** There will be changes in labor models which is in accordance with the modifications in the industry.
3. **Legal Regulations:** Standardization of protocols in domestic and international trade to form appropriate administration and organization structures. The increasing importance of digital security, the training of qualified workers, supporting and increasing research and development are needed.
4. **Education:** Especially developing countries will have to accept the digital revolution so as to cope with the technological developments by re-designing their education policies. Investment for education for Industry 4.0 will come at first rank to both individuals and the corporates so as to reach productivity.
5. **Labor Market:** Re-structuring labor force becomes compulsory due to the developments in communication and electronic technologies as a result of globalization. In our era, the most important factor is not the location but the performance of work and its being precise and on time delivery to the employer.

Current technologies made the individuals reach the information wherever they are in the world provided that the essential infrastructure is supplied. This situation provided a big flexibility to individuals and corporates. In other words, now is the time for “Information Society”. These developments made to work from where you are, instead of working for a giant, comprehensive bureaucratic organizations. Majority of corporate companies has now started to work extensively under different working conditions which are not dependent and traditional as to reduce costs, increase productivity, decrease speed of turn-over of workers, adaptation to the changing conditions and it also helps to meet the need of qualified men power. In addition, these developments made effective technology using labor force to be required. (Berkün, 2013a)

Consequently, the paradigm of the labor force changed. To abstain from crises, it needs to increase employment and to support training, investments, and incentives. New arisen business needs to reach a high-quality level. (Çakır, 2018)

FOURTH INDUSTRIAL REVOLUTION AND ITS IMPACTS ON LABOUR LIFE

Industrial revolution process finalized Agricultural Revolution period. Therefore, workers arose as a result of economic and social transformations. After, the industrial revolution, white collar workers emerged

and have their places in service sectors in transition to postindustrial society (Dursun, 2018). Industry 4.0 means a new period, which made a more productive use of men power while covering these developments, will lead to a change in structural change in manpower factor (Schuster, 2015; Alcin, 2016). In addition, working life conditions also restructured by developments in information and technology with Industry 4.0 period. Therefore, the importance is given to the whole and complete work performance and speed delivery to the employer (Berkün, 2013b:17). In this process, how and where the performance realized is not important (Berkün, 2013b). Most of the companies now turned to the flexible working models with qualified manpower by refraining dependent, traditional working styles as it decreases costs, raises the productivity and decreases personnel turnover (Tokol, 2001).

Industry 4.0 period also raised the employment in non-routine and non-information task force. The demand for a qualified workforce has started to rise in this direction (La Monica, 2003). Furthermore, this situation caused a new line of businesses. However, new areas of business and its characteristics, flexibility and working hours will create a numerous number of different and more complicated operational and organizational structures. Therefore, workforce need to have a different system that worked for the classical structure, must have a potential to administrate the complicated structures and to act with its own initiative with active functioning of communication channels (Cakır, 2018). This approach while providing the automation among administration, organization, and production processes will especially cause the qualified workers to plan their working life to increase the possibilities of working without limitation of place and time.

So, it is expected that the workers may find more free time as working conditions will not be routine. The responsibilities of workers will change. Workers will have advantages in working life such as high flexibility and integrated-adapted machinery will also change responsibilities. (Gabriel, 2016). Increasing responsibilities of the workers in working life will also increase the importance of technical training in Industry 4.0 process (Kagermann, 2013).

With the industry 4.0 process, growing automation and increasing responsibility levels of workers will cause to rise organizational stress level. In addition, as the working hours diminishes the areas will emerge of which robots providing workers health and safety (Eyuboglu. 2016:4).

On the other hand, economic, technological and social developments will have multiple effects on labor unions. The most important change is the decrease in member numbers. As a result of all these factors, changes will occur in the mission and occupation of labor unions. Especially, in economic recession and crises periods, the priorities of labor unions change. For example, the occupation of labor unions covers to create new job opportunities by decreasing working hours to participate in administrative affairs, to prevent unemployment by pressing the government.

The priority is given to sustain real wage levels and to provide real wage increases to workers with low income, to protect acquired health and pension rights and to defend fringe benefits. Administrative authorizational topics which are in the context of collective bargaining agreement are re-issued and to be discussed mutually. Furthermore, organization of work and working conditions due to the general level of employment, investment policies due to the place and characteristic of investment application of new technologies, are in the occupation area of labor unions (Egemen 1991; Kahraman, 1991). The important aspect of the problem is the behavior of laborers and the composition of manpower. In the inner structure of labor unions, the discussions about the situation of white collar and blue collar workers and the results of the increase in technical specialists, create important problems. In reality, the rise of a new category of workers is always a substantial problem. Now, atypical workers or technical specialists are the components of this problem. Main topics are as follows: Social interest areas of workers, the

solutions to the different corporates and sectors, new regulations for the new workers, environmental problems, protective legal regulations, and what kind of new possibilities can be provided to labor unions under the framework of commercial and financial new regulations both domestically and internationally (Egemen, 1991:2). Industrial relations in developed market economies made strengthened the tendency for participating in managing the future. There is an important transformation in the nature of collective bargaining agreements. In various developed countries, voting power by bargaining, with the participation of employers and government develop and they discuss the dynamic solutions for the structural problems. As a summary, since 1980, disagreement and conflict issues are now replaced by voting authorization and Increase in productivity discussions. Competition factors other than the price gained importance. Future economic performance expectations have pressure on today's discussions. The dominant development in the contracts gives attention to long term efficiency, productivity excluding strikes. The world changes as technology develops. The newest approaches are brought by changing technology which transforms globalization. The careful followers who follow the situation can realize that recently the main reason for political and social surprises comes from technological developments. Technological developments also changed production processes. As a result, habitual patterns are upside down. New problems, new solutions, and new concepts emerged. Now, the structure of production also changed.

In the past, industrial production was important but now the services sector becomes significant. Formerly, industrial production was very important but now manufacturing industry gains importance. Before, production was dependent on hand labor however now, even in the manufacturing Industry, most of the workers work with computers (Kocaoğlu, 1991). Changing conditions of the World has also affected the behavior of workers towards the unions. Now, the worker sees the union as a service agent but not a class struggle organization now, they expect concrete services for their daily needs. The number of the unionist type who bangs on the tables, jaws at crowds, criticizing the abstract system decreased. On the contrary, negotiating, well-educated technical unionists gain importance. Therefore, the degree of loyalty to the union is determined by concrete services provided to workers but not the abstract speeches and promises. The unions and organizations organization suffer damages when they cannot realize the syndical expectation of workers. In the past, "Abundance of associations without unions" emerged in Latin America and they were used as pressure instrument of employers and regarded as humanity crime in the modern world now appear as the main preference of workers in the unions which fell beyond the transformation. The whole development indicates that new union organizations are needed which can cope with changing conditions. (Kocaoglu, 1991) One of the main problems of Industry 4.0 is to find both digital leaders and workers who can adapt themselves to the new technologies. Qualified work manpower will either rise or drop medium level qualified workers and it will increase Polarization. (Manyika, 2013).

IMPOVERISHED WORKERS IN LABOUR LIFE

It is easy to assume that the effect of globalization will go on for many years and it will simultaneously signify the present and the future. (Esping-Andersen, 1990; Sallan Gül, 2004; Koray 2005) and its effects will be more and more apparent on the poor forming poverty. On the one hand, globalization is supposed as if it will bring more and more social security and social protection (Bauman, 1999; Sassen, 1998b).

Globalization will have the impacts internationally as the name refers. Social states' depreciation will be more distinctive (Keyman, 1995). The international flow of capital while forcing the boundaries, government powers will stay domestic and restricted. (Mishra, 1999). As the capital moves internationally,

the States' tax collection authority and capacity will be poor and it will also cause inequality among the governments and make it difficult to apply social welfare conditions. Thus there will be a tendency towards failure and to leave social and economic welfare responsibilities. (Cohen, 2000; Dean, 1991). The most effective part of the society is the ones who sell their labor (Sassen, 1998a; Sassen, 1998b). While the globalization means to have more and more social security protection to protect the poor people, it also made the application of financing these problems harder and harder (Esping-Andersen, 1994).

Furthermore, as the unemployed-poor people are out of the economic system, they are no more included in the economic and political life meaning that they are imposed to influential and authoritative environment effects and they also nearly lose decision making processes which are against their interests.

Permanent income has a tendency to drop as a result of continuous decline in wages and irregular working hours. The unskilled workers will be under risk of losing their jobs or to be exploited by the employer to work for lower wages and or have to work for unknown hours.

In the past, though the wages were enough as the blue-collar workers were dominant now due to decreasing wages now the workers are beyond to meet even their basic needs. Now, due to increasing consumption needs, psychological needs come into the scene. Psychological needs and drop in wages made the consumption balance more complicated while opening the gap of poor workers. Now, the subject of poverty stories is the effect of psychological reasons as the poor goes under the poverty limits. This special dimension poor segment is now beyond its classical meaning. Now, we met with a new dimension of poverty (Bauman, 1999; Harvey, 2003).

IMPOVERISHED WORKERS IN TURKEY

In Turkey, there are many reasons for the increase of poor workers and the interrelations are very much complicated. Unemployment and household family members must be analyzed differently as the groups are having many complexities (Kapar, 2010; Şenses, 2001).

The percentage of participation in employment and the laborers in Turkey is definitely lower than the EU and OECD countries. Although the population consists of young people, the percentage of employment is behind the other countries. Potential workforce cannot be fully utilized. In the year 2009, only 44% of 15-64 years old were able to find a job. This is the lowest rate among the OECD countries. The average percentage for the OECD is about 65%. The small number of workers and the unemployed household population have the accelerating effect on impoverishment (TÜİK, 2010).

In Turkey, there are two important factors household population in the villages and agricultural sector with the employment it offers. The rural areas and agricultural employment suffer a lot even in economic development phases meaning that they cannot take their share. In other words, they suffer and are exposed to big damages (TÜİK, 2010).

Another factor increasing unemployment is the existing and increasing number of unpaid family members. These family members are employed in rural areas but in non-agricultural sectors. The rate is about 13,5 percent of the household workers are unpaid. (TÜİK, 2010). Seasonal workers or temporary workers, on the other hand, is another problem as they are insecure and the wages are too low. According to TÜİK, it is calculated as 6.7% in the year 2008. Small entrepreneurship seems as if it works for employment as the percentage increased by 20% for the self-employment (TÜİK, 2010).

The employment level of Turkey is 40% which is below the EU and OECD countries. This situation creates high risky groups for poverty e.g. wageless household family members (TÜİK, 2010). TÜİK

survey indicates that 54% of the workforce comprises of workers with a quite low level of wages (TÜİK, 2010). The group forms a significant number of poor workers with a low level of wages and salaries. As the flexibility increases in work environment e.g. part-time jobs, then comes weakening of the poverty. Part-time working slowly becomes the reason for poverty. However, on the other hand, the war against inflation and the relevant policies so as to get a competitive advantage in international markets, also restricted the rise of wages in Turkey as in the other countries. The second factor which hinders the rise of wages is due to the weak unions and weak collective bargaining agreements. So, with high unemployment rates and lower wages than a lot of countries concern is to stop the impoverishment.

Currently, due to high tax and social security payments, the net income is severely affected through which net income diminished for many households below poverty levels (OECD, 2009).

If we analyze the EU and OECD countries, social protection measures are ready to provide the needed. If the employment is not enough, then to support the poor, all social security systems are active so as to help the needed people (Eurofound, 2010). However, in Turkey, there is a big social security gap and there are weak social insurance bonds and it seems to modify the social security system may remain limited (Kapar, 2010). However, special studies related to social security rights and with the increase in income must be on the agenda for the poor. Social security gap problem must be solved. (Aktan, 2002; Drucker, 1994; Kapar, 2010)

FINAL WORDS ...

Let's assume that we all caught up with new technology, with the new production techniques... But who will make it survive? The coming generation who are technology addicts are not as hard workers are we are. For them, it is easy to reach information from the Internet and they do not want to lose time with libraries or any other source rather than internet... Imagine these generations will work in a factory... How we will make them fight with the difficulties?

Definitely, we must take care of new generation and carefully follow their mentally and physically wellness as if nowadays problems started to increase as the youth cannot find real friends rather than Social Media or dark internet. Their mental needs cannot be sustained through social media which are full of lies and it also threatens the life of youth. Even some young people try to make suicide together as a group. They are fully under control of the internet. The number of youth applying to the psychiatrists are growing day by day as they cannot support their mental needs by themselves or they cannot supply the necessary help from their parents

Therefore, we must have the utmost care for our children and the youth so as to grow mentally healthy brains which will join in working life. Will they be successful? Will they be healthy or do we want healthy brains in working life?

CONCLUSION

Until now, the world realized three industrial revolutions, now prepares the Fourth Industrial Revolution dominated by digital technology. Federal Research Ministry, Germany which realized 4.0 process so as to re-gain the competition power drop the need of manpower at the lowest level and this situation will lead to the newest developments both in production processes and the future of whole humanity. As a

consequence, researches for the concept of 4.0 are still rising every day. It is defended that Even Industry 4.0 process will inactivate some jobs via robots especially in routine technological developments, it will by-pass manpower and many jobs. However, although the Industry 4.0 will inactivate some jobs, it is also defended that it will increase the employment of highly qualified manpower (Çakır, 2018). Industry 4.0 process will lead to a structural transformation and it will bring a new production process in which robots and men will work harmoniously. There are mainly three Scenarios related to this matter (Buhr, 2017).

- **Automation Scenario:** Systems will direct the workers, following, and control procedures are taken by the technology, therefore, the demand for unqualified workers decreases.
- **Hybrid Scenario:** Workers work in harmony with the technology and they follow and control procedures. As the demands changes frequently and due to its numerical increase, the workers must be as flexible as possible.
- **Expertise Scenario:** In this scenario, only highly qualified workers manage the business. In general, the expected transformations in working life due to Industry 4.0 can be summarized as follows: (Çakır, 2016):
 - The demand for qualified workers and digital talents will increase,
 - The new job opportunities will emerge although there will be a decrease in hand made business.
 - The importance of flexible structures will increase so as to cope with the continuous changes occurring in technological structure and working conditions.
 - As equilibrium of working time and private life will change, the importance given to leisure time will increase and more importance will be given to leisure time as the workers have their freedom.
 - Extensive and tight measures will be in use against possible risks of workers' health and business security,
 - Lifetime learning and technical training concepts will gain more importance due to cybersecurity risks,
 - Structural conflicts or psychological stress will rise instead of physical stress in working places,
 - Unionism will lose its importance so there will be changes in rolls and structures of unions.
 - Serious polarization will be observed between qualified and unqualified workers

All these transformations show that steps to be taken must not be limited to the level of technology. As the investments, legal regulations, production patterns, and education will have interaction, there will be an enormous transformation in social life. In the globalization era that we live in, the Regulations must be prepared against transformation in working life and men power market as it will secure the advantage in competition.

Impoverishment is a topic which indicates the factors of continuous alteration, regeneration, and repetition which repeat themselves. So, the causes of impoverished, its conclusions and solution will be always on the agenda and the situation is no more explained with the old discussions and interpretations.

International Labor Organization formed issues like workers' work safety and their protection in working life environments. Under these conditions, it seems it should care for the workers' well-being and happiness, however, this situation is now heavily discussed. And it has to be repeated again and again louder and louder so as to show that social wellbeing and social security is important and the necessary measures have to be taken. The alternative social market has to be formed against individualistic economies to decrease impoverishment.

Quantity of poor workers and the worse ones losing their capacity has increased against the operations of capitalist economies. Under these circumstances, social payments given to poor people and the responsibilities of employers have to be defined again. Especially the for the minimum wage owners are clearly taken into account by not mixing with the other poor groups which receive financial aid and social services.

The acceptance of reality for the poor workers will help to define payment and needed relations. Therefore, the subsidies and social services which are related to human rights is the major requirement for social justice and the balanced distribution of income. If the distribution of income is not in a balanced position, it definitely means more poverty in redesigning the world of which nobody wants to reach.

Majority of technological developments and its effects can be predicted however the effects on the work market and poverty and inequality effects cannot be foreseen.

When we analyze the studies related to the effects of Industry 4.0 on the work market, the common opinion is that this transformation will affect nearly every work market. The only contradictory thoughts are when the transformation will be realized and the nature of the transformation. It seems even the economists who have optimistic viewpoints, now accept that Industry 4.0 will destroy many job sectors. The optimistic part is that of the economists believe in the creative nature of human beings.

Many jobs valid for today is no more exist. According to them, many disappeared jobs will be replaced by the new ones. Furthermore, the optimists claim that as the leisure time will increase, this situation will further be beneficial for humanity. In short, optimists have the opinion that as the new jobs will be created, in the long run, welfare to be gained. Pessimists, on the other hand, claim that in the very near future, to sustain the economic order, billions of people will have no functions. Time to time, Capitalism has a crisis but the market always found solutions to the problems. But, if the threats may have effects on the working market as the pessimists declare then it is inevitable that the market economy will confront with an enormous problem which can shake the economy with a big shock. This is the distribution problem. Human beings work in order to gain an income and they consume this income in order to meet their needs so as to buy goods and services produced in the market. So, they constitute the demand side of the market. So, if they become jobless, then how come they demand goods and services as they will have no income? If there will be such a big problem of unemployment caused by Industry 4.0, then how come the jobless masses will demand goods and services as they would have lost their incomes?

What happens if there will be no demand, and for whom will the production be made? Finally, robots do not eat, they do not go to school and the hospitals. Productivity supplied by the technology makes it possible to handle the economy of scarcity by increasing goods and services.

However, the problem is that, who will buy the goods and services in other words, the problem of distribution has to be solved under the framework of the free market economy. So this situation of unequal distribution may be a problem to be solved as the major economic issue.

Of course, the main target of the pessimist side is not being hostile to technology. Especially, in health and transportation, technology shouldn't be stood against, but there should be a hostility for it. Because developments concerning the above sectors increase the welfare of human beings. It seems technological development is an inevitable process. Problems to be solved are unemployment, poverty, and inequality. The correct and useful policies must be on the agenda so as to solve the problems related to poverty, unemployment, and inequality.

Major transformations that take place in technology along with the digitalization of the production processes brought up deep transformations. The particular situation also has significant results on the

functioning of working life. Digital revolution exposes the necessity of changing the legal concepts that are consolidated on the issue of identifying the production systems and labor relations up to the present time.

At present where we transform to the age of globalization and information society, the fourth industrial reformation, namely Industry 4.0 prevails. The impact of Industry 4.0 is also reflected on the service industry. The first industrial reformation of the history of humanity states the commencement of steam power and machine tool kind of machinery utility. The second industrial reformation is the inception of electric and assembly lines. The third industrial reformation is related to the expansion of electronic technologies. Today, in the meanwhile, the fourth industrial reformation prevails. The determinant of the fourth industrial reformation, on the other hand, is that data processing systems are getting more and more integrated with the real world. The impact of digitalization of employer - employee relations in working life and syndicalist perspective are disputable.

The disputes particularly concentrate on how the new employment styles that are based on the technological innovations will be. What has to be avoided is the statute of the employees who became waged and syndicated in the past century and who became completely disintegrated and unprotected self-employees. The principal of 'labor is not a commodity', which is adopted in the Philadelphia Declaration can be expressed today as 'labor is not a technology'. As a first precaution against the negative impacts of digital technologies on working life, syndicalist establishments can start by having more existence in information networks. International applications bring out the importance of the support activities that are offered to laborers working on digital platforms. Similar undertakings are also widely spread in today's European countries. Time is the determinant in these undertakings.

At present in order the labor law to provide employment that is suitable to human honor, self-respect, dignity, and quality of life to workers digitally, it has to identify functional instruments and new interpretational categories. To get the laborers due for his labor, to have a daily maximum resting period, to provide the balance between work and private life, to maintain his mental health, to put the protective content of the social security into action, to try to prevent the risks from happening beforehand rather than protective function of compensation from the loss due to risks indicate great importance from the perspective of workers in the term of Industry 4.0. In other words, the attitudes for the protection of labor (such as dependent working, independent working, part-time working) puts the subject into a protective approach rather than qualifying the connection (relation). The new term related to the protection of fundamental rights supported also by means of agreements in the age of digitalization for the protection of labor has to be realized by more existence of the collective representative organizations in digital platforms and by providing a more widely spread support labor network.

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Chapter 21

Robot Process Automation (RPA) and Its Future

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ABSTRACT

Many software automation techniques have been developed in the last decade to cut down cost, improve customer satisfaction, and reduce errors. Robotic process automation (RPA) has become increasingly popular recently. RPA offers software robots (bots) that can mimic human behavior. Attended robots work in tandem with humans and can operate while the human agent is active on the computer. On the other hand, unattended robots operate behind locked screens and are designed to execute automations that don't require any human intervention. RPA robots are equipped with artificial intelligence engines such as computer vision and machine learning, and both robot types can learn automations by recording human actions.

INTRODUCTION

Robotic Process Automation (RPA) is the new technology that aims to create software robots (bots) that mimic human behavior. Transitioning to RPA, enterprises aim to reduce labor costs, increase productivity, reduce error rates and improve customer satisfaction. Increasing average cost of worker around the globe (The Biggest Cost Of Doing Business: A Closer Look At Labor Costs, 2018) (United States Nonfarm Unit Labour Cost, 2018) enterprises adapt the RPA technology very fast in the past few years. RPA has become one of the most trending technologies in many industries. This chapter will introduce the RPA technology and discuss its social implications.

In general, RPA is a system aimed at automating business processes through business logic and user inputs. RPA applications provide tools for users to define robots (or bots) that can mimic their interactions with applications processing a transaction, manipulating data, triggering responses and communicating with other digital systems. (Boulton, 2018) According to a Trecent report automation technology such as RPA are predicted to have a potential economic impact of \$6.7 trillion by the year 2025. According to the same report, the automation market will have the second largest economic impact only behind the mobile

DOI: 10.4018/978-1-7998-1125-1.ch021

Internet (Ostdick, 2018) In a recent survey of 500 senior decision makers, 77 percent of respondents believe RPA will drive productivity, through the automation of mundane, transactional tasks. In the same survey, 56 percent of respondents indicated they are planning to use RPA to free up staff, allowing them to focus on higher value work. (What is RPA?, n.d.) Given these statistics, RPA is expected to grow into one of the leading technological platforms and will become a standard for performance. (Ostdick, 2018)

The term RPA can be dated as early as mid-2000s, although the underlying technologies such as computer vision and workflow automation has been developing for some time before. While RPA is still considered as a developing technology, it still relies on the technologies artificial intelligence (AI), screen scraping, and workflow automation and elevates these technologies to a new level, advancing their capabilities in a significantly improved way. Rather than being dependent on code as is required for screen scraping, RPA software provides tools for users to build workflows in a visual way that can be entirely independent of coding knowledge. Also, unlike many web scraping tools, some RPA software makes use of optical character recognition (OCR) technology to adapt to changing websites without requiring intervention from a human employee.

Deloitte suggests that RPA is the combination of AI and automation: “RPA, a synonym to AI, is the application of technology allowing employees in a company to configure computer software or a ‘robot’ to reason, collect and extract knowledge, recognize patterns, learn and adapt to new situations or environments.” (Laurent, Patrick; Chollet, Thibault; Herzberg, Elsa, 2018) In addition, collaboration between RPA and AI allows for complex capabilities to emerge. While automation mainly aims to restructure and organize rule-based and repetitive processes; defining and handling exception cases are still highly manual tasks. At this point, AI can help the automation software for processes that do not require complex decision-making and analysis, such as natural language processing, (NLP) or online customer support. Future of RPA is seen as the coordination between these technologies.

It's recognized that AI technologies will have a significant impact on our society. What happened in the 19th century with Industrial Revolution, a similar social change is likely to take place in the 21st century with AI. We know from history and from what AI does that the first jobs to go are the ones that are simple and repeatable jobs and tasks that are currently performed by people. We can be confident that the jobs being replaced are only one very small side of what AI is really going to change for the society. The short-term job losses and lack of laws and regulations should be a big concern to all and be addressed at the same pace as technology is advancing. Between the job creation, reallocation of skills, and the improved quality of life that much of society will experience as a side effect of AI, long-term benefits to society will lift up all of society across the globe. (Kelemen, 2018)

This chapter will introduce the technologies used in RPA applications and discuss the future of RPA.

BACKGROUND

Automation is a system that functions without direct human interaction. Many automated systems have the following in common: taking the human factor out and thus improving precision, quality, and accuracy. The first idea of how to automate processes using software came in 1935, when the computer scientist Alan Turing described how a systematical algorithm could work processes more effectively. His ideas on algorithms and automation had a lasting impact (Middelburg, 2017) In 1965 the first Robotics Institute was opened (Willcocks P. L., 2016), and service automation was the next wave of improvement in automation (Middelburg, 2017).

Robot Process Automation (RPA) and Its Future

(Willcocks P. L., 2016) define RPA as service automation, but other terms apply to service automation. For example, a scripting tool, artificial intelligence, cognitive computing, BPM, etc. RPA addresses the part of service automation that automates structured processes (Willcocks P. L., 2016). Robotic Process Automation is defined by the IEEE Standards Association as:

A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management. (IEEE Std 2755-2017, 2017)

The term Robotic Process Automation (RPA) was first used in 2012 (Hindle, 2018). It began to gain popularity in 2014 and 2015 when companies started to announce considerable savings due to automation. The market for RPA back-office automation was becoming more significant by early 2016, but it was still relatively small-scale during this time (Willcocks P. L., 2016). According to Horses for Sources Research (Fersht, 2017) and Everest Group research (Robotic Process Automation (RPA): Technology Vendor State of the Market Report, 2017), the global RPA market which includes both RPA services and RPA software increased by about 64% from 2016 to 2017 (Fersht, 2017) (Robotic Process Automation (RPA): Technology Vendor State of the Market Report, 2017). HfS Research (Fersht, 2017) reported a 42% increase in the market from 2017 to 2018 and an expected increase around 94% from 2018 to 2021 (Fersht, 2017).

Just like with all automation, RPA means replacing processes previously done by humans, but this time done by configuring a robotic software to perform the tasks, interacting between different systems such as spreadsheets, Customer Relationship Management (CRM) systems or Enterprise Resource Planning (ERP) software (Willcocks P. L., 2016). In short, RPA provides the tools to automate rule-based, logical processes involving well-defined and structured data with a deterministic set of output values (Willcocks P. L., 2016). In addition, the tasks are often repetitive and highly manual (Willcocks P. L., 2016). Such tasks can be labelled “swivel chair”, referring to moving inputs from one side to outputs on the other side without much need for consideration (Willcocks, Lacity, & A, 2015). However, the robot should, if given a suitable process and well-defined working logic, outperform humans in terms of quality, time and cost (Willcocks, Lacity, & A, 2015).

The goal of RPA is not to simply assist humans in automating the processes; instead, it aims to replace humans entirely (Willcocks, Lacity, & A, 2015). While applications such as Excel assist humans in calculations, they still require human involvement. In RPA, calculations are mostly done behind the scenes by the robot, with only input and output by a human.

Of the benefits that RPA provide, the most interesting one is that RPA does not disturb the underlying system (Willcocks P. L., 2016). Every action a robot takes can be easily logged and audited; and thus the risk of non-compliance is minimal (Willcocks, Lacity, & A, 2015). This is different to most classic business process automations, which can manipulate data directly in a database.

RPA applications have been reported over the last 5 years in business process like accounts payable, accounts receivable, travel expenses, fixed asset accounting, master data management, billing, keeping employee records, among others (Willcocks P. L., 2016) (Asatiani, 2016) (Willcocks, Lacity, & A, 2015). Most of these processes are back office or support processes for services where the customer is not directly involved.

Case studies for application of RPA include the finance industry (Seasongood, 2016), energy and BPO (Willcocks P. L., 2016). In addition, several studies list the main areas of RPA implementation as accounts payable, accounts receivable, travel and expenses, fixed assets and human resource administration. (Deloitte: The robots are coming, 2015) (Capgemini Consulting: Robotic Process Automation-Robots conquer business processes in back offices, 2016). The Capgemini study (Capgemini Consulting: Robotic Process Automation-Robots conquer business processes in back offices, 2016) also revealed that the main measures for RPA success are: cost reduction, increasing process speed, error reduction and increasing compliance.

In the last decades, revolutions in technology have led to fear of job loss and alterations of current labor (Autor, 2015). This debate on the fear of job loss continuous due to the research of Frey & Osborne (2017), they state that almost half of the jobs in the USA are at high risk of being replaced by computerization in the coming decades. However, Arntz, Gregory & Zierahn (2017) stress the overestimation of the research of Frey and Osbourne (2017), due to their consideration of the computerization on occupation-level. Arntz et al. (2017) repeat the same analysis, but use a job-level approach where several tasks within a job are taken into account, and find an automation risk of jobs within the USA of 9%. They also state that the possibility of automation does not imply that automation will indeed take place.

Argote and Goodman (1985) address the influence of robotics on individuals and factory companies. They focus on the displacement of employees and alterations for retained staff. In their research, they find likewise opposing effects. Modifications of current jobs, accompanied by in-house training programs, omit some of the potential loss of jobs for current employees. These retained jobs result in positive effects on the employee by learning more skills, performing more significant tasks, and more interaction with colleagues. However, they find adverse effects for employees who got partly replaced by robots but retained a part of their former job. These employees perform less significant tasks and experience lesser control, and they also experience a decrease in interaction with others.

RPA is generally considered as an uncomplicated form of AI (Anagnoste, 2017). This form of automation is considered revolutionary due to the ease of use, the low price and the fast implementation. Where RPA is being defined as a software-based solution for the automation of rules-based processes that consists of repetitive manual tasks with structured data and pre-determined outcomes (Aguirre & Rodriguez, 2017). Moreover, RPA is a software application used to interpret and capture existing applications with the goal of communication across multiple IT platforms, data manipulation and transaction processing (Suri, Elia, & Van Hillegersberg, 2017). In this paper, RPA is defined as the latter definition. Additionally, although the possibility of the application of AI on RPA exists, it is not included in this paper, since the integration of AI on RPA is uncommon (Le Clair et al., 2017).

There are two main differences between the implementation of RPA and classic business automation (Lacity & Willcocks, 2015a). Firstly, programming of RPA can be learned with a few weeks of training; hence no extensive programming experience is needed. Which results in a cheap form of automation with a quick way to achieve a high return on investment (van der Aalst, Bichler, & Heinzl, 2018). Secondly, RPA automates a process with an “outside-in” approach; therefore it controls the computer on the user interface level, which does not disturb the underlying computer systems (van der Aalst et al., 2018). These main differences provide a significant benefit over traditional business automation, which is done according to an “inside-out” approach. Besides the quick achievement of high return on investment, the primary goals of the implementation of RPA are; cost reduction, quality increase and faster processes (Anagnoste, 2017). Additionally, the implementation time of RPA has an average of eight weeks from

the high-level process design until the delivered benefits. Due to the fast implementation, the low cost, and the rapid increase in productivity, RPA tends to be less susceptible to the IT paradox.

The current literature on automation in general provides different insights into the benefits and threats of automation on employment. Since a growth of the automation market is expected, the effects of automation on the current workforce become increasingly important. Especially, the prediction of Frey and Osborne (2017) that 47 per cent of jobs are susceptible to the computerization and therefore emphasize the importance to explore the effects of automation on the current workforce.

Within the field of automation, RPA is a rapidly growing software tool within the growing market of automation. Also, due to the novelty of RPA, there is uncertainty about the effects of RPA on involved jobs and the affected processes. The literature indicates that the implementation of robotics in the workforce can influence the employees both positively and negatively. Although plenty of research is conducted on AI in general, RPA is a more straightforward version and therefore different form of automation. Since this is a different type of automation, further research is needed to determine the effects of RPA on the quality and the quantity of labor (Lacity & Willcocks, 2015b). Implementations of RPA within large companies are researched to provide an answer to the following research question:

What are the effects of the implementation of Robotic Process Automation on FTE effort and the impact on the job design of involved jobs within large companies?

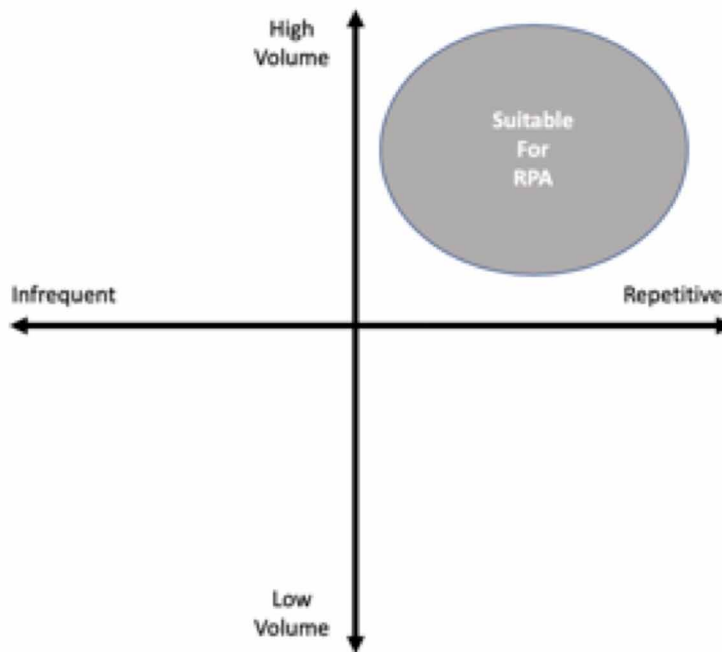
This research question is formulated to explore the phenomenon of RPA and therefore contribute to the current literature on the field of automation and the influence of robotic automation on employees. Additionally, this exploratory study gains managerial insights into the overall effects of robotic automation on employees in practice, which is supportive of managerial decisions whether or not to apply robotic automation within a business process.

PROPERTIES OF RPA

The first question about RPA that comes to mind is where and when it is applicable. Similar to programming, RPA robots have to be given explicit rules to follow. This doesn't necessarily mean that non rule-based processes are not suitable for RPA; they will be covered later in the RPA and AI section. That being said, the best-suited processes for RPA have high transaction volume, high level of standardization, well-defined implicit logic, and high maturity. Automating high volume and repetitive tasks can bring high savings in working time (FTE), while maturity secures the automated processes' presence in the environment. Figure 2 shows the 'automatable region' for the processes based on their volume and frequency Lacity et al. (2015). The region encapsulates the tasks that have the highest potential of savings, either through high-volume less frequent processes or high-frequency low volume ones, or a combination of both ends. The automatable region applies to all automation tools and methods, RPA being only one of them.

Many analysts see RPA and BPM as similar tools that serve for the same purpose. However, RPA and BPM are different in many aspects. The goal for BPM is to redesign processes for better efficiency and effectiveness. Alternatively, for RPA the main goal is to automate what already exists with a process, i.e. to model the existing process as is and then execute it using a robot. This makes RPA a non-invasive technology, as no changes in the infrastructure or to the existing ecosystem is needed. On the other hand,

Figure 1. Types of processes that are suitable for RPA

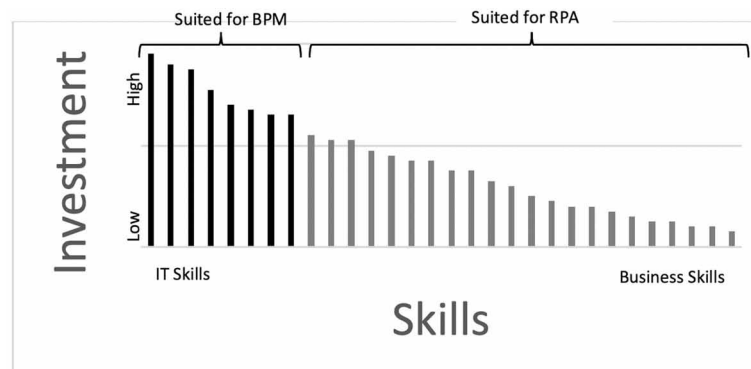


BPM usually requires and introduces new software and has deeper access to the backend systems. As a result, BPM users usually need to have programming skills and abilities to create software and tools for end-users. RPA developers often only need to possess basic knowledge of programming design concepts. Most RPA software provide tools for the RPA developers to easily design workflows and implement them with no or minimal coding. Figure 2 shows the differences between the processes that are suitable for BPM and RPA and skillsets that are required (Willcocks et al. 2015B)) RPA is fitted for processes that require less resources and focus more on process expertise. The chart also shows how RPA and BPM can work together in the same environment, instead of replacing each other. Therefore, instead of focusing on only part of the automation, BPM and RPA can be used to supplement each other. It is more important to look at the overall automation strategy of a company and treat BPM and RPA as part of that strategy (Willcocks et al., 2015A).

Required Skills

A notable aspect of RPA is the ease of developing and modelling processes. RP developers do not require programming skills but should possess knowledge about business processes (Lacity & Willcocks, 2015). They are expected the *teach* the robots the processes they would be automated, instead of programming them. As this job doesn't require the traditional software development skillset, RPA can be managed by the business and operations teams, instead of IT and Engineering. That being said, an RPA project as a whole would require assistance from different teams, including IT, digital operations and backend.

Figure 2. Distinction between BPM and RPA processes



It should be noted that roles within the RPA management team must be well-defined and all members should receive appropriate training aligned with their roles. Operational responsibilities include exception handling, testing, system support, process support and product support.

Process Selection Criteria

The first step of automation should not be automation itself; rather, care should be taken to select suitable processes. To this end, the implementation should begin with questions such as should this process exist in the first place. Process elimination, optimizing and simplifying should be the first steps; this is done to avoid automating redundant tasks and allow focusing on the tasks that benefit most from RPA.

Lately, there have been significant advances in artificial intelligence (AI), which in long-term can further revolutionize business process automation, and change the selection criteria for which process to target with RPA. This is especially true with unstructured, shapeless data or processes without implicit logic for the robots to follow. (Willcocks et al., 2015B)

Scalability

An important aspect of RPA is its scalability. RPA is easy to develop compared to traditional BPM tools, but on top of that, it is more easily scalable. This is crucial for BPO providers, who already in their business are seeking similar strategies in their business processes – the ability to define a process and reuse it for multiple customers (Slaby, 2012). To enable scalability, it must be included in the implementation and development strategy (Willcocks et al., 2015B). To get the maximum out of the robots, they must be multi-skilled (Willcocks et al., 2015A). Internal infrastructure must grow in pace with automation, to keep up with the demand in terms of resources, and the internal technical architecture must make this possible (Lacity et al., 2015; Willcocks et al., 2015B). This way, the software can be easily scaled up and down to meet changes in workload (Lacity & Willcocks, 2016). The scalability must be a culture and should be adopted throughout the organization (Willcocks et al., 2015A).

SOLUTIONS AND RECOMMENDATIONS

Generally, terms like “Digital Transformation” have been too broad and confusing, and as a result, companies do not know where to begin, which leads to frustration and failure. However, the truth is that a complete Digital Transformation will require more than one technology; hence the term Intelligent Automation, which is basically the automation of the company’s processes (including general corporate-level processes using BPM and specific task-level processes using RPA), supported by analytics and decisions made by Artificial Intelligence.

Intelligent Automation is a term that describes a holistic solution for digital transformation, mainly based on process management (BPM) to orchestrate users, tasks, systems and robots (RPA) depending on the business needs at each moment. On the other hand, it also contemplates the use of analytics and AI (especially Machine learning) to make automated and intelligent decisions, and case management to provide processes with enough flexibility for end-to-end case management success. Finally, it is worth mentioning that another key feature of this trend is the integration between the different systems used in the company. Integration will prevent the duplication of data in the systems and users will need only work on one platform.

Robotic Process Automation (RPA)

Robotic Process Automation is a technology which aims to reduce human intervention in computer applications, especially in repetitive tasks that vary very little in each iteration.

RPA works primarily by interacting with “high level” applications, which are the software layers at the graphic interface level, as oppose to machine language or programming code. Put more simply, it is a type of software that emulates the real interaction that a human would have with conventional computer applications.

This technology is suitable to replace simple and repetitive manual tasks such as data entry in applications. This means that employees have more time to focus on other branches of value for the company such as decision-making or improving customer relations.

It is a relatively fast technology to implement and can therefore bring immediate benefits to a company through time and cost savings, especially if it can be applied in the bottlenecks of certain processes.

Artificial Intelligence

Artificial Intelligence is the simulation of human intelligence by machines.

In other words, it is the discipline that tries to create systems capable of learning and reasoning like a human being.

Artificial Intelligence encompasses other concepts such as Machine Learning, Deep Learning, Natural Language Processing (NLP), Visual Recognition, Big Data, etc.

Although it is a very broad concept and covers many levels (from simple automations to complex virtual assistants), it is worth highlighting the following virtues in the current business environment:

- Deciphering patterns from previous experience.
- Intelligent decision making.
- Prescriptive and predictive analytics.

- Improving the user experience.

RPA and BPM

Intelligent Automation proposes concrete solutions; in short, it consists of a successful and interconnected implementation of technologies, so let's break them down and explain the role each one plays:

Business Process Management (BPM)

BPM is a process automation technology that includes the efficient coordination of people, systems and data.

The objective of BPM is to ensure that the operational and business process infrastructure is solid. Therefore, it acts as a base layer in the organization, automating the behavior of complex processes that require people to intervene in data entry and decision making, the use of systems at specific moments such as calculations or integrations, control of actions and data generation and storage.

In other words, BPM plays the role of “orchestra conductor” in the organization, assigning which employee, external user or system should act at each moment, and ensuring the complete tracking and storage of all the information that is exchanged and generated during the process, from beginning to end.

Integrations

The connection and integration between systems is one of the biggest headaches for a company, since each system or software has its own peculiarities.

They generally offer an Application Programming Interface (API) to interact with, which is usually based on some standard such as SOAP (applied in Web Services) or REST (based on HTTP protocol), for example. Integrations usually require code, but with a platform, in addition to managing BPM processes, you can have native connectors (for example, with SAP or Dynamics CRM) and make connections based on SOAP or REST without using code and in a fast and simple way. For cases in which it is not possible to integrate via API, we would opt for RPA to undertake a superficial integration at the graphic interface level.

The main objective of intelligent automation is to improve the customer and employee experience and boost productivity. In addition, it generates time and costs savings, significantly reducing human intervention in the process cycle, which allows employees to have more time to focus on creative improvements, strategy, making decisions, etc. Another objective is the reduction of errors in the processes, as well as a reduction in paper usage, since this trend is completely oriented towards purely digital management.

In short, intelligent automation was born as a term related to digital transformation, but with the advantage of being better defined and proposes a real solution by combining four branches of technology: BPM, RPA, Artificial Intelligence and Integration. An ideal case would be a company with a backbone orchestrated by workflows (using BPM) that involve users, systems, data and documents; uses RPA in specific moments and tasks (to tackle bottlenecks in previously manual tasks); with hybrid decision making between managers and automations based on Artificial Intelligence. Finally, we complete the picture if we connect all the systems used by our company through integrations (API level when possible, and with RPA when not) and centralize the information generated by the processes in a main database. The data will be analyzed and feed the AI machine learning, to ensure better documented decisions.

The main objectives of Intelligent Automation are the same as always (and at the same time so difficult to achieve): to improve end-to-end customer experience and improve the productivity of our employees, getting rid of repetitive tasks and enabling employees to focus on tasks that add value for the company (creative improvements, new strategies and solutions, decision making, etc.) and of course savings in time and costs.

Comparison With BPM

Although Business Process Management (BPM) and Robotic Process Automation (RPA) operate with a similar process logic based on events, actions, conditions and loops, the context for their application is vastly different. BPM ensures a solid operational and business process infrastructure, whereas RPA is used to tackle tasks just as a person would, but at a much higher speed; therefore, it operates at a more superficial level. Both are relatively quick to implement and allow a very agile adjustment to possible changes in the processes.

BPM can be considered as the foundation for company operations, orchestrating a coordinated and efficient workflow that integrates users, systems and data. RPA, for its part, allows certain tasks within the company workflow to be undertaken in record time, notably improving the times for repetitive tasks that may have caused bottlenecks.

In short, RPA and BPM are not in conflict with each other. Although both seek process optimization, their area of influence is different, and each case will require greater presence of one or the other. Indeed, in most circumstances, the best solution will be to implement both solutions. Although RPA can have a greater initial impact, what companies often need is to establish an efficient workflow between its departments and employees, instead of optimizing a specific repetitive task.

How to Combine BPM and RPA

In general, the best strategy is to start by establishing an optimal workflow throughout the enterprise and detecting all bottlenecks. BPM is the ideal tool for this, using statistical simulation to estimate times and resources and then in production to ensure continuous improvement. Detecting the bottlenecks and optimizing the processes with BPM is often sufficient, and if needed, RPA can be implemented to expedite specific tasks.

How to Choose Between BPM and RPA

RPA makes sense when we speak of simple processes, with a high volume of repetitive transactions, and a type of process in which human participation is not necessary. This means that there is no decision process in the transaction itself that can condition it, or that this decision process is very simple.

With this in mind, it is a good idea to consider the use of RPA when we want to:

- Eliminate repetitive tasks
- Reduce those small errors, that can come at a high cost for the proper functioning of the company
- Perform simple but repetitive calculations

Robot Process Automation (RPA) and Its Future

To choose an RPA, the Forrester analyst Craig Le Clair recommends the following rule of 5 (Le Clair, 2018):

- The first rule is based on the limited rules capacity of RPA: No more than 5 decisions per robot. RPA does not have an effective decision rules management; decisions would need to be coded in each robot, and if the rule changes each one would need reprogramming. Hence, it is better to use another system for decisions that can connect with the robot.
- The second rule comes about because robots are sensitive when apps change: No more than 5 connected applications. RPA does not connect with other applications via API, instead it mimics the behavior of a human.
- The final rule: No more than 500 clicks, is important because RPA tasks need structure. Thousands of keystrokes, clicks and mouse movements point to a less structured Process.

In the case of a BPM, or DPA, this allows process automation, in many cases with little code, and in some cases without code. BPM orchestrates the different processes in a company by automating automatic tasks; either using integrations with the other systems, or through integration with other tools, such as RPA; and other tasks which require human participation. This automation also provides the business user with the information necessary for decision-making, on a macro level, with information for “complex event processing” (CEP) and “Business activity monitoring” (BAM) and allow business users to continuously improve their business processes in a fast and agile way, with little or no involvement from IT departments.

Implementing a BPM is therefore meaningful when we speak of process automation, which requires participation from people and machines, and in which there is decision-making, and a workflow based on the process decisions. BPM can automate processes of high-value and high volume but is not necessarily the best option for highly repetitive tasks which don't require human participation.

BPM allows the rapid adaptation of the company's processes with minimal involvement of IT departments, overcoming the classic division between business users and the team in charge of technology development and implementation. Furthermore, it can break down existing silos in any organization.

BENEFITS OF RPA

Improved Customer Satisfaction

Capturing new customers is five times more expensive than retaining current ones. Therefore, all sales strategies should take customer satisfaction into account and leverage intelligent automation to boost satisfaction and increase the retention ratio. For customers to be satisfied, we have to offer them positive experiences at all points of contact with the company before, during and after the purchase of the product or service. The customer's overall experience is a journey (customer journey), which can start when a potential client does not even know the brand, through to buying the service and requiring after-sales attention.

Each and every one of these touchpoints are unique opportunities for recruitment, loyalty and recommendation. A high recommendation rate (Net Promoter Score, NPS) means that customers recommend you because they are happy with your company.

According to a 2016 Accenture report, 52% of the companies surveyed had changed providers in the last year due to poor customer service. Seventy-three percent of them wanted a service more suited to their needs, while 61% most valued speed when checking data and response to queries and incidents.

Financial services is one of the sectors that has evolved the most in recent years, digitizing their services by implementing online banking and mobile banking. Even so, there are many manual tasks that create inaccuracies, inefficiencies and long waiting times. Intelligent automation technologies can record conversations between customers and banking staff and then automate all subsequent management. The necessary documentation will be processed automatically so that it complies with the current legislation.

Knowledge is also created by analyzing data, spotting patterns and trends and creating algorithms that can predict future behavior. The chatbot with voice recognition and Machine Learning will help both telephone and online customer service. This automation and digitalization of the back office will generate more time and resources for personalized attention.

According to a study by Capgemini, 63% of organizations have improved customer satisfaction thanks to intelligent automation. (Connatty, 2018) It has resulted in improved response times with direct processing, personalized service, 24/7 availability and customized products designed by customers. And all thanks to the implementation of BPMS, RPA, IA and integration systems. It should be emphasized that each customer touchpoint is important for overall satisfaction and, that using intelligent automation technologies, will make it easier to gain customer loyalty and recommendations.

Efficient Management of Digital Processes

In the digital era, it is a race to adapt to the new market needs for organizations that must redefine their work processes to be agile and competitive. The needs of digital organizations involve harnessing abundant amounts of information to feed their processes and optimize response times, thus improving the quality of the services they offer their customers.

During recent years we have seen how organizations undertake their transformation projects in line with the new digital philosophy; agile and flexible. But the need to incorporate new tools that provide a holistic view necessary to make automated decisions and directly impact on digital positioning has also become evident. Process analysis must conclude which existing processes must be redefined, maintained or eliminated and recreated from scratch.

Many organizations are skeptical when it comes to addressing the redefinition of their processes, since for years they have given more than effective results. The new digital era puts strategies, past performance and the way of working to the test, to get the best out of organizations and elevate them towards new, more efficient, flexible and faster processes. New digital processes should facilitate the cohesion of technological accelerators with new customer-centric scenarios

The correct redefinition of processes in the digital era implies starting from a position capable of providing a global and centralized view. Organizations should work on the concept of “a business platform” as a homogeneous element capable of integrating any data layer in a modular and transparent way. This is the only way to build the intelligent scenario necessary to tackle a first phase of vision and redefinition of processes, to later define and implement the digital strategy.

According to IDC, in 2023, 35% of workers will start working with bots or other forms of AI, which will require company leaders to redesign operational processes, performance metrics and recruitment strategies. (Murray, 2018) Organizations must have new solutions that help consolidate the “digital

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business platform”. These business platforms must facilitate process visibility and streamline their optimization; in a simple and visual way they must:

- Consolidate the information in business systems.
- Homogenize processes and work methodologies.
- Monitor all digital processes from a single point.
- Facilitate employee access to the processes.
- Automate decision making and help business agility.
- Establish new KPIs (key performance indicators) and KBIs (key behavior indicators) apt for the digital age.
- Facilitate integration of new applications and data sources consolidating everything in the business platform.
- Drive agility and flexibility with great capacity for customization.

RPA Applied to the Digital Process

The adoption of a digital business platform is just the first step in the redesign of processes. Next, it is necessary to endow that platform with automation capacity, which allows the consolidation and management of the large amount of information coming from different sources. Finally, it will be necessary to integrate an intelligence layer that facilitates automated decision making and recommendations to impact the market as quickly as possible. These platforms must also update the interfaces to improve employee collaboration and help increase efficiency, productivity and improve response times.

According to IDC, by 2023, 95% of organizations will have incorporated new sets of digital KPIs, focused on product and service innovation rates, data capitalization and employee experience, to navigate the digital economy. (Nicastro, 2019) These new KPIs should be defined, managed and reviewed autonomously by digital business platforms based on the impact of the digital strategy.

- Process Automation used by management teams to transform the chaos in their departments into productivity. They need only define the process flow diagrams with the procedures that they want their teams to follow.
- Dynamic Case Management to make the right decisions fast by automating procedures and using real-time information. Gathering all necessary information to perform accurate work throughout the case lifecycle.
- User Interface (UI) that allows you to adapt to the faster, smarter and hyperconnected digital world, surprising its users with attractive portals adaptable to multiple devices and responding immediately to their needs with agility and zero-code changes on the fly.
- Mobility to face the daily challenge of working faster and better. The real-time digital business in a 100% web environment eliminates bottlenecks and drives instant knowledge and innovation.
- Analysis and Smart Decision leveraging a wide range of sophisticated functionalities including Native Reporting, Deep BI, Impact Identification, Workload Distribution, Business Rules, Analytics, BAM.
- Document Management to enjoy the immediate benefits of accelerated business transactions and processes leveraging the most complete systems to manage your documents and digital content.

- Business Rules and Data to keep your information under control and seamlessly manage documents, digital content, dictionaries and more, combined with a powerful Business Rules Engine.
- Integrated Artificial Intelligence for systems that learn, adapt and potentially act autonomously.
- Connectivity and API to facilitate integration with external systems and applications to empower a centralized management.

Technological leaders that want tackle a company's digital transformation with guaranteed success need to execute their digital strategy based on new intelligent business processes. To ensure efficient management of their digital processes, a holistic approach must be considered; the organization is a living organism in which all the functions are related and work together. According to the latest KPMG report, 83% of Spanish organizations are exploring several intelligent automation technologies, but only 15% apply an integral approach. (Easing the pressure points: The state of intelligent automation, 2019) This integrated coordination and mindset is what is needed to achieve a successful transformation.

If we approach business digitalization with this philosophy, all business processes will have to be rethought and redefined, seeking agility, efficiency and productivity. It is important to understand that digital transformation does not just implicate the technology department. On the contrary, it involves the total reinvention of the company at all levels. Managers must redesign operational processes and digital KPIs as by 2023, 35% of workers will use different forms of Artificial Intelligence. (Murray, 2018) This will even affect the human resources department as they develop recruitment strategies to capture digital talent.

Digital Evolution

Some speak of digital evolution rather than transformation because the improvement and adaptation process to the new business reality is constant. To redesign an organization's processes, we must first start by adopting a digital business platform, and then empower it with automation capacity. The final step is to implement an intelligence layer that will complete the process. The coordination and synergy achieved recognizes that the true value is an effective 'business as a whole', not just certain sections or departments. The work methodology and processes become homogeneous, favoring the consolidation of the information from diverse business systems. Furthermore, the intelligence applied to the data combined with employee access to the processes, will allow companies to offer customers better products, services and attention to their needs.

Business process management platforms will help you transform your entire business and achieve your digital goals. Intelligent process automation, designed through flowcharts, without programming a single line of code, will result in increased productivity. Rapid and accurate decisions can be made thanks to dynamic case management, while integrated Artificial Intelligence with learning capacity will optimize effectiveness. In the digital age, these new integrated digital processes will be a company's main asset to achieve success.

Evaluating Benefits of RPA

Robotic process automation (RPA) integrates automation with artificial intelligence (AI) to automate processes through the deployment of custom applications. The use of AI is about leveraging intelligent algorithms to resolve inefficiencies and drive enhanced customer experience at every point of interaction.

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An RPA solution emulates human actions to automate the tasks that require human intelligence, without necessitating changes to the underlying systems and processes. RPA is about employing software robots with the ability to replicate human actions to eliminate inefficiencies in processing of information or data. Simply put, RPA envisages a virtual workforce with skills comparable to that of human beings.

The commoditization of financial services has spurred banks to improve front-end services and customer experience. Backend operations, however, have not received as much attention, and offer tremendous scope for improvement. Backend processing typically involves high volume, rule-driven, repetitive tasks that are labor-intensive, and therefore, prone to errors. When automated using RPA, these tasks will not require the constant intervention of skilled human resources who can thereby focus on higher value-adding activities. The investment is minimal as RPA does not entail any changes to the underlying legacy IT infrastructure. At the same time, it speeds up core processes, significantly enhances productivity and accuracy, lowers costs, and cuts time-to-market for new offerings.

Measuring RPA Success

Perhaps it is the implied simplicity, or its general acceptance in the industry, but ROI (return on investment) is the ubiquitous approach to evaluating success of an investment. To establish a consistent understanding of ROI, let's define it as follows:

As for automation, the prevailing measure of "Gain from Investment" is cost reduction. While FTE arbitrage is seemingly the easiest gain to derive, and gaining the most traction in headlines about RPA, our point of view is that there are more meaningful interpretation of ROI when it comes to automation and RPA.

Establish a Baseline

When evaluating automation, think of the robotic process as a digital employee. How do we evaluate our human employees? Baseline metrics and comparison to others. We've all undoubtedly undergone a performance review at least once during our career. Common employee evaluation techniques include speed, accuracy, and monetary contribution to the company.

A Holistic View of RPA Benefits

Intrinsically, there are two categories of RPA benefits at a company: primary and secondary. Primary benefits include those that are directly related to the implementation of RPA. Examples include improved efficiency, increased accuracy, and headcount reduction. Secondary benefits are those benefits made possible indirectly by RPA implementation. These benefits, while harder to quantify, can lead to tremendous gains to the company, both in top line revenue growth and bottom line cost savings.

Figure 3. ROI calculation formula

$$ROI = \frac{(\text{Gain from Investment} - \text{Cost of Investment})}{\text{Cost of Investment}}$$

Primary Benefits:

- **Increased Efficiency:** Perhaps the most frequently referenced (and most easily grasped) benefit of automation, increased efficiency is realized through higher workload capacity and increased speed, both resulting in increased throughput rate. In a bank, this might mean that a loan closing and booking team can address more loans each day, improving the customer experience and reducing the need to hire as volume increases.
- **Increased Accuracy:** Any process that requires manual data entry or data transformation introduces the opportunity for error. While humans experience fatigue and distraction, an automated process can run 24-7-365 and utilizes computer memory and programmable rules to ensure consistency and accuracy. In a bank, data entry and transcription errors can result in increased rework, decisioning based on inaccurate data, and negative financial impacts and fines.
- **FTE Reduction:** Headcount reduction may be the most difficult benefit to discuss but is also widely misunderstood. Workload redistribution and reduced future hiring needs are more realistic options. An organization that embraces automation can address increased capacity related to growth without adding headcount.
- Secondary Benefits
- **Asset Redeployment:** Workload Redistributions allow an organization to move headcount from one area to another to address organizational needs. If automation produces increased capacity and the workload doesn't match the excess labor supply can be reallocated to new areas. For example, consider how a bank would redistribute work in the front, middle, and back office if they suddenly had more "free" time to work with. Keep in mind that resources and capital refer not only to human capital, but also technology resources like computers and bandwidth.
- **Improved Customer Experience:** All the primary benefits mentioned above relate to cost savings, but viewed from another angle, these primary benefits enhance the customer experience which can lead to increased revenues as well. For example, as employees' capacity increases (through speed, efficiency, redistributed workload), more time can be allocated to customer-facing functions and activities (like improved customer service, increased sales efforts, customer retention activities). There are also benefits from increased speed-to-market through faster loan decisioning and approval or improved competitive positioning through lower costs (reflected in reduced lending costs and interest rate margins) due to resource needs and efficiency improvements.
- **Faster Scalability:** In today's banking environment, top management should consider the question, "how do you make your bank immediately scalable without increasing headcount?" As financial institutions grow through acquisition and organically (new locations or branches), this question becomes top-of-mind. While physical hiring requires time, an automated workforce is distributed as a software resource. With automation you gain a pre-trained digital workforce. Scalability is instantaneous as jobs can be added by purchasing software licenses and applying them to an existing automation protocol. Literally load an automation workflow to a robot and press "Go."
- **Increased Job Satisfaction:** Job satisfaction surveys regularly reveal that the most engaged employees feel they are doing meaningful work that can be easily mapped to company success metrics. What can banks do to increase employee engagement and job satisfaction? Start by taking automatable functions away and allow these employees to be more customer-centric. Banks should consider who will do this work in the future if they are not automated.

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- While cost reduction is often touted as the most significant gain for banks implementing RPA, it's important to look beyond ROI and dig deeper into RPA's capabilities to truly grasp the potential benefits that come with implementing this tool.

RPA USE CASES

While there is an unlimited number of use-cases for robotic process automation, certain business processes lend themselves to higher ROI by leveraging RPA. These processes tend to be rules-based, repetitive, and large-scale. Or, simply so complex and mundane involving multiple disparate business applications that nobody wants to do the task over and over. Let's take a look at a few scenarios where clients tend to see greatest return on investment.

1. Claims adjudication

With insurance companies often relying on a multitude of legacy software platforms to keep track of and adjudicate claims, RPA delivers exceptional savings as insurance processes fit perfectly into the "rules-based, repetitive, and large-scale" categories.

2. Procurement

The integration of the purchasing department and the accounts payable systems is an ideal candidate for RPA.

3. Supplier portal integration

Once automated, this process also leverages the software robot's integration capabilities. A portal is an important mediator between an organization and a supplier, and RPA can deliver a more consistent and error-free integration for your suppliers.

4. Data entry

Data entry is the epitome of monotony. Can you agree? Since RPA has the capability for basic pattern recognition, it can convert nearly all kinds of text into editable and searchable machine encoded text, so the need for manual data entry is reduced. Therefore, fewer errors, faster results, fewer tired and bored employees.

5. Reconciliation

By comparing documents such as cash and bank statements, the procedure is to ensure the reliability of the records.

The software bot can perform data extraction from the bank statement, thereby increasing the possibility of accurate comparison. By finding and approving matched orders, bots can also match purchase orders with delivery notes.

6. Price comparison

Software robots can track varying prices and automatically extract the data for the optimal price setting.

7. Sales activities

We talk about data duplication, creation and provision of invoices, smooth update of CRM (Customer Relationship Management), and so on. Sales are an important aspect of all kinds of business, regardless of size or domain.

Take a moment to think about the monotonous work of keeping CRM and accounting records data consistent. The good thing is that software robots can handle this for you. For example, automation allows you to send invoices to customers much faster than by doing it manually.

It is the earlier customer payment, which improves cash flow, resulting in improved customer satisfaction as a result of this highly desirable result. More generally, the need for error-free sales activities is justified by the desire to avoid customer complaints and dissatisfaction, which is the result of administrative mistakes.

8. Payroll

If your company relies heavily on legacy systems, it may not be easy to adopt the latest payroll software. Software robots can be helpful to help automate the process.

9. Report generation

Regular reporting is necessary. Software robots can not only automatically summarize the data necessary to create these reports, but they can also be distributed to all stakeholders. It is not difficult at all to see how this relaxes the burden of compliance.

10. Customer service

With the advent of chat bots, RPA can be leveraged to instantly query legacy back-end systems whenever a customer asks a question to deliver a much more personalized answer than what a chat bot could deliver by relying on machine learning alone.

FUTURE RESEARCH DIRECTIONS

Robotic process automation's workflow efficiency benefits have been of great value to financial services organizations. According to KPMG, banks and other financial organizations that leverage RPA realize 75% cost-savings. (How Robotic Process Automation Shapes Fintech's Future, 2018)

Bots can perform repetitive, clerical tasks such as processing customer applications and responding to basic customer queries faster and more accurately than human workers. Bots also behave more predictably than people. They don't deviate from their programming so they won't make mistakes or

circumvent processes. Accordingly, RPA is a powerful risk management resource that many financial institutions already use to monitor compliance and create audit trails.

But RPA's contribution to operational efficiency is just the tip of the iceberg. Financial organizations that venture deeper into RPA's capabilities will find a wealth of transformational opportunities that can reshape the customer experience. In particular, RPA is an enabler of new digital financial technology (fintech) that enhances the quality of service and convenience for employees and customers alike.

According to a PwC report, RPA is the "starter piece" for long-term digital transformation initiatives. (The Role of Robotic Process Automation in Banking and Financial Services, 2018) On the most basic level, RPA can be used to bridge integration gaps between legacy software. For instance, RPA can act as an integration mechanism that integrates legacy solutions to newer IT systems. This gives banks and other financial organizations the opportunity to expand their fintech footprint gradually and with minimal disruptions to existing processes. Rather than uprooting and replacing existing legacy tools, bots can push and pull data between new and old applications to orchestrate workflows that might otherwise dwell in silos.

Robotic process automation can also reduce the testing surface of new custom developments and fintech applications. Software robots, which have roots in software QA automation, can be used to validate the output of new custom developments. Consequently, new financial services can be developed with minimal risk to existing processes.

Applied to customer-facing services, RPA is directly responsible for some of the most common fintech utilities. Case in point, bots can automatically populate data fields based on photos of documents that are uploaded via a mobile camera to a fintech application. This works for basic banking functions, such as mobile deposits, but also more advanced processes such as applying for a loan or even initiating peer-to-peer lending.

Robotic process automation can also catalyze new classes of fintech products. Consider the example of what American Banker calls "robo-advisory services" for wealth management. Investment values and information can change by the minute. Software bots can continuously interface with various data sources to track market conditions, and customers can automatically receive recommendations based on the most up-to-date information.

For the "more mature and astute investors," American Banker noted that financial institutions can build on RPA's capabilities to offer a "hybrid robo-adviser service." Bots and algorithms track the quantitative aspects of wealth management. Human financial advisers supply the qualitative consultations. This is a perfect example of adding value to a customer relationship by liberating human workers to focus on judgment-based services.

IOT, BLOCKCHAIN, AND MORE

Putting RPA at the helm of quantifiable data-driven workflows will be especially important for innovation enablement in the years ahead. The Internet of Things is expanding the realm of financial technology services. Customers can now link their financial data to wearable technology and even household appliances. Software bots' ability to interface with the front ends of many application types can help automate the real-time movement of information between systems.

Likewise, RPA is an enabler of blockchain technology. Blockchain uses a distributed digital ledger system to verify data inputs through a consensus. No single source controls the ledger, which makes

it difficult for anyone contributor to commit fraud. For this to work properly, financial organizations will need to continuously record data entries and attributes such as time stamps, geo-location and more from many disparate APIs and IT systems. The benefit of RPA bots is that they can operate as fluidly as humans can across IT infrastructure. This means RPA can effectively bridge multiple disparate systems to the blockchain.

Robotic process automation may also be important for blockchain security. According to PwC, financial services organizations will still need to prove the validity of their blockchain applications. Auditors must answer important questions such as “Who controls the blockchain?,” “Who gets access?” and “Who monitors activity?” Rather than manually auditing the blockchain, PwC proposes automating these verification processes. And just as RPA can be used to validate data for compliance purposes, we anticipate that it will have a role to play in auditing the blockchain.

Many businesses are already using bots to enable fintech innovation. But like we said at the beginning of this post, most financial organizations have only skimmed the service of RPA’s potential.

RPA Market Predictions

The Robotic Process Automation (RPA) market size is anticipated to reach USD 8,781.2 million by 2026 growing at a CAGR of 29.5%. (Robotic Process Automation (RPA) Market Size, Share, Trends, & Industry Analysis Report, By Process, 2018) Requirement of businesses to eliminate human errors due to manual interference in processes along with reduction in time consumption are factors responsible for positively influencing the adoption rate of RPA technology.

Previously artificial intelligence and robotic process automation were largely considered to be different technologies. But, with advancements in the offerings it is observed these technologies are complementing each other in terms of handling processes. It enables organizations in processing huge volumes of data and in providing support for better decision making. Cognitive computing which covers wide array of areas including adaptive learning, speech recognition, and pattern identification is integrated in robotic process automation (RPA) solutions to transform and automate crucial business processes of organizations across multiple industry verticals.

The potential of achieving robust ROI from deployment of RPA completely dependent on the organizational requirements and business processes which are to be automated. In the near future, the market is expected to witness growing base of RPA vendors as they target to gain revenue share from this expanding market. This is expected through introduction of solutions which will cater to the rising need to automate business process management processes. Furthermore, the adoption is expected to intensify as the prices of RPA deployment are continually witnessing a declining trend. Moreover, this technology adoption provides organizations the capability to accomplish better outcomes from their process with benefits including reduction in costs, improved accuracy, and better compliance.

However, factors like reluctance in the transition phase from conventional business process to automation along with shortage in technical expertise required during deployment and integration of RPA solution are challenges which might affect the growth in this market. Analysis for each region (North America, Europe, Asia Pacific, Latin America, Middle East & Africa) is provided for all segmentation of the robotic process automation market research report.

North America is expected to be largest regional market while Asia Pacific regional market is expected to witness significant growth during the forecast period of 2018 to 2026. The region’s leading position is attributed to significant demand and preference of the BFSI industry vertical towards automation of

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business processes. Furthermore, presence of established and major players in North America region and availability of infrastructure for effective adoption of RPA is another factor responsible for the boost in adoption of robotic process automation solutions.

European region is expected to witness growth in this market as the region has a presence of significant amount of companies in the manufacturing and logistics sector. Adoption of RPA technology provides the capability to streamline pickup and drop operations. This eventually leads to reduction in cycle time ultimately resulting in enhanced customer experience.

The major key players operating in the robotic process automation (RPA) market include UiPath Inc. (U.S.), Blue Prism Group Plc (UK), Celaton Ltd. (UK), Softomotive (UK), Kofax Ltd. (U.S.), Xerox Corporation (U.S.), Automation Anywhere Inc. (U.S.), Ipsoft, Inc. (U.S.), UiPath (U.S.), Verint Systems Inc. (U.S.), Pegasystems Inc. (U.S.), Redwood Software (Netherlands), Daythree Business Services (Malaysia), and Kryon Systems (Israel).

Research has segmented the global robotic process automation market on the basis of process, operation, type, industry, organization size, and region:

- Robotic Process Automation by Process Outlook (Revenue, USD Million, 2015 – 2026)
 - Automated Solution
 - Decision Support and Management Solution
 - Interaction Solution
- Robotic Process Automation by Operation Outlook (Revenue, USD Million, 2015 – 2026)
 - Rule Based
 - Knowledge Based
- Robotic Process Automation by Type Outlook (Revenue, USD Million, 2015 – 2026)
 - Tool Based
 - Model-Based Application Tools
 - Process-Based Application Tools
 - Service Based
 - Consulting
 - Integration and Development
 - Training
- Robotic Process Automation by Industry Outlook (Revenue, USD Million, 2015 – 2026)
 - IT & Telecom
 - Healthcare and Pharma
 - BFSI
 - Manufacturing
 - Logistics
 - Retail
 - Travel & Hospitality
 - Others
- Robotic Process Automation by Organization Size Outlook (Revenue, USD Million, 2015 – 2026)
 - Small and Medium Sized Businesses (SMBs)
 - Large Enterprises
- Robotic Process Automation by Region Size Outlook (Revenue, USD Million, 2015 – 2026)
 - North America

- Europe
- Asia Pacific
- Latin America
- Middle East and Africa

CONCLUSION

No study is without limitations when it comes to the results, and neither is this one. All in all, the research design for this study has been well-constructed, but as with all case studies, they share the aspect that there is only limited generalizability. All the findings and conclusions apply only in the context of this study, and any generalization outside the established setting should be done with caution. If a more comprehensive understanding of RPA projects in different contexts is needed, then further research must be conducted.

Another point to keep in mind when interpreting the results from this study is that in its core, the research is centered on forming, analyzing and criticizing a process model. It is possible, that this approach, because of its focused nature, narrows the scope too much, leaving some important aspects completely outside the selection. It could be, that some aspects are therefore completely ignored in the study. The impact of this limitation on projects can be mitigated by being open and attuned to suggestions for improvements in the process flow, essentially treating this established process as a solid template to further build on.

RPA as a technology is still very new and the range of diversity of literature available is not too wide. It is likely that because of this, the contents of the RPA literature review are not as comprehensive as they could be. As the technology evolves, further studies should be conducted, to keep up-to-date with the state of RPA and how this context could change in the future. However, due to the test case being successful, the introduced process that was extracted from the literature is applicable and exhaustive enough to serve as a basis for the process model.

Another matter to consider, caused by the novelty of RPA, is the pace at which the technology is still advancing. Most of the sources for RPA literature are only a couple of years old, and with the completion of this thesis taking more than half a year in total, it is possible that during this timeframe there were some significant findings or advances in the field. To this end, it is worth noting that it is possible the findings of this thesis are already slightly outdated due to this fast pace. Again, further studies could help in understanding how and why RPA is different and how it has evolved.

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KEY TERMS AND DEFINITIONS

AI: Artificial Intelligence. A branch of computer science that focuses on simulating human actions and behavior.

BPM: Business process automation. A software tool used to improve an organization's business processes through the definition, automation, and analysis of business processes.

ROI: Return on Investment. The measure of gain or loss generated on an investment relative to the amount of money invested.

RPA: Robotic process automation. Software that can emulate human actions.

Chapter 22

Cultural Effects of Global Businesses and Multinational Businesses: Localization Versus Globalization – Middle–Point Cultural Hybridization

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ABSTRACT

The concept of globalization is a process in which countries, cultures, organizational cultures, and even organizational structures converge with each other and a single standard point of view in the world emerges, and it identifies and defines the differences of the elements. This shows that the processes of globalization and localization are always in interaction. Convergence brought by globalization shows that multinational enterprises perform standard activities at the global level. However, in contrast to this convergence, with the effect of localization, hybrid organizational structures are becoming important especially in order to provide competitive advantage in the national market. While creating hybrid organizational structures, attention is paid to establish a structure that will not hinder the coordination between the host country and the home country. In this context, the definitions of globalization, localization, hybridization, and how the complexity of their interactions are reflected in business strategies are discussed from a theoretical point of view.

DOI: 10.4018/978-1-7998-1125-1.ch022

INTRODUCTION

Globalization: economically, it implies big markets, information and communication technologies, locality brings to mind all other areas of life. In recent years, perhaps one of the most discussed issues in Social Sciences has been ‘globalization’. The general argument about the concept of globalization is that national cultures, national economies, and the majority of social life in which national borders have been resolved are defined by global processes (Hirst & Thompson, 1996).

With the acceleration of the globalization process, the fields of activity, forms of competition, organizational structures and the management approaches of the enterprise have started to change. It is no longer necessary to combat the impact of the activities in the local country or in a very limited international environment, but in a global market and as the struggle is to fight global competitors. Therefore, the process of globalization and the role of multinational enterprises need to be understood. However, multinational enterprises are seen as “cultural exchange intermediaries” that carry out cultural transfer from one community to another.

The understanding of the globalizing world is very complex in many respects. Globalization has a complex social, economic and political context that includes many issues of different dimensions within its structure. Economists and ecologists similarly refer to the concept of “global localization”. The interaction of globalization and localization processes with each other makes itself felt in social life. Therefore, globalization, not as opposed to universality and locality, defines a mode of movement simultaneously and concurrently (İçli, 2001: 163). The new concept of locality, which emerged in parallel with the global and explained in relation to the global, differs from that of the national. Because ethnic differences and local contradictions are presented as localities within the scope of the pluralism presented by globalism (Karakas, 2003).

In addition to the concepts of globalization and localization, multinational enterprises face a new concept reflected in business strategies. This is the concept of “hybridization”. Hybridization has become part of the cultural industry, both globalization and localization, as well as the period of the cultural production trend (Wang & Yueh-yuYeh, 2005).

Friedman opposes the use of the concept of hybridization or creolization to explain the relationship between global and local. He claims that both concepts are based not on a process, but on the concept that sees culture as a product, but rather as a self-view that will create a new form by mingling with other cultures. Friedman prefers to explain the relationship between global and local with articulation. He argues that global processes are transformed into a dialectical articulation with the local structures that make it. The study is mostly a literature-based study. The following topics will be discussed in the chapter: definitions globalization and localization; the relationship between globalization, localization and culture; cultural impacts of global enterprises and multinational enterprises; cultural hybridization; reflections of conceptual confusion on business strategies.

DEFINITION AND FORMATION OF THE CONCEPT OF GLOBALIZATION

Discussions on globalization, especially in the 1990s, have started to gain intensity. Although debates started after the Cold War, it would be wrong to link the beginning date of the phenomenon of globalization to the demolition of the bipolar system. There is widespread view among social scientists and

historians that globalization has a history that can be essentially equated with the history of capitalism and the nation-state (Ateş, 2006: 25).

Globalization is a concept that includes the development of economic, social and political relations between countries, the better recognition of the beliefs and expectations of different societies and cultures, the more frequent the international relations (Arslan et al., 2007: 223).

Globalization brings to mind the world, information and communication technologies, locality, which has become a major market economically and affects every aspect of life. Globalization movements have emerged in the last 20 years and have gained speed. The understanding of the globalizing world is quite complex in many respects. Globalization has a complex social, economic and political context that includes many issues of different dimensions within its structure. Economists and ecologists similarly refer to the concept of “global localization” (Arslan et al., 2007: 224).

Several opinions are suggested about the date when the term “globalization” began to be used. Some say the word was first introduced in 1963 by Canadian sociologist Marshall McLuhan with the expression “the global village”, while others express that it was popularized and used in American schools such as Harvard, Columbia in the 1980s (Sezgin & Sezgin, 2011: 98).

Many definitions have been made about the concept of globalization. The basis of this is that scientists have not yet reached a common judgment about this concept. This is due to how rich and broad the subject is and how different the perspectives are and that it is an important issue for almost every branch of science (Seymen & Bolat, 2005).

Globalization, economic, political and cultural integration on a global scale, use of ideas, ideas, practices, technologies globally, universalization of capital circulation, emergence of new relations and interaction forms that transcend the boundaries of the nation-state, convergence of spaces, shrinking of the world, unlimited competition, free movement is the growth of the market on a world scale and out of national borders. In short, the world is becoming the only market (Balay, 2004: 62-63).

With the interaction and change experienced in the global sense, information, raw materials, products and services increasingly entered into international circulation and sharing, and especially after the 1980s these developments accelerated. Economic relations between the countries have increased and polarizations based on ideological differences have been solved, a process of liberalization has been entered into the world and cultures, beliefs and ideals have begun to become more similar by the crossing of boundaries. All these developments, which are still under the influence of the socio-economic structure in which intensive technological breakthroughs and communication are present, are explained with the concept of globalization today (Özgen & Yalçın, 2017).

The American National Defense Institute defines globalization as “the rapid and sustained cross-border flow of goods, services, money, technology, ideas, information, culture and peoples”. According to a study carried out by this institute, it provides unprecedented integration, an information revolution is experienced and markets, companies, organizations and management become international. The United Nations Commission on human rights defines globalization as “a process with only non-economic social, political, environmental, cultural and legal dimensions” (Tağraf, 2002: 35-36).

The concept of globalization can be defined as the process whereby national identities, economies and borders are dissolved worldwide, social life is influenced by the global process and becomes more dependent, the world goes to economic integration, societies become more alike, the emergence of a single global culture or the expression and definition of the identities and originality of communities, the world’s narrowing, shrinking, sing the meaning of everything national and perceiving the world as a single place (Tutar, 2000: 17).

The concept of globalization is defined as production and distribution of products of a similar type and quality in the business schools worldwide (Rugman & Moore, 2001).

Parker (1999) explains globalization as the boundaries of different kinds of borders beginning to fade away and disappear in all areas, such as physical boundaries, such as location, nation-state, time, economy, industry, organization, or cultural norms and assumptions of less concrete nature.

Once the definitions of globalization have been examined, it may be useful to look at Berger's work for a better understanding of the concept. Berger (1997) mentions four aspects of globalization. First, globalization is the cultural face of an economic-based process. This first view, which Berger describes as "Davos culture," refers to an elite culture that portrays itself as a "yuppie" lifestyle. On the second view, globalization takes place in the form of a culture which is an element of formations such as foundations, academic communication networks, non-governmental organizations and multinational organizations. Berger calls this globalization "Faculty Club Culture" and shows environmentalism and feminism as an example. The third view of globalization is called "MC world culture", in a word borrowed from Benjamin Barber. Watching American TV series and movies, wearing jeans, t-shirts with symbols and slogans of American universities, and consuming American fast food shows American stamped popular culture manifests itself. Fourthly, pluralism, the market economy and pro-democracy discourse are widely imposed on Latin American countries, East Asian countries, the Philippines, the South Pacific, Africa and Eastern Europe (as cited in İçli, 2001: 164).

Cavusgil and Knight (2009: 21) stated that the main drivers of globalization are:

- Overcoming barriers to trade and investment around the world,
- Transition to a market economy and free trade in China, India and former Russian countries,
- Modernization of countries around the world, industrialization and development of national economies,
- The growth and integration of world financial markets,
- Rapid and major developments in the technological field.

Globalization, in and of itself, is a neutral concept. But it can be used to advance good or bad goals or achieve good or bad effects. The 'yang' of globalization is that it can raise incomes, transfer ideas and knowledge, open up new markets, and promote more dialogue and understanding among different cultures. The 'yin' of globalization is that it can lead to more volatility and uncertainty, and more disruption in people's lives. It can also facilitate the international movement of 'bads' such as drugs, crime and terrorism (Dunning, 2007: 16).

REFLECTIONS OF THE GLOBAL PERIOD ON THE WORLD

There are specific rules that globalization brings to the whole world. These include: countries to get rid of isolation from the outside, privatization and the change of internal-external economic and social balances; central government control declines, central power loss is one of the factors that can happen (Friedman, 2000 as cited in Başaran, 2008: 8-9).

In a sense, globalization has led to the development of countries and regions that are investing in technology and information for the world and to the opening of the gap between them and the undeveloped regions. In the 21st century, the speed of technology has reached incredible dimensions and the most

important results of this, GSM and satellite communication, and the technical possibilities that enable people from both ends of the world to be in constant contact as if they were side by side, have become smaller in the form of a global village. However, during this emergence, countries such as Chile and Zambia, which had a significant income from copper on the world, have undergone great destruction. Japanese and Americans develop sugar substitute sweeteners while the main producers of sugar cane is the Philippines and the Dominican Republic countries. Western countries have developed alternatives to oil wind, water and solar energy solutions. If oil production is the foundation of a country the substitutions for oil create a difficult situation (Schaeffer, 2003 as cited in Çekiç, 2010: 156).

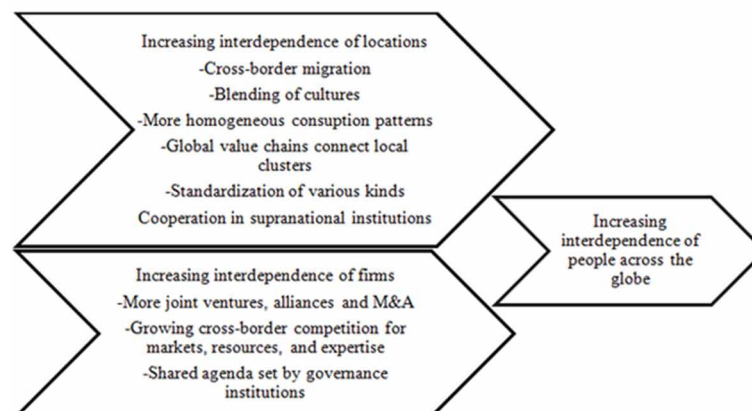
Hobsbawm states how globalization has come to affect today: “it was possible to see how the past lost its role, including the past in the present time, and a world where the old land and sea maps of the people in life did not show the land pieces or the seas that we were watching, either individually or collectively, at the end of this century. We don’t know where we’re going where we’re supposed to go” (Turan, 2007:121).

Similarities in behavior and thought patterns are increasing with the changes in the definition of the state, the removal of boundaries and the loss of national identity. With the support of technology, uniform lifestyles, clothing styles, and dietary habits lead to a global analogy, a one-dimensional cultural identity associates move away from their traditions (Çekiç, 2010: 158-159).

As summarized in Figure 1, globalization has manifested itself through certain very clear outcomes. Most obviously for the study of international business, there has been a greater interdependence of locations and interdependence of firms. The interdependence of locations is an especially complex issue and is associated with the growth of international firms. The borders of countries (and cities and regions) have become increasingly blurred, because economic actors located within that location also have operations in multiple other locations. At the country level, it affects the identity of the nation-state. On the other hand, countries remain sovereign and independent, while on the other hand, they are increasingly swayed by developments outside their borders. At the same time, this does not mean countries have no distinct identity; there are clearly defined characteristics, and patterns that are history-dependent and idiosyncratic, such as areas of specialization, technological competences, structure of markets, consumption patterns, and culture. Although at a policy and international business level, countries have more

Figure 1. The consequences of globalization

Source: (Collinson et al., 2017)



interdependence, at a sociological, cultural, and political level they remain distinct. These differences continue to matter, and despite the rhetoric, there is little evidence that there is significant convergence at these levels.

The interdependence of firms has taken place through alliances, joint ventures, and out-sourcing activities and is a distinctive feature of globalization. Collaboration by economic actors is happening in ever-greater numbers with every passing year. This is a phenomenon that has sparked the attention of managers, policymakers, and academics alike.

RESULTS OF GLOBALIZATION IN TERMS OF BUSINESS

In a global world, it is very difficult for enterprises to live solely within national boundaries and continue their lives. Businesses must therefore take a serious account of participation in global activities. In this context, the global enterprises that have come to the fore have emerged as important players who direct the global world.

Businesses are going through a different and hard-to-understand period where global integration exists, rapid changing technologies, and demand for these are increasing, industrial boundaries are becoming uncertain, the product life cycle is shortened (Das & Teng, 2003).

Globalization offers a wide variety of advantages to businesses on the one hand, and on the other hand, it is stated that it is confronted with problems of a different nature (Gregorsen, Morrison & Black, 1998).

Because of its globalizations' structure, it can offer business a great deal of opportunities, and these opportunities need to be seen and evaluated by businesses. Some of these opportunities can be stated as follows (Özgen & Yalçın, 2017),

- Commercial activities have been started to establish various rules and standards around the world.
- As a result of globalization, inter-enterprise cooperation and partnerships have developed.
- As a result of globalization, foreign direct investment has increased.
- Globalization enables production distribution and consumption factors to be evaluated on a world-wide scale.
- As a result of the tight integration of the actors involved in the production of world-wide units, a single area of integrity has started to emerge from economic, technological and even legal phenomena.

Many enterprises were forced to adapt to the developments that emerged as a result of globalization and started to be managed with new modern management techniques and skills. In this context, new management and management approaches have emerged and started to be implemented.

Das and Teng (2003: 279) stated that today's business world has a period in which global integration exists, rapidly changing technologies and demand for them increase, industrial boundaries are beginning to become obscured and the product life period is shortened. In today's business world where global competition accelerates, product life span is shortened and customer expectations and needs are constantly changing (Eren, 2016).

The problems that enterprises may face as a result of globalization in Parker (1998) are indicated as follows:

Cultural Effects of Global Businesses and Multinational Businesses

- Globalization has underscored the importance of intangible things in organizational success: rapid growth and developments in knowledge-based industries have drawn particular attention to the role that knowledge plays in organizations. The discoveries in information technologies often reveal how important knowledge is for organizational success.
- As a result of globalization, organizations face problems that cannot be solved: Businesses have had to establish and balance the goals or issues that are conflicting or competing with globalization. Social responsibility against profitability, cooperation against competition, group interests against individual interests and heterogeneity against homogeneity can be given as examples. Businesses face and are confronted with conflicting situations and uncertainties.
- As a result of globalization, organizations increasingly have to manage various differences: with global economic integration, the support of government practices and global human rights emerging from the diversity of people, such as color, race, gender and nationality, has begun to emerge as an important problem in the world. In a short period of time, companies have realized that different ideas need to be involved in decision-making processes in order to make global decisions. Organizations are hosting different people as well as hosting different systems, structures, thoughts and behaviors.
- Globalization has imposed new roles on executives and organizations that the past did not prepare them for: Research in the field of business is more related to the past and then to the present, but today's global firms face a future that has nothing to do with the past. Businesses have to think about new things or develop different approaches and methods. Changes in different areas in the global context force enterprises to change.

There are many benefits that accrue from taking firms into foreign markets, including (Hill, 2009)

- Extending successful home market products and strategies into new markets.
- Taking advantage of resources available in the worldwide marketplace. These include cheaper or better raw materials and components, reductions in labor or processing costs, and Access to new ideas and expertise.
- Building scale economies in sourcing, manufacturing, and marketing that reduce worldwide costs of doing business.
- Acquiring economies of scope. As firms build up their foreign market presences, they acquire a number of advantages from operating in multiple markets.

DEFINITION OF LOCALIZATION

The interaction between globalization and localization processes is felt in the social life. Therefore, globalization, not as opposed to universality and locality, defines a mode of action simultaneously and concurrently (İçli, 2001: 163).

When the nation state becomes weaker, it becomes less convincing and less powerful, it is seen that the response to it is spreading in two different ways at the same time. The nation state is both over and under. It is both global and local at the same time. There are two sides of the transition from the period when globalization is under the domination of national states, national economies, national cultural identities: global and local. (Hall, 1991: 26).

One of the meanings of the concept of localization is the weighting of local units in the division of labor between the administrative units of the state and the local government units. Today, globalization is one of the meanings of the concept of localization, which is discussed together, without the need for the nation-state, the individuals and local units have the ability to manage themselves under the sense of common unity and culture. In this context, local has two different meanings in the process of globalization. The first of them is local in the context of nation-states according to the global level. Here, the level of nation-states has a local meaning according to the global one. The second is local at the level of ethnic groups and micro-nationalisms according to the nation-state level (Gelekçi, 2005: 269).

Localization is recognized as another global reality. In other words, localization is now recognized as a global value in the world (Arslan et al., 2007: 227). From another perspective, the localization of identity and culture is seen as a sub-process of globalization. Localization is developing in a bipolar manner. First, it is the reaction to the basis of the denial of dominance and monopoly of national values and that threatens nationalism. The second important dimension of localization is the rejection of morality and identity based on the single-type model of production imposed by global capitalism. Local actors focus on identity and culture and develop a structure that legitimizes the nation state from the inside. On the one hand, the rejection of national identity and policies imposed by the nation state, and on the other, the rejection of the single-type consumption culture imposed by global capitalism are the main elements in the emergence of local identity and cultural policies. While identity policy is mostly caused by individual field, cultural policies are mostly due to group identity (Ateş, 2006: 32-33).

Globalization is forcing the nation state to redefine its authority and domination (Bilgiç & Gül, 2010: 620). In our globalizing world, while the meaning and content of locality are being restructured, cities and local governments are gaining new functionality. The acceleration of the linking of communication and information networks within a certain hierarchical structure, in a way that today's cities will surpass the borders of national giants, requires the cities in strategic locations to create an effective service network (Arslan et al., 2007: 227).

The new understanding of locality, which emerged in parallel with the sphere and described as related to the global, differs from the national one in some respects. Ethnic differences and local contradictions are presented as localities within the scope of pluralism offered by globalism (Karakaş, 2003: 4). While economic, social and political ties across borders affect people significantly, mutual community initiatives, localization of culture and identity, and intergovernmental initiatives are increasingly intensified in the world (İçli, 2001: 163-164).

Karakaş (2003: 8) examines the fact that the energy produced by globalism leads to a tendency to serious similarities externally to internally significant differentiations in nation states. The strongest examples for the internal situation undermining social identities in the form of multiculturalism, multi-ethnicity, and the US. It states that countries such as Canada are based on multiculturalism and multi-ethnic ideas in order to establish their sense of social identity at the upper level of identity.

The emergence of globalization and the factors (technological, ideological, economic) that bring about changes and transformations in today's world weaken nation states, with the strength of uniformization and erosion of national identities, therefore, in many countries with strong national identities, movements against globalization and micro-nationalism are gaining strength from time to time (Yılmaz and Çetin, 2007:16-18).

The culture of uniform production and consumption in the global environment, as well as the administration of states by similar political regimes, eroded the distinctive characteristics of national identity. Because of the fact that national identity is no longer a point of reference and the imposition of a uniform

global consumer culture, the individual is in search of his own unique identity and the most likely option is the reproduction of traditional local identity features in the global environment. As a result, it is seen that nation culture constitutes the last remaining point the nation states (Ateş, 2006: 33).

In some countries, in terms of social values, people do not accept that there is inequality between institutions, organizations and people. Again, some countries' peoples are disturbed by uncertainty and while others are trying to correct the situation, others may be very tolerant and comfortable in these circumstances. While some countries are more collective in their social lives and relationships, they look at each other and their common interests, while others may place individualistic behaviors on their own personal expectations and desires. In some countries people exhibit masculine attitudes that are high-achieving, superior, heroic and elite, and prefer to stress for it, whereas in others, people have a more feminine and conciliatory mood and behavior, showing cooperative, cooperative decision-making, group decision-making, raising the quality of life. For example, countries such as Japan, Austria, Germany and Mexico have masculine attitudes, but countries such as Sweden, Norway and Denmark have a feminine attitudes (Eren, 2008: 136).

The managers of global companies are obliged to know the common cultures, beliefs, social and religious values, common behavior patterns, thinking styles and head structures that they share, while they manufacture and employ labor and managers in various countries of the world, sell the products they produce to people in different countries. Otherwise, they may face many mistakes and failures they do not expect (Eren, 2008: 136).

RELATIONSHIP BETWEEN GLOBALIZATION AND CULTURE

The concept of globalization is the process of the world societies resembling one another, and consequently the emergence of the only global culture, on the other hand it is used as the process of defining and expressing the differences between communities and societies (Keyman, 2000:1).

Culture can be defined as "the sum total of the beliefs, rules, techniques, institutions, and artifacts that characterize human populations" or "the collective programming of the mind". There is strong consenses, however, that key elements of culture include language, religion, values, attitudes, customs, and norms of a group or society. Language is perhaps the most important key to understanding culture in general and the specific values, beliefs, attitudes, and opinions of a particular individual or group. Religion, linked to both regional caharacteristics and language, also influences business culture through a set of shared core values (Collinson et al., 2017).

Global culture is associated with the increase in the speed and intensity of communication. An impact of globalization is the intensification of information, news and image flows as is known" (Eken, 2006: 249). Globalization has reshaped the ways and modes of thinking to nourish and mobilize cultural changes in societies (Bird and Hang, 2009: 139).

The approaches of theoreticians interested in the cultural dimension of globalization are divided into two. While some theorists consider globalization as the beginning and target of a certain homogenous process, others consider globalization as a heterogeneous process between cultures.

Those who consider globalization as a heterogeneous process (Said, 1995; Hall, 1992) point out that seeing globalization only as a result of western modernity will lead to the thinking of the ones outside the west that are passive and depending on the west (as cited in İçli, 2001: 165).

Giddens takes part in the group that treats globalization as a homogenous process. Giddens sees in globalization transformations in time and space. With the use of mechanical watch in the 18th century, time became more than a specific phenomenon and became universal. On the basis of Universal Time, social life has been reorganized within the global system. Global maps allow space to be perceived in universal dimensions. The fact that time is independent of space is a modernizing process (Giddens, 1998: 25-28). According to Giddens, the precondition for globalization is that time is independent of space. In this way, social relations were freed from dependence on space and interacted with distant places. Giddens sees globalization as a direct result of modernization. Modernization extends social relations, and establishes networks of global relations among societies. Long-distance relationships with local activities are developing (Giddens, 1998: 66-67).

Giddens cannot be expected to participate in the argument that globalization is the spread of modernity across the world. According to Giddens, the four dimensions of globalization are the “capitalist world economy”, “an international division of labor”, “the nation-state system” and “a military world order”, the four dimensions of modernity are the dimensions of “capitalism”, “industrialism”, “surveillance” and “military power” that expand and spread to the planetary scale (Giddens, 1998). In other words, globalization in Giddens’s mind is the transfer of modernity to the planetary scale (Robertson, 1999).

It is generally accepted that the main feature of globalization is the tension between universalism and locality. On the one hand, as a result of the belief that the globalization of capital and liberal market ideology have evolved, Fukuyama (*The End of History and the Last Man*) states that the solution to problems of difference is by becoming the same. Cultural homogenization has emerged (Fukuyama 1990 as cited in İçli, 2001: 165).

According to Robertson (1999), who devoted a significant portion of his work to the discussion of cultural, especially religious issues, built an ideology with the theory of world systems and became a party to the global cultural chaos. As a matter of fact, Wallerstein identifies culture as central in the context of the central-environmental theory and considers the cultures of the environment-Islam, Indian and Chinese as dysfunctional and portrays them as “subjugating to the center.” This idea, which identifies culture with the center and assumes that the environment has no influence on the cultural construction of the modern world system, has led Robertson to overlook the importance of direct actions towards the global situation.

Featherstone (1995) also states that due to the shifting of the global power from the west (like Japan, Taiwan), it will also have to be taken care of (as cited in İçli, 2001: 165). For example, Japan is a globally prominent country. The influence of Japan does not spread as a way of life as it is in the propagation of American culture, but in the form of the relationship between the global and the local. Robertson’s concept of glocalization emerges as a concept related to this situation. This concept has been used to describe the relationship between globalization and the local one in the form of “a creation of locality, then inclusion”. It states that the universalization of localities and the localization of universalities can take very different forms by taking advantage of the opportunity to point out spatial relativity (İçli, 2001: 167).

In fact, Hirst ve Thompson (2000: 27) claim that there is no such thing as globalization, that the so-called phenomenon today is present in previous periods of time, and that even the ancient periods have given this understanding a clearer and more integrated view.

The proposition that globalization will bring all societies together in one economic political and cultural unit (global integration) is unacceptable to many thinkers from Giddens to Friedman, from Robertson to Cox. On the other hand, thinkers like John Meyer and Daniel Bell insist that globalization leads to integration (Guillen, 2001: 244-247).

Ohmae (1995) indicates that a global culture has been formed by the definition of a transboundary civilization. McLuhan (2001) points out that a global culture is formed by the concept of global village. Smith (2004: 278) states that the concept of “global culture” is problematic. According to him, since the concept of “culture” corresponds to a pluralistic phenomenon, there is no such thing as “global culture”.

Since a relative autonomy of culture is an important precondition for continuity of differences, analyzing globalization independently from culture jeopardizes the existence of differences. It is very important for Robertson (1999) to analyze culture based on culture.

According to Robertson (1999), the world has shrunk to a single place with globalization. But this global uniqueness, that is, “shrinking to one place”, does not mean a simple uniformity. This is a complex social and phenomenological situation in which people’s different levels of life become revealed. In other words, it is the global human condition (Tomlinson, 2004; Robertson, 1999).

Robertson (1999), in his analyzes of globalization, tries to end the “second place of culture” by destroying the central role of the economy. According to Robertson (1999), culture has always been considered a “secondary phenomenon” in globalization analyses, and all globalization discussions have been made on the basis of Economics and are still being conducted.

Robertson (1999: 16), for many years, as a result of a conscious mistake, says that the culture in the shadow of the economy is now understood to be important.

“Although economic issues are very important in the relations between societies and in various forms of transnational relations, we have become increasingly aware that they are largely subject to cultural contingencies and cultural coding.....It is becoming increasingly clear that what constitutes and shapes most of the relations between nationally organized societies and friendship has a cultural nature at its core”

The fundamental misconception of the economy-centred ministers of globalization is that they cannot realize that the culture and the economy are increasingly intertwined in the contemporary market. The reason is that consumers who are created by contemporary capitalism increasingly demand the adaptation of products to the regional, social, ethnic class and gender markets, which makes the economy obliged to take local cultures into consideration, in other words, to localize (Robertson, 1999).

The phenomenon of globalization shows its effect in local economies. Capital can easily circulate among countries; particularly, there are intense capital inflows to markets with high return potential. This situation helps the developing countries to catch up with the levels of development (Tülay & Ataman Erdönmez, 1999: 3) together with the changes in their culture.

What Robertson (1999) calls “global culture” a result of the interactions of different cultures. The syndication of the global and local has led Robertson to seek a new concept. Robertson proposed the concept of “glocalization” by referring to the concept of “dochakuka” meaning “global draft” adapted to local conditions in the Japanese business world. he emphasized synonyms with this concept.

Globalization refers to the expansion and intensification of the network of economic relations worldwide. It leads to the emergence of Western political, cultural and social values as a choice to be accepted by other societies of the world. These values cover many areas ranging from consumer culture to a democratic management style, from human rights to positive science (Ateş, 2006: 26).

Cultural and social similarities or differences have the effect of changing the results of activities in global markets (Saydan & Kanıbir, 2007:79). It is postulated that every society and every country has

their own cultural dynamics before studying the effects of cultural differences on global markets, and therefore there may be significant differences between countries (Steenkamp, 2001:36).

Some nations believe that their social and cultural values are higher, whereas people of other countries have lower cultures. This is called ethnocentrism. These social values and conditionals pose significant obstacles to people's lives, to working together with other members of foreign countries, to working in committees and teams. Properties and standards of goods produced in some countries sometimes find it difficult to sell to other countries (Eren, 2008: 137).

If globalization is to enter a country, it first destroys the culture of the country it will enter first. Because culture is the habits of a society and by changing these habits, it will adapt to political and economic globalization by vaccinating these habits (Camadan, 2010: 15).

One example of economic globalization is the McDonalds business. Ritzer relates Weber's theory of rationality to the modern world in the context of McDonaldization, and discussed the impact on social life and human relations. Ger and Belk (1996: 227) state that in order to determine the culture of global consumption, the spread of multinational companies, the spread of global capitalism, the spread of global consumerism, and the homogenization of global consumption must be dealt with in a connected manner (as cited in İçli, 2001: 166).

In 1977, Procter and Gamble entered the Japanese market with swaddling clothes. swaddling clothes had tried and succeeded in the US market. But swaddling clothes did not succeed in the Japanese market, because Japanese mothers used swaddling clothes in different colors and forms for boys and girls. The company changed its market share from 10% to 20% by making the necessary changes (İslamoğlu, 2006: 129).

Social and cultural strengths, differences in family forms, traditions and behaviour, educational levels and spoken languages are important for international markets. For example, McDonalds used pork meat among the menu types in the US and European branches. In Turkey there are soup sales in the month of Ramadan (Korkmaz et al., 2009: 104).

Cultural reactions to products are a factor in a failure of the product. Cultural characteristics such as colors, values, beliefs, language, religion, tastes can cause businesses to fail in the international market. Examples of these failures can be specified as follows (Elden, 2004: 216-218):

- Chevrolet's Nova brand, which means star, does not go in Spain, "No VA!" is perceived as, "no go".
- When a Renault advertisement showed in a blonde woman sitting next to the driver, the woman was perceived as dishonest by consumers and therefore the advertisement aroused a sense of shame in society.
- The Ford Fiera (a low cost truck design for developing countries) faced sales problems, because Fiera in French means "ugly old woman."
- The Ford Comet reached had limited sales when it was called Caliente in Mexico. This is because Caliente means prostitute in slang terms.
- When an American Restaurant Taco Time wanted to expand in Japan, it was unable to succeed because its menu was close to the Mexican style rather than the Western American style. The Japanese approach the Mexican image negatively.
- Mars M&M's encountered problems in the French pronunciation. Because neither the "&" sign nor the "s" plural form is in French and therefore, this ad is pronounced "Aimainaimze" in French.

Cultural Effects of Global Businesses and Multinational Businesses

The same problem arises from the fact that the Whirlpool brand in Spain is not pronounceable in Spanish.

- When Coca Cola entered the Chinese market after 1920, The Coca Cola brand was developed by a group of letters in the Chinese alphabet. But when this letter Group was translated into Chinese, it meant “bite the wax tadpole”. After a long struggle, the company has replaced old characters with new ones by using language experts and the meaning has been changed to “happiness on your lips”. Coca-Cola had to remove two-liter bottles from the market in Spain, because many Spanish consumers do not have a refrigerator that can fit a bottle of that size (Kotler, 2000 as cited in Saydan and Kanibir, 2007: 85).

These examples show that a word, behavior or attitude that will be welcomed positively in one country could be unacceptable because of cultural differences in another country and can lead to misunderstandings.

Despite the various patterns and processes of globalization, cultural differences still remain important. Even with greater common access, via various media and the internet, to the same brands, rock icons, and sport stars, differences remain. Terms like cultural convergence or, simply, Americanization overstate the similarities between groups of people around the world. Cultures vary and these variations lead to real and significant differences in the ways that companies operate and people work. Moreover, because of globalization more and more firms are coming head to head with the added complexity of doing business globally which stems from huge amount of variety that still exists in the world (Collinson et al., 2017).

The 21st century has brought about a great change in terms of social dynamics. Globalization is used as a symbol of these social changes and transformations. Positive and negative evaluations are made. It is discussed in a complex and very intensive way, created by globalization through social relations. The cultural dimension of globalization is going phenomena.

Global culture is “the cultural complex of foundational assumptions, forms of knowledge, and prescriptions for action that underlie globalized flows, organizations, and intuitions” (Boli, 2001). Global culture encodes the norms, models, and institutions that are made sacred and treated as desiderata, presumably uniting a world society. As much as this global framework is general and as much as the concept of “culture” is illusive, there have been several attempts to specify the normative framework of an emerging world society (Erez and Drori, 2009).

CULTURAL EFFECTS OF GLOBAL BUSINESSES AND MULTINATIONAL ENTERPRISES

In order to better understand global and multinational businesses and their cultural effects, it is necessary to know the types of businesses that are engaged in international activities and addressed under different names. There are four categories that outline where a business can find its place in the international arena. These are local, international, multinational and global phases. While a local business operates only within its own territory, the international business has commercial relationships with different countries, while operating from a specific country. Multinational businesses can be defined as enterprises engaged in trade and production activities in more than one country and global businesses that see the world as a business area.

International business is a business operating in one or more countries outside of its own country (Mutlu, 1998: 9). International businesses in foreign countries in one or more of the various branches

of the production or sales. Although they operate in foreign countries, they are mostly enterprises with limited investments outside of the parent company (Ünsar, 2007: 696). Collinson, Nurula and Rugman (2017) define international business as the study of transactions taking place across national borders for the purpose of satisfying the needs of individuals and organizations.

A multinational business is a business that manages its production and marketing activities in two or more countries, has its own business strategies and applies these strategies to all subsidiaries or branches (Mutlu, 1998: 10). According to a report of the 22nd Congress of the International Chamber of Commerce held in Istanbul, when the production of an international business in foreign countries exceeds 25-30% of total production, it can be called a “multinational business” if the profits in foreign countries have an important ratio of total profits and the staff in foreign countries have reached an important ratio of total personnel. In this case, the international business is considered to be a multinational enterprise satisfies three criteria, namely “production”, “profit” or “employee” in foreign countries (Ünsar, 2007: 696-697). Multinational business is defined “A multi-plant firm that controls and coordinates operations in at least two countries; or a firm that engages in value-added international business activities, that has affiliates in more than one country, and whose operations and activities in different locations are actively coordinated by one or more headquarters organizations” (Collinson et al., 2017: 5).

The transnational corporation is a business that can go beyond international or cross-border borders, and states that multinational businesses do not recognize political, economic or even ideological boundaries. The supranational corporation is defined as a company which is not a member of any country and has been established by an international agreement, registered and affiliated with an international body, audited by this organization, paid tax to this organization and lost its nationality legally (Mutlu, 1998).

The supranational company has activities worldwide, uses advanced technology and has global products, prices etc. Businesses managed by world citizen managers are defined as global businesses (Mutlu, 1998: 10). For example, Nestle is an example of a multinational enterprise becoming a global business. Nestle’s headquarters were Veney in Switzerland, but the company’s activity continues every day around the world. Nestle, which has hundreds of products, acquired the French Perrier company and took the lead in the soda market. Nestle has 494 factories and 210,000 employees in 71 countries. 40% of sales and profits are from Europe. 35% of sales and profits are from South and North America. 20% of sales and profits are provided from other regions.

The features of the global business can be listed as follows (Güleş & Bülbül, 2004: 22):

- They are not absolutely big. They are shrinking to take advantage of flexibility.
- They benefit from the appropriate global resources for low cost and high quality products.
- They plan, coordinate and carry out their operations based on the whole world.
- They see the world as a great market.
- They continuously control and reorganize their resources, abilities, knowledge and skills so that national and regional borders do not pose obstacles.
- Its employees can be of any ethnic, religious and national origin.
- Product strategies are adaptive and adaptable to local customer requirements
- They are businesses that do not do business in many countries, but are completely ignored by national borders.
- The national identity of their capital is unclear.
- They have their own corporate culture. They have an innovative culture.

Cultural Effects of Global Businesses and Multinational Businesses

Table 1. Differences between global businesses and multinational businesses

Design	M: Editing for production, designing for the local markets first. G: Interested in international performance criteria in design process.
Adaptation	M: The features of the local markets are required in production adaptation through national differences. G: Products are adapted to global demands and needs. The interest for the product adaptation is limited.
Market	M: Departments represent the differences. G: Departments represent the similarities within the group
Competition	M: Local and National competition are related. G: The competition in a national market is affected by the global position of the enterprise.
Place	M: National distribution channels G: Global standardization of the distribution
Production	M: Standardization is limited since the need of product adaptation for national pleasure. G: Producing in global standards. The adaptation is approached through modular design.
Promotion	M: National product image, sensitivity to national needs G: Global product image, sensitivity to global needs
Price	M: Consumers want to spend more for goods. G: Consumers prefer a product that has global standards if it is cheaper.

Source: (Duggel, 2002)

If we consider the concept of globalization from the standpoint of multinational businesses, the globalization of markets is an expression of a demand for tastes, preferences and prices that are gradually becoming universal. Supplies, goods and services become more standardized and competition between sectors reaches a global scale (Tağraf, 2002: 36).

In parallel with the globalization process, the number and effectiveness of multinational businesses in the world has increased greatly. Their annual sales exceed the sum of the gross national product of many developing countries.

It would be useful to make some comparisons in order to understand more clearly the economic greatness of multinational and global businesses. General Motors' income is compared with Finland's gross domestic product. Toyota's income is comparable to Hong Kong's gross domestic product, and the Royal Dutch/Shell Group's income is comparable to Norwegian's gross domestic product. The economic magnitude of global businesses can only be compared with countries that are considered to be developed and have strong economies (Tağraf, 2008: 8).

The strategy differences between multinational businesses with global businesses show itself in terms of design, adaptation, market, competition, location, production, price, promotion. These differences are summarized in the table below.

Multinational businesses are seen as "cultural exchange agents" that carry out cultural transfer from one community to another (Jain, 1990 as cited in Erem et al., 2000: 7). Werther (1996: 5) emphasizes the role of the young generation in the cultural absorption of cultural exchange as "the McDonald's generation". In Trinidad, the American television series "The Young and the Restless" became so popular that work stopped in many places at the time of the show. Again, despite the Iranian government's banning satellite dishes, many Iranians are watching American TV series like "Baywatch" with their dish antennas hidden in their balcony (Erem et al., 2000: 8). Guyoliver (1999: 191) considers culture as a "product". MTV's world-wide publication in English, sometimes only, can be considered as a cultural export.

The “Valentine’s Day” celebrations included in the Turkish cultural structure constitute a good example of the changing of the cultural mosaic of society. In fact, this development is closely related to the concept of “culture learned” among the characteristics of culture defined by working anthropologists.

The advertisements of global companies on television have so much influence on people. For example, Iranian youth that wear blue jeans under their chadors at the expense of being whipped and Nike Brand shoes on feet that have been naked for centuries. The purchase of the southern Sahara’s Texaco baseball cap, and the fact that children in Turkey don’t want to eat anywhere else than McDonald’s. This is the biggest proof that globalization has monopolized consumption. One point of unification is the United States. This gives us an estimate of who created the ideology of globalization (Camadan, 2010: 14).

With the acceleration of the globalization process, business areas, competitive forms, organizational structures and management approaches have started to change. It is no longer necessary to combat the impact of activities only in the local country or in a very limited international environment but in a global market and the challenge of combating global competitors. For this reason, the globalization process facing the role of multinational businesses need to be understood (Tağraf, 2002: 33).

Multinational Enterprises (MNE) activity includes norms, values, conventions, practices and artefacts derived from the national culture of the home country of MNE, and those of other countries in which it operates. Such institutions also encompass corporate culture, or the norms, values and practices that are specific to one firm MNEs act as conduits for the transfer of such institutions across borders, and in doing so, they are likely to influence the culture of their host countries as well as help to change practices in the home country. Specifically, an MNE may help to refashion (business) culture in a particular country in two ways. The first is by the deliberate injection of norms and practices from its home country, and those of other countries in which it operates, into the behaviour of its affiliates and in its dealing with local firms and governments. The second route is more indirect, and results from exposing the nationals of the countries in which they operate to the practices of other countries (Dunning & Lundan, 2008: 647).

CULTURAL HYBRIDIZATION

Hybridization has become a part of the cultural production trend, with both globalization and localization (Wang and Yueh-yuYeh, 2005:175). Friedman opposes the use of the concept of hybridization or creolization to explain the relationship between global and local. He claims that both concepts are based not on a process, but on the concept that sees culture as a product, but rather as a self-view that will create a new form by mingling with other cultures. Friedman prefers to explain the relationship between global and local with articulation. He claims that the global processes have become dialectically articulated with the local structures that form it (İçli, 2001: 169-170).

Robertson (1998) states that the cultures of individual societies are the result of changing degrees of interaction between other communities in the global system, and that the global culture itself is part of the product of specific interactions between national communities and within them. Hannerz states that hybrid cultures are the result of people’s efforts to create their own synthesis effectively, reducing the cultural distance between the center and the environment and ensuring continuity (as cited in içli, 2001: 169).

In the discussions on globalization, postmodern diversity and hegemonic¹ Westernization are presented as well as another scenario for the outcome of cultural globalization. The concept of hybridization

and colonialist discourse alleged are to be accomplices with traditional capitalism and tends to address incomplete structural inequalities (Wang & Yueh-yu Yeh, 2005:176).

Tatlıdil (2000: 122) states that it is known that the differences of historical development and experiences of societies, the characteristics of their geography, regional and regional differences will exist in the globalization process. It cannot be argued that these differences will change in the direction of integration in the functional sense but point to the controversy that existing social differences will be parts of cultural mosaic in the process of globalization.

REFLECTIONS ON CONCEPTUAL COMPLEXITY IN THE STRATEGIES OF GLOBAL AND MULTINATIONAL BUSINESSES

International business research has reflected a developmental perspective, driven by the recognition that many firms gradually expand their worldwide operations. In general, this expansion has been found to initially involve exporting products to leverage domestically based operations, then expand local facilities to protect and further build established export markets, and then become increasingly global in terms of building and leveraging dispersed worldwide operations to enhance firm competitive advantage. This gradual expansion has had direct and important implications for the organizations multinational corporations, with international business studies having identified various firm-specific and environmental factors influencing multinational corporations organizations. Specific firm-specific factors have been found to include the extent and nature of a firm's worldwide operations, its national origin, its information-processing capability, and the mind-set of its senior managers. In terms of environmental factors, an important distinction has been made between "global" and "multidomestic" strategies. Whereas multidomestic strategies are associated with environments marketed by relatively independent national markets, global strategies are associated with environments marketed by integrated or contiguous world markets (Malnight, 2000).

How are global cultural themes affecting organizations? The array of global norms, which reflects the complexity of human history and of current international arrangements, can be distilled into three global culture process: rationalization, professionalization, and actorhood (Erez & Drori, 2009).

- **Rationalization:** Rationalization pertains to systemization, standardization, routinization and thus formalization of social activity. It is defined as the "continuing efforts to systematize social life around schemes that explicitly differentiate and then seek to link means and ends" (Jepperson, 2002). Rationalization also breeds standardization, or the emergence of consistent and uniform procedures for executing tasks. With voluntary rules (like ISO) and other more formal (like financial reporting), these rationalized steps create a regime of standardization of everything from the design, quality, and delivery of both products and services), add pressure on organizations to comply with such standards, and thus fuel isomorphic tendencies among organizations. In short, rationalization, drawing from world norms of universality and related scientization, shapes organizations towards more formal and standardized forms. Universality drives comparability and thus benchmarking. Scientization drives models for how such comparability is to be executed, namely according to analytic schemes of both features and causality.
- **Professionalization:** The global cultural emphasis on universalism also nourishes the work-related emphasis on Professionalization. Professionalization refers to knowledge and expertise as

drawn only from legitimate, or preferably certified, members of a profession. Not only are certification and accreditation themselves rationalizing procedures, but professionalization distinctly offers a legitimate basis for counseling organizations and their managers on how to execute their tasks. Professionalization contributed to formal role differentiation within organizations: it defined management as a profession, severing its ties with ownership, and created a sense of discrete organizational tasks associated with such roles. As a result, organizations of various sorts have similar formal posts: from general manager to financial officer to human resource manager, the work tasks for these managerial roles are distinct, as are the professional backgrounds, certification and professional ethos. Professionalization also helps mitigate the cultural diversity that results from mobility and transnational exchange: it offers tools to manage diversity, coordinate activities, and streamline processes, assuming that cultural diversity itself is a universal phenomenon and thus remedied by standardized tools.

- **Actorhood:** Agentic tendencies in global culture constitute a culture of actorhood, where social entities are instilled with a strong sense of agency, authority, and “voice”. Through education and personal development strategies, and with a basis in the scientized vision of the natural and social world as manageable and controllable, people and organizations are transformed into highly agentic and proactive social entities. This global cultural emphasis on the role of personal agency, which is labeled “actorhood”, profoundly impacted on work situations. This has changed the relationship between workers and their organization: structurally, it created channels for worker input into organizational process; and, behaviorally, it engaged workers in modes of self-efficacy and self-motivation.

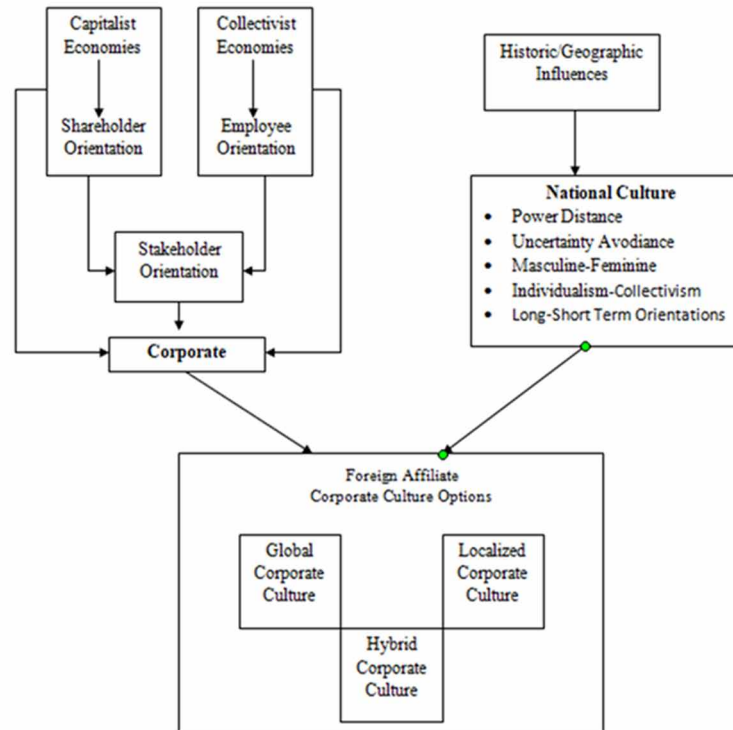
The globalization movement is the trend toward increasing interdependencies among world markets, and the diffusion of new ideas, technologies, resources, products, services, and lifestyles through international markets. Globalization comprises two components: Modernization involves the upgrading of Technologies and living standards that occurs as ideas, products, and services diffuse through world markets. The second component, acculturation, involves the transfer of lifestyles and behaviors among societies. Currently, Westernization is the dominant form of acculturation. This occurs when non-Western societies emulate the lifestyles, values, and behaviors of North America and Western Europe. While globalization has been occurring since international business began, thousands of years ago, its effects have become more pronounced with the technological developments of the 20th century, most notably after 1945 and again after the 1980s (Hill, 2009: 13-15).

Corporate cultures are heavily influenced by home market national cultures. As a result, firms must understand what factors affect the corporate culture they are taking abroad. Generally, as illustrated in Figure 2 two key influences, societal competitiveness and shareholder-stakeholder orientation, affect home market corporate culture (Hill, 2009: 377).

- **Shareholder-Stakeholder Orientations:** At the company level, corporate cultures tend to be oriented toward specific objectives or audiences. One effect of the globalization process has been to heighten competitive and Shareholder orientations. U.S. corporations operating in the highly capitalist market of North America tend to have Shareholder orientations: their bottom-line profit motive dominates all other considerations, and stock price valuations weigh heavily on management thinking and corporate cultures. In many societies, however, capitalism and Shareholder orientations are less pronounced and firms emphasize other objectives. As international firms

Figure 2. Influences on corporate cultures in international markets

Source: (Hill, 2009: 378)



enter foreign markets, that recognize that pure Shareholder orientations are often inappropriate as they are “guests” in those countries and must make positive impressions on governments, local businesses, and the community (Hill, 2009). Many therefore opt for stakeholder orientations that emphasize not only external constituents such as shareholders, financial communities, government regulators, environmental groups, consumer activists, press relations, and local communities, but also internal constituents such as suppliers, employees, distributors, and customers (Dunning, 2007: 19). Stakeholder approaches give companies flexibility in the worldwide marketplace, and allows corporate cultures to be adapted to local situations.

- **National Culture Influences on Corporate Cultures:** International firms must take account of national culture influences on corporate cultures. Based on Hofstede’s work Table 2 shows five major factors affecting corporate cultures, which are describe in further detail below (Collinson et al., 2017; Hill, 2009).
 - Power distance is the extent to which a culture accepts that power in organizations is distributed unequally. High power distance equates with steep organizational hierarchies, with more autocratic leadership and less employee participation in decision making.
 - Uncertainty avoidance is the degree to which members of a society feel uncomfortable with risk and uncertainty. High uncertainty avoidance (Japan, Argentina, France) will be reflected in the high priority placed on rituals, routines, and procedures in organizations and society in

Table 2. National culture influences on corporate culture

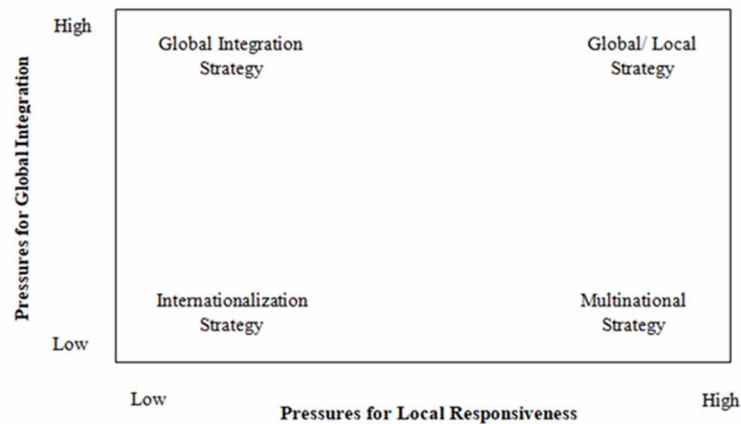
Dimension	Country Examples		Corporate Culture Effects
	High	Low	
Power Distance The extent to which power and status differences are accepted within national cultures	Brazil India Mexico Philippines	Scandinavia Israel	Deep vs. shallow corporate hierarchies Established protocols and chains of command vs. egalitarian structures Formal vs. informal communications
Individualism vs. Collectivism Whether individual or collective action is the preferred way of dealing with issues	USA UK Canada Australia Netherlands	Colombia Greece Mexico Taiwan Venezuela	Individual vs. consensus means of decision making Rewards/accountability accrues to individuals or groups Tolerance for individualistic behaviors vs. conformism
Masculinity-Femininity Extent to which aggressive or passive behaviors dominate societal behaviors	Austria Venezuela Mexico Japan Italy	Scandinavia Thailand	Aggressive pursuit of objectives vs. acceptance of prevailing conditions Attitudes toward gender roles (strong vs. weak distinctions) Concerns for working conditions, job satisfaction, employee participation
Uncertainty Avoidance Tolerance for uncertainty, unpredictable situations	France Greece Peru Portugal Japan	UK USA Scandinavia India	Risk-oriented vs. risk-averse societies Structured, protocol-oriented organizations vs. fleet-footed, informal, fast-acting organizations High vs. low tolerance for mistakes
Long Term vs. Short Term Orientations Focus on immediate needs/goals versus long-term needs/goals	Hong Kong Japan (long-term)	France Russia USA (short-term)	Affects goal setting, planning frameworks, organizational accountability

general. Countries with low uncertainty avoidance (Denmark, UK, India, US) tend to emphasize flexibility and informality rather than bureaucracy.

- Individualism is the extent to which people are supposed to take care of themselves and be emotionally independent from others.
- Masculinity is the value attributed to achievement, assertiveness, and material success (Japan, Mexico, Germany, UK) as opposed to the stereotypical feminine values of relationship, modesty, caring, and the quality of life (Sweden, Netherlands, Denmark), according to Hofstede.
- Some societies, especially those in Asia, tend to think long term. Others, especially firms in shareholder-oriented societies, think short term first to maintain stock prices and corporate performance levels.

How companies proceed in their internationalization and globalization strategies depends on what it takes to be successful in their industries. Prahalad and Doz (1987) developed a matrix linking industry success factors with strategy. This is shown in Figure 3. On the vertical axis, the pressures for global integration include linkages among product and service strategies across markets and cross-border supply chain strategies. On the horizontal axis are pressures for local market responsiveness. The matrix shows that when pressures for global integration are high and local responsiveness pressures are low, a globally integrated strategy is followed (cross-border branding and supply chains). Where pressures for both global integration and local responsiveness are low, internationalization strategies work well.

Figure 3. Industry success factors and strategies



When company markets need extensive localization, and there are no real pressures for global integration, then multinational strategies, with localized marketing and supply chains, are appropriate. Finally, in situations requiring both integrated global strategies and degrees of local responsiveness, a global-local strategy can be implemented. Note that many firms have businesses requiring different strategic orientations (as cited in Hill, 2009).

CONCLUSION

Globalization brings with it its own 'yin' and 'yang': where convergence and divergence, uniformity and diversity, competition and cooperation, centralization and decentralization, and individualism and communitarianism go hand in hand (Dunning, 2007: 14).

We live in a world in which the global competitive position of corporations and countries is increasingly dependent on their success in forming, and learning from, cross border partnerships, strategic alliances, and of being part of a network of related activities. We live in a world in which the human and physical global environment underpinning the wealth-creating activities of corporations, and the policies of national governments, is rapidly and fundamentally changing (Dunning, 2007: 14).

The concept of globalization, on the one hand, is a process in which countries, cultures, organizational cultures and even organizational structures converge with each other and a single standard point of view in the world emerges, and on the other hand, it identifies and defines the differences of the elements. This shows that the processes of globalization and localization are always in interaction. The process of globalization also brings together the domination of a global culture throughout the world. The dominance of a global culture around the world can now be explained by the presence of information societies along with developments in communication and information technologies. There are some things that affect globalization in the cultural sense. One of these is the phenomenon of change. The fact that national cultures and traditional social ties are faced with the process of change, which are global conditions that create the effect of change, and the reduction of the effects of traditional actors by eliminating physical and social boundaries, reveals the existence of hybrid cultures.

Globalization reflects not only a remarkable intensification of global exchanges and flows and a dramatic thickening of international and transnational webs of relations, but also a major cultural change. Global culture, with its core themes of progress and justice, brings three profound changes to organizations: rationalization, professionalization, and actorhood. This change is also accompanied by a shift in the organizing logic from the particularistic to the universal (Erez & Drori, 2009).

While the growing economic gap between developed and developing countries sets a barrier for further globalization, many local organizations adopt the transnational features with expectation, for a better fit with modern or global trends. Such hybrid or glocal forms are shown in corporate set-ups like malls and franchise, in local civic associations, and indeed in multi-national organizational organizations that are infused with global norms and the features of global culture (Erez & Drori, 2009).

Convergence brought by globalization shows that multinational enterprises perform standard activities at the global level. However, in contrast to this convergence, with the effect of localization, hybrid organizational structures are becoming important especially in order to provide competitive advantage in the national market. While creating hybrid organizational structures, attention is paid to establish a structure that will not hinder the coordination between the host country and the home country.

Parker (1999) emphasized that the boundaries between the existing marketing, finance and production became more streamlined. A world in which borders are gradually lifted brings with it the rise of different levels of borders in businesses. In order to meet the needs and expectations of the local, regional, international and global society, more flexible structures should be established in enterprises by overcoming horizontal and vertical borders.

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KEY TERMS AND DEFINITIONS

Cultural Hybridization: It is to remove the national culture from the local and blend it with the positive or negative bi-directional effects of globalization.

Global Business: Operating globally, utilizing advanced technology, global products, competencies etc. businesses that manage policies and are managed by world citizen managers are defined as global businesses.

Globalization: It is a process which has economic, social, political, cultural, environmental, legal dimensions that removes borders in almost every area, such as the nation state, time, industry, cultural norms, and assumptions.

Glocalization: The practice of conducting business according to both local and global considerations.

International Business: These companies operate in one or more countries outside their own country.

Localization: In the division of labor between the central government units of the state and the local government units, local units gain weight. In another aspect, it is the ability of individuals and local units to self-manage under the sense of coexistence and culture without the need for a nation-state.

Multinational Business: These are the enterprises that carry out the production and marketing activities of the ownership in two or more countries partially or wholly, own business strategies and apply these strategies at all of its subsidiaries or branches.

Strategy: It is a decision or a set of consecutive decisions that are expected to have an impact on the ability of an entity to realize its objectives in the long term.

ENDNOTE

¹ The power of capitalist rules in capital/financial sovereignty.

Section 4

Relevant Topics and Current Issues in Business Ecosystems

Chapter 23

Blockchain Ecosystems in the Sharing Economy: An Evaluation for the Health Services Industry

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ABSTRACT

In the 21st century, the free movement of information became quite important with the increase of internet technology. The fact that people can exchange money or data with each other without the need for any intermediary has led to the development of a new economic area under the name of the sharing economy. One of the most important features of the sharing economy is that the parties of the economic transaction establish this relationship through a technological platform. Similarly, allowing peer-to-peer transactions and seeing them as a reliable and public platform has made blockchain technology the focus of attention as a digital business technology in various sectors. In this study, blockchain technology, which is considered as the future technology of the sharing economy, is explained within the framework of a health sector model that deals with the partnership between the sharing economy and blockchain technology.

INTRODUCTION

The rapid development of the internet world has moved far beyond the image, music or knowledge sharing of people with each other and has started to gain economic significance. The transformation of the sharing of resources into an economic relationship among the parties has revealed the concept of “sharing economy”. With the sharing economy comes a resource transfer from a person who has a resource and doesn’t needed it to a person who needs this resource. As a result of this transfer, revenue is generated from idle sources. Ensuring mutual trust is one of the fundamental obligations of this economic relation-

DOI: 10.4018/978-1-7998-1125-1.ch023

ship. Regarding the sharing economy conducted over internet-based platforms, blockchain technology has generally been thought of as a business technology that could cope with this challenge. Blockchain technology secures the processes carried out among peers with its decentralized structure by protecting them with cryptographic passwords. Blockchain technology, which is found to be very secure owing to this feature, has started to be used in many sectors following finance.

Within the scope of this study whether it is possible to use blockchain technology, which is seen as the future technology for the theoretical framework of blockchain technology and the sharing economy, the relationship between sharing economy and blockchain technology in healthcare services, besides the economic value of the blending of these two new concepts are the fundamental hypotheses which are questioned. Pursuant to these fundamental hypotheses, one of the aims of this study is to determine whether the use of blockchain technology in health services can provide added value within the scope of sharing. The second is to present the advantages to be attained with a model of this type for health services. For this purpose, pioneering studies on the use of blockchain technology and the sharing economy in health services have been researched, and studies on the current application samples have been conducted.

Considering the organization of the study, following the introduction in the second section evaluations of the current literature on blockchain technology and sharing economy are presented and both qualitative and quantitative findings are included. In the third part methodologies are outlined, and in the fourth part findings are included. In the fifth part of the study, the advantages and disadvantages that can be obtained within the framework of a health sector model that considers the partnership of the sharing economy and blockchain technology are evaluated. Finally, expectations and recommendations for the future are included.

LITERATURE REVIEW

There are many studies on blockchain technology and the sharing economy. In the studies on the sharing economy, the initiatives that are carried out through online platforms such as Uber and Airbnb are generally examined. Following from hotel and transportation services, the sharing economy has begun to find areas of use in entertainment, finance, and retail (PwC, 2018:9).

The studies carried out within the scope of blockchain technology started with finance, and are further diversified on a sectoral basis. Even in public places blockchain technology finds use. In this study, in addition to the studies that address the relationship between blockchain technology, which is seen as the future technology of the sharing economy, and the sharing economy, the studies and evaluations that address the combination of these two concepts in the health sector are included. It can be said that the studies carried out in relation to health services are much more limited.

Some of the studies on the sharing economy, blockchain technology and the relationship between these two concepts with the health sector are shown in Table 1.

Prior to evaluating works on the sharing economy, it would be useful to define what the sharing economy is. In recent years, start-up companies such as Uber and Airbnb have created a new rental market. These markets have been characterized by their owners as leaseholders, peer-to-peer markets or sharing economy markets (Horton & Zeckhauser, 2016). The sharing economy was born as a new economic structure that dealt with the transfer of various goods, services and value. The specialty of the

Table 1. Literature review selected publications about sharing economy/blockchain technology

Authors	Subject of Research/Method	Scope	Result
Bell, et. al. (2018).	Clinical trials, drug tracking, data sharing, device tracking, and health insurance are evaluated.	Health Sector/Blockchain Technology	Taking advantage of blockchain technology in the health sector; improvements can be made in areas such as device monitoring, clinical trials, drug monitoring, and health insurance. However, there are barriers related to organizational, structural, technological and human factors prevent the health sector from adopting this technology.
Borsenberger (2017)	Evaluating the effects of the urbanization phenomenon that has become widespread in the context of the sharing economy.	Parcel Delivery Sector/ Sharing Economy	It has been stated that globalization and urbanization are a significant factor in the expansion of the sharing economy in areas such as health care, libraries and public transport. If the sharing models can be effectively implemented, it has been stated that savings of up to 7 percent in the household budget and up to 20 percent in waste maintenance can be achieved.
Cao, Cao, Wang and Lu (2017)	Literature sources, research methods and viewpoints of 242 articles related to blockchain which were carried out in China and other countries between 2014-2016 were analyzed.	Blockchain Technology/ All Sector	It has been determined that the local research carried out on blockchain were decentralized, that the studies are not systematic and do not reach a certain depth of research.
De Filippi (2017).	The effects of blockchain technology on the sharing economy were evaluated.	Blockchain Technology / Sharing Economy/ All Sector	It has been stated that the blockchain technology can support decentralized forms of organization and collaborative approaches.
Frenken (2017)	Capitalism, redistribution, and cooperativism were questioned by considering the sharing economy in terms of political economy.	Sharing Economy	The environmental impacts that could be assigned to three possible scenarios that were compared on the global/national and local scale were evaluated.
Hileman and Rauchs, (2017)	With the DLT (Distributed Ledger Technology) questionnaire applied to 44 firms from 13 different countries and 29 public institutions from 19 different countries, it is aimed at understanding the prevailing business models, and trying to understand technical cooperation and obstacles.	Over 200 companies, Central Banks and Public Sector Organizations	90% of the participants stated that they used a blockchain data structure. Costs and benefits are uncertain. This situation makes it difficult to adopt DLT. When the use of DLT is classified by sectors; 30% have related to banking and financial services; this is followed by the government (13%), insurance (12%) and health (8%).
Huckle, Bhattacharya, White and Beloff (2016)	Autopay, Tourism and Digital Rights Management.	Shared Things Project Scope: Mobile financial wearable devices and IoT, IoT in Sharing Economy.	Scenarios have been developed by utilizing wearable technologies and blockchain technology.
Jarvenpaa, S. and Teigland, R. (2017).	Trust and trustworthy systems have been studied in digital environments.	Digital commerce/Sharing Economy	The subjects of elations between trust, governance, access, how Ethereum works and smart contracts in a blockchain are grounded.
Luisetto, M. (2016)	Literature Review using Pubmed, and other database. Their research involved in professional social media, sharing economy, management, Pharmaceutical care and clinical pharmacy, Healthcare Cost Management and ICT in healthcare.	Health Sector/Sharing Economy	They concluded that the use of sharing economy tools would reduce the costs of health services by 30-40%.
Metwally (2018)	An evaluation has been made on the sharing economy and the health sector.	Health Sector/Sharing Economy	While the sharing economy reduces costs, it increases the accessibility to healthcare services. Rather than discussing the effects of the sharing economy on the health system, he emphasized the need to increase the quality and ensure confidentiality for health services which have been considered within the scope of sharing economy.

continued on following page

Table 1. Continued

Authors	Subject of Research/Method	Scope	Result
Pazaitis, De Filippi and Kostakis (2017)	They studied the value of the conceptual model of backfeed, and its connection with the theoretical framework.	Sharing Economy	They proposed a three-layer model to integrate the production, registration, and realization of value by associating the sharing economy with the knowledge economy, which they regard as a new method for resource allocation in society. They describe the sharing economy as the last layer of a new value system that contains the qualitative elements of social relations.
Schumacher (2017)	It has examined how the sides of the health ecosystem benefited from blockchain technology.	Health Sector/Blockchain Technology	It is stated that by utilizing blockchain technology in the health sector, a sharing economy could be created as a result of the sharing of genomic, metabolic and other health data among the parties, thus contributing to an increase in the general welfare.
Sundararajan, (2016)	The digital determinants of the sharing economy and the blockchain technology were analyzed.	Sharing Economy/Blockchain Technology	The sharing economy generates productivity gains, and reduces transaction costs thanks to an increased utilization of shared assets, leading to cost and price decreases, sustaining consumption and economic growth. The contribution of the sharing economy to the digital economy has been discussed. It has stated that contributing to the reduction of the sharing economy and ecological footprint will be achieved.
Yaeger, et. al. (2019)	An analysis was carried out on the use of blockchain in the health sector.	Health Sector/Blockchain Technology	There are various limitations in using blockchain in the health sector. A significant amount of participation from the sector is required for the nodes of such a network. Serious processing power is required to manage the blockchain network. This increases energy costs.
Yue et. al. (2016)	To introduce a model that aims to manage health data for the health ecosystem.	Health Sector/Blockchain Technology	They have proposed an architectural structure that aims to ensure that the patient manages all of their data securely through their data gateway.
Hawlitsek et. al. (2018)	The potential of blockchain technology to overcome the problem of trust in the sharing economy has evaluated.	Health Sector/Blockchain Technology	They have stated that blockchain technology will provide solutions to prevent deficits of security for the technology applications within the scope of the sharing economy.
Babkin et. al. (2018)	Develop a digital model for the sharing economy.	Sharing Economy/Blockchain Technology	An economic model based on blockchain technology is proposed, and the characteristics of the sharing economy have been explained.

sharing economy is its being a new business model that includes transactions from customer to customer (C2C), similar to peer-to-peer (P2P) processing in blockchain (Puschmann & Alt, 2016).

So what is blockchain technology? Blockchain technology can be described as a digital structure or network, which enables data transfer between individuals by using digital platforms, which is protected by passwords and has a decentralized structure.

The “trust” factor is one of the most important elements for the digital structure that constitutes the blockchain technology and for the economic transactions subject to the sharing relationship. Besides, studies related to the sharing economy deal with many aspects such as consumer behavior, technology, sustainability, production, logistics, finance, law, economics and value transfer, profit and cost savings. Within the scope of this study, the feature of the sharing economy related to technology bears importance. Investigating the studies suggesting the use of blockchain as a digital model from the perspective of the sharing economy, it can be said that blockchain technology has been seen as a safe and transparent technological infrastructure for the sharing of resources or value (Nichol, 2018; Babkin et. al., 2018; Huckle et. al., 2016; Mainelli & Smith, 2015). In terms of the fact that it makes transferring value a possibility,

Pazaitis, Filippi & Kostakis (2017: 106), taking into consideration the sharing economy in a normative point of view, it evaluates distribution of the value created through the social sharing mechanism within the context of; (a) perceptions of value in the economy; (b) the techno-economic context of the sharing economy; and (c) a transition to a new value system.

Studying the views that the sharing economy provides profit, and prosperity (Frenken & Schor, 2017), and studies which prove it saves money by reducing transaction costs (Wallenstein & Shelat, 2017), the sharing economy is expected to contribute to the increase of savings by eliminating intermediaries as in blockchain technology.

In the literature, the relationship of blockchain technology with economics and the sharing economy is often covered by features such as “trust” (Jarvenpaa & Teigland, 2017; Hawlitschek, Notheisen & Teubner, 2018; Woskowiak, 2014) and cost savings (Halaburda, 2018; Avital et al., 2016). According to Woskowiak (2014), “trust” is critical for all peer-to-peer transactions. As the sharing economy grows, on-line reputation grows in importance. Lundy (2016) refers to blockchain technology as practices without a central authority, based on “trust” and democratization. Hawlitschek, Notheisen & Teubner (2018), regard “trust” as one of the fundamental promises of blockchain technology in relation to the sharing economy, because a lack of trust in the sharing relationship can result in giving up on the income obtained. Individuals would prefer not to participate in a sharing relationship rather than do risky shopping. Botsman (2012) therefore defines trust as the currency of the sharing economy.

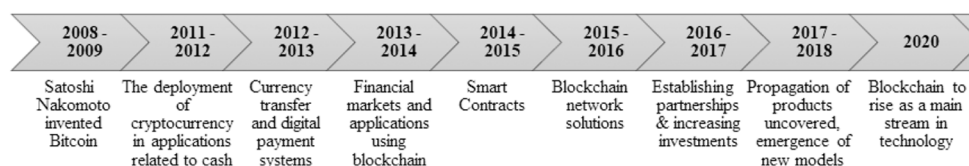
In the studies conducted in the cross-sectional area of blockchain technology and the sharing economy, there are limited scientific studies on what kind of advantages or disadvantages may there be in the economic sense in terms of health services. For this reason, this study aims to contribute to the literature and to present a perspective for future research by evaluating whether or not it is possible to attain added value for the sharing economy in health services by making use of blockchain technology.

METHODOLOGY

The conceptual framework on blockchain technology and the sharing economy was carried out in the form of examining the models of the sharing economy in the literature and the studies carried out in the health sector. A qualitative research method has been preferred because of the difficulty of obtaining quantitative data in this area.

Scientific studies dealing with the intersection of blockchain technology and the sharing economy, the reports of international organizations, analysis of institutions and organizations and the reports of leading companies in this field have been evaluated, and the possible effects of using a model that harmonizes these two new concepts in health services have been analyzed.

Figure 1. Evolution of blockchain technology
Source: Adapted from DHL (2018:3) & Chaparro (2018).



BLOCKCHAIN TECHNOLOGY AND SHARING ECONOMY IN HEALTHCARE

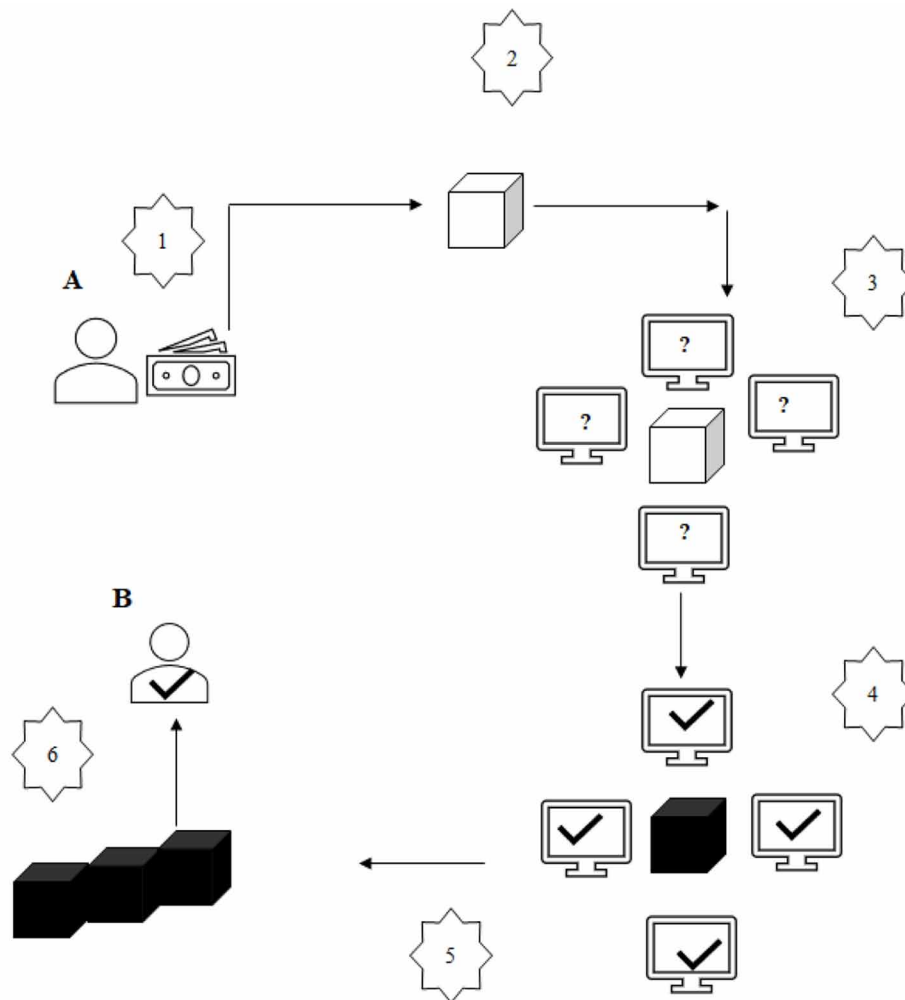
Nowadays, it is possible to come across examples of the sharing economy in many sectors. Health services have not been indifferent to the developments in this area. In this section, the relationship between blockchain technology and the sharing economy was evaluated in the context of health sector examples.

Blockchain Technology

Nakamoto (2008), in the study “Bitcoin: a Peer-to-Peer Electronic Cash System”, has proposed a trust-based solution to the problem of double payment for financial transactions by using a distributed time-stamp between peers. The rise of the Bitcoin currency along Nakamoto’s article and the emergence of

Figure 2. How the blockchain works

Source: Adapted From Finance Magnates (2016).



this rise in parallel with the 2008 financial crisis has led to the thought that Bitcoin emerged as a reaction to the monetary system (James, 2018).

The evolution of blockchain technology is examined in Figure 1, which starts with the emergence of blockchain technology with Bitcoin in 2008, how its current applications have been shaped and the future expectations have been given.

When the development of blockchain technology since 2008 is examined, it can be stated that it mediates the birth of new products and new business processes. In the future, it is foreseen that it will be used as the main technological structure.

The main elements of blockchain technology, which is expected to show high developmental potential, are decentralization, transparency, invariability, autonomy, having open sources, and anonymity (Siyal et al., 2019). The main components of this solution consist of features such as a timestamp server, a work proof mechanism, a common network, special processes that promote the interconnection of structures called blocks where the transactions in the network are registered, and decentralized authorization (Nakamoto, 2008). Blockchain technology, according to Nichol (2017:2), is the currency that can be used in any industry that allows for the transfer of information in different ways, such as payment infrastructure, digital values, digital identity, verifiable data and smart contracts.

The characteristic of the common network that forms the blockchain is that it has a distributed structure. Data is stored in nodes in this distributed network. All processes are executed on the network are linked to the most recently executed transaction with passwords. In this way, the security of the process is provided (Johnson, 2018:9). The validity of the password is controlled by all participants in the network and the data is connected in blocks and chronologically to the main block. The miners are the ones who create and manage new blocks (Kogure, Kamakura, Shima, & Kubo, 2017:56). If you remove a process from the transaction sequence, the miner must also change the previous operations. Each transaction consists of a single record that does not change (Nichol, 2017:5). Therefore, the system has a high power to provide security.

The operating mechanism of a blockchain is represented in Figure 2, using six steps. In the sixth step, which is the end of the process, the value transfer of the process takes place safely.

In the first stage of the transaction, A wants to transfer money to B without an intermediary. The money transfer process is saved to the network as an online block in the second stage. In the third stage,

Table 2. Main types of blockchains segmented by permission model

		Permission Types	Read	Write	Commit	Example
Blockchain Types	Open	Public Permissionless	Open to anyone	Anyone	Anyone	Bitcoin, Ethereum
		Public Permissioned	Open to anyone	Authorised participants	All or subset of authorised participants	Supply chain ledger for retail brand viewable by public
	Closed	Consortium	Restricted to an authorised set of participants	Authorised participants	All or subset of authorised participants	Multiple banks operating a shared ledger
		Private Permissioned "enterprise"	Fully private or restricted to a limited set of authorised nodes	Network operator only	Network operator only	External bank ledger shared between parent company and subsidiaries

Source: Hileman & Rauchs, (2017:20)

the block is published to all users on the network. In the fourth stage, it is confirmed by the users on the network whether it is correct or not. The block is added to the blockchain in the fifth stage. In the sixth and final stage, the transfer of money has reached B.

In accordance with the source, blockchain technology is developed in three different modes: public, hybrid or consortium and private permissioned. While the public blockchain has a completely decentralized structure, the hybrid has a partially decentralized structure while the private blockchain has a central structure (Lu, 2018). A blockchain network is also been divided into different segments according to the different permission types for these three different modes.

Table 2 shows the blockchain networks that Hileman and Rauchs (2017) divided into four segments according to the permission type.

In this model, the online network in which a transaction is submitted for approval is categorized in respect to the type of access of the blockchain network users. Considering the fact that access is open and closed, this table contains the type of permission, the persons authorized to read the transaction, the persons authorized to change and process, and the examples within the scope of this process.

The difference between open and closed blockchains is entirely related to threats to which the security and the system is exposed. For example, the public permissionless blockchain indicates that the actors involved in the system are not known and are open to hostile attacks. On the contrary, participants are well known in the private permission blockchain and are held responsible for the contracts in the chain. The benefits derived from blockchain technology, whose functions and types we have described, are transparency, the lack of fraud risk, low or no cost exchange, high transaction speed, a secure network, and ensuring the security of financial data (Sharma, Moon & Park, 2017:186).

Sharing Economy

Implementations in the form of earning from things that are shared are evaluated within the scope of the sharing economy (Huckle et al., 2016). The sharing economy was first used in by Lessig (2008:154), and was subdivided into two categories: “thin sharing economies” and “thick sharing economies”. Thin sharing economies include the social sharing of a resource. This source is shared independently of the price. Conversely, thick sharing economies are more individual. Rifkin (2014) defines having access to most products and services at no cost as a zero marginal cost society. To him, 70-90 percent of GDP in developed economies is comprised of services that have been defined as the transfer of benefits without the transfer of ownership rights (Ehret, 2015).

According to Botsman and Rogers (2010), who describe the sharing economy in different forms, such as collaborative consumption, collaborative economy and sharing economics, there are three types of sharing relationship. The first of these is product service systems. Sharing services such as Zipcar are systems that allow companies and individuals to share products or services. The second is the systems that allow the matching of products or services by using redistribution markets. The third is the systems that match the common ways of living through digital technologies.

The sharing economy is an economic structure different from the traditional market economy, which, unlike centralized institutions, is based on distributed networks and includes a collaborative approach and the way of consumption, production, and financing are determined by this collaborative approach (Roggenkamp, 2015:12). According to Thompson (2015), the sharing economy refers to a peer-to-peer sharing platform that serves the purpose of optimization of resources and benefits of individuals, com-

panies, non-profit organizations, and governments in the transfer and sharing of goods/services and the reuse of resources.

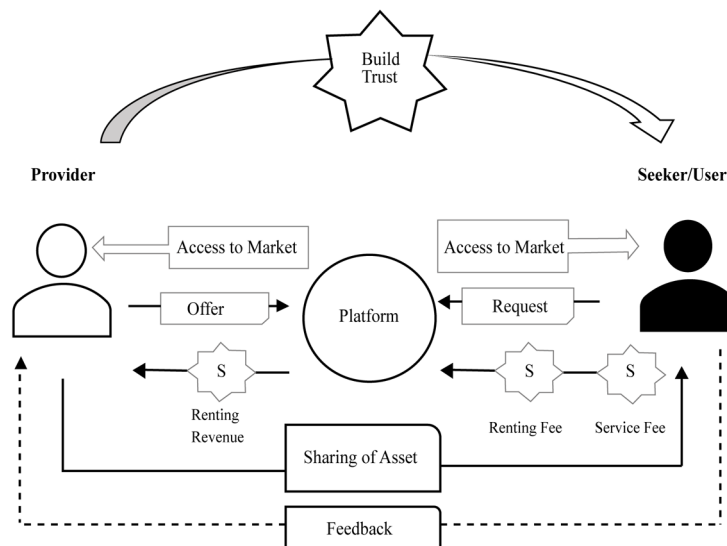
According to Haawlitsek, Notheisen & Teubner, (2018), the sharing economy is a peer-to-peer economic system in which financial resources are shared and increase their use. In the sharing economy transactions are carried out using online platforms and exhibit a temporary property turnover. This is the most important aspect of the sharing economy that differs from the traditional market economy. In other words, instead of having an asset, there is a change in the consumption pattern as in obtaining the right of use. In this new economic model, which takes place in the form of transfer from customer to customer (C2C), the key issues are the change in customer behavior, social networks, and electronic markets, and the spread of mobile devices, and electronic services (Puschmann & Alt, 2016). Therefore, there are also those who view the sharing economy as a product of technological developments (Hamari, Sjöklint & Ukkonen, 2015). In addition to this technological development, blockchain technology can be considered as one of the future technologies of the sharing economy. The biggest contribution of technological developments to the sharing economy is that both the scope of the shared products, and the public that are provided with transfer methods are quite extensive. Depending on the scope of the sharing relationship, it may be possible to increase the added value created.

The characteristics of the sharing economy and the functioning of this economic model will be explained prior to mentioning the relationship between the sharing economy, and blockchain technology. According to Sundararajan (2016: 27), who stands out in the literature with his studies on the sharing economy, the characteristics of the sharing economy are divided into five. These characteristics are listed below article by article.

1. Largely market-based and creates new markets,
2. Provides high-impact gains that enable new opportunities for everything,

Figure 3. The functioning of the sharing economy

Source: Adapted from Business Model Toolbox (2018) and Benov, E. (2018).



Blockchain Ecosystems in the Sharing Economy

3. Provides crowd-based networks instead of central institutions or hierarchies,
4. Blurred lines of business being conducted by professionals or amateurs
5. Likewise, there is uncertainty about whether the job is affiliated with a business or unaffiliated.

The transactions in the sharing economy are based on three components. These components are; that the party who is the service provider in a transaction sells, rents or enables a source that has not completed its economic life, to market it for the purpose of using it together, that customers see this source and an online platform becomes the mediator of these two parties (Hawlitschek, Notheisen & Teubner, 2018:50).

The details of the relationship between the parties of an economic transaction taking place in the sharing economy is given in Figure 3. As can be seen in the figure, the most important element of the sharing economy platform is the building of a trust environment.

The sharing economy brings together the parties of the transaction on an online platform. Through this platform, people who have any kind of resource and those who look for this resource are matched. As a result of the transaction, the right of access is obtained instead of buying this asset. As Babkin et al. (2018) stated, sharing economy does not promise great hopes for the global economy but has significant effects on the economy. Rifkin (2014:9) believes that the new business models emerging with the sharing economy are the end of capitalism.

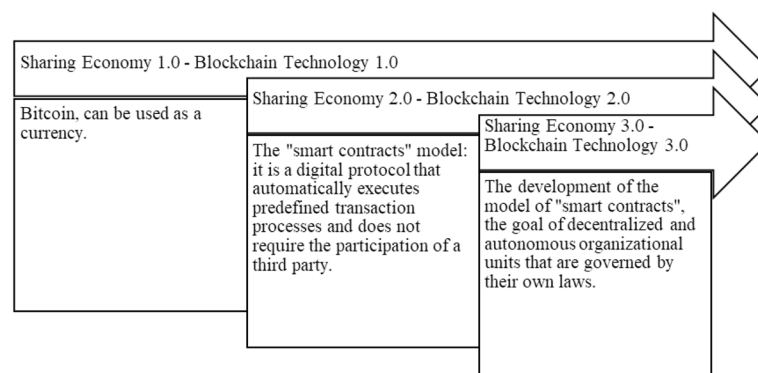
With digital processes becoming widespread, so is research on the role and impact of the sharing economy. For example, according to Coyne and Onabolu (2018: 369), the sharing economy targets the democratization of trade and institutionalized methods of change. Blockchain technology can be considered as one of the digital technologies that will enable this change (Sundararajan, 2016:58).

The Relationship Between Blockchain Technology and the Sharing Economy

It will contribute to the integrity of the study to explain the historical development of the relationship between blockchain technology and the sharing economy, which is seen as one of the most suitable digital platforms for the future of the sharing economy.

Figure 4. Evaluation of the sharing economy and blockchain technology

Source: Swan (2015) and Babkin et al.(2018).



The fact that the sharing economy denotes economic relations based on internet technologies and allows the sharing of idle resources through internet technologies constitutes the basis of the idea that blockchain technology has become mainstream.

The evolution of the sharing economy will be handled with a parallel approach to the evolution of blockchain technology. In this context, first of all, the approach of Swan (2015) will address the evolution of the blockchain. In terms of the convenience provided by organizations, which define blockchain as a revolution, Swan (2015), who divides blockchain technology into three categories as Blockchain 1.0, 2.0 and 3.0, considers blockchain 1.0 as a currency. This currency is used in applications involving cash transactions and is associated with Bitcoin and crypto currency. Blockchain 2.0 includes applications such as stocks, futures and smart contracts beyond cash transactions. Blockchain 3.0 consists of applications that facilitate health, science, culture and state transactions beyond the money and financial markets. Blockchain 3.0, provides a technical solution to the problem of cooperation in joint or group production with cryptography (Davidson, Filippi & Potts, 2016). It is thought that blockchain 3.0, which represents a programmable social age, can provide solutions to all areas of human life and to many social problems (Lu, 2018).

Babkin et al. (2018), dealt with a categorization similar to Swan (2015) within the framework of the relationship between blockchain technology and the sharing economy. In this context, the development of the sharing economy and blockchain technology is given in Figure 4.

As can be observed in Figure 3, blockchain technology - sharing economy 3.0 includes the implementation of decentralized smart contracts with more advanced and unique laws applied in different sectors. In this study, evaluations within the framework of blockchain and sharing economy 3.0 will be made and the models of sharing economy based on blockchain technology will be explained in terms of health services.

It can be said that when the samples that create the sharing economy using blockchain technology based applications (Share Ring, Bee Token, Origin, etc.) have been examined, an added value can be provided over the potential in various sectors by utilizing blockchain technology. Thus, the harmonization of blockchain technology and the sharing economy will affect the structural changes of existing institutions and redistribution of income by providing a transformation in the economy (Barzilai, 2017).

IBM sees blockchain technology as a real platform that enables individuals to share directly with others, providing a person-to-person economy (Lundy, 2016). For instance, ShareRing, which brings together blockchain technology and sharing economy, aims to provide a radical change in the way we share goods and services by creating a platform of this nature (Miller, L., 2018). Slock.it is one of the first applications of blockchain technology that allows renting, selling and sharing of something without a tool, and provides a vision for the future of the sharing economy with intelligent contracts (using the Ethereum platform) (Karafiloski, 2017). Companies such as Origin and Bee Token are also companies that benefit from blockchain technology and can be an example of sharing economy.

According to estimates, the market size of blockchain technology is expected to increase from \$411.5 million in 2017 to \$7,683.7 million by 2022 (marketsandmarkets.com, 2017). Similarly, the market size of the sharing economy is estimated to increase globally from \$15 billion in 2014 to \$335 billion by 2025 (PwC, 2018).

According to Biswas & Pahwa (2015), the sharing economy has created a new area of economic activity with micro-entrepreneurs and new markets. Entrepreneurs of this new economic activity have started to generate income by renting various assets (such as furniture, camping equipment and parking lots). New economic activity areas formed by the sharing economy can be listed as logistics, financial

services, household goods, education, transportation, accommodation, and even health services (Biswas & Pahwa, 2015).

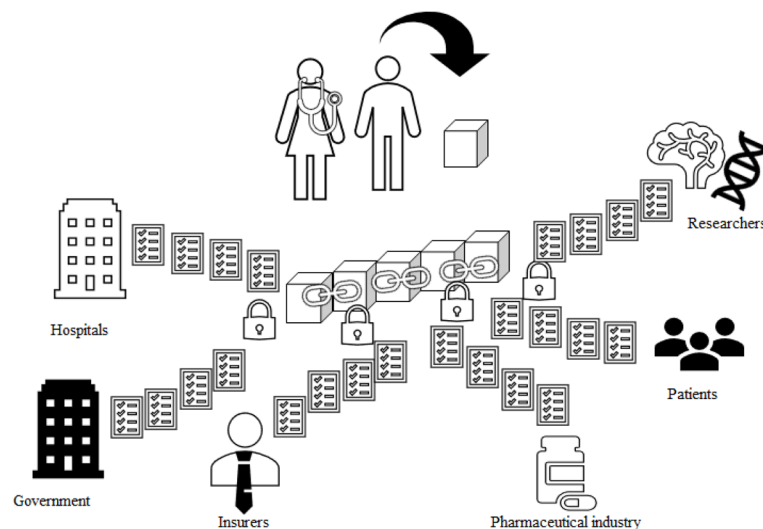
When the sharing economy and the market economy are compared, some advantages of the sharing economy over the market economy can be mentioned. To begin with, the sharing economy offers gains for the sustainability of resources with the use of idle resources. The second superiority of its is the flexibility of decentralized institutions in goods/services delivery in the sharing economy. As a result, consumers get the most suitable goods/services for their needs. The third advantage is that the sharing economy ensures that some goods are obtained at lower costs in decentralized markets (Allen & Berg, 2014). The sharing economy saves money and time by eliminating ownership and access barriers, providing users with access to health care and medical equipment as well as basic goods and services for the low-income group. In addition, it contributes to welfare increase by eliminating inequalities in access to goods and services resulting from income differences (Pluess et al., 2016).

In sharing economy companies, the basic problem of companies is trust. While in traditional companies consumers are safeguarded by laws that protect consumer rights, many of these regulations have not yet been implemented in the sharing economy business models (Yaraghi & Ravi, 2016). The decentralized structure of blockchain technology can be safer than the central solutions for the sharing economy. The reason why it is considered safe is that centralized systems are more vulnerable to cyber-attacks. Besides, in the case of any disagreement with blockchain technology regarding user rights, agreements can be reached by means of smart contracts (Williamson, 2018).

Blockchain technology, a digital platform, can be considered as a technology that affects the future of the sharing economy. With the merger of blockchain and the sharing economy, it is believed that a revolution that will transform the global economy and distribute wealth beyond certain companies and individuals will be conducted (Share Tool White Paper, 2018:18).

The main arguments behind this notion are that it allows direct peer-to-peer connection to be established by combining the supply and demand segment, because of the decentralized structure of blockchain technology, and unlike the sharing economies such as Uber, Airbnb, it makes sharing cheaper and reduces costs because it eliminates the transaction fees paid for these platforms (Achievion Solutions, 2018). In

Figure 5. Blockchain in the healthcare industry



addition to the advantages it provides, the sharing economy presents problems related to competition (Gata, 2015). Therefore, it brings with it the obligation to make arrangements for its functioning.

The World Economic Forum (2016) has developed a seven-principle guide for policy-makers by examining policies governing the sharing economy in cities in different parts of the world such as Portland, Toronto, London, Boston, Beijing and Seoul. These principles are: creating space for innovation, people-centered, proactive approach, assess to the whole regulatory system, data driven government, flexible governance and shared regulation.

Use of Blockchain Technology in Health Services

The importance of blockchain technology has increased the necessity of regular storage of health data due to a patient-centered approach in health services and the necessity for electronic medical records to be accessible to all parties in the health sector. Thus, while access to health data is facilitated, the interoperability of stakeholders in the sector increases. In addition to this, contributions such as secure storage of data, value-based payment mechanism to gain operational, medical supply chain, etc. can be obtained (Yaeger et al., 2019).

Blockchain technology provides a safe mechanism for recording and maintaining a comprehensive medical history for each patient. Patients, doctors, health care system regulators, hospitals, insurance companies, and other stakeholders can benefit from this mechanism (Weber, 2018:51). Providing data sharing via blockchain technology provides transparency between the parties of the health sector and gives the power to control the health data of patients (Sater, 2018).

Figure 5 illustrates the functioning of a simple blockchain ecosystem in the health sector. Medical data related to health services are recorded on the electronic medical record of the institution concerned. This data is encrypted and recorded in a personal block of the patient. This block is presented to the participants of the network forming the chain. Thus, other participants in health care services have a copy of the data. We can classify the data generated in health care as patient-generated data and data obtained from clinical and health records. Different health data (genomic data, laboratory records, images, etc.) is stored in a data repository. The stored data is structured and unstructured. This information is digitally encrypted and signed. Recordings are indexed historically, and a unique record is created for each patient. Records have a timestamp. With whom the medical data is shared depends on the patient's permission (Frost & Sullivan, 2017).

The Relationship Between Health Services and the Sharing Economy

The sharing economy mediates the creation of economic value by allowing someone else to use anything that is both expensive and rare and contributes to the increase in productivity and reduces costs. It has been determined that the cost of health services can be reduced by 30-40% by taking advantage of the sharing economy tools in health services (Luisetto, 2016).

Internet-based sharing platforms are the most important tool for the sharing economy. According to Yaraghi & Ravi (2017:6), there are many applications in the health sector that respond to digital advances. These applications are digital platforms that mediate the delivery of non-urgent, low-cost health services and can be read as an indicator of the future development that the sharing economy can promise. One of these platforms is a mobile application called Pager.com, which provides a maintenance model based on a sharing economy. In case of need for health services, the patient is mediated to communicate with

a health professional (doctor, nurse, etc.); thus eliminating the waiting time in the hospital. Therefore, the patient is provided with information at a lower cost without creating an additional burden on the health system. These services, of course, include non-emergency situations such as a sore throat, fever, and light injuries. In addition to these platforms, health services can be saved through sharing experiences by taking advantage of peer power. Health companies turn their experience and expertise into cost advantages by using their patient expertise, and therefore increase their revenue. For example, a diabetic peer who teaches a patient diagnosed as diabetes how to do blood glucose measurement can be utilized in this context (Goldsmith, 2017). HelpAround's diabetes safety network is also one of the best examples of the sharing economy. With this network, patients with diabetes can connect with others in their area and share resources that mediate diabetes measurement. They can receive advice from other patients and nurses registered in this network. It is aimed at sharing economic resources and overcoming the difficulties experienced by chronic patients with this service, especially benefitting the low-income population (Pluess et al., 2016).

Another example within the scope of health services is PatientsLikeMe.com. With the recommendations made via this platform, drugs that are not covered by health insurance are determined and the drug supply can be established at a cost far below the actual value (Fuscaldo, 2014). Other examples of a sharing economy are Uber Health and HealthMap Vaccine Finder. These companies have established partnerships for the provision of health packages and immunization for people with low incomes and people living in rural areas (Pluess et al., 2016). The partnership between Lyft and The Blue Cross and Blue Shield Association also acts as a mediator for transport services for people who cannot access health services in a timely manner due to transportation barriers. Blue Cross has a database of 106 million members. Since 3.5 million of these members have not been able to make timely appointments or because they completely miss their appointments due to the obstacles in transportation, it is planned that this damage will be compensated by this partnership, which is made to prevent damage to the health system (Japsen, 2017).

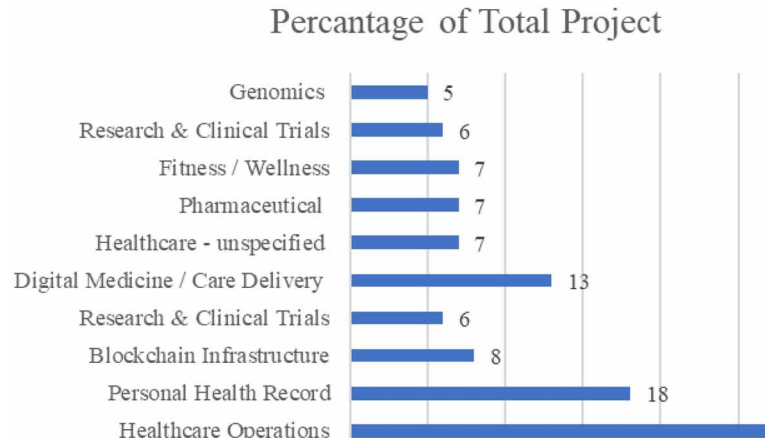
Another example of a sharing economy in health care is Cohealo, which has increased access rather than promoting medical equipment ownership in hospitals, increasing the use of this equipment and increasing savings. The actions of this company towards savings is to purchase medical equipment with a cooperative approach and to ensure the common use of this equipment by various institutions. Cohealo thus saved \$4 million on capital demand of \$21 million (Cohealo.com, 2017). In order to make efficient use of scarce resources, people are turning towards a new consumption pattern every day. The sharing economy, which has started to spread to every area of our lives, also provides new behavior patterns in health services. With the manipulation of these behaviors in terms of health care, it can be said that both health expenditures and financial problems can be solved.

The Effects of Blockchain Based Sharing Economy Model on Health Services

The main aim of this study is to investigate the use of blockchain technology in health services and thus to question the economic gains that can be achieved within the scope of sharing economy. It is possible to say that the level of use of technology in health has expanded in many ways, such as equipment used for home care services, wearable devices, and mobile devices. According to the OECD Digital Economy Outlook 2017 report (2017: 215), the widespread use of health and wellness applications that integrate mobile devices and smartphones into health services has managed to integrate rural individuals in the health system, particularly in low- and middle-income countries such as Ghana, Kenya, South Africa

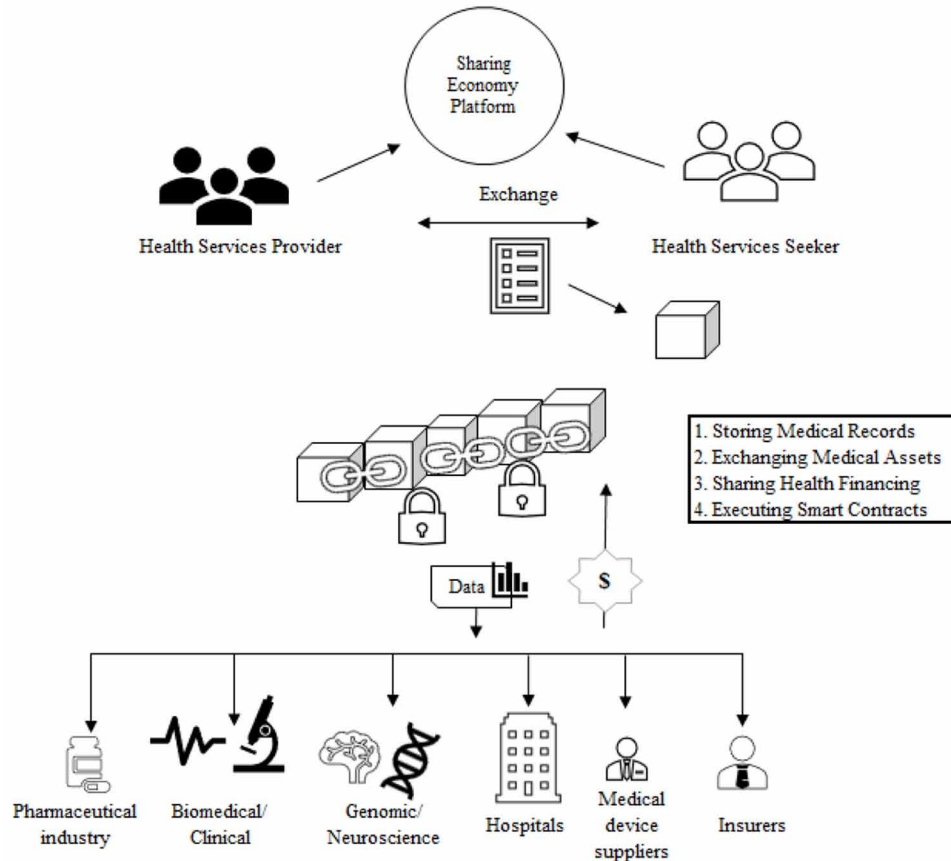
Figure 6. Healthcare and biomedical blockchains project (Total Project: 159)

Source: Blockchain Project Index, <https://db.biomedicalblockchain.org/>, 28.03.2019.



and Tanzania. In addition to increasing access to healthcare services, the use of digital technologies has

Figure 7. Sharing economy and blockchain technology partnership model in health care



become widespread and new technologies such as blockchain technology provide users with a chance to earn money from anonymized medical data (Gainfy White Paper, 2018:13). Blockchain-based platforms such as Gainfy provide monetary incentives to individuals who participate in these activities in exchange for physical activities such as walking, running, cycling in order to collect data on health and wellness behaviors (<https://gainfy.com/individuals/>). In this way, researchers have access to a wide range of health data recorded through personal activity monitors.

The fact that digital technologies affect the behavioral habits of especially younger generations towards consumption also directs their health behaviors. As mobile applications are more widely used by young people, it can be ensured that future generations adopt the universal health coverage health care sharing model within the scope of sustainable development targets of future generations by providing behavioral changes through incentives for the development of health awareness (Jones & Jones, 2017: 44). In this context, smart contracts can be used. Apart from the technological products and habits that individuals benefit from within the scope of health services, data that contribute to the development of genetic science can also provide positive outcomes for the health sector through the blockchain. According to Schumacher (2017: 11), the sharing of specific genomic, metabolic, and other health data can be very effective in achieving scientific and medical progress. With this sharing economy comes contributions to providing better medicines, and general welfare for patients all over the world. Applications such as DNA.Bits and Genecoin, which enable individuals to take a back up of their DNA, are used for this purpose (Franzetti, 2015:7, Thompson, 2015; Swan, 2015:58). In addition to monitoring health behaviors, it is also possible to create new sources in the health sector in terms of management of medical records, financing services, joint use of medical devices and equipment, and to create revenue within the scope of the sharing economy.

Figure 6 presents the focus areas of 159 projects using blockchain technology in the health sector and their percentage distribution.

While 5% of total projects focus on genomic projects, 7% focus on fitness/wellness. The biggest share is health-related operations. 38% of these projects focus on data and asset management. As in Figure 7, transactions made in the health sector by taking advantage of the sharing economy platform have been taken into consideration within the framework of a health sector model that deals with the sharing economy, and with the partnership of blockchain technology.

Within the scope of the model, when management of the data on processes such as the archiving and sharing of medical records, exchange of medical equipment, sharing the financing of health services is established over Bitcoin, it is possible to obtain economic gains, to contribute to a drop in health care services expenditure while some health care services can be saved. For example, using non-urgent and low-cost health services through sharing platforms may help to reduce waiting times in hospitals and contribute to the reduction of health expenditure. The regulatory role of the state within the scope of the model should not be forgotten.

SOLUTIONS AND RECOMMENDATIONS

The relationship between the use of blockchain technology in health care services is summarized in Table 3, where services that contribute to income generation, services that contribute to cost reduction, and services that can be saved are mentioned.

Table 3. Advantages of blockchain based sharing economy platforms

Type of Service	Operation Type	Advantages	Digital Platform
Access to Health Staff	Storing Digital Medical Records	It acts as a mediator for the patient to communicate with health personnel for non-urgent, low-cost health services.	Pager.com/Mobil application
		It can help reduce costs of health care by reducing waiting times.	
Benefit from peer power	Storing Digital Medical Records	By providing effective management of chronic diseases, health services can be saved.	HelpAround/Mobil application
		By acquiring an idea about drugs that are not covered by insurance, savings can be obtained from resources spent on the drug.	PatientsLikeMe.com/Online platform
Resolve access to health services	Storing Digital Medical Records	By increasing access to health services, it can contribute to the prevention of costs arising from cancellation of appointments.	Lyft, The Blue Cross and Blue Shield Association/Online platform
Provide access to medical equipment	Exchanging Medical Assets	By allowing the sharing of medical equipment among healthcare facilities, it can prevent the waste of resources. Thus, it can contribute to saving.	Cohealo/Venture-backed technology
Sharing of health records	Storing Digital Medical Records	It can prevent cyber-attacks by ensuring reliable transfer of data.	Proof.work/blockchain technology
Genetic Research	Storing Digital Genesis Records	By converting human DNA into data and storing it in a Bitcoin network, it converts this data into money.	DNA.Bits, Genecoin/blockchain technology
Sharing of health services	Sharing Health financing	Sharing of health services can contribute to higher quality access to health services and to reducing costs of health services.	Sharable.Life/blockchain technology
Aggregate health and behavioral data.	Storing Digital Medical Records	This technology could help increase consumer safety while also giving an opportunity to consumers to monetize their clinical data.	Gainfy/blockchain-based "big data" platform

The table describes the examples of digital platforms that enable economic advantages and the types of health services carried out on these digital platforms and transactions performed on these digital platforms. In addition to the samples mentioned here, it is possible to make more accurate decisions by

seeing the patient's history while making decisions about them, particularly with the use of blockchain. The increase in the production quality of health data can also contribute to the acquisition of more effective data for scientific research, and consequently to an increase in the solutions produced for human health. In this way, with the increase in the health level of societies, it can contribute to the increase in the general welfare. Another contribution of these platforms is that they increase access to health services and decrease inequality in access to health services.

FUTURE RESEARCH DIRECTIONS

It is necessary to consider what can be achieved with the blockchain-based sharing economy platforms as an opportunity for health services and to consider areas that will allow cost-effective management of the resources allocated to health. Monitoring, management and data conversion of outputs in this area will help to achieve significant gains in the field of economics.

Within the scope of health services, it is suggested to carry out future studies in the fields of health economics and behavioral economics based on the findings obtained from this study, which deals with the relationship between blockchain technology and the sharing economy. All topics such as the management of data and its effects on the economy, and the characteristics of the market etc. by way of using blockchain technology in health and the biomedical field, can be considered as research topics. Further studies can be done in relation to the sharing economy in areas that generate revenue, minimize costs and allow savings. As the sharing economy gains increasing momentum with digital technologies, it can be useful to evaluate the impacts on the general economy on a sectoral basis.

CONCLUSION

The worldwide digital transformation has led to an increasing acceleration in the technological race. It is an undeniable reality that you need to keep up with the technology in order not to fall behind your competitors in the technological race. As a result of this transformation, the economies of countries are also digitized. The digitalization of economies differentiates the production and consumption structure and brings about the differentiation in the sectoral changes and business methods.

Changes in consumption patterns of individuals have taken the form of obtaining the right to use that resource instead of owning resources, and the sharing economy has begun to acquire assets. Although the sharing economy emerged in areas such as accommodation and vehicle sharing, it is observed that it has started to shift into different areas as well. Health services can be considered as one of these areas. This study evaluated the economic gains for the health sector within the framework of a health sector model that deals with the sharing economy and the partnership of blockchain technology. Since it is a niche study area, because of the difficulty of obtaining quantitative data, a qualitative research method is preferred and the possible effects of a model of this nature are analyzed by using the reports from the existing literature, institutions and international organizations.

In the health sector, income generation from the idle sources, the starting point of the sharing economy enables sharing of experience and advice, easy access to non-emergency simple health care facilities by using sharing economy platforms, sharing of medical equipment between health institutions, sharing of

health-related data among the stakeholders of the health sector, transforming the physical activities of individuals, and facilities.

Within the scope of the findings obtained from the study, it can be said that it is possible to make a profit from health services carried out through blockchain-based sharing economy platforms in health services. These platforms contribute to the increase in welfare by increasing access to health services and medical equipment while providing positive outcomes in health services and reducing costs. Keeping the medical history of patients using blockchain technology increases the quality of the data, and makes it possible for physicians to make accurate decisions, and to give more transparency to the health sector's stakeholders.

The most important problem related to the processes carried out in health services which can be evaluated within the scope of the sharing economy is the mutual trust relationship. It is possible to overcome the trust problem related to the sharing economy with blockchain technology thanks to its features such as the use of cryptographic passwords in the operations carried out, the participation of all parties in the approval mechanism and the inability to change the data. At the same time, regulating the economic relations in the sharing economy is very important in order to eliminate the problem of trust.

In order to ensure cost-effective management of the limited resources allocated to health, to ensure sustainability of these resources and in order to prevent inequalities in access to health services, it can be considered a solution to make use of blockchain based platforms related to the sharing economy.

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KEY TERMS AND DEFINITIONS

Bitcoin: It is a digital currency.

Blockchain Technology: Blockchain technology can be described as a digital structure or network, which enables data transfer among individuals by using digital platforms protected by passwords and has a decentralized structure.

Cost-Effective Management: It is a form of management ensuring the maximization of the benefits that can be obtained from the resources allocated to health and the reduction of costs.

Peer-to-Peer Markets: It is a type of market that provides the transfer of goods, services and assets without the need for any intermediaries among individuals.

Sharing Economy: The sharing economy refers to a peer-to-peer sharing platform that enables transferring and sharing of goods/services among people and reuse of resources.

Sharing Economy Platform: These are internet-based applications in which relationships based on sharing of economic assets among individuals are carried out.

Smart Contract: It is a digital protocol. The process of a contract is automated by software and the process steps are performed automatically.

Chapter 24

Digital Transformation and Environmental Management Applications: Approaches Used for Value Creation in the White Goods Industry

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ABSTRACT

Today, when determining competitive strategies, businesses should consider environmentally-sensitive approaches and Industry 4.0. The fact that the world is increasingly affected by environmental negativities leads businesses to adopt green thinking. Increasing the orientation of the businesses to green is possible with the concentrated roles of all business functions. In this study, it was determined how much of the Industrial 4.0 approach of the White Goods sector in Turkey was adopted. In addition to this, it is examined how much they integrate the approaches that aim to minimize the harm to the environment to their enterprises in order to create an effective management system. As a result, it can be said that environmental awareness has been formed in the leading enterprises of Turkey such as Arçelik and Vestel and that developments in the world have been followed and tried to be integrated in the name of Industry 4.0.

INTRODUCTION

Digitalization in industry is a result of decades of evolution in industry and has been named in the USA (smart manufacturing) and Germany (Industry 4.0), which are two separate advanced industrial countries. Although the names stand out manufacturing, digitalization covers all sectors of the economy and all aspects of daily life. Industry 4.0 suggests that advanced industrialized countries considerably increase the competitiveness of their manufacturing industries by reducing the competitiveness of developing countries in this area by significantly reducing the needs of digitalization and labor force in the industry.

DOI: 10.4018/978-1-7998-1125-1.ch024

The sectors that first felt the necessity of digitization in the industry in Turkey were automotive, white goods and electronic main industry companies, especially those engaged in intensive export activities to EU countries and exporting supplier companies in these sectors.

The rapid development of technology, communication and information technology has a serious impact on human life in all aspects. These developments also affect production processes and forms. As a result of the so-called Industry 4.0 developments, production processes and structures in the future will be very different from today's structure. The enterprises which foresee this process and prepare their infrastructure, and thus the countries, will provide a high level of competitiveness. Enterprises that are prepared for rapid changes in global markets and that are experiencing these changing conditions will be able to create production processes that are closer to customer wishes and needs by taking advantage of technological developments thanks to their infrastructure, physical and intellectual skills. Together with these changes, environmental awareness has become a factor that is considered in the wishes and needs of customers. The adoption of green thinking is becoming an increasingly important issue with the demand of customers and suppliers to minimize the negative impact on the environment. The approaches of the enterprises towards the direction of green may vary. It is clear that the world is increasingly affected by environmental negativities and that global warming is expected to reach irreversible proportions. Prevention of this situation is possible by the movement of the state, society and enterprises. Unless it is understood that damage to the environment in any part of the world will pose a threat to everyone in the future, measures taken will be inadequate. Laws and obligations to protect the environment, the adoption of green thinking, green sustainability, green production and green product choice indicate that an awareness has started to be created in order to protect the environment.

In increasing the orientation of enterprises to green, it is possible to have all the functions of the business with their ecologically concentrated roles. These roles bring with them environmentally sensitive approaches. Firstly, digital transformation, green thinking and environmentally sensitive applications will be discussed. While discussing the issues, the ways in which these two approaches, which are very important in achieving competitive advantage to enterprises, will be discussed from a strategic management perspective. Finally, the digital transformation process experienced by the company in the white goods industry in Turkey and the environmental approach that aims to minimize the damage of which they will be put forth in order to create an effective management system has adopted.

DIGITAL TRANSFORMATION

Digitalization in industry is a result of decades of evolution in industry, and it has been named in the same years in two different advanced industrial countries. This paradigm shift in the industry was first launched in the USA in 2010 with the names of Smart Manufacturing and in Germany in 2011 with the names of Industrie 4.0. Although manufacturing is promoted by names, digitalization covers all sectors of the economy and all aspects of our daily life (Ulusoy, 2018).

The 4th industrial revolution has some characteristics that are different from the first three industrial revolutions before it. The first of these is that it is a revolution that was first named before it took place in history. Secondly, the operators who had acquired the equipment in the first three industrial revolutions and founded it with their machines and production could say that they were keeping up with this revolution. For example, after the 2nd Industrial Revolution, a manufacturer who established the assembly line system at the factory or a manufacturer who installed a computer programed production bench after the

3rd Industrial Revolution could claim to be adapting to the new system. But the 4th industrial revolution is not just a phase of supplying equipment, it is a long-term process. In fact, the 4th industrial revolution is not only a technological development, but rather a transformation of the production processes, lifestyles, the way of working and working, the organizational structure, the legal processes, and the change of an area that completely covers our lives (Nuroğlu, 2018).

Industry 4.0 can be defined as the advancement of the acquisitions achieved in automation, digitalization, internet, information and communication sectors by taking it one step further and benefiting from these gains in production processes. A more technical description is the transformation of mechatronics (mechanical + electronic) systems into cyber-physical systems (German Standardization Roadmap, 2016).

The most commonly used terms for describing digital transformation in industry or Industry 4.0 are cyber-physical systems, internet of things, smart factory, internet of services, smart product, machine-to-machine, big data, cloud technologies, cloud-based manufacturing.

- **Cyber-Physical Systems:** Cyber physical systems connect with mechanical and electronic components through information technologies to ensure the communication and continuity of each one within a network system. The first form of these technologies is RFID technology in 1999. Cyber physical systems are not only network machines, they create an intelligent network that encompasses machines, smart products, people, that is, the entire value chain and everything in the product cycle. uch intelligent networks are the most important substructure of smart factories that support Industry 4.0 (Firat and Firat, 2017).
- **Cloud Technologies:** Cloud technology enables large data generated at any time to be made available to platforms that offer online storage services over the internet, not to hard drives. The general name given to this data, storage and processing technology is cloud computing (Hashem et al., 2015).
- **Internet of Things:** Industry 4.0 is one of the largest and most comprehensive concepts that come together. It is the most commonly used definition in literature that objects with digital network and internet are in contact with the environment in the physical and social context with the acquisition of a virtual identity. With the use of the Internet, objects are in communication and they can manage themselves in smart factories (Gabaçlı and Uzunöz, 2017).
- **Cloud-Based Manufacturing:** Cloud-based manufacturing (CBM) is another emerging paradigm that will make a significant contribution to the success of Industry 4.0. CBM can be defined as a network-attached production model that increases productivity to respond to customer-generated variable demand, reduces product lifecycle costs, and utilises on-demand access to a share cluster of shared diversified and distributed production resources to create a transient, configurable cyber-physical production line that allows optimal resource allocation (Yıldız, 2018).
- **Smart Factories:** The combination of virtual and physical worlds through Cyber-Physical Systems and the combination of technical processes and business processes as a result represents a new industrial era that can be best identified with the concept of “smart factory”. Placing cyber-physical systems into production systems creates the “smart factory”. Smart factory products, resources and processes are characterized by cyber-physical systems. This structure provides significant quality, time, resources and cost advantages compared to conventional production systems. Smart factories are designed for sustainable and service-oriented business applications. These applications can be summarized as adaptability, flexibility, self-adaptation and learning features, fault tolerance and risk management. The high level of automation at the smart factory is standard prac-

tice. Automation is made possible by a virtual network of physical system-based manufacturing systems that automatically controls production processes. Flexible production systems that can respond in virtually real-time conditions enable radical optimization of internal production processes. Production advantages are not limited to only one-time production conditions, but can also be adapted and optimized for multiple operators in network organization structures (Soylu, 2018).

Machines and robots communicating with each other will enable practical production of large production series and flexible factories to be created. The use of advanced automation (unmanned production lines), data and simulation techniques will increase production speed and reduce the amount of stock needed, which will increase productivity. The sensors that will be used will allow immediate monitoring of the production process and possible errors will be interfered with, which will increase the quality. On the other hand, the demand for low skilled workforce is expected to decrease, while the demand for labor force with different competencies is expected to increase. Furthermore, it can be said that producers will focus on investments in this area during the process of adaptation to Industry 4.0 (Soysal and Pamuk, 2018).

- **Big Data:** Big data; social media shares, network logs, blog, photo, video, log files etc. all data collected from different sources is defined as a format that is transformed into meaningful and operable form. Big data consist of a large number of information such as web servers' logs, internet statistics, social media broadcasts, blogs, microblogs, climatic sensors and information from similar sensors and call records from GSM operators. It is important for companies because it allows companies to take strategic decisions correctly, manage their risks better, and innovate when they are interpreted with the correct analysis methods and collecting information from different sources (Gabaçlı and Uzunöz, 2017).

Industry 4.0 is not an isolated transformation from other systems, focusing on solving a single problem. Successful businesses will not be the ones who invest more, but on the contrary, those who succeed in integrating the whole system and being able to connect to the systems system will get the most benefit from this transformation. Managing digital employees, creating and executing new business models, and assimilating new business cultures through digitalization, in short, "the ability to manage change" will be the key to the success of businesses and countries.

According to the survey conducted by TÜBİTAK (2016) with 1000 private sector companies in Turkey, the digital maturity level of the Turkish industry is between Industry 2.0 and 3.0. The three sectors with the highest level of digital maturity are material (rubber and plastic), computers, electronics and optical products and automotive and white goods. In Intelligent Production Systems Technology Roadmap prepared by TÜBİTAK (2016), 8 critical technologies, 10 strategic targets and 29 critical products have been identified in 3 technology groups (Digitalization, Interaction and Future Factories) and a plan has been drawn for priority sectoral applications of critical products and technologies. Automotive, white goods, and chemical and food sectors were identified for priority sectoral applications.

TÜSİAD and Boston Consulting Group conducted a joint study on Industry 4.0 awareness with 25 Turkish manufacturing companies operating in six different sectors in Turkey. These sectors are automotive and automotive subsidiary industries, machinery, white goods, food and beverages, textiles and chemicals (TÜSİAD, 2016). According to the results of the survey, selected industry leaders have a high

level of awareness about Industry 4.0, but they are already implementing a number of applications in their own firms. The figure 1 shows what developments are taking place in the sector.

As a result, competitive advantage in the globalized market, reducing dependence on unskilled labor, bringing fast and error-free products to markets, increasing flexibility and reducing costs can be seen as the key points of Industry 4.0. In addition to these factors, the depletion of resources, the decrease in life expectancy of the world, and the growing concern of the Society for this situation have led to the development of Industry 4.0. Thanks to the technology and innovations brought by Industry 4.0, it is obvious that it will contribute greatly to sustainability, which is the most popular and focused concept of recent times (Soysal and Pamuk, 2018).

TENDENCY TOWARDS GREEN APPROACHES

With the activities they carry out, businesses have the potential to influence the environment positively or negatively and to be affected by the environment. This level of interaction is different for each business. But when the cumulative effect is taken into consideration, the idea that the world is approaching its borders in terms of natural resources and environmental degradation has become an important and priority issue (Hancioğlu et al., 2018).

It is thought that with the deterioration of the environment and the acceptance of this situation by the enterprises, enterprises will play a major role in the formation of sustainable societies. In the management literature, scientists began to ask the question of how increasingly organizations can become green (Harris and Crane, 2002: 214).

Today's dynamic environmentalism and the need to minimize environmental problems, as well as in all sectors, assume great responsibilities to enterprises. Many factors, such as climate change, global warming, increasing population, unplanned industrialization, developing technology, generation differences, financial necessity, demographic changes, loss of biodiversity, air pollution, ozone layer thinning, more frequent occurrence of toxic chemical substances and heavy metal residues in nature, global

Figure 1. Industry 4.0 applications in pilot industries

Source: (TÜSİAD, 2016)

Industry 4.0 lever	Company	Examples
1 Integrated, automated and optimized production flow	Home appliances	Integrated quality management Tracks products within the manufacturing process and correlates failure data from testing after front-end-production to reduce waste and improve processing
	Machinery	Integrated design data Utilizes vertical data integration from design to the end-of-line of its semi-automated manufacturing process for optimization of operations
	Home appliances	Horizontal data integration Enabled its suppliers to view selected ERP data to tie them closer to an integrated production process
2 Virtual product design	Automotive	Virtual factory and product design Offers a joint solution to integrate factory and product design to optimize manufacturing through factory simulation based on the actual manufacturing needs
3 Flexible manufacturing	Home appliances	Flexible manufacturing robots Implemented a manufacturing line which communicates with RFID-based smart products and adjusts tools and manufacturing tasks to product type
4 Automated logistics	Automotive	Laser-guided automated guided vehicle (AGV) Operates a laser-guided AGV logistics system, where the host computer controls inventory and schedules, controls deliveries and routes the AGVs
5 Learning and self-optimizing	Chemicals	Self-optimizing process flow Works on an IT algorithm to optimize the quality of the end products process through recognition of disturbances in the basic materials mix

financial crises and market instability, combined with environmental sensitivity, have led businesses to think differently about their ways of doing business (Stringer, 2009; Esty and Winston, 2008).

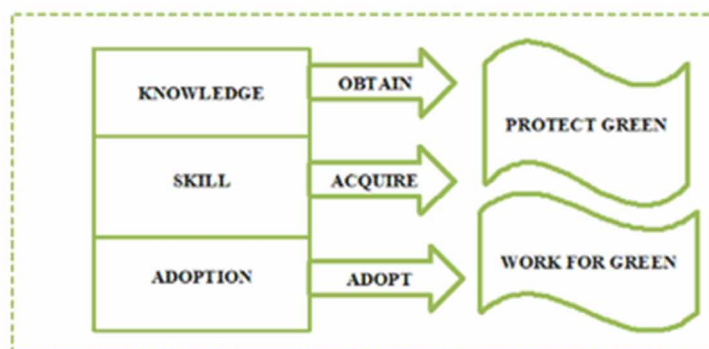
The concept of Environmentally-Conscious Business which tells us that businesses should pay more attention to the environment, meet the demands of environmentally conscious consumers and make less damage to the environment through the activities performed as well as profit is a relatively new concept that has emerged in the days when enterprises are trying to carry out their activities with an environmental-oriented approach.

One of the most important pillars of the successful business management of the 21st century is the ability of enterprises to create green strategies (Düren, 2002: 160). Green strategies focus on protecting and renewing the ecosystem, and ecological actions such as climate change, conservation of Natural Resources and Prevention of toxic waste are carried out (Phillips and Phillips, 2011: 37). The concept of green here can be defined as focusing on environmental concerns around the world and thus trying to make a difference. The concept of green is actually the cornerstone of a culture. A number of studies have to be carried out for the settlement and placement of the green approach in businesses. The knowledge, skill, adoption rule in Figure 2 can be applied to place the green culture in the enterprise. In order for green culture to be formed in enterprises, it is necessary to have knowledge about the concept of green and to obtain this knowledge from its source correctly. Then the enterprises will have to acquire skills based on the knowledge required for green. The latest stage is to share the acquired knowledge and skills with others and to protect the green by adopting them (Özyaral, 2013).

The most important attribute for businesses to start to become green enterprise is the need to have “green thinking”. There are a number of approaches that businesses can follow in order to integrate the environment with the business mentality, in other words to have green thinking. These approaches are listed below (Yeşilaydın, 2018a):

- Minimize water use
- Minimize energy use
- Reduce waste reduction
- Differentiating products
- Investing in alternative energy
- Location near renewable energy sources

Figure 2. 3 rules for the adoption of Green culture



- Saving cost savings
- Reduce the use of automobiles, increase alternative transport
- Creating a green project team
- Establishing green workplaces and working conditions
- Manage Competitors
- Get better office furniture and items
- Managing environmental risks
- Clean the workplace regularly
- Use environmentally friendly Technologies
- Trying to avoid ecological footprint
- Building green buildings
- Create green control mechanism
- To gain green competitive advantage

In order to successfully carry green and sustainable thinking to businesses, key players in both administrative units and business units need to take on a number of roles. The green roles and responsibilities that the units in the enterprises have to take for the formation of green thought are defined in Table 1.

Managers should address environmental pollution and environmental problems as an important issue and should invest in environmental issues as well as investments in other areas. Management said, “is there any benefit of being green?” instead of the question “When does a certain environmental investment benefit to operate? will give the business competitive advantage by asking the question ” (Harvard Business Review, 2008: 55).

Many studies have been conducted in order to draw attention to the globalization of environmental problems, sustainable development and changing environmental conditions. Wealth and Welfare of Arthur Cecil Pigou (1912 ve 1920), Silent Spring of Rachel Carson (1962), The Limits of Growth published by Club of Rome in 1972, Schumacher (1973) has published in Small is Beautiful, in summary, the resources are limited and measures are not taken, the people’s attitude to the World dragged to an irreversible point. In addition, conferences on creating and increasing global awareness, and the relationship between environment and development were carried out one after the other. These are the United Nations Conference on human environment (Stockholm) (1972), The Common Future (Brundtland) report (1987), The United Nations Conference on Environment and development (1992), the Rio +5 Forum (1997), The World Summit on sustainable development (2002) (Çankır et al., 2012).

ENVIRONMENTALLY SENSITIVE APPROACHES

When we consider today’s businesses with a green and sustainable perspective, it is observed that the concept of “green” is integrated into all business functions. From production to human resources, from marketing to supply chain, from accounting to finance, all units can be said to be reshaped by adopting the green outlook.

All business functions undertake ecologically oriented roles. These roles bring with them green approaches. Green marketing aims to raise consumers’ awareness about responsible consumption instead of encouraging unlimited consumption. Green finance targets long-term sustainable growth instead of short-term earnings. Green accounting aims to include the social and environmental costs of produc-

Table 1. Green roles and responsibilities within the organization for green thinking

Research and Development (R&D)	• Minimize the water, energy and raw materials needed to produce the products • Evaluate the infrastructure required to support products or services over time • Use products that can be biologically degradable, recycled or reused
Marketing and sales	• Promoting green products and packaging • Collect data and use electronic media channels for the sale of products and services • Provide discounts or incentives for wholesale purchases, re-use or minimum recycling
Operation and Logistics	• Reduce transport emissions • Minimize the amount of packaging, storage and waste • Include robust repair and recycling programs in operations
Buildings and Facilities	• To build, protect and use green plants • Establishing partnerships with green architects, contractors and suppliers • Investing in intelligent building systems that minimize energy and water use • Develop a greener waste management plan • Ensure green cleaning and landscaping applications at facilities
Human Resources	• To include Social Responsibility funds in retirement alternatives • Creating alternative work policies (remote work, alternating office use) • Giving incentives to green jobs (bicycle, public transport, alternative fuel vehicles)) • Providing access to health services for employees (doctor, nutrition specialist, counseling, ergonomics) • Offer healthy food choices • Offer training opportunities at or near the office • Educate existing and new employees on green practices and share green strategies with new staff • Recruiting people who are experts in sustainability
Public Relations and communication	• Transfer the mission, values and measured results of green thinking • Developing relationships and communication channels with social stakeholders (employees, partners, community, shareholders, customers) • Use electronic media channels (instead of paper) to distribute information
Information Technology	• Develop green policies for the supply and use of electronic devices • Train employees in document scanning, online storage and web-based journals and newspaper subscriptions • Developing electronic information management systems that reduce paper stock • Train employees to use video and teleconferencing technology to minimize travel
Procurement	• Creating green purchasing policies for supplies, durable goods and food • To prepare contracts to ensure that suppliers comply with the sustainable values of the organization
Health and safety	• Minimizing emissions to protect employees and the environment • Presenting ergonomic working environment (lighting, seating arrangement, working surface and heat control)
Law and risk management	• Evaluate the risks of providing products and services that adversely affect people and the environment • Investing in renewable energy and green partnerships

Source: (Stringer, 2009 as cited in Yeşilaydın, 2018a)

tion rather than externalizing them. Green management aims to provide meaningful and safe working conditions instead of pursuing labor productivity with one-way determination (Shrivastava, 1995: 130).

Melynk and Handfield (1995) stated that the main purpose of environmentally sensitive / green production is to minimize the effects of wastes on the environment while increasing resource efficiency. In order to achieve this goal, careful design of both production processes and waste flow is required starting from design. The control of production planning and production processes with different tools should be clearly defined, the results must be measured, evaluated and managed. Environmentally friendly production should not only be limited to the processes of production, but also to other members of the supply

chain. In this way, it will be possible to minimize the negative impact on the environment in the production / supply of semi-finished products or raw materials used by the enterprise (Melynk et al., 2000).

Jeswiet (2007: 29-30) describes the important elements of environmentally sensitive production as follows:

- Environmental problems arise when people want products and need them.
- The number of consumers will not decrease and their habits will not change.
- In modern societies, mass production is a standard.
- All designs are produced.
- It is important to mention the environmental impact of the design of all products.
- All production processes have an environmental impact.
- It is important to make the right design at the beginning.
- Designers must consider potential environmental impacts in all design processes.
- If nature is not treated fairly, it will bear the consequences.

In order to encourage the design and production of products to be least harmful to the environment, regulatory and supervisory public institutions also have important roles. In areas such as prohibiting the use of chemicals that are harmful to the environment and human health, limiting them, and preventing dangerous substances released to the environment in an uncontrolled manner, stricter rules are put into service by the relevant ministries and institutions in developed countries (mainly in the European Union) (Aydın, 2018b).

Human Resources Management (HRM), one of the most important business functions, is directed to environmental activities and Green Human Resources Management (Green-HRM) is used to describe environmental policies and to define its implementation (Kedikli, 2018).⁸

Green-HRM has an important role in the integration of green practices into policies and practices of enterprises. Because Green-HRM increases the training and awareness of personnel in this field, complies with the environmental policies of enterprises, increases the loyalty of employees and ensures the implementation and continuity of environmental sustainability policies (Singh and Rao, 2016: 95). Green-HRM is the use / implementation of human resources policies in order to increase effective and efficient use of internal resources. In this context, Green-HRM covers the subjects of increasing the sensitivity of every employee of the business to environmental practices, training and participation in the business activities in this direction. Green-HRM can be defined with three main parts. First; It is concerned with the development of environmental policies and practices, such as recruitment, training and development of environmental information and promotion of environmental management leadership. Second, the motivation of employees, evaluation and awards are determined in accordance with green practices. The third is the promotion of employee participation, staff empowerment and the creation of a green organizational culture (Rezaei-Moghaddam, 2016).

Although Green marketing may seem to conflict with respect for the environment, the ability of marketing to accept new, different lifestyles, different ideas to society and to large masses can be used for public interest (Aydın, 2018a).

Green marketing concept to the literature of entry and wide-scale adoption, 1975, is based on. At the “environmental marketing” event organized by the American Marketing Association (AMA), the concept was discussed with the contributions of academics, decision makers and other participants and found its place in the literature in 1975. The concept of ecological marketing is defined as follows in this

event in which the relationship between marketing and the environment is discussed: “Green marketing is a whole of the effort to consume, produce, distribute, promote, package and recover to be sensitive or sensitive to ecological concerns.” This broad point of view recognizes that many companies are involved in green marketing. Green marketing is not limited to governmental or non-governmental organizations and is not just an activity undertaken by consumers. Manufacturers, wholesalers, retailers and service providers all have the opportunity to contribute to green marketing (Dahlstrom, 2011).

The ability to work together with customers and suppliers in order to compete in enterprises, to supply quality materials and raw materials is expressed by the concept of “supply chain management” (Güleş et al., 2012: 1). The supply chain is a set of activities covering the entire life span of a product from the design stage to the consumption phase. The planning, harmonization, execution, follow-up and control of these activities are the main subjects of supply chain management (Köseoğlu & Acar, 2014: 45). Supply chain management is the management of communication with suppliers and customers in order to deliver more customer value at less cost (Christopher, 2011: 2).

Sustainable supply chain management is the systematic coordination of key business processes within the organization in order to improve the long-term economic performance of an enterprise and its supply chain, and the strategic, transparent integration and success of the organization’s social, environmental and economic objectives (Carter & Rogers, 2008). Green Supply Chain Management is an important component of sustainable supply chain management, as can be seen from the definition. Green supply chain management differs from traditional supply chain definition in that it focuses on issues such as waste from any process in the chain, energy efficiency, greenhouse gas emissions and legal environmental regulations (Paksoy et al., 2011). In the context of green supply chain management, businesses must purchase raw materials, semi-finished products or products with less environmental damage on human health and environment; produce products with environmentally-polluting, recyclable, environmentally-friendly production methods and technologies; and adopt the environmental outlook in the transportation and distribution of products.; recycle, reusable, environmentally friendly materials for packaging by preventing unnecessary packaging and ensure the disposal, recycling and reuse of waste through an efficient waste management system (Yeşilaydın, 2018b).

Environmental accounting, in other words green accounting, is the process of identifying, measuring and reporting the environmental resources, costs, expenses and risks to be allocated to various sectors, private firms or private departments, projects or processes within the company (Gale and Stokoe, 2001). Environmental accounting in general, environmental accounts contribute to policy makers as a database for strategic planning and policy analysis and as a policy tool for identifying and identifying strategies for sustainable development, to monitor interaction between environment and economy (Demir, 2018).

The role and scope of accounting has expanded considerably in sustainability accounting, which aims at creating an economic, social and environmentally sustainable structure in enterprises. The role of accounting in such a structure has changed beyond document collection, classification, recording, and analysis and reporting of information on sustainability and the development of sustainability (Senal & Ateş, 2012). Sustainability accounting; It can be expressed as the whole of the accounting methods that ensure the economic, social and environmental sustainability of the enterprise at the same time. Sustainability accounting structure, unlike traditional accounting structure, the role of accounting has been extended to include the following information (Moradzadehfard & Moshashaei, 2011):

- To develop management systems related to supply chain management in organizations, to ensure the establishment, implementation and supervision of purchasing policies and standards

- Support communication with stakeholders using available reliable data
- To ensure that enterprises develop policies against sustainability issues and implement and follow these policies throughout the enterprise
- To promote data preparation, interpretation of data and decision-making processes, and to increase sensitivity to regulations that determine the framework of business activities in order to provide timely information on social and environmental issues
- To create voluntary social and environmental regulations and rules appropriate to the business area of the enterprise and related to this field and to ensure that these regulations and rules are integrated into the business

In the simplest definition of finance; it is one of the business functions that are responsible for providing the funds they need in order to survive and sustain their activities. Based on the definition of finance can be said to be the heart of a business, so the business's "green" strategy will be the heart of Finance. In its simplest definition, green financing is the financing of products and services through appropriate opportunities provided by financial institutions for the use of products that are nature friendly or less harmful to nature (Baytören, 2018).

The topics covered in the scope of green finance can be listed as follows (Kim, 2012 as cited in Baytören, 2018):

- Financing green initiatives and technologies,
- Creating green financial products,
- Finding green investors,
- Consider environmental risks in investment decisions.

As a result of globally increasing environmental consciousness and the support that states give to clean energy, it will not be wrong to predict that green financing will continue to be important in the future. As a matter of fact, at the G20 summit in 2016, the heads of state adopted the necessity of "scaling green financing" for the first time and emphasized the importance of the issue. With increasing energy demand worldwide, governments need to set appropriate policies in order to ensure that this energy is needed with green investments. For example, in some European countries, it is important to enact laws that provide investment in electric vehicles that are less harmful to the environment. In addition, the promotion of renewable energy use by states in a variety of ways can also support the green investments that businesses will make. Green energy certificates are given to enterprises that use renewable energy in their operations and enterprises are encouraged to have green financing. These certifications will be an incentive to use sustainable energy for other businesses as it is a prestige certificate symbolizing the environmental sensitivity of enterprises (Baytören, 2018).

It seems possible that businesses can show the performance they want by adapting to both the concept of innovation and the green paradigm. The combination of the green paradigm with the subject of innovation reveals the concept of green innovation (Hancıoğlu, 2018b). Green innovation/eco-innovation is defined as new or significantly improved products and services leading to environmental developments, marketing methods, processes, creation and implementation of the regulations of the organization and institutional arrangements (OECD, 2009).

Chen et al. (2006: 332) defines green innovation as hardware or software innovation in technology related to the green product or process. Green innovation is made up of technologies such as energy saving, waste recycling, green product designs or corporate green management.

It is a necessity to implement green innovation practices in order to prevent global climate change, to give a direction to the unsustainable development of the world, to protect biological diversity for future generations, to regulate resource management models and financial approaches, to make production and consumption sensitive to more rational, efficient and environmental protection (İncekara & Hobikoğlu, 2014: 2).

ENVIRONMENTAL MANAGEMENT (GREEN MANAGEMENT)

Increasing environmental problems and approaching an irreversible point of damage to the environment have exposed the fact that enterprises and stakeholders are more sensitive to the environment. The traditional approach, which claims that enterprises' primary objective is to achieve profit and market share, has not accepted and shifted this paradigm for many years with the idea that the environment-sensitive paradigm will cause cost increases. The concept of green management has emerged as a new way of thinking with increasing public pressure and awareness of being green in its enterprises. Today, green management and sustainability related activities of businesses are beyond voluntary social responsibility and are the most important factor in the process of creating strategies (Hancıoğlu, 2018a). Green management has emerged as an important administrative issue for enterprises to gain profit and market share and to assume responsibility for environmental protection on the one hand (Hock & Erasmus, 2000).

Green management is not a management style; to restructure business processes. Restructuring should involve many business processes (Arikboğa, 2012: 31). According to Tinoco and Robles (2006: 1082 as cited in Jabbour et al., 2010: 1051), green management, organizational structure, planning activities, responsibilities, practices, procedures, processes, along with the development, implementation, implementation and critical analysis needed to make the necessary resources and environmental protection includes. Green management is the practice of an enterprise to minimize or eliminate the negative effects of environmental activities. Green management is more than just corporate concern about the environment, Green management is a way of thinking (Taylor, 1992: 670).

Green management practices can be summarized in seven groups (Düren, 2000: 205-206):

- Promoting the use of renewable resources
- Investing in environmentally friendly clean Technologies
- Reduction of environmentally hazardous waste
- Reduction of recycling processes and methods
- Green control
- Green marketing
- Creating green businesses and workplaces

Green management is important for a number of reasons, including expectations of individuals to use resources intelligently and responsibly; environmental protection; minimize the air, water, energy and other materials contained in the final products consumed by individuals; recycle and reuse these products to the extent possible; respecting the tranquility, peace and beauty of nature; eliminating toxins

that damage individuals and society; reduce greenhouse gas emissions and avoid activities with irreversible effects to the climate (Marcus & Fremeth, 2009: 17-18).

The reasons for businesses to turn to processes in line with the green management concept (Düren, 2000: 192-193):

- Increased public pressure
- New laws and regulations, increasing the environmental and social responsibilities of businesses
- Preventing activities that adversely affect the environment, leading to cost reduction
- Increasing demand for pollution prevention methods, technologies and products produced by new sectors that implement these methods
- List of the works carried out in this area leading to the increase in the reputation of the businesses

The inclusion of green/environmental concerns in organizations is usually carried out through technical changes in product and service projects, production and operation processes. However, discussions indicate that the interest in the technical aspects of green management has increased, emphasizing that green management should be complemented by green management practices that support human elements and behavioral aspects in management (Perron et al., 2006).

Since Green management is a continuous process of evaluation and improvement to create environmental and managerial perfection, it is observed that it follows each other in the stages of the “Green management cycle” (Figure 3). For most businesses, the best way to start is through the control phase. Although many businesses assume responsibility for environmental auditing, green management requires the evaluation of the entire system, not how well businesses comply with the legislation (Taylor, 1992: 678-679).

Green Management covers all efforts to minimize negative environmental impacts throughout the product lifecycle (Klassen and McLaughlin, 1996: 1199). Green management strives to create eco-friendly products through ecological designs, packaging and material handling. Low energy promotes the use

Figure 3. Green management cycle

Source: (Taylor, 1992: 679)



of less resources and environmentally efficient and convenient production technologies (Shrivastava, 1995: 130).

Changing understanding of competition leads companies to new searches. One of the most important concepts guiding these searches is sustainability. The survival of individuals depends on natural resources. The importance of sustainability is understood at the point of maintaining the balance between man and nature. Sustainability ensures continuity of productivity and diversity, together with the ability to be continuous (Hancıoğlu & Türkoğlu, 2017).

One of the most important concepts in identifying a business as a green enterprise is its efforts for sustainability. Sustainability is the realization of economic activities by giving importance to the use of resources in the future generations as well as efficient use of natural resources (Uçma Uysal & Yazıcı, 2016: 21). Today, it can be argued that green approach and sustainability affect each other, integrate, and increase the competitiveness of businesses. The meaning underlying the concept of sustainability can be expressed in situations such as continuity, sustainability. The concept of sustainability can express the dependence on an external factor depending on the expectations defined above. However, it can be said that the concept of sustainability is more meaningful when it is used in relation to similar issues such as consumption of natural resources, environment, wastes that are abandoned to nature, economy, air pollution and development (Akgül, 2010:134-135).

Sustainability reports help businesses measure economic, environmental, social and management performance. Sustainability reports contribute to the green economy and sustainable development. These reports allow the government, the business environment and the wider environment to understand the multifaceted performance of the enterprise.

EVALUATION OF WHITE GOODS SECTOR BUSINESSES IN TURKEY IN TERMS OF DIGITAL TRANSFORMATION (INDUSTRY 4.0) AND ENVIRONMENTALLY SENSITIVE APPROACHES

The concepts of environmentally sensitive approach with Industry 4.0 are in interaction. The environmental impact of the new production style will be lower in nature as the simplest form will allow more production with less resources. It is planned that the level of emissions and wastes will decrease as production will focus on quality and productivity. As a matter of fact, it will be possible to evaluate all kinds of risks in the virtual environment before the establishment of the production facility and without realization of the investments, since it will be possible to create a production process prototype and process controls in the virtual environment. The use of renewable energy will increase, and the use of classical energy sources will decrease. This will have a positive environmental impact by providing significant resource savings (EFFRA, 2013).

When the Turkish machinery sector strategy document and action plan (2017-2020) is examined, the establishment of research laboratories in order to raise awareness of intelligent production systems and develop human resources on this subject, and the elimination of existing deficiencies in the production of autonomous robots, one of the most important components of intelligent production systems., the development of flexible and intelligent manufacturing technologies that enable production systems to adapt quickly and effectively to market changes, and the development of automation systems in which worker-machine-robot interaction in factories is provided in accordance with standards are promising in terms of adaptation to Industry 4.0 (Türkiye Makine Sektörü Strateji Belgesi ve Eylem Planı, 2017-2020).

Turkish businesses are still in pre-investment and planning periods in Industry 4.0 compared to developed country companies. In addition, it has been noticed that there is a disconnection and non-communication between technology user and technology supplier companies in the Turkish internal market and that as a result of this disconnection, technology supplier companies are suffering from a shortage of demands. This is an element that increases Turkey's imports and the current account deficit as a result. In this survey, as in other studies, the high dependency on exports to imports, the low share of value added products in total production, limited labour force competencies remain a threat to Turkey's international competitive position (TÜSIAD-BCG, 2017: 47).

According to a study that measures the current knowledge and interest in Industry 4.0, awareness has emerged in the companies surveyed in Turkey, although not yet transition to Industry 4.0. it is observed that the infrastructure is being developed in accordance with digital transformation (Yüksel & Şener, 2017: 29).

Turkish businesses' strategic cooperation with foreign companies in the past, mainly to close their technology The strategic cooperation of Turkish businesses in the past to close the technology deficits mainly with foreign firms has increased and their scope has changed. Their strategic alliances are now increasingly driven to increase market share and sales volume. Turkish businesses attach importance to increasing their sales one of the issues is innovation and new product development. Unlike developments in the world of white goods sector, the number of patent applications is one of the sectors in Turkey (Özkul, 2011).

White Goods Industry, included in the scope of electricity appliances as well as durable goods, possesses a wide range of products due to the varying technologies it incorporates. Refrigerator, deep freezer, washing machine, dryer, dishwasher and oven are regarded as the six main products whereas durable goods such as cookers, vacuum cleaners, toasters, food processors, fruit presses, blenders, and mixers are included in the small home appliances category. Products such as air-conditioners, water heaters and water purifiers are also counted among the electricity home appliances. With its production capacity of 25 million units and actual production of 21 million units, the white goods industry has become a significant focus of production in the last 10 years and Turkey has become the LEADING country in Europe in the white goods sector. The industry, having achieved 14 million units in exports, is exporting 70% of its manufacture to more than 100 countries in such markets as European countries, neighboring countries and Africa. The Turkish market used to sell 2 million units in domestic sales in the 1990s; however, in the last 5 years, domestic sales have gone up to 5 million units and achieved another record by rising up to 6.5 million units by the end of 2011. The white goods companies operating in Turkey are making significant investments in the R&D (Research and Development) area and they are able to achieve success in the world as a result of the competitive power they gain through these investments. In the last 10 years, improvements in the energy efficiency of the products have reached up to 65%. The white goods sector also strikes out with the number of its patent applications. Having assumed a leading position in many white goods categories, Turkey is making a significant impact in the world with the washing machine that consumes the least water, the dishwasher that washes fastest and consumes the least water, the refrigerator and tumble dryer that consumes the least energy, the most silent washing machine, dishwasher and oven (TÜRKBEŞD).

White Good Manufacturers' Association of Turkey (TÜRKBEŞD) has six members: Arçelik, B/S/H, Candy Group, Demirdöküm, Silverline and Vestel. The brands of the members are Altus, Arçelik, Beko, Bosch, Candy, Esty, Gaggenau, Grundig, Finlux, Flavel, Profilo, Regal, Schöck, Seg, Siemens, Silverline, Süssler, Demirdöküm, Vestel, Vestfrost. The companies to be discussed in the study were selected in this

context. If businesses have corporate websites, sustainability reports have been examined and conclusions about digital conversion and environmental management approaches have been made and the situation in the sector has been tried to be explained. Secondary data sources are benefited. In later studies, the question list (Appendix 1) compiled by Yeşilaydın (2018a) to enterprises in the White Goods Sector in Turkey can be made more comprehensive.

Arçelik today offers products and services in more than 145 countries with 18 production facilities in 7 countries, including Turkey, Romania, Russia, China, South Africa, Thailand and Pakistan, 30.000 employees worldwide, sales and marketing offices in 32 countries and 11 brands (Arçelik, Beko, Grundig, Blomberg, Elektrabrigenz, Arctic, Leisure, Flavel, Defy, Altus and Dawlanance). As in previous years, Arçelik continues to lead Turkey in the field of patent, the World Intellectual Property Organization (WIPO) published the most international patent applications in the list of companies 74. In line with many leading international companies in the sector has taken place in front of. According to Arçelik's vision of "respect for the world, respected in the world", the efforts to reduce the environmental impact of the products such as energy, water consumption, sound power levels have gained a significant share among R & D activities. Arçelik continued to offer the most and the firsts to its users in Turkey and in the world markets as a result of R & D activities. Within the scope of R & D activities carried out on the concepts of digitalization and Internet of objects (IoT), we continued to work on establishing necessary ecosystems to increase our expertise in communication protocols, cloud security, data analytics, robotics, artificial intelligence and related fields and to increase the value added created exponentially. Aware of the responsibility of sustainable life, Arçelik aims to protect the environment and Natural Resources during the product life cycle with its environment-friendly activities and products. Arçelik integrates its new vision into its main business activities with its "respect to the world, respected in the world" and "sustainability" approach. The main business objectives set in line with the new vision represent three aspects of sustainability in economic, environmental and social dimensions. Within the framework of a sustainable approach, Arçelik aims to be a part of the solution and continues its efforts to protect climate change and limited natural resources. In Arçelik, which aims to continuously reduce the environmental impact of production processes in every phase, the production processes have high efficiency, consuming less natural resources. In order to transfer a clean and healthy environment to future generations, Arçelik regularly monitors its environmental performance by determining its environmental objectives and targets to control the environmental impacts and reduce the use of resources. As Arçelik and its employees, they comply with national and international legal regulations and regulations and produce environmentally sensitive products within an environment management system that is based on continuous development. Highlights of environmental policy (Arçelik; Arçelik, 2018):

- Transmitting a clean and healthy environment to future generations
- Efficient use of energy and natural resources
- Reducing negative environmental impacts from design to life cycle
- Prevention of pollution at the source
- Increasing the environmental awareness of our employees and society

Vestel's understanding of sustainable and inclusive growth, which is part of the vision of intelligent life, includes reducing our environmental footprint. By minimizing environmental impacts, it adopts responsible production and consumption that uses resources efficiently. It uses the technology in the most efficient way and adds power to human and environment with its smart products. It also considers

the product, service and supply chain by evaluating its effects beyond its operations throughout the value chain. Vestel group of companies plays a leading role in energy efficiency projects. Vestel Electronic aims to provide world class manufacturing and energy efficiency plays an important role in achieving this goal. Within the scope of reducing environmental impacts, they aim to reduce energy and natural resource consumption of their products and consumers. They provide innovative and efficient products to follow global trends such as digitalization, smart home appliances, new generation technologies and nano-technology (Zorlu, 2017).

As with Turkey's technological transformation, to lead its digital transformation and to adapt to Industry 4.0 are among Vestel's strategic priorities. For more than three years, teams of specially trained engineers have been implementing the process of adapting to Industry 4.0. At Vestel Electronics, these teams include horizontal / vertical value chain integration, artificial intelligence software, IoT (Internet of Things) technologies, dark factory applications, automation (robots and collaborative robots - cobot), three-dimensional printing, automatic oriented material handling equipment (AGV and self-driving, non-steered vehicles (SDV) applications. In Vestel White Goods, as of 2017, these teams can perform Process Analysis, mechanical designs, parts manufacturing, programmable control device (PLC) and robot software and simulation analysis from A to Z. Vestel continues its investments in Turkey in order to reach the "smart factory" where all processes will be managed by artificial intelligence, which is fully compatible with Industry 4.0. In this context, Vestel city aims to be the first facility to realize industrial 4.0 transformation in Turkey (Zorlu, 2017).

Demirdöküm, considering the corporate website, can make an inference that they assume Environmental Responsibility and follow developments in the world about Industry 4.0. Environmental responsibilities "Vailant group, "we are working to create a better climate at home and around us." with its vision, it takes ecological responsibility and brings a comprehensive approach to environmental protection. This responsibility does not only take into account all legal provisions, but also includes all other compliance obligations Vailant Group undertakes to comply voluntarily." The details about how the application was transferred were not given (Demirdöküm).

CONCLUSION

It is clear that the world is increasingly affected by environmental negativities and that global warming has reached irreversible proportions. It is possible to prevent this situation by raising awareness of governments, businesses and consumers. Laws and obligations to protect the environment, green sustainability and green product choice are some of the proofs that this consciousness is formed. Some businesses continue to completely ignore the environment-sensitive processes that lead to increased cost. Conscious consumers who think that they have the right to make use of nature in their future generations prefer green product to exclude insensitive businesses from competition.

In the context of social responsibility, evaluating the ecological environment as an important factor in decision-making processes, aiming at eliminating or minimizing the environmental damage in its activities; the understanding adopted by enterprises trying to fully fulfill their responsibilities towards society can be considered as green management (Nemli, 2001: 212-213).

Green is green in us, green is new fashion, green is seen as new black, consumers want it, businesses demand it, they are also demanded by green administrations. The future of businesses is built on green and social responsibility (Tran, 2009: 22).

The inclusion of green/environmental concerns in organizations is usually carried out through technical changes in product and service projects, production and operation processes. However, discussions indicate that the interest in the technical aspects of green management has increased, emphasizing that green management should be complemented by green management practices that support human elements and behavioral aspects in management (Perron et al., 2006). According to Siegel (2009), “green management is important”, businesses should adopt green management practices. The activities included in the green management practices complement the practices of the businesses and their strategies at the institutional level and ultimately increase their profitability and return to shareholders.

Businesses do not have the obligation to implement green management practices due to normative necessity, because green management conflicts with the economic interests that are proposed to satisfy the stakeholders that are important for businesses and to continue their activities as profitable businesses (Marcus ve Fremeth, 2009: 19). The green approach suggests that it can increase the cost (Palmer et al., 1995). Since these and similar considerations still exist in the literature, there are still doubts about whether more green management offers a competitive advantage for some enterprises. The traditional view suggests that green management imposes cost, slows productivity growth and prevents competitiveness. The revised new point of view is that green management is a driving force for corporate entrepreneurship and innovation.

Bağcı's study shows that Germany, England, South Korea, Japan, China and the USA's policies for preparation for the new production style are handled together with the environmental sensitivity perspective (Bağcı, 2018). It is suggested that the countries will bring green technology, sustainable production and green innovation along with industrial 4.0 policies. Studies are being carried out to create an integrated system that provides energy saving, environmentally friendly, low carbon use, less waste for sustainable production and provides integrity for smart generation technologies that increase efficiency in resource utilization.

When we look at Turkey's current export composition, production of goods with high added value, high technology and Competitive Power is very low. It is predicted that the competitive environment in the world will accelerate. The advantage of this cost advantage in labor-intensive manufacturing countries such as Turkey, will be lost to countries with better technological level. The transition to intelligent systems in production will primarily increase productivity, quality and flexibility in production; this will enable Turkey to become more competitive position in the world.

First of all, Turkey needs to complete the automation and Information Systems process, which is the basis of Industry 4.0. As a matter of fact, the share of medium and high-level technological production in value added is very low. However, the share of trade is very high compared to the share of the industry. This causes a disadvantage in compliance with Turkey's industrial sector process. For this reason, high-tech production should be given priority and intensity (Bağcı, 2018).

According to TÜBİTAK (2016), when the opportunity to transform digital industry is missed, the advantages of Turkey's existing logistics and low labor costs will no longer be valid. While half of the global trade volume is projected to use Intelligent Communication of objects in 2030, it is obvious that countries that cannot capture this intelligent production system will not be able to get a share from the global trade pie. When the white goods sector have been assessed, Turkey's leading white goods brand of Arçelik, Vestel and Demirdöküm also shows that the transfer of environmental awareness and practices. Vestel's work is undeniable in order to integrate Industry 4.0 into production. Arçelik continues to prepare infrastructure for this production structure.

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KEY TERMS AND DEFINITIONS

Environmentally Conscious Business: It is an understanding that aims to minimize the harm to the environment, especially in production, management and decision-making processes while maintaining the activities of the enterprises acting with an environmentalist approach.

Green Accounting: The accounting of financial works that are carried out on issues such as environmental protection, environmental pollution prevention studies, environmental investments in cases where businesses are responsible for the environment.

Green Financing: Financing products and services with more appropriate opportunities for use of products that are nature friendly or less harmful to nature. Considering environmental risks in investment decisions.

Green Human Resources Management: It is the use of human resources policies in order to increase the effective and efficient use of internal resources.

Green Innovation: The creation of new and competitive products, services, processes, procedures and systems designed to use natural resources at a minimum level and to provide better quality of life on behalf of all.

Green Management: It is the organization process in which environmental targets and strategies are fully integrated into the operation in order to gain competitive advantage through waste disposal, sustainability, continuous learning and social responsibility.

Green Marketing: It is all kinds of marketing activity that aims to meet the consumer demands and requirements and pay attention to the minimum damage to the environment.

Green Supply Chain Management: It is the system where recycling is possible where waste is reduced and reused.

Industry 4.0: Digitalization, internet, information and communication, automation sector developments as a result of the interaction with each other to move forward and reflect these developments in production processes.

Internet of Things: Objects with a digital network and internet have a virtual identity and communicate with the environment in a physical and social context.

Smart Factory: It is a production facility that uses software, modeling, Internet of objects, large data and other automation in order to optimize the manufacturing process.

Appendix

Table 2.

GREEN THINKING CHECKLIST	YES	NO
Is the environmental issues supported by the organization related to the business objectives?	☒	☐
Does the corporate culture support green thinking and green movements?	☒	☐
Is there some work being carried out to explain and adopt the green thinking structure to the employees?	☒	☐
Do sustainable strategies demonstrate a holistic approach?	☒	☐
Are green education programmes being implemented?	☒	☐
Are there encouraging practices to encourage sustainable behavior?	☒	☐
Is virtual communication available?	☒	☐
Are employees able to store information electronically instead of being dependent on paper?	☒	☐
Are there any green building systems to minimize the use of energy and water?	☒	☐
Is there a re-use program for furniture, electronic tools, equipment, telephones and other products?	☒	☐
Are there green policies in the process of purchasing (consumables, durable goods, etc.)?	☒	☐
Are employees encouraged to use alternative transport methods?	☒	☐
Does the workplace offer a productive and healthy working environment?	☒	☐
Is management willing to allocate resources to green initiative?	☒	☐
Green strategies are now being used?	☒	☐
Are the suppliers aware of the green thinking structure and policies of the enterprise?	☒	☐
Does the enterprise have a programme for reducing the use of toxic substances?	☒	☐
Is water used in the enterprise efficient?	☒	☐
Are recyclable materials used in the enterprise?	☒	☐
Is the selection of the establishment location of the enterprise have been taken into consideration any issues such as alternative transportation, water raiding method, Urban Development and reducing any negative impact on the environment?	☒	☐
Are workers ' meals made from fresh and organic products?	☒	☐
Does the enterprise include environmental social responsibility projects?	☒	☐
Cleaning products that do not emit hazardous chemicals are used in the enterprise?	☒	☐
Are employees trained in the use of cleaning products that do not contain chemicals?	☒	☐
Is it training for workers to recycle, reduce waste and Toxic Substances and control cancer-causing substances?	☒	☐
Are plantation systems used to reduce water consumption and pesticide use in landscaping of enterprises?	☒	☐
Are suppliers polluting the environment?	☐	☒
Are the suppliers working in compliance with all applicable laws?	☒	☐
Are there dangerous ingredients in the products?	☐	☒
Does the enterprise have a comprehensive sustainability vision that guides its activities?	☒	☐
Do we have the potential to perform some environmental improvements with new technology?	☒	☐

Chapter 25

Copyright, Patent, and Trademark: Are Females More Likely to Invest in These Strategic Assets?

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ABSTRACT

Technological improvements have introduced many changes that attract not only the entire society but also companies. Companies that use technological opportunities take advantage of competition. In a rapidly changing world companies should be innovative and flexible to adapt to new technological developments. In this study, the authors investigate the relationship between firms' innovative activities in terms of patents, trademarks, and copyrights and female-dominated firms using some control variables at firm level.

INTRODUCTION

Firms have to struggle with some challenges due to globalization and technological developments. Information and communication technologies have dramatically changed the way firms do business (Bounfour & Miyagawa, 2015). A new phenomenon has emerged called the knowledge-based economy. Today firms do not only exist because of their physical assets but also with their non-physical assets. Thus, the knowledge-based economy is not only created by tangible assets but also by intangible assets

DOI: 10.4018/978-1-7998-1125-1.ch025

(Volkov & Garagina, 2007). Intangible assets are very important for a firm to gain competition advantages. Investment in intangible assets can show a firm's power.

Many researchers agree that chief executive officers (CEOs) have a significant effect on the performance of business (Waldman, Javidan & Varella, 2004). Some studies argued that women are tend to invest more in intangible assets. Women power is present in all fields of business. Therefore, it is important to reveal whether women are innovative. Innovative property is familiar as scientific R&D (including patents, licenses and know-how), as well as being broader than R&D (including innovative and artistic content in commercial copyrights, licenses and designs) (Barnes & McClure, 2009). Female-led businesses are considered a vehicle for the world economy as well as social wellbeing (Filculescu, 2016). Female led businesses are important in the world economy. Although female-owned businesses are the focus of many studies, there are few studies showing how innovative women are.

Top managers have a substantial role on firm performance. What choice a top manager makes will definitely affect a firm's success. What determines the choice is linked to the characteristics of the top managers. Hambrick and Mason (1984) developed a theory that a manager's strategic decisions will affect a firm performance called upper echelons theory. Upper echelons theory, which was first mentioned by Child (1972), suggests that top management's decisions and choices impact a firm's performance (Waldman, Javidan & Varella, 2004). According to Hambrick and Mason (1984), organizations are reflections of the values and cognitive biases of top managers.

Organizational competition requires some skills, knowledge and capabilities of top managers (Díaz-Fernández, González-Rodríguez & Simonetti, 2015). There are many studies showing that top managers' characteristics have an important role in a firm's performance.

This study focuses on female owners and female top managers to find out whether they are likely to invest in innovative activities in terms of trademarks, patents and copyrights. The importance of this study is that sample also covers non-publicly held firms. There are several studies regarding the effect of top manager gender on firm performance (e.g. Ararat, Aksu & Cetin, 2015; Isidro & Sobral, 2015; Adams & Ferreira, 2009; Carter, D'Souza, Simkins & Simpson, 2010), R&D activities, or innovative activities. On the other hand, the effect of female owners on such activities is unknown. Therefore, research regarding this kind of relationship needs to be deepened, particularly for Turkish firms.

The sub-headings are as follows. The second subheading presents a literature review and hypotheses regarding females and intangible assets; the third subheading introduces research design, sample selection procedure, estimation model; and the fourth subheading produces research results such as descriptive statistics, correlation matrix, and estimation results. The fifth and sixth sections mention solutions and recommendations and future research directions. The final section presents the research conclusion.

BACKGROUND

Intangible assets such as employees' skills, information technology (IT) systems and organizational culture are worth more than tangible assets and they are also difficult for competitors to imitate (Kaplan & Norton, 2004). Intangible assets can be classified as assets or skills which are things one owns including patents, trademarks, copyright and registered designs beside trade secrets and databases (Hall; 1992). Intangibles are items that do not have physical substance or represent a right granted by the government or by another company (Mooney, 2008). Some intangibles may never be categorized in financial state-

ments because of their elusive nature. Yet, their impact can never be questioned (Bontis, 1998). There are many definitions regarding intangible assets.

Intangibles include “scientific or technical knowledge, design and implementation of new processes or systems, licenses, intellectual property, market knowledge and trademarks (including brand names and publishing titles”. In broad terms intangibles include “computer software, patents, copyrights, motion picture films, customer lists, mortgage servicing rights, fishing licenses, import quotas, franchises, customer or supplier relationships, customer loyalty, market share and marketing rights” (IAS 38).

“Intangible resources range from the intellectual property rights of patents, trademarks, copyright and registered design; through contracts; trade secrets; public knowledge such as scientific works; to the people dependent, or subjective resources of know-how; networks; organizational culture, and the reputation of product and company” (Hall; 1992). Intangible assets incorporate a broad variety of heterogeneous assets that contain innovative products, patents, software, human capital, consumer relationships, and distribution systems. Other than that, investment growth in intangibles is more than the investment in tangibles because of the changes in global competition and in production specializations and the expansion of the digital economy (Andersson & Saiz, 2018). Jiang, Zimmerman and Guo (2012) define intangible assets in female-owned businesses as social capital (network relationships), relational capital (the reputation of products and companies) and human capital (generic knowledge or subjective resources of know-how).

There are many classifications for intangible assets. Many studies attempted to categorize the intangible assets. The most remarkable ones are listed as follows. Kaplan and Norton (2004) suggest three categories of intangible assets that are essential for implementing any strategy: Human capital, information capital and organization capital. As human capital includes employees’ skills and knowledge, information capital involves a company’s database, information systems and technology infrastructure, and organization culture involves a company’s culture and its leadership. Corrado, Hulten and Sichel (2004; 2005; 2006) classified intangible assets into three categories as computerized information, innovative property and economic competencies. As computerized information reflects computer software and computerized databases, innovative property includes scientific R&D and non-scientific inventive activities such as new products and new production processes leading to a patent or license, mineral exploration, copyright and licenses. Economic competencies involve knowledge embedded in firm-specific human and structural resources such as advertising expenditures, training costs, payments for job-related education, costs of organizational change, and development.

Financial Accounting Standards Board (FASB) provides five categories of intangible assets. They are marketing-related intangible assets, customer-related intangible assets, artistic-related intangible assets, contract-based intangible assets and technology-based intangible assets. While assets such as trademarks or trade names, certification marks, trade dress, and noncompetition agreements represent marketing-related intangible assets, assets such as customer lists, customer contracts and customer relationships are customer-related intangible assets. Examples of artistic-related intangible assets include plays, operas, ballets, books, magazines, newspapers, compositions, song lyrics, pictures, and photographs. Intangibles such as licenses, royalty, advertising, supply contracts, construction permits, franchise agreements, and employment contracts represent contract-based intangible assets. Lastly technology-based intangible assets include assets such as patents, computer software, internet domain names, databases, trade secrets like secret formulas, and processes (Mard, Hitchner & Hyden, 2007).

Intangible assets, which were referred to as knowledge assets or intellectual capital, do not have a physical or financial embodiment (OECD, 2011). However, some intangible assets may be contained

in physical substances like a compact disc (in case of computer software), or legal documentation (in the case of license or patent). In this situation a firm should use judgment to assess whether an asset incorporating both intangible and intangible elements is tangible or intangible (IAS 38).

Intangible investments are growing faster than tangible investments. Evidence from a number of countries shows that investment in intangible assets is growing more dynamically than that in tangible assets (OECD, 2011). According to Corrado, Hulten and Sichel's (2009) research on investment of businesses in intangibles by decade, this increased in the US from 1950 to 2003. For example, computer software investments increased from 85.3 billion dollars in 1990 to 172.5 billion dollars in 2003; scientific R&D and non-scientific R&D increased from 157.7 to 230.5 and from 145.2 billion dollars to 237.2 billion dollars, respectively. Intangible asset investment has been rising in Europe since 1995 (Andersson & Saiz, 2018). According to European Economic Forecast Institutional Paper (2016) besides the increase of intangible investments, the US intangible investments are greater than EU intangible investments. In the UK intangible investment has grown steadily between 1997 and 2015 and only fell slightly during the economic recession. Yet, tangible investments of £ 141.7 billion are greater than intangible assets by £ 134.2 billion (Office for National Statistics, 2015). However, in Australia intangible investments are very low when compared to the US and Japan, by nearly half. Yet Australia has a higher proportion compared with Spain and Italy (Barnes & McClure, 2009). Also, in Turkey, Findik and Ocak (2015) investigated the changes in intangible investments of BIST firms by year following the classification of Corrado, Hulten and Sichel (2009) and they divided intangible assets into three sub-components. These are economic competence which covers trademarks, special costs, agreements, rights, customer lists, and dealer lists; computerized information which covers software, information systems, domains, and consumer databases; and innovative property which covers capitalized research and development, copyrights, designs, licenses, and patents. They stated that intangible investments increased among Borsa İstanbul firms over the years (2005-2013). Firms in Turkey (BIST ALL firms) invest more in innovative properties such as patent, license, and design than the other subcomponents of intangible assets.

The present study focuses on investments in patent, trademark and copyrights. Patent is an exclusive right given by a patent office that allows the company to manufacture or sell an invention for a defined period (Weygandt, Kimmel & Kieso, 2015). The patent owner is protected from the use of the patent by others (Mooney, 2008). Patents are significant to represent a firm's ability to transform an investment into a valuable knowledge (Quintana-García and Benavides-Velasco; 2016). Trademark is a word, phrase, symbol or other specific identity that is assigned to a particular enterprise or product (Weygandt, Kimmel & Kieso, 2015; Siegel & Shim, 2000).

Trademarks create immediate product identification (Weygandt, Kimmel & Kieso, 2015). A trademark is generally assumed not to have a limited term of existence or limited life (Siegel & Shim, 2000). Copyrights are exclusive rights granted by the government that allows the owner to publish, reproduce and sell literary, artistic and published work (Weygandt, Kimmel & Kieso, 2015; Siegel & Shim, 2000; Mooney, 2008). A copyright holder can print and reprint the work, can sell or distribute copies and can perform the work (Siegel & Shim, 2000). Patents, trademark and copyrights are capitalized only by abiding by some conditions. According to IFRS, an intangible asset shall be recognized if "it is probable that expected future economic benefits are attributable to the asset will flow to the firm and the cost of the asset can be measured reliably" (IAS 38).

Men have been dominating the business world for years. But increasing number of women have been entering the workplace in all developed countries. The rate of women participation in management has increased in most countries. However, China has the lowest percentage of female managers (at 16

percent) compared with Australia, Canada, the UK and the US having the highest percentage of female managers (at over 30 percent) (Davidson and Burke; 2011). According to 5th Annual Report regarding the women on board in Turkey, which is prepared by Sabancı University, Corporate Governance Forum of Turkey and the authors of the report are Ararat et al (2017), there are 404 firms listed in Borsa İstanbul and 236 firms have a female director in their boards. The percentage of firms with female directors is 58.7%. Also, there are 98 female independent directors. Latest version of same report (6th Annual Report regarding the women on board in Turkey) (2018) documented that 244 firms have a female director and the percentage of firms with female directors is 60.6%. Also, there are 131 independent female directors in Borsa İstanbul. A large number of listed firms still have male dominated boards.

Many studies in psychology and sociology support the idea that women and men react to risk differently (Eckel & Rossman, 2008). Besides it is generally believed that female senior executives are more risk averse than male ones (Han, Cui, Chen & Fu, 2019; Faccio, Marchica, & Mura, 2016; Yao, 2015). Some of the studies state that women owners may not be willing to invest in intangibles as they are risk averse (Parrotta & Smith, 2013; Sila, Gonzalez & Hagendorff, 2014) because intangible investments provide long term return. Parrotta and Smith (2013) investigated Danish companies' risk attitudes measured as investment, profit, return to equity and sales by using a merged employer-employee panel sample. They presented empirical evidence that female CEO and firm's risk attitudes are negatively associated. Sila, Gonzalez and Hagendorff (2014) investigated whether there is a relationship between board gender diversity and corporate equity risk using more than 2,000 firms. The results show that female directors tend to have lower equity risk. Another perspective suggests that women are more innovative compared with men and they may tend to invest in intangibles to take risky positions. Ting, Azizan and Kweh (2015) state that women are greater risk takers than men. They found that female CEOs are greater risk takers than their male counterparts in Malaysia. Faccio, Marchica and Mura (2016) found that firms run by female CEOs have lower leverage, less volatile earnings, and a higher chance of survival than otherwise similar firms run by male CEOs.

Global Entrepreneurship Monitor (GEM) Special Report (2015) worldwide suggests that women entrepreneurs have equal or higher innovation levels compared to men entrepreneurs. The report states that Chile and India have the highest levels of innovation by women (Kelley, Greene, Herrington, Ali and Kew 2015). According to GEM 2016/2017 Women's Entrepreneurship Report, female total entrepreneur activity rates have increased by 10% and the gender gap in entrepreneurial activity has narrowed by 5% since 2014. But the gender gap in Turkey is the greatest. There are 3 female entrepreneurs for every 10 male entrepreneurs. However, women entrepreneurs have high innovation levels (Greene, Herrington, Ali & Kew 2015). Also, the percentage of female inventors is very low (7%) around the world. However, female patenting is slowly increasing in recent years, but it is still low at around 10% (Intellectual Property Office, 2016).

The present study discusses women from two perspectives. One of them is female owners and the other one is female managers. There are many studies regarding the gender of top management. Many studies have analyzed the relationship between diversity in knowledge base and the performance of firms. However, studies investigating the effect of employee diversity on innovation are rare (Østergaard, Timmermans & Kristinsson; 2011). Few studies link gender to innovation (Belghiti-Mahut, Lafont & Yousfi, 2016).

Swartz and Firer (2011) suggest that boards of directors with higher percentage of women will affect the decisions about intellectual capital performance in the future and that boards of directors with more women are more sensitive to the public than those with men. But Strohmeier, Tonoyan and Jen-

nings (2017) suggest that firms led by women tend to exhibit a lower breadth and depth of innovation than those led by men. Chiucchi, Giuliani and Poli (2018) found that gender diversity in the ownership structure of firms was negatively and significantly related with intellectual capital performance of firms using small sized Italian firms.

Han, Cui, Chen and Fu (2019) state that female CEOs show incremental and radical innovation behaviors when compared with male CEOs. Dohse, Goel and Nelson (2019) and Na and Shin (2019) state that female owners are more likely to introduce innovations. Studies investigating the relationship between intangible assets / innovation and women who are in top management or are members of board of directors (Chen, Leung & Evans, 2018; Findik & Ocak, 2019; Liao, Zhang & Wang, 2019; Miller & Carmina Triana, 2009; Terjesen, Couto & Francisco, 2015; Østergaard, Timmermans & Kristinsson, 2011; Ritter-Hayashi, Vermeulen & Knoben, 2016) are specified below.

Miller and Carmen Triana (2009) found that there is positive relationship between board gender diversity and innovation. Their results also showed that gender diversity is positively related to innovation in the form of R&D expenditures. Miller and Carmina Triana (2009) investigated Fortune 500 firms. They found that there is a positive relationship between board gender diversity and innovation. Østergaard, Timmermans and Kristinsson (2011) found that firms with more balanced gender composition tend to be more innovative than firms with high concentration of one gender.

Terjesen, Couto and Francisco (2015) state that female directors show better financial performance and enhance the board's effectiveness. They found that firms where there are more female directors have higher firm market and accounting measures. Their research also showed that female CEOs promote corporate incremental innovation behaviors and radical innovation behaviors.

Ritter-Hayashi, Vermeulen & Knoben (2016) state that the level of women's economic opportunity in a country moderates the effect of gender diversity on a firm's tendency toward innovation. The researchers examined the proposed moderating effect in a cross-country study. They used 15,157 firms retrieved from the World Bank Enterprise Survey in 15 developing countries. They found direct and positive correlation between gender diversity and likelihood of firms to innovate. They also found that firms with female top managers have a positive effect on innovation.

Chen, Leung and Evans (2018) found that board representation by women has greater innovative success and it enhances firm performance in innovation-intensive industries. They also state that female directors have a tendency to invest in innovation and obtain more patents. Additionally, they show that female board representation is positively associated with performance for innovative and creative firms.

Liao, Zhang and Wang (2019) investigated 688 firms listed in the manufacturing industry in China to find whether there is a relationship between female directors and firms' environmental innovations. The study revealed that the greater the proportion of female directors on the board of directors, the higher the level of a firm's environmental innovation.

However, Strohmeyer and Tonoyan (2005) analyzed 1,055 female-led businesses and 2,207 male-led businesses in Germany and they found that male-led businesses are more innovative than female-led ones in terms of product innovation, process innovation and innovation index indicators.

Jiang, Zimmerman and Guo (2012) examined whether social, human and reputational capital types of intangible assets contribute to growth of women-led businesses. Their findings show that women entrepreneurs' social capital in the form of networks, human capital in the form of education and experience and reputational capital in the form of credibility have significant roles. -

Wang and Jiang (2019) researched the relationship between brand equity and firm sustainable performance using Chinese listed firms and controlled for CEO gender in their study. They found a negative correlation between female CEO and brand equity in their research.

Serviere-Munoz and Saran (2012) found that Mexican women are more attuned to be innovative than their male counterparts in small businesses. Martini, Corvino and Rigolin (2012) investigated a sample of companies listed on Borsa Italiana. The sample covers the period between 2006 and 2010 containing 345 observations. Their results indicate that board diversity affects the propensity for innovation investment of Italian listed companies. Wang and Jiang (2019) discovered that brand equity enhances the firms' sustainable performance. The study was based on archival data from Chinese listed firms.

Findik and Ocak (2019) investigated 215 firms using Borsa İstanbul for the period from 2005 to 2013. They handled the cumulative intangible assets and innovative properties which cover patents, licenses, designs, copyrights, and capitalized R & D as dependent variables and they found that the tendency of firms with a certain level of board independency and gender diversity in the top management team to invest in intangibles and innovative property are high in Turkey. This study differs from the study by Findik and Ocak (2019) by using different database and firms. Their study handled intangible assets at cumulative level. But this study uses only three types of intangible assets: patent, trademark and copyright. Also, this study checks the effect of female owners on these kinds of intangible assets.

Taking into account the prior research mentioned above regarding the effect of females on intangible assets (Chen, Leung & Evans, 2018; Findik & Ocak, 2019; Liao, Zhang & Wang, 2019; Miller & Carmina Triana, 2009; Terjesen, Couto & Francisco, 2015; Østergaard, Timmermans & Kristinsson, 2011; Ritter-Hayashi, Vermeulen & Knoblen, 2016), two different hypotheses are structured. The hypotheses are as follows:

H₁: There is a positive and significant relationship between female owner and three types of intangible assets: patent, trademark and copyright.

H₂: There is a positive and significant relationship between female manager and three types of intangible assets: patent, trademark and copyright.

RESEARCH DESIGN

In this section, the following subheadings present sample selection procedures, final sample, estimation model, and the variable definitions used in the estimation model.

Sample Selection Procedure and Final Sample

We used the World Bank's 'Turkey Regional Enterprise Survey 2015' to test the hypotheses in this study (<http://www.Enterprisesurvey.org>). The World Bank interviewed firms in the private sector in Turkey between 2015-2016. Firms are from 26 different regions (please check the World Bank, Turkey Regional Enterprise Survey's manual to see which cities are classified in which region) and the sample covers three main sectors. These are manufacturing, retail-whole sales and non-retail services. Firms in the sample were categorized into four different sizes according to the number of employees. These are micro sized firms (number of employees < 5), small sized firms (number of employees, >=5 and <=19), medium sized firms (number of employees >=20 and <=99) and large sized firms (number

of employees ≥ 100). (We did not use this classification in the estimation model, we used the natural logarithm of total number of employees as firm size, see the Section Estimation Model and Variables). World Bank Regional Enterprise Survey's sample covers 6006 observations. Our final sample covers 5,455 observations at maximum level, because some respondents did not answer questions, or they answered the questions with 'I do not know'. On the other hand, we deleted some observations in the number of total employees (which is used as firm size in this study) in the Regional Enterprise Survey because these observations seem to be outliers.

Estimation Model and Dependent and Independent Variables

The following estimation models are structured to test the effect of females (both manager and owner) on copyrights, patents, and trademarks. Logistic regression was used to test the hypotheses. The reason for structuring the following models are to determine the probability of whether women invest in intangible assets, namely patent, trademark, and copyright, using the Survey sample.

$$\text{Prob}(\text{Patent}_{it}) = \beta_0 + \beta_1 \text{TopManagerGender}_{it} + \beta_2 \text{FemaleOwnerDummy}_{it} + \beta_3 \text{TopManagerExp}_{it} + \beta_4 \text{FirmAge}_{it} + \beta_5 \text{FirmSize}_{it} + \Sigma \text{Sector Dummies} + \Sigma \text{Region Dummies} + \varepsilon$$

$$\text{Prob}(\text{Patent}_{it}) = \beta_0 + \beta_1 \text{TopManagerGender}_{it} + \beta_2 \text{FemaleOwnerPercent}_{it} + \beta_3 \text{TopManagerExp}_{it} + \beta_4 \text{FirmAge}_{it} + \beta_5 \text{FirmSize}_{it} + \Sigma \text{Sector Dummies} + \Sigma \text{Region Dummies} + \varepsilon$$

$$\text{Prob}(\text{TradeMark}_{it}) = \beta_0 + \beta_1 \text{TopManagerGender}_{it} + \beta_2 \text{FemaleOwnerDummy}_{it} + \beta_3 \text{TopManagerExp}_{it} + \beta_4 \text{FirmAge}_{it} + \beta_5 \text{FirmSize}_{it} + \Sigma \text{Sector Dummies} + \Sigma \text{Region Dummies} + \varepsilon$$

$$\text{Prob}(\text{TradeMark}_{it}) = \beta_0 + \beta_1 \text{TopManagerGender}_{it} + \beta_2 \text{FemaleOwnerPercent}_{it} + \beta_3 \text{TopManagerExp}_{it} + \beta_4 \text{FirmAge}_{it} + \beta_5 \text{FirmSize}_{it} + \Sigma \text{Sector Dummies} + \Sigma \text{Region Dummies} + \varepsilon$$

$$\text{Prob}(\text{Copyright}_{it}) = \beta_0 + \beta_1 \text{TopManagerGender}_{it} + \beta_2 \text{FemaleOwnerDummy}_{it} + \beta_3 \text{TopManagerExp}_{it} + \beta_4 \text{FirmAge}_{it} + \beta_5 \text{FirmSize}_{it} + \Sigma \text{Sector Dummies} + \Sigma \text{Region Dummies} + \varepsilon$$

$$\text{Prob}(\text{Copyright}_{it}) = \beta_0 + \beta_1 \text{TopManagerGender}_{it} + \beta_2 \text{FemaleOwnerPercent}_{it} + \beta_3 \text{TopManagerExp}_{it} + \beta_4 \text{FirmAge}_{it} + \beta_5 \text{FirmSize}_{it} + \Sigma \text{Sector Dummies} + \Sigma \text{Region Dummies} + \varepsilon$$

Copyright, *patent* and *trademark* are handled as the variable of interest, *intangible investments*. *Copyright* is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. The Survey manual defined copyright as 'protects works of authorship such as writing, music and works of art that have been tangibly expressed'. *Patent* is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. The Survey manual defined patent as 'has a limited duration property relating to an invention and granted by Patent Institute'. *Trademark* is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. The Survey manual defined trademark as 'identifies and distinguishes the source of goods of one party from those of other parties'.

The variables of interest are the gender of top manager (*TopManagerGender*) and female ownership in this study. *TopManagerGender* is equal to 1 if the gender of top manager is female, 0 otherwise. In the World Bank's manual, top manager refers to the highest management individual and the manual stated

that this person may be the owner of firm. Female ownership is measured at two levels. In the first level, female ownership (*FemaleOwnerDummy*) is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. In second level, female ownership (*FemaleOwnerPercent*) is calculated as the total percentage of female owners in the firm ownership structure.

There are some control variables at top manager specific and firm specific level. The top manager specific control variable is their experience. Top manager experience (*TopManagerExp*) is calculated as the natural logarithm of total years of experience of the top manager in the sector. Besides, we checked some firm specific characteristics, namely, firm age, female ownership, and firm size. Firm age (*FirmAge*) is calculated as the natural logarithm of years since formation. Recent studies show that firm age has an impact on intangible investments (Chappell & Jaffe, 2016; López-García, Montero & Moral-Benito 2012; Nunes, Serrasqueiro & Matos 2017; Anderson & Eshima, 2013), Firm size (*FirmSize*) is calculated as the natural logarithm of the total number of employees. Intangible assets may vary across the firm size (Denicolai, Ramusino & Sotti 2014; Rezaie & Salehi, 2015; Steenkamp & Kashyap, 2010; Mezghanni, 2010; Minetti, Murro & Paiella, 2015; Lin, Lin, Song & Li 2011; Tsai, Lu & Yen, 2012) Lastly, we control for sectors and regions because of their unobservable effects. Sectors are controlled at main sector level (manufacturing, retail-whole sales and non-retail services). Twenty-six regions are also controlled in this paper. These regions are coded as TR10 (İstanbul), TR21 (Tekirdağ, Edirne, Kırklareli), TR22 (Balıkesir, Çanakkale), TR31 (İzmir), TR32 (Aydın, Denizli, Muğla), TR33 (Manisa, Afyon, Kütahya, Uşak), TR41 (Bursa, Eskişehir, Bilecik), TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova), TR51 (Ankara), TR52 (Konya, Karaman), TR61 (Antalya, Isparta, Burdur), TR62 (Adana, Mersin), TR71 (Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir), TR72 (Kayseri, Sivas, Yozgat), TR81 (Zonguldak, Karabük, Bartın), TR82 (Kastamonu, Çankırı, Sinop), TR83 (Samsun, Tokat, Çorum, Amasya), TR90 (Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane), TRA1 (Erzurum, Erzincan, Bayburt), TRA2 (Ağrı, Kars, Iğdır, Ardahan), TRB1 (Malatya, Elazığ, Bingöl, Tunceli), TRB2 (Van, Muş, Bitlis, Hakkari), TRC1 (Gaziantep, Adıyaman, Kilis), TRC2 (Şanlıurfa, Diyarbakır), and TRC3 (Mardin, Batman, Şırnak, Siirt).

RESULTS

This section covers descriptive statistics, univariate analysis, correlation matrix and main estimation results, the estimation regarding interaction variables and lastly, sectoral estimation results.

Descriptive Statistics and Univariate Analysis

Table 1 presents the descriptive statistics regarding the variables in this study. Of the observations, on average 8.52%, 9.35%, and 14.76% have a *copyright*, *patent* or *trademark*, respectively. Of the observations, 7% have female top manager (*TopManagerGender*) and 13.17% have a female owner (*FemaleOwnerDummy*). The average value for percentage of female ownership in the sample is 9.53% (*FemaleOwnerPercent*). The mean value of top managers' experience (*TopManagerExp*) in the sector is about 19 years and the minimum value of top managers' experience is 2 years (logarithmic mean value of top managers' experience is 2.82). The average value of firm age (*FirmAge-Raw*) is about 14 years (logarithmic average value of firm age -*FirmAge-Log*- is 2.33). While the minimum value of firm age is 1 year, the maximum value of firm age is 159 years. The average value of firm size (*FirmSize-Raw*) is

Copyright, Patent, and Trademark

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Copyright	5,843	0.0852	0.2792	0	1
Patent	5,846	0.0935	0.2912	0	1
Trademark	5,852	0.1476	0.3547	0	1
TopManagerGender	5,994	0.0700	0.2552	0	1
FemaleOwnerDummy	5,996	0.1317	0.3382	0	1
FemaleOwnerPercent	5,971	0.0953	0.2808	0	1
TopManagerExp (Log)	5,919	2.8249	0.6242	0.6931	4.2195
TopManagerExp (Raw)	5,919	19.924	10.680	2	68
FirmAge (Log)	5,974	2.3356	0.8529	0	5.0689
FirmAge (Raw)	5,974	14.269	11.759	1	159
FirmSize (Raw)	5,670	12.180	37.693	1	800
FirmSize (Log)	5,670	1.4065	1.2374	0	6.6846
<i>Copyright</i> is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. <i>Patent</i> is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. <i>Trademark</i> is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. <i>TopManagerGender</i> is equal to 1 if the gender of top manager is female, 0 otherwise. <i>FemaleOwnerDummy</i> is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. <i>FemaleOwnerPercent</i> is calculated as the total percentage of female owners in the firm ownership structure. <i>TopManagerExp</i> is calculated as the natural logarithm of total years of experience of the top manager in the sector. <i>FirmAge</i> is calculated as the natural logarithm of years since formation. <i>FirmSize</i> is calculated as the natural logarithm of the total number of employees					

about 12 (logarithmic average value of firm size -*FirmSize*-Log- is 1.40). The range of firm size which is calculated as the total number of employees of firms is between 1 employee and 800 employees.

Table 2 presents the univariate analyses (mean differences) for subsamples (TopManagerGender = 1 vs. TopManagerGender = 0 or FemaleOwnerDummy = 1 vs. FemaleOwnerDummy = 0).

Univariate analyses in Table 2 show that the mean values of copyright, patent and trademark in the group of female top managers (TopManagerGender = 1) are lower than the mean values of copyright, patent and trademark in the group of male top managers (TopManagerGender = 0). But the difference is only significant for copyright. On the other hand, the mean values of copyright, patent and trademark in the group with female owners (FemaleOwnerDummy = 1) are higher than the mean values of copyright, patent and trademark in the group of firms which does not have a female owner (FemaleOwnerDummy = 0). The mean differences regarding FemaleOwnerDummy for all intangible assets (copyright, patent, trademark) are significant. Firms with a female owner and large firms are more likely to hire a female top manager. The mean value of top manager experience, firm age and firm size in the group of firms with male top managers is higher than the mean value of top manager experience, firm age, and firm size in the group of firms with female top managers. On the other hand, the mean value of top manager experience, and firm age (logarithmic form) in the group of firms with male owners is higher than the mean value of top manager experience and firm age (logarithmic form) in the group of firms with female owners. Additionally, the mean value of firm size in the group of firms with female owners is higher compared to firms with male owners.

Table 2. Univariate Analysis

	TMG = 0	TMG = 1	(0) - (1)	FOD = 0	FOD = 1	(0) - (1)
Variable	Mean	Mean	Difference	Mean	Mean	Difference
Copyright	0.0864	0.0656	1.45 *	0.0794	0.1214	-3.88 ***
Patent	0.0934	0.0895	0.25	0.0849	0.1469	-5.52 ***
Trademark	0.1485	0.1307	0.98	0.1372	0.2134	-5.57 ***
TopManagerGender	-	-	-	0.0132	0.4448	-53.90
FemaleOwnerDummy	0.0786	0.8357	-53.9 ***	-	-	-
FemaleOwnerPercent	0.0443	0.7698	-67.7 ***	-	-	-
TopManagerExp (Log)	2.8450	2.5652	8.88 ***	2.8351	2.7598	3.13 ***
TopManagerExp (Raw)	20.216	16.182	7.46 ***	19.996	19.460	1.30 *
FirmAge (Log)	2.3555	2.0705	6.61 ***	2.3421	2.2906	1.57 **
FirmAge (Raw)	14.456	11.813	4.44 ***	14.245	14.398	-0.34
FirmSize (Raw)	12.341	8.6805	1.90 **	11.239	17.780	-4.45 ***
FirmSize (Log)	1.4261	1.1262	4.72 ***	1.3675	1.6460	-5.75 ***

TMG = TopManagerGender, FOD = FemaleOwnerDummy
Copyright is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. *Patent* is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. *Trademark* is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. *TopManagerGender* is equal to 1 if the gender of top manager is female, 0 otherwise. *FemaleOwnerDummy* is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. *FemaleOwnerPercent* is calculated as the total percentage of female owners in the firm ownership structure. *TopManagerExp* is calculated as the natural logarithm of total years of experience of the top manager in the sector. *FirmAge* is calculated as the natural logarithm of years since formation. *FirmSize* is calculated as the natural logarithm of the total number of employees

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01

Correlation Matrix

Table 3 presents the correlation coefficients among the variables which were used in the model. We present the correlation matrix to determine whether there is a multicollinearity problem among the variables. The correlation matrix shows that there is no multicollinearity problem among the variables (except the coefficient - 0.89 - between *FemaleOwnerDummy* and *FemaleOwnerPercent*) because as stated by Gujarati and Porter (2012), it is a major problem when the correlation coefficient exceeds 0.80. The correlation coefficient between *FemaleOwnerDummy* and *FemaleOwnerPercent* is 0.89. It is not a problem for this paper because we do not use these variables in the same estimation model. The results regarding correlation coefficients indicate that there is a positive relationship between the presence of female owners and intangible assets such as patent, copyright and trademark. Firm age (*FirmAge*) and firm size (*FirmSize*) are positively related to intangible assets such as copyright, patent and trademark. Top manager experience (*TopManagerExp*) is positively and significantly correlated with *Patent* and *Trademark*, but it is insignificantly correlated with *Copyright*. While *FirmAge* is negatively and significantly correlated with *TopManagerGender*, *FemaleOwnerDummy* and *FemaleOwnerPercent*, it is positively and significantly correlated with *TopManagerExp*. On the other hand, *FirmSize* is negatively

Copyright, Patent, and Trademark

Table 3. Correlation matrix

	1	2	3	4	5	6	7	8	9
(1) Copyright	1								
(2) Patent	0.59 ***	1							
(3) Trademark	0.61 ***	0.58 ***	1						
(4) TopManagerGender	-0.01	-0.004	-0.02	1					
(5) TopManagerExp	0.02	0.04 ***	0.05 ***	-0.11 ***	1				
(6) FemaleOwnerDummy	0.05 ***	0.07 ***	0.07 ***	0.59 ***	-0.05 ***	1			
(7) FemaleOwnerPercent	0.01	0.002	-0.01	0.67 ***	-0.09 ***	0.89 ***	1		
(8) FirmAge	0.06 ***	0.08 ***	0.08 ***	-0.08 ***	0.47 ***	-0.03 *	-0.08 ***	1	
(9) FirmSize	0.20 ***	0.21 ***	0.25 ***	-0.06 ***	0.04 ***	0.07 ***	-0.01	0.06 ***	1

Copyright is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. *Patent* is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. *Trademark* is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. *TopManagerGender* is equal to 1 if the gender of top manager is female, 0 otherwise. *FemaleOwnerDummy* is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. *FemaleOwnerPercent* is calculated as the total percentage of female owners in the firm ownership structure. *TopManagerExp* is calculated as the natural logarithm of total years of experience of the top manager in the sector. *FirmAge* is calculated as the natural logarithm of years since formation. *FirmSize* is calculated as the natural logarithm of the total number of employees

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

and significantly correlated with *TopManagerGender*, while it is positively and significantly correlated with *TopManagerExp* and *FemaleOwnerDummy*

Estimation Results

We mainly used logistic regression to test our hypotheses. Table 4 presents the estimation results. Additionally, Table 5 also presents the results regarding interaction variables. Lastly, Table 6 presents the sectoral results which cover 3 main sectors, namely manufacturing, retail-whole sales and non-retail services.

Table 4 shows that while firms with female top managers (*TopManagerGender*) are less likely to invest in intangible assets, namely *Copyright* and *Trademark* (except *Patent*), firms with a female owner (*FemaleOwnerDummy*) are more likely to invest in these kinds of assets (*Copyright*, *Trademark*, *Patent*). On the other hand, we found that there is no relationship between the percentage of females in the firms' ownership structure (*FemaleOwnerPercent*) and intangible assets. Additionally, we found a negative association between top manager experience (*TopManagerExp*) and copyright. Older firms and larger firms are more likely to invest in these kinds of assets.

Table 5 presents the results regarding interaction variables. We created an interaction variable using the variable *-TopManagerGender-* and the variable *-TopManagerExp-*. Even though female top managers seem to have a negative effect on intangible assets, their experience may preserve the direction of relationship. The results in Table 5 show that only in column 1 and 2 is the interaction variable positively

Table 4. Main results

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Copyright	Copyright	Patent	Patent	Trademark	Trademark
TopManagerGender	-0.600** (0.267)	-0.457 (0.285)	-0.335 (0.241)	0.0184 (0.270)	-0.532** (0.212)	-0.151 (0.237)
FemaleOwnerDummy	0.301* (0.167)		0.367** (0.158)		0.374*** (0.141)	
FemaleOwnerPercent		0.101 (0.241)		-0.120 (0.250)		-0.183 (0.215)
TopManagerExp	-0.279*** (0.0964)	-0.297*** (0.0968)	-0.146 (0.0959)	-0.146 (0.0967)	-0.0669 (0.0812)	-0.0709 (0.0815)
FirmAge	0.303*** (0.0729)	0.326*** (0.0735)	0.387*** (0.0710)	0.394*** (0.0715)	0.334*** (0.0586)	0.345*** (0.0589)
FirmSize	0.515*** (0.0410)	0.526*** (0.0406)	0.508*** (0.0388)	0.520*** (0.0385)	0.542*** (0.0344)	0.556*** (0.0342)
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.847*** (0.410)	-2.832*** (0.412)	-3.46*** (0.413)	-3.44*** (0.415)	-3.393*** (0.361)	-3.368*** (0.362)
Pseudo R ²	0.1732	0.1739	0.1709	0.1691	0.2024	0.2021
LR Chi ²	510.21***	509.90	537.71	527.63	866.47***	859.79***
Observations	5,455	5,438	5,301	5,284	5,308	5,291
Copyright is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. Patent is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. Trademark is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. TopManagerGender is equal to 1 if the gender of top manager is female, 0 otherwise. FemaleOwnerDummy is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. FemaleOwnerPercent is calculated as the total percentage of female owners in the firm ownership structure. TopManagerExp is calculated as the natural logarithm of total years of experience of the top manager in the sector. FirmAge is calculated as the natural logarithm of years since formation. FirmSize is calculated as the natural logarithm of the total number of employees						

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01, Standard errors in parentheses

associated with the dependent variable. Female managers who have longer experience in the sector (*TopManagerGender* $\times$ *TopManagerExp*) are more likely to invest in copyright. We found no relationship between the interaction variable and other kinds of intangible assets. Hence, the results of control variables at firm level are the same as in the main estimation results. Older firms and larger firms tend to invest in patent, trademark and copyright.

Table 6 presents the sectoral estimation results. We divided the sample into three sub-sectors. These are the manufacturing sector, retail-whole sales sector, and non-retail sector, respectively. The results show that firms with female managers are less likely to invest in copyright and patents in manufacturing sector. Firms with a female owner in manufacturing and non-retail sectors are more likely to invest in patent, trademark and copyright. Firm size is positively associated with the dependent variables in all columns. Hence, older firms are more likely to invest in intangible assets except for firms in non-retail services.

Copyright, Patent, and Trademark

Table 5. The results regarding interaction variable

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Copyright	Copyright	Patent	Patent	Trademark	Trademark
TopManagerGender	-2.264** (0.999)	-2.132** (1.003)	0.141 (0.773)	0.536 (0.788)	-1.314* (0.733)	-0.918 (0.751)
FemaleOwnerDummy	0.305* (0.167)		0.365** (0.158)		0.376*** (0.141)	
FemaleOwnerPercent		0.00105 (0.00241)		-0.00123 (0.00250)		-0.00181 (0.00215)
TopManagerGender x TopManagerExp	0.628* (0.351)	0.632* (0.351)	-0.181 (0.282)	-0.197 (0.284)	0.293 (0.260)	0.287 (0.264)
TopManagerExp	-0.326*** (0.0993)	-0.345*** (0.0997)	-0.126 (0.101)	-0.125 (0.102)	-0.0946 (0.0845)	-0.0972 (0.0847)
FirmAge	0.303*** (0.0729)	0.327*** (0.0735)	0.387*** (0.0710)	0.393*** (0.0716)	0.334*** (0.0586)	0.345*** (0.0589)
FirmSize	0.517*** (0.0411)	0.528*** (0.0407)	0.508*** (0.0388)	0.520*** (0.0385)	0.542*** (0.0344)	0.556*** (0.0343)
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.715*** (0.415)	-2.698*** (0.416)	-3.525*** (0.423)	-3.510*** (0.425)	-3.314*** (0.367)	-3.292*** (0.368)
Pseudo R ²	0.1744	0.1750	0.1710	0.1693	0.2027	0.2024
LR Chi ²	513.65***	513.38***	538.12***	528.10***	867.78***	861.01***
Observations	5,455	5,438	5,301	5,284	5,308	5,291

Copyright is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. *Patent* is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. *Trademark* is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. *TopManagerGender* is equal to 1 if the gender of top manager is female, 0 otherwise. *FemaleOwnerDummy* is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. *FemaleOwnerPercent* is calculated as the total percentage of female owners in the firm ownership structure. *TopManagerExp* is calculated as the natural logarithm of total years of experience of the top manager in the sector. *FirmAge* is calculated as the natural logarithm of years since formation. *FirmSize* is calculated as the natural logarithm of the total number of employees

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01, Standard errors in parentheses

Our estimation results regarding all tables indicate that female managers are less likely to invest in these kinds of intangible assets. These results are in accordance with the results of papers by Zhu and Yin (2016), and Martini, Corvino and Rigolini, (2012) because females in top management may consider stable expectations (Zhu & Yin, 2016). On the other hand, firms which have a female owner are more interested in investing in intangible assets. When the sample is partitioned into three sectors, the test variables are significant and are the same as in main estimation results for only the manufacturing sector.

Table 6. Sectoral results

Sectors	Manufacturing						Retail - whole sales						Non - retail services					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Copyright	Copyright	Patent	Patent	Trademark	Trademark	Copyright	Copyright	Patent	Patent	Trademark	Trademark	Copyright	Copyright	Patent	Patent	Trademark	Trademark
Top Manager Gender	-0.55* (0.32)	-0.42 (0.34)	-0.50* (0.30)	-0.18 (0.33)	-0.92*** (0.27)	-0.38 (0.30)	-1.09 (0.80)	-1.22 (0.82)	-0.03 (0.59)	0.23 (0.63)	-0.13 (0.50)	-0.22 (0.54)	-0.46 (0.65)	-0.01 (0.76)	0.09 (0.58)	0.48 (0.69)	0.43 (0.50)	0.70 (0.61)
Female Owner Dummy	0.18 (0.20)		0.37*** (0.18)		0.44*** (0.17)		0.25 (0.41)		0.24 (0.41)		-0.041 (0.34)		1.21** (0.49)		0.51 (0.49)		0.54 (0.42)	
Female Owner Percent		-0.0002 (0.002)		-0.0007 (0.003)		-0.00 (0.002)		0.005 (0.005)		-0.001 (0.006)		0.0007 (0.004)		0.007 (0.007)		0.0005 (0.006)		0.001 (0.006)
Top Manager Exp	-0.21* (0.11)	-0.22* (0.11)	0.014 (0.12)	0.02 (0.12)	-0.04 (0.10)	-0.03 (0.10)	-0.39* (0.22)	-0.40* (0.22)	-0.41* (0.21)	-0.44** (0.21)	-0.12 (0.16)	-0.14 (0.16)	-0.41 (0.32)	-0.43 (0.32)	-0.44 (0.29)	-0.48* (0.29)	0.05 (0.24)	0.03 (0.24)
FirmAge	0.32*** (0.08)	0.34*** (0.08)	0.45*** (0.08)	0.45*** (0.08)	0.42*** (0.07)	0.42*** (0.07)	0.41** (0.18)	0.45*** (0.18)	0.31* (0.16)	0.34*** (0.17)	0.28*** (0.12)	0.31** (0.13)	-0.04 (0.23)	-0.04 (0.23)	0.13 (0.21)	0.13 (0.21)	-0.12 (0.16)	-0.11 (0.16)
FirmSize	0.54*** (0.05)	0.55*** (0.05)	0.54*** (0.04)	0.56*** (0.04)	0.56*** (0.04)	0.58*** (0.04)	0.44*** (0.08)	0.44*** (0.08)	0.43*** (0.08)	0.44*** (0.08)	0.50*** (0.06)	0.50*** (0.06)	0.59*** (0.14)	0.59*** (0.14)	0.57*** (0.12)	0.56*** (0.12)	0.57*** (0.10)	0.57*** (0.10)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.92*** (0.50)	-2.93*** (0.50)	-3.9*** (0.51)	-4.0*** (0.51)	-3.41*** (0.45)	-3.41*** (0.45)	-3.35*** (0.83)	-3.41*** (0.84)	-3.0*** (0.82)	-3.0*** (0.82)	-3.58*** (0.70)	-3.62*** (0.70)	-3.39*** (1.27)	-3.11** (1.30)	-3.3*** (1.25)	-3.07** (1.27)	-5.17*** (1.19)	-5.03*** (1.20)
Pseudo R ²	0.1497	0.1513	0.1587	0.1566	0.1874	0.1862	0.1311	0.1335	0.1299	0.1307	0.1511	0.1530	0.1481	0.1415	0.1181	0.1221	0.1886	0.1853
LR Chi ²	275.4***	277.3***	314.4***	307.5***	471.9***	466.1***	76.24***	77.61***	76.4***	76.8***	147.2***	149.0***	46.86***	43.88***	45.8***	46.6***	102.0***	98.51***
Observations	2,502	2,492	2,528	2,518	2,532	2,522	1,322	1,319	1,377	1,374	1,437	1,434	788	784	826	822	817	813

Copyright is equal to 1 if the firm has copyright covering its main activity or product, 0 otherwise. Patent is equal to 1 if a firm has patents covering its main activity or product, 0 otherwise. Trademark is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise. TopManagerGender is equal to 1 if the gender of top manager is female, 0 otherwise. FemaleOwnerDummy is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise. FemaleOwnerPercent is calculated as the total percentage of female owners in the firm ownership structure. TopManagerExp is calculated as the natural logarithm of total years of experience of the top manager in the sector. FirmAge is calculated as the natural logarithm of years since formation. FirmSize is calculated as the natural logarithm of the total number of employees

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses

SOLUTION AND RECOMMENDATIONS

The research questions in this paper are that firms with female managers and firms with female owners are more likely to invest in intangible assets such as patent, trademark and copyright. The results of the paper show that female owners and female managers with longer experience tend to invest in these kinds of assets. Firms may hire more female managers at top management level to enhance their performance because a recent study by Findik and Ocak (2016) in Turkey showed that intangible assets enhance firms' financial performance (Findik & Ocak, 2016).

FUTURE RESEARCH DIRECTIONS

Further research may use different control variables and use cross-country data. World Bank Regional Enterprise Survey 2015 presents some information regarding firm legal structures. These legal structures may be employed as control variable in the estimation model. Different types of ownership such as domestic ownership and foreign ownership can be taken into account in the estimation process. Managers' education level also may be controlled in the estimation model. The survey also presents some information regarding the financial structures of firms. Therefore, the financial structures can be controlled in the estimation model.

On the other hand, researchers may test the effects of female managers on these kinds of intangible assets using Borsa İstanbul firms. Recently, Findik and Ocak (2019) tested the effects of female managers and female directors on the intangible assets and their subcomponents using the Corrado, Hulten and Sichel (2009) classification. Researchers may test the effects of female managers and female directors on each item of intangible assets such as patent, trademark, copyright, software etc.

CONCLUSION

The study has some limitations. First, we used a limited number of control variables at firm characteristic level and firm manager level. Second, the study does not cover a time interval. Third, the study covers only firms in Turkey.

This study presents some important findings regarding the effects of females at owner level and manager level on intangible assets such as trademark, copyright, and patent. While females at owner level are more likely to invest in some kinds of intangible assets, female managers are more risk averse. On the other hand, female managers with longer sectoral experience are more likely to invest in copyrights.

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Copyright, Patent, and Trademark

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KEY TERMS AND DEFINITIONS

CEO: Chief executive officer.

EU: European Union.

FASB: Financial Accounting Standards Board.

GEM: Global Entrepreneurship Monitor.

IAS: International accounting standard.

IT: Information technology.

OECD: Organisation for Economic Co-Operation and Development.

R&D: Research and development.

US: United States.

APPENDIX

Table 7. Variable definitions and source of data

Variable	Definition	Source
<i>Copyright</i>	is equal to 1 if firm has a copyright covering its main activity or product, 0 otherwise	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>Patent</i>	is equal to 1 if firm has a patent covering its main activity or product, 0 otherwise	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>Trademark</i>	is equal to 1 if firm has a trademark covering its main activity or product, 0 otherwise	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>TopManagerGender</i>	is equal to 1 if the gender of top manager is female, 0 otherwise	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>FemaleOwnerDummy</i>	is equal to 1 if there is a female owner in the firm ownership structure, 0 otherwise	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>FemaleOwnerPercent</i>	is calculated as the total percentage of female owners in the firm ownership structure.	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>TopManagerExp</i>	is calculated as the natural logarithm of total years of experience of top manager in the sector	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org
<i>FirmAge</i>	is calculated as the natural logarithm of years since formation	World Bank's 'Turkey Regional Enterprise Survey 2015' http://www.Enterprisesurvey.org

Chapter 26

The Development of Servitization Concept in the Era of Industry 4.0 Through SCM Perspective

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ABSTRACT

The transition from goods-dominant logic to service-dominant logic has captured the attention of industries for decades now. Servitization is one of the concepts that enable organizations to make this transition by providing services along with their products and has become an important competitive strategy for organizations to survive in their ecosystems. Thus, in this chapter, the objective is to increase the understanding of servitization concept in the era of Industry 4.0 from supply chain management perspective. The content analysis methodology is used to examine articles that bring together servitization and supply chain management and to find out where servitization stands with regards to Industry 4.0 applications. The findings show Industry 4.0 applications during servitization operations are yet to develop, and accordingly, the chapter concludes with further research directions in relations to servitization and Industry 4.0 applications in the frame of supply chain management.

INTRODUCTION

Traditionally, it was likely to increase market share through maximization of the tangible quality of a product or through productivity improvements via standardization techniques, nevertheless; globalisation and advances in technology in recent years have altered the business landscape, and this has changed value perception of consumers (Vandermerwe, 1990). As manufacturers have acknowledged that global

DOI: 10.4018/978-1-7998-1125-1.ch026

competition is not just based on price, they tried to create value through altering their orientation towards service (Gremyr et al., 2010), and start adding services to their product offerings (Vandermerwe, 1990).

In order to understand the concepts better, it is essential to start with definitions. A product is defined as anything offered to a market for consumers' attention, acquisition, use or consumption with an aim to satisfy their wants and needs (Kotler & Armstrong, 2006). Taken its roots from Industrial Revolution, the traditional language of exchange was dependent on products in which value was added during manufacturing process, and so on operand resources (tangible, static ones which need changes to make them valuable) (Lusch et al., 2008; Vargo & Lusch, 2008). This traditional paradigm is called goods-dominant logic (GDL), and it idealizes manufacturing and distribution of tangible goods as they can be standardized and inventoried until they are purchased by consumers (Vargo et al., 2010).

A service is, on the other hand, generally defined by not being a product (Baines et al., 2009a). The previous literature gathered the characteristics associated with services under IHIP characteristics which includes Intangibility, Heterogeneity, Inseparability (e.g. simultaneous production and consumption), and Perishability (e.g. non-storable or non-transportable) (Lovelock & Gummesson, 2004). However, the IHIP characteristics hinder to study the services within the lenses of GDL (Vargo et al., 2010), thus a need occurs for a new paradigm: service-dominant logic (SDL). SDL emphasizes intangibles, know-how, and skills as the fundamental factor in exchange (Vargo & Lusch, 2004; 2008), hence it highlights operand resources (intangible and dynamic ones that can create value) (Vargo & Lusch, 2008) and a relationship based approach as it is a significant ingredient to form a set of loyal and profitable customers (Miller, et al., 2000).

Nevertheless, after some time, especially with the developments in technology, several scholars (e.g. Araujo & Spring 2006; Goldhar & Berg 2010; Pawar et al. 2009) stated that the IHIP characteristics are *myths* (Vargo & Lusch, 2004a), and there is no crystal-clear distinction between goods and services. Slack et al (2009) even rejected this distinction and supported Levitt (1972) by stating that if the objective of all business is to serve customers, then everybody is in service business. Therefore, it can be stated that every business, whether it is in manufacturing or service business, is providing service to some extent (Yildirim, 2010).

By keeping this argument in mind, as mentioned above, in order to survive in severe global competitive environment, organisations start to place service orientation at the center of their operations (Gremyr et al., 2010). Accordingly, they started to add services to their product offerings to create value (Vandermerwe, 1990), and this strategy is called as servitization (Vandermerwe & Rada, 1988). The aim of this research is to deepen the understanding of the servitization concept by identifying, interpreting, and summarizing the current knowledge in the era of Industry 4.0 through a supply chain management (SCM) perspective, and the subject will be detailed in the next sections.

The chapter is organized as follows: The next section investigates servitization and supply chain management and explains where these two meet. The two subsequent sections explain our research methodology and the findings from the content analysis, respectively. The last two sections present future research directions and the conclusion regarding what we have studied in the chapter.

BACKGROUND

Servitization and Supply Chain Management

Through years, developing service provision for strategic competition has become a differential feature of innovative manufacturing firms (Spring & Araujo, 2009). Bundling products with services could be a way of differentiation and could provide a defence for severe market competition especially for manufacturing firms which have a high installed product range (Wise & Baumgartner, 1999). Accordingly, since the term “servitization” first coined by Vandermerwe and Rada (1988) and supported and enhanced the idea that services are a means of maintaining competitiveness, research on the role of services and on servitization has been increasing (Vandermerwe & Rada, 1988).

The first definition of servitization of manufacturing stated that it is a process of adding services to product offerings with an aim to develop additional value (Vandermerwe & Rada, 1988). After the term appeared, other researchers offered diverse definitions. For instance, while Desmet et al. (2003, p.46) explained the term as “paying more attention to the services component of the product offering”, Lewis and Howard (2009) described it as the extension of customer offering with service elements for increasing profitability. Weeks and Benade (2009) provided a similar definition to the first one and they stated that servitization is a transition of manufacturing organisations into ones that provide an integrated bundle of products and services. Further definitions, on the other hand, highlighted innovative aspect of servitization process. For example, several researchers (e.g. Baines et al., 2009b; Neely, 2008; Visnjic, 2010) indicated that servitization creates innovations in organizations’ capabilities and processes. Kastalli and von Looy (2013) later created an integrated definition indicating both the process/transition and innovative aspects. According to the researchers, durable goods manufacturers prefer to innovate their offering through adding services to their existing offerings throughout the life cycle. Similarly, recent definitions also highlighted the transition towards service-centric approaches and innovations in business models. For instance, Raddats et al. (2019, p.) stated that servitization “...is the the transformation of a firm from taking a product- to taking a service-centric approach. It represents a significant change in the business model and mission of the firm, whereby the service business serves as a growth engine of the firm.”

While coining the term, Vandermerwe and Rada (1988) also explained the evolution of servitization. According to the researchers, organizations go through the following three steps: (1) Providing goods or services, (2) providing goods and services, (3) providing goods, services, support, knowledge and self-service which are called as “bundles”, since these elements are interconnected, and therefore they are sources of entry barriers. Due to this evolution, concepts such as “transition from products to services” (e.g. Oliva and Kallenberg, 2003), “service transition” (e.g. Fang et al, 2008), “service innovation” (e.g. Evanschitzky *et al.*, 2011), “manufacturing service integration” (e.g. Schmenner, 2009) are used to describe the transition of manufacturing companies. Moreover, the topic of innovative combination of goods and services (e.g. the second step described above) has been discussed within other domains such as “product-service systems” (e.g. Johnstone *et al.*, 2009), “complex services” (e.g. Neely et al., 2011), “hybrid offerings” (e.g. Ulaga & Reinartz, 2011), “integrated solutions” (e.g. Brady *et al.*, 2005; Davies, 2004). Thus, nowadays these terms are used interchangeably with servitization (Kowalkowski et al., 2017a; 2017b).

Although servitization is a complex field, the number of organizations engaged in servitization is increasing. Recent research have demonstrated that more than a third of large manufacturing firms

propose services (Neely, 2008). Caterpillar, GE, IBM, Xerox and Rolls-Royce are common examples of servitized companies (Cohen et al., 2006; Kastalli and von Looy, 2013). For instance, Rolls-Royce now offers a total care package called as “power by the hour” which includes an engine and accessory replacement service offered with a fixed-cost-per-flying-hour basis (Rolls-Royce, 2012). This means Rolls-Royce is responsible for risk and maintenance, and the company generates revenues through providing engine for customers (Neely, 2008).

The reason of the increase in the number of servitized companies is the demand of consumers. Consumers began to demand solutions and/or customized offerings rather than pure products or services, information and knowledge from suppliers with customized relationships (Vandermerwe, 1994). This demand can be met by servitization as it brings service culture and customer orientation to organizations (Neu & Brown, 2008). This culture creates a new capability which is difficult to imitate and brings new customers while maintaining existing ones (Schmenner, 2009). As customers’ demands are met through more reliable and durable bundles of products and services, they are released from the problems and some costs that are related with use and maintenance (Manzini & Vezzoli, 2003). This means servitization create a “peace of mind” for consumers (Weeks & Benade 2009, p. 392) because, in case of a problem, it will be handled by the company/the provider of the offering.

With servitization, organisations experience a transition from transactions towards relationships (Neely et al., 2011). As the organizations engage in servitization, they develop closer and long-lasting relationships with customers which lead to a loyal customer base. This in turn increases market entry barriers, sales revenue, profits, and market size (Goldhar & Berg 2010; Schmenner 2009). Another reason for increased revenues through servitization is that services are more stable during fluctuations in economies, and thus they may be able to create high profits margins (Oliva & Kallenberg, 2003; Salonen, 2011). Therefore, organisations engaged in servitization are more likely to remain competitive (Martinez et al. 2010; Pawar et al. 2009).

Although servitization seems beneficial, it is not free from obstacles. For instance, due to the requirement for diverse organisational principles, structures, processes, and capabilities, organisations experience managerial challenges (Oliva & Kallenberg, 2003; Martinez et al., 2010). These managerial challenges may also be the reason for negative service quality (Oliva, 2001) which leads to reduced value for consumers (Gebauer & Friedli, 2005). This may also decrease the chance to create a brand reputation as a reliable provider for companies (Oliva & Kallenberg, 2003) which may bring competitive disadvantage.

According to previous literature, communication is another problem. This challenge is two-sided. First, the communication between managers and employees may create an obstacle. Managers may have a fear of losing power and authority (Ashforth & Lee, 1990), whereas employees may fear losing their jobs, as addition of services might require new capabilities or skills. Therefore, if management does not communicate well with employees regarding customer orientation and new service culture, the transition towards servitization will face challenges (Gebauer et al., 2010). Second, the transition towards relationship-based transactions with servitization increases the number of customer touch-points (Martinez et al., 2010) which requires better communication between, especially front-line employees and customers.

Another obstacle is about the product itself (Baines et al., 2009a, b; Brax, 2005). Services’ unique characteristics produce challenges during production, delivery and design of product service bundles (Brax, 2005). This means that adding services to product offerings may bring extra challenges such as creating a fit between technical competences and capabilities (Windahl *et al.*, 2004) and improving internal efficiencies of operations (Salonen, 2011). Due to these challenges, companies may experience

a loss in their revenues. For instance, Rolls-Royce is a common example while describing servitization. However, Rolls-Royce's proportion of revenues coming from services declined from 53% to 49% between 2006 and 2009 (Neely et al., 2011).

Throughout the last decade, industries have been facing many transformations which dramatically change production, operations and delivery of products as well as the companies' relationship with customers (Gersch & Goeke, 2007). While servitization can be considered as one of these transformations, the other one is technological one which creates a digital transformation for the industries and global economy (Kowalkowski et al., 2017a). A recent phenomenon is Industry 4.0 which uses different emerging technologies such as Internet of Things (IoT) and creates a cyber-physical and intelligent systems for developing value (Frank et al., 2019; Müller et al., 2018). This means that with Industry 4.0, industrial products and systems integrate with more software and embedded intelligence (Lee et al., 2014). Therefore, this new phenomenon, despite being born from a different field of research (e.g. engineering and computer science), (Liao et al., 2017) brings new challenges for servitization. For instance, IBM has recently acknowledged that:

- Customers demand access to offerings from the cloud and require cognitive capabilities in the cloud as well as in their mobile phones,
- Industrial customers are more concerned about data security as any attack may damage trust, or decrease revenue and market value,
- IoT and cloud are ways of creating innovation in service journey required by customers, and ways to reach competitive advantage, as well,

Therefore, IBM has altered its business model and become a cognitive solution and cloud platform company (Spohrer, 2017).

As IBM example demonstrates, Industry 4.0 changes not only the behavior of the customers but also the development of response to the needs of them by organizations. However, although both servitization and Industry 4.0 have implications for creating a better competitive position in the market, previous literature (e.g. Ardolino et al., 2017; Belvedere et al., 2013; Coreynen et al., 2017; Kamp et al., 2017; Vendrell-Herrero et al., 2017) has devoted little attention to connect these two fields of research.

As mentioned before, one of the challenges of servitization is related with managerial issues. There needs to be a shift towards a service culture, and this may create some problems within the organization. However, as Christopher and Peck (2004) stated "no organization is an island". To survive in a competitive market, companies need to design and coordinate their supply and distribution networks for effective delivery of their products and services, which is known as supply chain management. However, the studies on supply chain management concentrate on manufacturing, and there is a debate on the transferability of theories to services contexts (Baltacioglu *et al.*, 2007; Ellram *et al.*, 2006). Although servitization and supply chain management were born from the same field of research, few studies in previous literature (e.g. Bustinza *et al.*, 2013; Finne & Holmström, 2013) focused on developing value through service additions to product offerings.

Therefore, although servitization has been at the center of research fields such as operations management and marketing, the concept needs to be further discussed within the lenses of supply chain management and Industry 4.0. Accordingly, the aim of this chapter is to deepen the understanding of the servitization concept by identifying, interpreting, and summarizing current knowledge through the

lenses of supply chain management and Industry 4.0, and thus we have used supply chain management in order to understand the servitization examples in the literature with regards to industry 4.0 applications.

Supply chain management has been studied for decades in the literature since its introduction in the beginning of 1980s (Oliver & Webber, 1982). Throughout the 1980s and 1990s, the term gained a lot of attention from the researchers (Huan et al., 2004). However, its implications can be traced back in 1960s in the literature of business studies (Forrester, 1958). Like servitization, supply chain management also tries to address customer requirements with proper inventory control and increase customer service level by enhancing the performance of all members of the chain (Ellram & Cooper, 1993). The key components of supply chain management were identified to be business process, management components and network structures (Lambert et al., 1998) and integration of business processes in the chain has been the core of supply chain management (Cooper et al., 1997). All in all, as we discussed before, starting with definitions in order to understand a concept is essential, therefore we adopt the definition of Mentzer et al. (2001) as it is one of the most cited definitions of all. The authors define supply chain management as “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole” (Mentzer et al., 2001, p. 18).

As the aim is the maximization of the entire chain performance, by taking a system approach (meaning the whole may be greater than the sum of its parts) (Christopher, 2010), supply chain should be managed as a single entity (Lummus et al., 2001). However, to become a single entity, trust and collaboration between the diverse partners in the chain should be present (Burgess et al., 2006). While trust is a key requirement to manage and monitor various partners in the chain to obtain long-term and mutually favourable relationships (Lee & Fernando, 2015), collaboration aids partners to share real-time and open information which may reduce alignment problems (Croom et al., 2000), improve customer satisfaction and value, and consequently increase profitability and create a competitive advantage (Baltacıoğlu et al., 2007; Mentzer et al., 2001).

Since the development of supply chain management is continuous, as there are many diverse fields of it emerged such as sustainable supply chain management and humanitarian supply chain management, advancement of technology has also altered the understanding of the management of the chain. With the digitalization, digital supply chain management, and components of management like supply chain management, digitalization and technology implementation have recently been of interest (Büyüközkan & Göçer, 2018).

METHODOLOGY

The chapter exploits content analysis methodology in order to deepen the understanding of development of servitization during the era of industry 4.0. Traditionally, content analysis methodology consists of four methods; material collection, descriptive statistics, category selection and material evaluation (Seuring and Gold, 2012) and is “a class of methods within empirical social science that can be applied both in a quantitative and qualitative way” (Seuring & Gold, 2012, p. 546). Therefore, the methodology is suitable for studies that are focusing on literature like our chapter which includes articles from 1988 to 2019 that examine servitization in the frame of supply chain management with regards to industry 4.0. Moreover, content analysis methodology has been used widely in supply chain management research (Cullinane &

Toy, 2000; Fahimnia et al., 2015; Haavisto & Kovács, 2014; Kovács et al., 2012; Kunz & Reiner, 2012; Seuring and Gold, 2012; Tabaklar et al., 2015; Seuring and Müller, 2008; Srivastava, 2007;; Tate et al., 2010;) and servitization research (Brax & Visintin, 2017; Ferreira et al., 2013; Rabetino et al., 2018). The rest of the methodology section explains the processes of material collection, descriptive statistics, category selection and material evaluation along with reliability and validity of the research.

Material Collection

Our material collection in the literature of servitization has started with the keyword search. The term “servitization”, with the combinations of supply chain management such as supply chain, channels, value chain, partnership, ecosystem in, has been used in databases, namely, in Emerald and ScienceDirect. The first reason behind the selection of the two databases is that these two databases are the most popular ones in marketing and supply chain management field. Secondly, these two databases cover most of the top journals in the field of supply chain management such as *Supply Chain Management: An International Journal*, *International Journal of Physical Distribution & Logistics Management*, *International Journal of Operations and Production Management* and *International Journal of Logistics Management* as well as top marketing journals where servitization articles published frequently such as *Industrial Marketing Management*. In our keyword search, since our focus is on industry 4.0 implementations, we have also used “servitization” with different industry 4.0 enablers (Rüßmann et al., 2015) such as digitalization, Internet of Things, big data, and cloud computing.

Descriptive Statistics

The concept of servitization was first introduced by Vandermerwe and Rada (1988) in 1988. Therefore, we have also limited our keyword research from the year of 1988 to 2019. After filtering the databases with keyword combinations and reading through all articles that came up, we have found that there are 51 articles (21 from ScienceDirect, and 30 from Emerald) relevant to our research topic (See Table 1). We have excluded conference papers and other working papers that came up from our keyword research.

Category Selection and Material Evaluation

After collecting articles out of keyword search, we have come up with categories and developed a template on Excel in order to evaluate the articles. Our categories involve aim of the articles, methods and theories used along with practical implications and empirical context. For validity and reliability, we coded articles separately based on identified categories. In order to solve disagreements and increase validity and reliability of our analysis, we have exploited “*discursive alignment of interpretation*” (Seuring and Gold, 2012) which gives authors freedom to discuss on issues related to coding and evaluation.

FINDINGS

The fundamental aim of the study is to deepen the understanding of the servitization concept by identifying, interpreting, and summarizing current knowledge within the lenses of supply chain management and Industry 4.0.

Table 1. Material collection process

Databases Keywords	ScienceDirect		Emerald	
	Number of articles	Relevant number of articles	Number of articles	Relevant number of articles
Servitization	70	19	72	30
Servitization + Big Data	5	0	0	0
Servitization + Cloud computing	0	0	0	0
Servitization + IoT	8	1 (repeated one) 0	1(repeated)0	1 (repeated) 0
Servitization + Digitalization	13	3 (one is repeated) 2	2(repeated)0	1(repeated)0
Total	96	21	72	30

The analysis showed that most of the articles are published in journals such as *Industrial Marketing Management* (n=12), *International Journal of Production Economics* (n=4) from ScienceDirect, *International Journal of Operations & Production Management* (n=10) and *Journal of Manufacturing Technology Management* (n=5) from Emerald. For instance, *Industrial Marketing Management* journal published more articles related with servitization because the journal published two special issues on “*Servitization*” and “*Service and Solution Innovation*” in 2017, and in 2011; respectively.

The articles are also analyzed in terms of their research methodologies. Most of the articles use qualitative methods for data collection. Moreover, the researchers mostly use multiple case studies. For the sources of evidence, researchers use semi-structured interviews, secondary data from the sample companies (e.g. annual reports), and from online sources, and observation. Most of these case studies focused on theory building. Furthermore, relative numbers of studies are conducted as literature reviews and viewpoints (see Table 3 and Figure 1).

Although, servitization first coined in 1988, a theory of servitization is still in a developing era, thus majority of the studies focuses on theory building by providing conceptual frameworks as findings. Despite not having its own theoretical bases, servitization concept has been studied under diverse theories coming from different fields such as management or marketing. For instance, since servitization is considered as a chance to survive through competition, Resource-Based View (RBV) is used by researchers (e.g. Lütjen et al., 2017) as a theoretical foundation. Furthermore, RBV’s extensions such as Dynamic Capabilities View (e.g. Raddats et al., 2017), and Relational View (e.g. Weigel & Hadwich, 2018) are also common theoretical lenses.

Table 2. Journal list

Journals from ScienceDirect	Frequency	%
Industrial marketing management	12	23.5
International Journal of Production Economics	4	7.8
Journal of Business Research	3	5.9
Energy Policy	1	2.0
Journal of Cleaner Production	1	2.0

Table 3. Research methodology distribution

Research Methodology	# of articles	%
Case study	27	52.9
Systematic literature review	9	17.6
Survey	8	15.7
Interview	2	3.9
Analytical model	3	5.9
Viewpoint	2	3.9

Another finding of the study reveals the frequency of keywords. Obviously, “servitization” has mentioned most. However, along with servitization, related concepts such as Product-Service Systems (PSS), and service infusion are also included in keywords. Apart from servitization and consistent with the aim of the study, there are keywords related with SCM such as channel competition, marketing channels, distribution channels, ecosystem and integration. Furthermore, although Industry 4.0 has not mentioned much within keywords, IoT and digitalization were used. Besides, as more articles have been published in *Industrial Marketing Management* journal, there are some keywords related with marketing such as customer orientation, value creation, and customer involvement. As a part of these articles, majority of them mentioned industry related terminologies. For instance, while some articles (e.g. Xing et al., 2017) used country names (e.g. Germany, China) as keywords for the data gathered in there, some others use “manufacturing” (e.g. Ambroise et al., 2018) or the name of the industry such as publishing industry (e.g. Vendrell-Herrero et al., 2017).

As most of the studies classify servitization as a competitive strategy that creates advantage, some of the articles have also come up with used strategy related keywords. Mostly, capabilities (related to resource-based view, dynamic, relational and operational), competence and competitive strategy are summed up under the category “strategy”.

Figure 1. Research methods distribution over the years

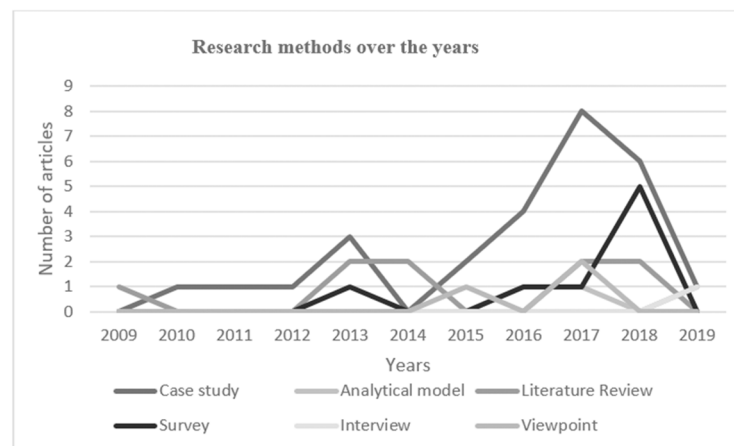


Figure 1. Research Methods Distribution over the years

Since every article has at least three keywords, there are some only mentioned once, and these keywords are gathered under the title of “Others” which includes but not limited to energy utilities, lighting, practice, success factors, barriers, and organizational design (See Table 4).

Contribution to Servitization Literature in the Era of Industry 4.0 and Supply Chain Management

The analysis demonstrated that there are really a limited number of studies (e.g. Reim et al., 2019; Sklyar et al., 2019) focusing on servitization in the era of Industry 4.0. These studies mostly published in *Industrial Marketing Management* and *International Journal of Operations & Production Management*. Since Industry 4.0 is a relatively new concept, it is expected that the number of studies is limited and most of them are published in 2019. These studies focus on the advantages created by Industry 4.0 about related concepts such as IoT, or digitalization. For instance, while Rymaszewska et al. (2017, p.92) addressed “*how organisations offering product-service systems can reap the benefits that the IoT*”, Sklyar et al. (2019) concentrated on digital servitization, which is the utilization of digital tools for transforming processes when a company experiences a shift from a product-centric to a service-centric business model as well as logic (Kowalkowski et al., 2017a). Accordingly, the results showed that within the selected keywords related with Industry 4.0, the most popular one is digitalization. As digitalization separates information from devices and technologies, it may help to reshape the nature of services as well as service operations (Lusch and Nambisan, 2015). Therefore, it is seen as an aid to adapt advanced service offerings (Cenamor et al., 2017) and as a part of servitization strategy (Reim et al., 2019). Furthermore, this separation creates knowledge dispersal and a requirement to collaborate with internal actors as well as actors that are from outside of firm’s boundaries (Sklyar et al., 2019), meaning supply chain partners. Prior studies assumed that the strategies of supply chain partners and manufacturers are aligned (Oliva and Kallenberg, 2003), however; as the global markets present diverse conditions for every partner, they are making different strategic choices (Reim et al., 2019), which creates further challenges for organizations shifting towards servitization. Thus, we need a deeper understanding of the supply chain partners’ role during servitization.

Table 4. Keyword distribution

Keywords	Frequencies	%
Servitization (e.g. PSS, service infusion, service transition, service innovation, etc.)	92	35.1
Industry related (e.g.manufacturing, publishing industry, Germany,etc.)	28	10.7
Marketing related (e.g. Customer orientation, value co-creation, etc.)	30	11.5
Industry 4.0 (e.g. IoT, Digitalization)	8	3.1
SCM related (e.g. channel competition, integration, distribution channels, ecocsystem etc.)	40	15.3
Methodology (e.g. literature review, quantitative theory, case study, etc.)	18	6.9
Strategy (e.g. capabilities, competitive strategy, competence, etc.)	19	7.3
Others (e.g. sustainability, financial performance, centralization, energy efficiency, etc.)	27	10.3

As mentioned above, the number of studies (e.g. Bustinza *et al.*, 2013; Finne&Holmström, 2013) focusing on servitization and SCM are already limited, and studies working on servitization and supply chain partners in the era of Industry 4.0 are scarcer with a handful of studies. The limited number of previous works integrating servitization, SCM, and Industry 4.0 have concentrated on issues such as network partners/actors (e.g. Reim *et al.*, 2019), buyer-supplier relationships in supply chain (e.g. Saccani *et al.*, 2014), intrafirm and interfirm change processes (e.g. Sklyar *et al.*, 2019). For instance, Reim *et al.* (2019) addressed the challenges service network partners face when trying to provide advanced services. According to the researchers, these challenges are capability related challenges (e.g. a lack of service provision vision), and market-related challenges (e.g. unfavourable local conditions), and accordingly some servitization strategies need to be provided to match with these specific challenges. Rymaszewska *et al.* (2017) further proposed that IoT technology requires a redesign of value chains, and as it aids improvement in offerings, it will enrich value chain with more innovative value-adding activities that gather and analyze data coming from machines and devices. In that way, value is created through quicker product introductions, new business models, supporting customer success, developing a product as a part of broader system, and data analytics (Rymaszewska *et al.*, 2017). Similarly, in a fashion setting, Pal (2016) developed six dominant ways to create value by driving responsibility, and these are value-adding services, product leverage, collaborative partnership, information transparency, awareness and platform-enabled networking.

Some studies have been taken a dyadic view by focusing on buyer-supplier relationships. Saccani *et al.* (2014) contributed to the literature by indicating that there is no best way to form a buyer-supplier relationship during servitization. However, the researchers also found out that the type of service is one of the fundamental factors affecting the formation of upstream relationships. With a similar focus, Vendrell-Herrero *et al.* (2017, p.78) worked on digital transition of publishing industry with a bidirectional perspective and concluded that digital servitization produces asymmetric *power dynamics of the interdependencies between upstream and downstream parties*, which empowers downstream companies (e.g. retailers) when resources are not inimitable.

In another study, Sklyar *et al.* (2019) focused on intrafirm and interfirm change processes, and indicated that increased demand for market efficiency and closer collaboration between ecosystem actors are the reason for enhanced relational and structural embeddedness, which further highlights the requirement for future studies focusing on supply chain/value chain/network/ecosystem partners.

FUTURE RESEARCH DIRECTIONS

As every research, the research of this chapter has limitations. First of all, there are limited keyword combinations in our material collection which resulted in rather smaller number of articles. Therefore, for further studies, we are considering expanding our keywords beyond servitization in order to picture the state-of-art of the relationship between servitization and supply chain management thoroughly. Findings regarding keywords out of the content analysis show that integrated solutions, product-service systems as well as service dominant logic can be used to expand the sample for further studies. Another way to expand the sample could be looking into the special issues dedicated to servitization, integrated solutions and product-service systems in diverse journals. Moreover, in our study, we only include two popular research databases, thus, including more databases enables us to reach more articles regarding the concepts under investigation.

Content analysis also gave interesting results on research methods exploited in sample articles. Over the years, using empirical research, specifically, case study methodology has been increased for several reasons. First, organizations have become more willing to share information with researchers in this topic as they believe the cooperation between the industry and the academia. As a result, most articles in our sample have great space and great number of practical implications for the industry. Second, since most of the articles using case study methodology have a theory building approach apart from some exceptions (see Raja et al., 2017) with theory elaboration approach, this could be a sign showing that servitization from supply chain management perspective is still developing. In terms of theory building, researchers are encouraged to conduct longitudinal studies (Polzin et al., 2016; Sklyar et al., 2019). For instance, Reim et al. (2015) encouraged future researchers to conduct longitudinal case studies focusing on better understanding of the complex relationships between business models, as well as more quantitative studies to empirically test the effect of different business models on company performance and growth. Another suggestion for future research direction for researchers in this field could be theory elaboration and theory testing using case study methodology. For instance, some studies (e.g. Baines and Lightfoot, 2013; Martinez et al., 2010; Rymaszewska et al., 2017) developed conceptual frameworks as a result of their studies, thus these frameworks can be tested in the future. Similarly, other studies also suggested to test the effect of servitization on financial performance (e.g. Ambroise et al., 2018), profits (e.g. Kohtamaki et al., 2013), price and service quality (e.g. Lee et al., 2016). Hence, another aspect of methodological directions is regarding the variables that are tested. Some researchers (e.g. Ayala et al., 2019; Reim et al., 2015; Weigel and Hadwich, 2018) advised looking for interaction effects between variables. For example, Weigel and Hadwich (2018) offered to search for further variables and look for moderating effects of, for instance, satisfaction with service network and commitment of employees.

There are studies focusing on servitization as a competitive strategy. Previous work acknowledges that combining products and services is a way to gain competitive advantage (Davies, 2004) as the final offering is more durable and reliable for consumers (Morey, 2003), and as it requires a closer and long-lasting relationship with consumers (Mont, 2002a). Therefore, these offerings could be imperfectly imitable, non-substitutable, or immobile, which are the characteristics described in Resource-Based View/Approach (RBV). Due to this relationship, previous research (e.g. Lütjen et al., 2017)) used RBV as a theoretical foundation. Furthermore, related with the criticism of RBV, due to changes in environmental or market related conditions, organizations need to develop diverse capabilities (e.g. routines and processes) to stay competitive (Zollo & Winter, 2002), thus Dynamic Capabilities View may be another theoretical basis, for instance, to study buyer-supplier relationships and networking capability (Mitrega et al., 2012). Moreover, supply chain management has become what it is today by borrowing theories from other fields (Halldorsson et al., 2007; Halldorsson et al., 2015). This gives a research field to see other perspectives and to be able to advance more. Thus, future research can borrow theories from other fields in order to advance servitization and form a supply chain point of view which also gives researchers a chance to understand how industry 4.0 enables can be implemented in supply chain in order to implement servitization better. For example, Ambroise et al. (2018) suggested the use of organizational and contingency theories. Moreover, network perspective and ecosystem view can be adopted in order to transfer knowledge and practices beyond organizational level (Raddats et al., 2017). Similarly, in order to test models presented in our sample, some authors suggested to use multi-actor analysis (Ruiz-Alba et al. 2018; Story et al; 2017) and expand their empirical studies to multiple industries (Hakanen et al., 2017; Ruiz-Alba et al., 2018).

As the Rolls-Royce example demonstrates, some companies struggle to obtain the mentioned benefits of servitization, and this may lead to servitization failures (Benedettini et al., 2015; Brax, 2005, Gebauer et al., 2005). Due to the challenges and sometimes failures, some firms also choose deservitization which is a process of reducing or withdrawing service elements in the offering (Gebauer & Kowalkowski, 2012; Kowalkowski et al., 2017a). Despite being cited as a successful example, Xerox deservitized its offerings and set up an independent firm called Conduent for their service-centric business process outsourcing offerings (Kowalkowski et al., 2017a). Therefore, future studies may not only focus on successful cases, because focusing on failures or deservitized may help companies understand capabilities in creating competitive strategies better (Raddats et al., 2017).

CONCLUSION

Servitization has been a competitive advantage for organization in competing within the global market and a good strategy to get the attention of customers. However, it is important to see how servitization will evolve in the era of industry 4.0. In this chapter, we specifically have an interest of servitization as a strategy in supply chain management and seeing the understanding of servitization in the frame of supply chain management. Looking at the enablers of industry 4.0 (Rüssman et al., 2015), there is little evidence in the literature that servitization meets industry 4.0 in supply chain management. Servitization has been developing and there are quite many literature review articles and case studies published in top journals in the field.

Our sample came up with limited number of articles where servitization meets supply chain management; however, creating ecosystem might need collaboration and integration of process among the members in a supply chain. Therefore, we believe that servitization can be studied by adopting different theoretical approaches (e.g. Ambroise et al., 2018) from other fields as this has become one of the ways of conceptualizing supply chain management.

Furthermore, as the world is becoming more digitalized, digital tools (e.g. big data, cloud computing, etc.) are utilized during the transformation process of companies from a product-centric to a service-centric logic (Kowalkowski et al., 2017a) which is called digital servitization. However, apart from some exceptions (See Sklyar et al., 2019), and as the results of this study demonstrates, there are still limited number of studies looking for the process of servitization in the era of Industry 4.0, or addresses the question of how digital tools could be utilized during servitization for creating sustainable competitive advantage. Moreover, with digital transformation, everything becomes interlinked, which requires further need to collaborate with other actors in supply chains/value chains/ ecosystems/networks. Therefore, by focusing on diverse methodologies, and industries, future research is still needed on the process of servitization with a multi-actor focus in the era of Industry 4.0.

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KEY TERMS AND DEFINITIONS

Digital Servitization: A process of shifting from product-centric logic to service-centric logic by providing bundles of products, services, and digital tools (e.g., big data, cloud computing, etc.) to develop value for customers.

Industry 4.0: The present trend of high utilization of automation and data exchange during manufacturing products.

Integrated Solutions: The bundles of products and services to maintain competitive position in the market.

Service: Intangible offerings of companies that hold IHIP characteristics (intangibility, heterogeneity, inseparability, and perishability).

Service-Dominant Logic: A logic that highlights intangibles, know-how, and skills as the key factor during transactions.

Servitization: A process of shifting from product-centric logic to service-centric logic by providing bundles of products and services in order to create value for customers.

Supply Chain Management: Chain of three or more organizations directly included in both upstream and downstream flows of products, services, cash, and information from the point of origin (e.g., supplier) to the ultimate consumer.

Chapter 27

How to Tax a Monopoly Platform in a Product Differentiation Set-Up?

A Primer Based on Salop's Circular City Model

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ABSTRACT

The chapter models a monopoly platform with buyers on one side and sellers on the other. The platform charges some combination of a fixed membership fee and a variable usage fee from both the sides and the buyers are heterogeneous in terms of the per unit benefit they derive on the transaction of the product. In this digital era of IT-based business ecosystems, the big names in the digital business market have been accused of serious tax avoidance in countries where they operate. In this backdrop, the author introduces a baseline monopoly platform model for policy making purposes, incorporating both ad valorem and specific taxes on the buyers' side of the platform alone. But the results can be similarly interpreted for the seller side as well, without any loss of generality. The chapter gives us insights as to whether there is any cross-side externality working in the presence of product differentiation in standard monopoly platform models.

INTRODUCTION

The Internet is a nearly perfect market because information is instantaneous, and buyers can compare the offerings of sellers worldwide. The result is fierce price competition, dwindling product differentiation, and vanishing brand loyalty. — (Robert Kuttner in Business Week, May 1998)

DOI: 10.4018/978-1-7998-1125-1.ch027

How to Tax a Monopoly Platform in a Product Differentiation Set-Up?

In view of the preceding quote, the author raises a simple question that is the internet really a nearly perfect market with “dwindling product differentiation”? This is hard to answer, because such estimation requires data which is not readily available. But, at least, one can theoretically model it in the context of a platform. In this context, platforms or networks operate in a framework where market structures are grossly different. Say, for example, one can think of Google and Facebook as near monopolists who provide their services for free; however, smartphones and video game consoles are generally priced well above zero (Jeitschko & Tremblay, 2013). But, when it comes to experience goods like clothes and shoes, these can be differentiated by feature and quality while for meat, fish, fruits, vegetables and other perishable goods product differentiation does not really exist as these are typically homogeneous. Given their relevance and the variety of pricing strategies used, it is important for these markets to be thoroughly understood. This motivates the issue of the extent of price variation that happens through product differentiation across the platform medium.

E-commerce sector has been the most sought after two sided platform at present. Names like — Flipkart, eBay, Snapdeal, Amazon, etc. now a days are familiar with every household. The giant leaps that these online platforms are taking, have made them the backbone of the service sector in most developing economies. The latest advances in information technology and its related applications in the strategic design of online business models have broader impacts on policy making than before. Here comes an important issue which warrants immediate attention — how to tax these platforms. Within the service sector, these platforms stand out as glaring example of segments which are inadequately taxed: globally very little tax revenue is collected from the online marketplace. More so, this has come to the limelight after the financial crisis of 2008 and the global recession in 2010 as the governments across the globe are facing a severe constraint in financing their expenditure. Countries’ across the globe have had different experiences when it comes to taxation of platforms. Say, in countries, like France, Italy, UK, some kind of a “Google Tax” on online transactions was proposed but eventually was rolled back. Developing countries like China and India have similar experiences. China had an import tax (of an ad valorem nature) on cross-border e-commerce retail imports which has now been scrapped. In India, after the introduction of Goods and Services Tax (GST) and effective since June 2016, for the sellers to advertise in these online platforms, there is an “Equalization Levy” charged at the rate of 6 per cent if the cost of advertisement exceeds rupees one lakhs.

The firms which are on the sellers’ side sell horizontally differentiated products and compete for buyers who are on the buyers’ side, mapped in the form of a circle on the platform as in Salop (1979). In this paper, the platform charges a combination of fixed membership fees and per unit usage fee contrary to many recent works like Belleflamme and Peitz (2019). This structure can be generalized where the platform suppose does not charge either the fixed fee or the variable fee. To develop the model on the spirit of theory of optimum commodity taxation, the author introduces both ad valorem and specific tax on the buyer’s side of the platform alone. However, the results are identically similar had the tax been imposed on the seller side like the case of India. The results in the presence of product differentiation, however, follows the standard results for monopoly with the imposition of tax, in contrast to the counterintuitive propositions by Belleflamme and Toulemonde (2016), Tremblay (2016) among others, based on the existence of network effects.

To motivate the example of monopoly platforms with differentiated products, one can think of a yellow pages directory of an incumbent telephone company. As Smet and Cayseele (2010) puts it,

A publisher is faced with two distinctly different demands: users searching for a good or service and firms announcing their goods or service to potential users... A publisher can choose to offer an undifferentiated product, ... Though, this is not what we observe in reality. Advertisers can select one out of many possibilities to join the platform: buy a small or large ad, buy a colour or black and white ad, add only text or also a picture."

This is basically how the advertisers design their ads to target the buyers who have a preference for differentiated products.

Though there are papers on platform differentiation already existing in the literature (Jeitschko & Tremblay, 2013), the research on taxation of two-sided platforms in a set-up where sellers sell differentiated products so far has remained mostly unexplored. Some recent papers like — Belleflamme and Toulemonde (2016) have reported counter intuitive results like imposition of a higher tax on the platform transaction may actually be a boon for the platform through strategic complementarities i.e. effect on the platform's profit through the modification of the other platform's equilibrium prices. However, Belleflamme and Toulemonde (2016) in their paper derived this result in the case of competing platforms. This paper makes an attempt to explore the incidence of taxation on a monopoly platform, i.e. what happens if these advertisements on the monopoly platform from the seller side are taxed or for that matter, if taxes are imposed on the platform's collection from the buyer side in the presence of platform differentiation. While the Laffer curve effect holds for both the types of taxes, given the efficiency level of the platform, for ad valorem tax the revenue is maximized at a higher rate than in the case of specific tax.

The rest of the paper goes as follows. Section 2 describes the existing works in the context of platform models. Section 3 develops the basic model of a two-sided market of buyers and firms where both the sides single-home as consistent with the idea of a monopoly platform. The author analyzes the model and determines the equilibrium number of buyers and sellers along with the comparative statics of efficiency. This is followed by the taxation narrative and what whether to go for specific tax or ad valorem tax. Section 4 concludes.

BACKGROUND: REVIEWS FROM THE EXISTING LITERATURE

The existing literature on economics of platforms can be broadly classified under two heads. First, there are studies, both theoretical and empirical, but mostly industry specific. The payment card industry in particular, has been the subject matter in Rochet and Tirole (2002), Schmalensee (2002), McAndrews and Wang (2007), Rochet and Tirole (2008) among others. Caillaud and Jullien (2001), Ellison et al. (2004), Jullien (2005) and Katsamakos and Bakos (2008) evaluate internet intermediary platforms. Studies by Ferrando et al. (2003) and Jeon et al. (2004) focus on the media and telecommunications sector. Schmalensee and Evans (2007) and Rysman (2009) deliberated on a strategy for the newspaper and payment cards industry, in particular. Moving to the existing empirical literature on two sided platforms, primary survey based studies have happened mostly in the context of different aspects of the US economy like books market, computer brands (like HP, Acer, IBM etc.), credit cards, etc. (see Goolsbee, 2000; Brynjolfsson & Smith, 2000; Goolsbee 2000a; Evans, 2003).

The other branch, in general, talks about theoretical studies on pricing theory of competing two sided platforms. The papers include Rochet and Tirole (2003; 2006), Caillaud and Jullien (2003), Armstrong (2006), Hagiu (2007; 2009) and Weyl (2010) among others. Rochet and Tirole (2003) constructs a game

where a platform decides on charges both on the buyer side and the seller side in the first period followed by a simultaneous move game on deciding about joining the platform between the agents on the buyer and the seller side in the subsequent period. Clearly, their paper highlights the essence of membership fees in the pricing structure of a platform. The problem is that neither the buyer side nor the seller side will join the platform until and unless the other side under consideration is suitably large. Caillaud and Jullien (2003) have termed this problem as the celebrated “Chicken-and-Egg-Problem” where both sides of the market affect each other and no side can emerge without the other. However, Caillaud and Jullien (2003) did not offer any clarification on how to resolve this “Chicken-and-Egg-Problem”. The celebrated “Chicken-and-Egg-Problem” was theoretically solved by Hagiu (2006) where he develops a model in which the sellers first decide on joining the platform followed by the buyers. Hagiu (2006) also points out that the basis of the “Chicken and Egg” problem lies in the asymmetry of information between the agents on both the buyer and the seller side. However, given the frenzied pace of revolution in information technology it seems that asymmetry of information argument is not tenable as both the buyers and the sellers know that there is a market on the other side and the simultaneous move in joining the platform is very reasonable. The present paper departs from this idea in the literature by relaxing the sequential move assumption on buyers’ and sellers’ decision of joining the platform and sticks to the simultaneous move situation. Armstrong (2006) in the process of comparing equilibrium prices, stress on the extent of cross group externalities on the platform. The literature on introducing product differentiation on a platform starts with the work by Hagiu (2009) wherein he fits product variety in the framework proposed by Armstrong (2006). Two major results proposed by Hagiu (2009) are — first, in the case of a monopoly platform, stronger preferences for product variety make products less substitutable thereby strategically helping the platform to make bigger profits on sellers as opposed to the buyers. Second, in case of competing platforms, more love for variety on part of the buyers reduces the effectiveness of the platform’s price cutting strategy on the buyer side.

Moving on to the taxation issue on a two-sided platform, Kind, Koethenbuerger and Schjelderup (2008, 2009, 2010) assessed the impact of ad valorem and unit taxes on both the viewer and the advertiser in case of competing advertising mediums. In their 2010 paper, they show that the imposition of a higher ad valorem tax on the buyers’ side does not necessarily lead to a hike in the price charged by the platforms from the buyer side and quite interestingly, Belleflamme and Toulemonde (2016) obtains the same result using unit tax in the context of accommodation platforms in USA like Airbnb, homestay, etc.. Also, Belleflamme and Toulemonde (2016) comes up with a novel conclusion in the context of competition between two platforms. Their results show that imposing a specific tax on one of the competing platforms may end up increasing the profit of the taxed platform (which they have called ‘lucky break’) or reducing it twice (called ‘double jeopardy’). Their results show that given the media industry operates in a two-sided market, low VAT rates may actually lead to the newspaper prices being higher and investments in journalism lower than what would otherwise have been the case. In the context of a digital monopoly platform, Bourreau, Caillaud and De Nijs (2016) have shown that imposition of an ad valorem tax is passed onto sellers’ side (the advertisers) and not on the buyers when there is no charge for data usage on the buyers’ side. Nevertheless, at the initial equilibrium if the platform charges subscription fees from the users on the buyer side then the effect of an increase in ad valorem taxes on the platform’s profit gets passed on to both the sides. The present study, unlike its predecessors, looks at the implementation of the two alternative taxation schemes and its impact on the government’s revenue collections and the dead weight loss in the context for a two-sided monopoly platform in the presence of sellers selling differentiated products.

THE BASELINE MODEL AND RESULTS

Consider a two-sided market. The two sides of the market are denoted by B and S where, B stands for the buyers' side and S stands for the sellers' side of it. The measure of buyers, N_B and the measure of sellers, N_S is 1. The market is served by a monopoly platform which uses a two-part tariff pricing structure and charges end-users on each side of the platform, a variable usage fee (*ex post*), a_i ($\forall i=B,S$) per unit of transaction and a fixed membership fee¹ (*ex ante*) A_i ($\forall i=B,S$). Here, the author assumes that the platform sets the per-interaction price (i.e. a menu of fixed membership fee and variable usage fee) following Rochet and Tirole (2006) as,

$$P_S = a_S + \frac{A_S}{N_B} \text{ for buyers and} \quad (1)$$

$$P_S = a_S + \frac{A_S}{N_B} \text{ for sellers} \quad (2)$$

Since the average fixed fee falls with the number of agents on the opposite side of the platform, a positive network externality is generated on each side of the platform from the other side. The number of buyers to the platform on the buyers' side is given by N_B and on the sellers' side is given by N_S . Also, it is assumed that no direct transaction between the buyers and the sellers is possible, it happens only through the platform. In this, lies the platform's role as an intermediary.

The firms which are on the sellers' side sell horizontally differentiated products and compete for buyers who are on the buyers' side, mapped in the form of a circle like in circular city model of Salop (1979). The author considers in the context of a platform, buyers who display preference for the utility gained from a particular brand's distinctiveness i.e. at the different points on the circumference of the circle, she gets to choose between horizontally differentiated products. Also, to ensure the free entry of symmetric firms in the context of platform markets, the use of circular city model is justified as opposed to the linear city model of Hotelling (1929). The sequence of decisions made in the model goes as follows. First, the monopoly platform decides about (P_B, P_S) . Then the firms and the buyers decide on whether to enter the platform or not. After entering the platform, the firm decides on the price P_i to be charged from the buyers taking into account their fixed costs of production, F and the fees paid to the platform. For simplicity, it is assumed that the N_S firms that have entered the platform locate themselves equidistantly around the circle. Next, these firms compete in prices to attract buyers. On the buyers' side, each consumer buys 1 unit of the product and the gross utility derived by a consumer located at the k^{th} location (see Figure 1) from buying the product is, v_k , which is uniformly distributed over the continuum $[0, 1]$ and the probability density function is given by, $f(v_k)=1$, for $0 \leq v_k \leq 1$. The cumulative density function in such a case becomes, $\phi(v_k)=v_k$ for $0 \leq v_k \leq 1$. But if she buys the product from a firm located at distance k , her utility falls by tk , where, t is the brand mis-specification parameter. Therefore, the net utility of a particular consumer k buying from firm i having usage benefit, v_k , is defined as,

$$u_B = v_k - tk - P_i - P_B \forall k \quad (3)$$

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where, P_i is the price charged by firm i . P_B is the per interaction price charged from buyers. From Figure 1, a consumer located at the k^{th} position can buy either from firm i or firm $(i+1)$ located to the right and left of it respectively, who are charging price P_i and P_{i+1} respectively. A consumer located at a distance k between firm i and firm $(i+1)$ is indifferent between buying from the two firms if the following equation holds,

$$v_k - tk - P_i - P_B = v_k - t\left(\frac{N_B}{N_S} - k\right) - P_{i+1} - P_B \quad (4)$$

Since the mass of buyers entering the platform is N_B , the circumference of the Salop circle in Figure 1 is given by N_B , so that the distance between any two firms on the platform, i and $(i+1)$ is given by $\frac{N_B}{N_S}$.

Equation (4) solves for,

$$k = \frac{1}{2} \left(\frac{P_{i+1} - P_i}{t} + \frac{N_B}{N_S} \right) \quad (5)$$

Substituting k in equation (3), the indirect utility function of the consumer located at k is derived as:

$$U_B = v_k - \frac{t}{2} \left(\frac{P_{i+1} - P_i}{t} + \frac{N_B}{N_S} \right) - P_i - P_B \quad (6)$$

To illustrate the existence of cross side externality, consider a rise in N_S given the value of N_B . This leads to an increase in the utility of the buyer. Since each consumer buys one unit of the product, $2k$ stands for the demand for firm i 's product.

Firm i 's profit is calculated as:

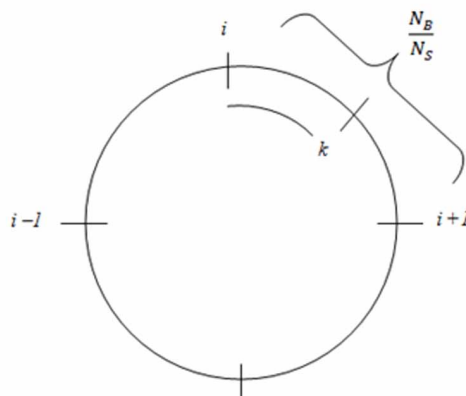
$$\pi_i = (P_i - c - P_S) \left(\frac{P_{i+1} - P_i}{t} + \frac{N_B}{N_S} \right) - F$$

where, P_S is the per interaction price charged by the platform from the firms on the seller side, c is the marginal cost of production and F is the fixed cost of production for firm i . After taking the first order conditions and imposing symmetry, $P = P_{i+1}$, the equilibrium prices are derived as,

$$P = \frac{N_B}{N_S} t + c + P_S \quad (7)$$

Figure 1. The Salop Circle

Source: Author' adaptation from Salop (1979, pp. 144)



Putting (6) in firm i 's profit function in (6) to derive firm i 's profit as,

$$\pi_{i+1} = \pi_i = \pi = \left[\left(\frac{N_B}{N_S} \right)^2 \times t \right] - F$$

As N_B goes up, π also goes up, given N_S , the cross-side externality on the seller side operates. In the free entry equilibrium the number of firms on the seller side is given by,

$$\pi = 0 \Rightarrow N_S = N_B \sqrt{\frac{t}{F}}, t < F. \quad (8)$$

It has been assumed that only those buyers with non-negative values of their net utility to join the platform and carry out transactions. This implies,

$$\begin{aligned} N_B &= F(U_B \geq 0) = F\left(v_k - \frac{t}{2} \left(\frac{P_{i+1} - P_i}{t} + \frac{N_B}{N_S} \right) - P_i - P_B \geq 0\right) \\ &= F\left(v_k \geq \frac{t}{2} \left(\frac{P_{i+1} - P_i}{t} + \frac{N_B}{N_S} \right) + \frac{N_B}{N_S} t + P_S + c + P_B\right) \because P = \frac{N_B}{N_S} t + c + P_S = 1 - F(v_k) \end{aligned} \quad (9)$$

from equation (7) where,

$$v_k = \left(\frac{3tN_B}{2N_S} \right) + c + P_S + P_B \quad \text{or,} \quad v_k = (1.5)\sqrt{tF} + c + P_S + P_B \because N_S = N_B \sqrt{\frac{t}{F}}$$

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from equation (8).

Therefore, from equation (9) the number of buyers who enter the platform are,

$$N_B = 1 - (1.5)\sqrt{tF} - c - P_S - P_B \quad (10)$$

The platform's profit is given by:

$$\pi = (P_B + P_S - \tilde{c}) N_B \quad (11)$$

The first term within brackets in the right-hand side of equation (11) denotes the per unit revenue earned from the buyer side of the market. Similarly, the second term within brackets represents the per unit revenue earned from the seller side. The marginal cost of arranging for a transaction between any two members on opposite sides is given by $\tilde{c}$. Thus, the term within brackets stands for the per unit net revenue earned from both the sides of the market and N_B represents the total number of transactions on the platform as N_B gives the circumference of the Salop circle. Also, it needs to be noted that a transaction is not complete unless a buyer meets a seller.

Using (10), the monopoly platform's problem can be written as maximization of,

$$\pi = (P_B + P_S - \tilde{c}) \left(1 - (1.5)\sqrt{tF} - c - P_S - P_B \right)$$

by choice of $\{\tilde{P}_B, \tilde{P}_S\}$.

Proposition 1: (i) *The per unit price charged on buyers' side is given by $\frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c}{4}$.* (ii)

The total number of transactions on a monopoly platform is given by

$$\tilde{N}_B = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{2}, (1.5)\sqrt{tF} < (1 - \tilde{c} - c) < 2 + (1.5)\sqrt{tF}.$$

The total number of sellers affiliating with the monopoly platform is given by

$$\tilde{N}_S = \sqrt{\frac{t}{F}} \left\{ \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{2} \right\}.$$

(iii) *The platform collects $\frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c}{2}$ per transaction.*

(iv) Platform earns a profit of $\left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{2} \right)^2$.

(v) At the equilibrium one unit reduction in the fixed membership fee increases the per unit usage fee by

$$\frac{2}{(1 - \tilde{c} - (1.5)\sqrt{tF} - c)} \sqrt{\frac{t}{F}} \text{ on the buyer side and}$$

$$\frac{2}{(1 - \tilde{c} - (1.5)\sqrt{tF} - c)} \text{ on the seller side of the platform.}$$

(v) **Proof:** (i) Assuming existence of an interior solution, the first order condition for platform's maximization exercise yields,

$$\frac{\partial \pi}{\partial P_B} = 0 \Leftrightarrow P_B + P_S - \tilde{c} = (1 - (1.5)\sqrt{tF} - c - P_S - P_B) \quad (12)$$

$$\frac{\partial \pi}{\partial P_S} = 0 \Leftrightarrow P_B + P_S - \tilde{c} = (1 - (1.5)\sqrt{tF} - c - P_S - P_B) \quad (13)$$

that solve for

$$\tilde{P}_B = \tilde{P}_S = P^* = \frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c}{4} > 0$$

(ii) The second part of the proposition follows by the substitution of $\tilde{P}_B$ and $\tilde{P}_S$ in (8) and (10) respectively to derive equilibrium $\tilde{N}_B$ and $\tilde{N}_S$. Similarly, adding up $\tilde{P}_B$ and $\tilde{P}_S$ to derive collection per transaction.

(iv) The equilibrium level of profit is derived from equation (11) by putting equilibrium values of $\tilde{P}_B$, $\tilde{P}_S$ and $\tilde{N}_B$.

(v) (ii) (v) Substituting $\tilde{N}_i$ in equation (1) and (2), given equilibrium value of P_i , $\forall i, j=B, S$; $i \neq j$ to obtain:

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$$da_s = -\frac{2}{(1-\tilde{c}-(1.5)\sqrt{tF}-c)}dA_s$$

Notice from proposition 1 above the equilibrium number of transactions, the collection of the platform per transaction and profit of the platform are derived as function of the unit cost of arranging transactions. In the comparative static exercise given below the author has derived the sensitivity of the equilibrium due to the change in the unit cost. Also notice that although the model can solve for the equilibrium prices charged on the two sides of the platform, it cannot derive the unique combination of per unit usage fee and fixed membership fee on either of the sides. However, on either side there exists a trade-off between the fixed fee and per unit usage fee charged by the platform: higher is the fixed fee, lower is the per unit usage fee. The last part of the proposition identifies the exact tradeoff that is going to exist at the equilibrium. The effect of one unit increase of the fixed membership fee gets multiplied by a factor of

$$\frac{2}{(1-\tilde{c}-(1.5)\sqrt{tF}-c)} \quad \text{and} \quad \frac{2}{(1-\tilde{c}-(1.5)\sqrt{tF}-c)}\sqrt{\frac{t}{F}}$$

for the seller and the buyer side respectively to decrease the rate of per unit usage fee. However, the rate of this decrease of per unit usage fee is higher on the buyer side when compared with the seller side as for sellers affiliating with the platform, the establishment costs are much less compared to what would have been very high otherwise. This makes the seller side relatively inflexible when compared with the buyer side.

Proposition 2a: *As the unit cost of servicing transactions on a platform rises i) the number of transactions on the platform falls; ii) the collection of the platform per transaction rises less than the rise in the unit cost; iii) the price rises on both the sides of the platform; iv) the profit of the platform falls; v) if the membership fee rises, the usage fee per transaction falls at a lower rate on the seller side as compared to the buyer side of the platform.*

Proof: It follows from proposition 1 that

$$\frac{d\tilde{N}_B}{d\tilde{c}} = -\frac{1}{2}, \quad \frac{d\tilde{N}_S}{d\tilde{c}} = -\frac{1}{2}\sqrt{\frac{t}{F}}, \quad \frac{d(\tilde{P}_B + \tilde{P}_S)}{d\tilde{c}} = \frac{1}{2}, \quad \frac{d\tilde{P}_B}{d\tilde{c}} = \frac{1}{4}, \quad \frac{d\tilde{P}_S}{d\tilde{c}} = \frac{1}{4}, \quad \frac{d\tilde{\pi}}{d\tilde{c}} = -\left(\frac{1-\tilde{c}-(1.5)\sqrt{tF}-c}{2}\right).$$

The statement of the last part of the proposition follows since

$$\sqrt{\frac{t}{F}} < 1 \quad \text{and} \quad da_B = -\frac{2}{(1-\tilde{c}-(1.5)\sqrt{tF}-c)}\sqrt{\frac{t}{F}}dA_B \quad \text{and} \quad da_S = -\frac{2}{(1-\tilde{c}-(1.5)\sqrt{tF}-c)}dA_S.$$

As the marginal cost of servicing each transaction on the platform rises, given the marginal benefit at the equilibrium, the profit maximizing monopoly platform prefers to restrict number of members of the platform on both the sides. Therefore, it reduces number of transactions on the platform. But in doing so it raises the price per transaction on the platform. Since the collection per transaction rises less than the rise in transaction cost, the profit of the platform falls. So proposition 2a predicts an inefficient platform will have a lower membership base and a lower profit. Also, if such a platform raises its fixed membership fee, per unit usage fee charged by it decreases at a lower rate on the seller side as compared to the buyer side of the platform.

Proposition 2b: *As the marginal cost of production goes up for the firms i) the number of buyers and sellers falls ii) the number of transactions on the platform falls; iii) the collection of the platform per transaction falls; iv) the price falls on both the sides of the platform; v) the profit of the platform falls.*

Proof: It follows from proposition 1 that

$$\frac{d\tilde{N}_B}{dc} = -\frac{1}{2}, \quad \frac{d\tilde{N}_S}{dc} = -\frac{1}{2} \sqrt{\frac{t}{F}}, \quad \frac{d(\tilde{P}_B + \tilde{P}_S)}{dc} = -\frac{1}{2}, \quad \frac{d\tilde{P}_B}{dc} = -\frac{1}{4}, \quad \frac{d\tilde{P}_S}{dc} = -\frac{1}{4}, \quad \frac{d\tilde{\pi}}{dc} = -\left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{2} \right).$$

As the marginal cost of production goes up for the firms, given the marginal revenue at the equilibrium, the profit maximizing firm's profit goes down and hence a lesser number of firms affiliate with the platform. This leads to two effects, viz., a direct effect i.e. a fall in the net utility derived by the buyer side with a rise in c coupled with an indirect effect, i.e. a lesser number of sellers also implies a lower net utility derived by each buyer due to the presence of the cross side externality effect as discussed earlier. Therefore, these two effects reduce the number of members on the buyer side which automatically reduces the number of transactions on the platform. On top of it, the platform's price per transaction on both the sides falls. As a result, the collection per transaction falls given the unit cost of servicing transactions on the platform in equilibrium thereby leading to a fall in the profit of the platform.

Proposition 2c: *As the fixed cost of producing a product by the seller rises i) the number of buyers falls but the number of sellers remain unchanged; ii) the number of transactions on the platform falls; iii) the collection of the platform per transaction falls; iv) the price falls on both the sides of the platform; v) the profit of the platform falls;*

Proof: It follows from proposition 1 that

$$\frac{d\tilde{N}_B}{dF} = -\frac{3}{8} \left(\frac{\sqrt{t}}{\sqrt{F}} \right), \quad \frac{d\tilde{N}_S}{dF} = \left[-\left(\frac{1 - \tilde{c} - c}{2} \right) \left(\frac{\sqrt{t}}{2F^{3/2}} \right) \right], \quad \frac{d(\tilde{P}_B + \tilde{P}_S)}{dF} = -\frac{3}{8} \left(\frac{\sqrt{t}}{\sqrt{F}} \right),$$

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$$\frac{d\tilde{P}_B}{dF} = -\frac{3}{16} \left(\frac{\sqrt{t}}{\sqrt{F}} \right), \quad \frac{d\tilde{P}_S}{dF} = -\frac{3}{16} \left(\frac{\sqrt{t}}{\sqrt{F}} \right), \quad \frac{d\tilde{\pi}}{dF} = - \left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{16} \right) \left(\frac{3\sqrt{t}}{\sqrt{F}} \right).$$

As the fixed cost of production for the firms goes up, there is a fall in the net utility derived by the buyers. This leads to a lesser number of buyers joining the platform. For the firms, indirectly, there is a fall in the marginal revenue (on account of the cross side externality effect) given the marginal cost at the equilibrium. This leads to a fall in the firms' profit and hence a fall in the number of firms joining the platform. The other results in proposition 2c can be obtained by similar reasoning as argued in proposition 2b.

Proposition 2d: *As the degree of mis-alignment parameter goes up, i.e. buyers don't get what they prefer and the associated cost goes up, i) the number of buyers and sellers falls; ii) the number of transactions on the platform falls; iii) the collection of the platform per transaction falls; iv) the price falls on both the sides of the platform; v) the profit of the platform falls;*

Proof: It follows from proposition 1 that

$$\frac{d\tilde{N}_B}{dt} = -\frac{3}{8} \left(\frac{\sqrt{F}}{\sqrt{t}} \right), \quad \frac{d\tilde{N}_S}{dt} = \frac{1 - \tilde{c} - 3\sqrt{tF} - c}{4\sqrt{tF}} < 0, \quad \frac{d(\tilde{P}_B + \tilde{P}_S)}{dt} = -\frac{3}{8} \left(\frac{\sqrt{F}}{\sqrt{t}} \right),$$

$$\frac{d\tilde{P}_B}{dt} = -\frac{3}{16} \left(\frac{\sqrt{F}}{\sqrt{t}} \right), \quad \frac{d\tilde{P}_S}{dt} = -\frac{3}{16} \left(\frac{\sqrt{F}}{\sqrt{t}} \right), \quad \frac{d\tilde{\pi}}{dt} = - \left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{16} \right) \left(\frac{3\sqrt{F}}{\sqrt{t}} \right).$$

As the degree of mis-alignment goes up, for the buyers there is a fall in their net utility derived. This reduces the number of buyers joining the platform. For a profit maximizing firm, as the number of buyers joining the platform falls there is a fall in the marginal revenue given the marginal cost at the equilibrium which brings down the level of profit for the firm. Hence, a fall in the number of firms joining the platform. This leads to a fall in the number of members on both the sides which automatically reduce the number of transactions on the platform. On top of it, the platform's price per transaction on both the sides falls. Since the collection per transaction falls given the unit cost of servicing transactions on the platform in equilibrium, there is a fall in the profit of the platform.

THE MODEL WITH TAXATION

Given the complementarity existing between both the buyer and the seller sides of the market, when the government imposes tax, what matters to the government is the effective per unit price that the platform charges on both the sides. The author defines, the effective per unit price as, $P_0 = P_B + P_S$. Now, consider the imposition of a tax on the effective per unit price the platform collects from both the sides. In particular, here, the paper considers two different kinds of taxes: an ad valorem tax charged at the rate of

$\theta \in (0,1)$ on the combined effective price charged by the platform; and similarly a specific tax $\theta \in (0,1)$. First, the case under ad valorem tax follows.

Ad Valorem Tax

With tax the buyer's price of the good becomes $P_0 = P_0(1+\theta)$ where, P_0 is the price received by the platform.

Consequently, the demand for the platform's service on the buyer's side is given by (from equation (10) above):

$$N_B^E = 1 - (1.5)\sqrt{tF} - c - P_0(1+\theta) \quad (14)$$

Using (8 and 14), the monopoly platform's problem can be written as maximization of

$$\pi = (P_0 - \tilde{c}) \left(1 - (1.5)\sqrt{tF} - c - P_0(1+\theta) \right) \quad (15)$$

which is maximized by choice of $\{\tilde{P}_0\}$. The platform's profit at the equilibrium is derived as $\tilde{\pi}$ by substituting $\tilde{P}_0$ in (15).

Proposition 3: (i) *The platform's collection is $\frac{1 + \tilde{c}(1+\theta) - (1.5)\sqrt{tF} - c}{2(1+\theta)}$ per transaction.* (ii) *The effective per unit price charged on buyers' side and sellers' side combined is given by*

$$\frac{1 + \tilde{c}(1+\theta) - (1.5)\sqrt{tF} - c + 2\theta(1+\theta)}{2(1+\theta)}.$$

(iii) *The total number of transactions on a monopoly platform is given by*

$$\tilde{N}_B = \frac{1 - \tilde{c}(1+\theta) - (1.5)\sqrt{tF} - c}{2}, \quad (1.5)\sqrt{tF} < (1 - \tilde{c}(1+\theta) - c) < 2 + (1.5)\sqrt{tF}.$$

The total number of sellers affiliating with the monopoly platform is given by

$$\tilde{N}_S = \sqrt{\frac{t}{F}} \left\{ \frac{1 - \tilde{c}(1+\theta) - (1.5)\sqrt{tF} - c}{2} \right\}.$$

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(iv) Platform earns a profit of $\pi = \frac{1}{1+\theta} \left(\frac{1-\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c}{2} \right)^2$.

(v) The government collects revenue of $\left[\theta \left(\frac{1-\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c}{2} \right) \right]$.

(v) **Proof:** (i) Assuming existence of an interior solution, the first order condition for platform's maximization exercise yields,

$$\frac{\partial \pi}{\partial P_0} = 0 \Leftrightarrow (P_0 - \tilde{c})(1+\theta) = (1 - (1.5)\sqrt{tF} - c - P_0(1+\theta)) \quad (16)$$

That solve for $\tilde{P}_0 = \frac{1+\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c}{2(1+\theta)} > 0$.

(ii) (ii) The effective per unit price charged on buyers' side and sellers' side combined is given by

$$\tilde{P}_0 + \theta = \frac{1+\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c+2\theta(1+\theta)}{2(1+\theta)}.$$

(iii) (iii) The number of transactions on the platform comes from equation (11) and given as

$$\tilde{N}_B = \frac{1-\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c}{2}; 0 < \tilde{N}_B < 1.$$

Putting $\tilde{N}_B$ in equation (5) to derive the equilibrium value of

$$\tilde{N}_S = \sqrt{\frac{t}{F}} \left\{ \frac{1-\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c}{2} \right\}.$$

The statement of the third part of the proposition follows.

(iv) Putting equilibrium value of $\tilde{P}_0$ in equation (12) to derive —

$$\tilde{\pi} = \frac{1}{1+\theta} \left(\frac{1-\tilde{c}(1+\theta)-(1.5)\sqrt{tF}-c}{2} \right)^2$$

(v) Total transaction revenue collected by the government is given by $\theta \tilde{N}_B$. Since

$$\tilde{N}_B = \frac{1 - \tilde{c}(1 + \theta) - (1.5)\sqrt{tF} - c}{2}$$

the statement of the fifth part of the proposition follows.

Notice from the proposition above that the imposition of ad valorem tax affects the price and the membership base on both the sellers' and the buyers' side of the market. This happens because of the complementarity that generates a cross-side externality between the two sides of the platform. In the comparative static exercise below, the sensitivity of the equilibrium due to the change in the tax rate has been derived.

Proposition 4: As the tax rate rises (i) the number of transactions on the platform falls; (ii) both the number of buyers and sellers falls; (iii) the combined effective price per unit charged on both the buyers' side as well as the sellers' side rises; (iv) the platform's collection per transaction falls; (v) the profit of the platform falls; (vi) government revenue rises (or falls) if and only if $\theta < \theta_{AD}$ ($\theta > \theta_{AD}$) where

$$\theta_{AD} = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{2\tilde{c}}$$

Proof: It follows from proposition 4 that $\frac{\partial \tilde{N}_B}{\partial \theta} = -\frac{\tilde{c}}{2}$. Also,

$$\frac{\partial \tilde{N}_S}{\partial \theta} = -\frac{\tilde{c}}{2} \sqrt{\frac{t}{F}}; \frac{\partial (\tilde{P}_0 + \theta)}{\partial \theta} = \frac{(1 + 2\theta + (1.5)\sqrt{tF} + c + 2\theta(1 + \theta))}{2(1 + \theta)^2}; \frac{\partial (\tilde{P}_0)}{\partial \theta} = -\frac{(1 - (1.5)\sqrt{tF} - c)}{2(1 + \theta)^2};$$

$$\frac{\partial \tilde{\pi}}{\partial \theta} = -\left(\frac{1 - \tilde{c}(1 + \theta) - (1.5)\sqrt{tF} - c}{2(1 + \theta)} \right)^2 - \tilde{c} \left(\frac{1 - \tilde{c}(1 + \theta) - (1.5)\sqrt{tF} - c}{(1 + \theta)} \right).$$

It is also known that

$$\frac{\partial (\theta \tilde{N}_B)}{\partial \theta} = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - 2\theta\tilde{c}}{2}$$

which is positive if and only if $\theta < \theta_{AD}$ and negative if and only if $\theta > \theta_{AD}$. The statement of the proposition follows.

A rise in the ad valorem tax rate leads to a fall in marginal benefit from choosing higher effective price per unit on both the buyers' side and sellers' side (follows from equations (16) above). However,

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the marginal costs do not change. Notice that, here, due to rise in 1 unit of tax rate effective per unit price charged by the platform rise by

$$\frac{(1 + 2\theta + (1.5)\sqrt{tF} + c + 2\theta(1 + \theta))}{2(1 + \theta)^2}$$

units which is more than the standard monopoly case. Therefore, equilibrium choice of both N_B and N_S falls, the total number of transactions falls and the combined effective price charged from agents on both sides of the platform rise. Interestingly, in spite of a greater rise in per unit price, the fall in membership base is exactly similar to the standard monopoly case. This happens due to the presence of the cross side complementarity existing between both the sides. Since the platform's collection per unit of transaction falls as the tax rate raises the effect on total revenue received by the government is ambiguous and the Laffer curve effect in the context of ad valorem tax is visible. The imposition of an ad valorem tax leads to a fall in the profit of the monopoly platform unambiguously. This result, however, does not support the case of "lucky break" proposed by Belleflamme and Toulemonde (2016).

Specific Tax

With tax the effective per unit price of the good becomes $P_0 = (P_0 + \theta)$ where P_0 is the price received by the platform. Consequently from equation (10) above the demand for the platform's service on the buyers' side becomes:

$$N_B^E = 1 - (1.5)\sqrt{tF} - c - P_0 - \theta \quad (17)$$

From equation (9) the monopoly platform's profit, now, is:

$$\pi = (P_0 - \tilde{c})(1 - (1.5)\sqrt{tF} - c - P_0 - \theta) \quad (18)$$

which is maximized by choice of $\{\tilde{P}_0\}$.

The platform's profit at the equilibrium is derived as $\tilde{\pi}'$ by substituting $\tilde{P}_0$ in (18).

Proposition 5: (i) The platform's collection is $\frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2}$ per transaction.

(ii) The effective per unit price charged on buyers' side and sellers' side combined is given by

$$\frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c + \theta}{2}.$$

(iii) The total number of transactions on a monopoly platform is given by

$$\tilde{N}_B = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2}, \quad (1.5)\sqrt{tF} < (1 - \tilde{c} - c - \theta) < 2 + (1.5)\sqrt{tF}.$$

The total number of sellers affiliating with the monopoly platform is given by

$$\tilde{N}_S = \sqrt{\frac{t}{F}} \left\{ \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2} \right\}.$$

(iv) Platform earns a profit of $\pi = \left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2} \right)^2$.

(v) The government collects revenue of $\left[\theta \left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2} \right) \right]$.

(v) **Proof:** (i) Assuming existence of an interior solution, the first order condition for platform's maximization exercise yields,

$$\frac{\partial \pi}{\partial P_0} = 0 \Leftrightarrow P_0 - \tilde{c} = (1 - (1.5)\sqrt{tF} - c - P_0 - \theta)$$

That solve for $\tilde{P}_0 = \frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2} > 0$.

(ii) (ii) The effective per unit price charged on buyers' side and sellers' side combined is given by

$$\tilde{P}_0 + \theta = \frac{1 + \tilde{c} - (1.5)\sqrt{tF} - c + \theta}{2}.$$

(iii) (iii) The number of transactions on the platform comes from equation (17) and given as

$$\tilde{N}_B = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2}; 0 < \tilde{N}_B < 1.$$

Putting $\tilde{N}_B$ in equation (8) to derive the equilibrium value of

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$$\tilde{N}_s = \sqrt{\frac{t}{F}} \left\{ \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2} \right\}.$$

The statement of the third part of the proposition follows.

(iv) Putting equilibrium value of $\tilde{P}_0$ in equation (18) to derive —

$$\pi = \left(\frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2} \right)^2$$

(v) Total transaction revenue collected by the government is given by $\theta \tilde{N}_B$. Since

$$\tilde{N}_B = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta}{2}$$

the statement of the fifth part of the proposition follows.

Notice from proposition above that similar to the case of ad valorem tax here also the imposition of tax affects both the sides of the platform which is due to the cross side externality existing between them, as already discussed. In the comparative static exercise below the author derives the sensitivity of the equilibrium due to the change in the tax rate.

Proposition 6: *As the tax rate rises (i) the number of transactions on the platform falls; (ii) both the number of buyers and sellers falls; (iii) the combined effective price per unit charged on both the buyers' side as well as the sellers' side rises; (iv) the platform's collection per transaction falls; (v) the profit of the platform falls; (vi) government revenue rises (or falls) if and only if $\theta < \theta_s$ ($\theta > \theta_s$) where*

$$\theta_s = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c}{2}$$

Proof: It follows from proposition 5 that $\frac{\partial \tilde{N}_B}{\partial \theta} = -\frac{1}{2}$. Also,

$$\frac{\partial \tilde{N}_s}{\partial \theta} = -\frac{1}{2} \sqrt{\frac{t}{F}}; \quad \frac{\partial (\tilde{P}_0 + \theta)}{\partial \theta} = \frac{1}{2}; \quad \frac{\partial (\tilde{P}_0)}{\partial \theta} = -\frac{1}{2}; \quad \frac{\partial \tilde{\pi}}{\partial \theta} = -\frac{1}{2} (1 - \tilde{c} - (1.5)\sqrt{tF} - c - \theta).$$

It is known that

$$\frac{\partial(\theta \tilde{N}_B)}{\partial \theta} = \frac{1 - \tilde{c} - (1.5)\sqrt{tF} - c - 2\theta}{2}$$

which is positive if and only if $\theta < \theta_s$ and negative if and only if $\theta > \theta_s$. The statement of the proposition follows.

The results derived in Proposition 6 from the imposition of specific tax are very similar to the results derived in Proposition 4 from imposition of ad valorem tax. As in the case of ad valorem tax, similarly, a rise in the specific tax rate leads to a fall in marginal benefit from choosing higher effective price per unit on both the buyers' side and sellers' side (it follows from equation 19 above). However, the marginal costs do not change. Notice that, here, due to rise in 1 unit of tax rate effective per unit price charged by the platform rise by $\frac{1}{2}$ units which is exactly similar to the standard monopoly case. Therefore, equilibrium choice of both N_B and N_S falls, the total number of transactions falls and the combined effective price charged from agents on both sides of the platform rise. Since the platform's collection per unit of transaction falls as the tax rate rises the effect on total revenue received by the government is ambiguous and a Laffer curve relation like in the case of ad valorem tax exists.

SOLUTIONS

Given the values of the different parameters of the proposed model, a unit rise in the specific tax rate results in relatively more deadweight loss as the total number of transactions falls when compared with the case of a unit rise in ad valorem tax rate. The per unit revenue collection of the government however shows Laffer curve behavior as the revenue is maximized at θ_{AD} and θ_s for ad valorem tax and specific tax respectively. Notice that given the parameter values, θ_{AD} is higher than θ_s which implies: if the tax rate is increased beyond θ_s even if in a specific tax regime government revenue collection starts falling, it continues to rise in an ad valorem tax regime. Therefore, the Laffer curve effect holds for both types of tax, given the different parameter values for ad valorem tax the revenue is maximized at a higher rate than in the case of specific tax. Also, the results can be similarly interpreted for the seller side as well, without any loss of generality.

FUTURE RESEARCH DIRECTIONS

To sum up, the paper highlights that for the purpose of policy making, ad valorem tax is more preferred to per unit tax. In this age of digital business ecosystems, designing a scheme for taxing platforms is a harder nut to crack, more so, when platforms make use of complex locational arrangements depending on the stringency of the tax compliance structure. This however, can be a part of future research where the monopoly platform chooses its place of operation depending on the tax compliance structure.

The framework of this model allows for other future extensions as well. The robustness of the current results can be checked by relaxing the assumption that those who join the platform must enter into a transaction. This extension on entry and exit can be modeled in the form of a two period game where in the first period the agents on both the buyer as well as the seller side (with product differentiation)

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decide on registering with a platform and in period 2 they decide on whether they are going to transact on the platform. This is logical because all those who register might not be willing to transact on the platform thereby deriving the conditions under which one comes across the co-existence of brick-mortar shops along with the online platforms. Also, the robustness of these results can be checked in terms of competing platforms.

CONCLUSION

The central objective of the paper is to study the incidence of two particular forms of commodity taxes *viz.* an ad valorem and a specific tax on a two sided monopoly platform where sellers sell differentiated products. The results are derived on the assumption that the agents on both the sides join the monopoly platform, say, the yellow pages directory of an incumbent telephone company to interact and are heterogeneous in terms of the per unit benefit they derive on the transaction of the product through the platform. Here, the model, can however, be generalized by structuring the membership fees according to the elasticity of both the sides are i.e. a finitely large number on any of the sides mean that the fees charged would be relatively very less. The major contribution lies in showing that the incidence of specific tax is exactly similar to the standard monopoly case except that the extent of deadweight loss is lower; the incidence of ad valorem tax comes with surprise. Given the positive network externality, in spite of a greater rise in per unit price, the fall in membership base is exactly similar to the standard monopoly case. While the Laffer curve effect holds for both types of tax, given the efficiency level of the platform for ad valorem tax the revenue is maximized at a higher rate than in the case of specific tax. In this context, for India, it is worth mentioning that the 6 per cent equalization levy will definitely lead to an increase in the government's revenue given the results derived in part vi) of Proposition 4 and Proposition 6.

ACKNOWLEDGMENT

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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KEY TERMS AND DEFINITIONS

Ad Valorem Tax: An *ad valorem* tax is a tax whose amount is based on the value of a transaction or of property. It is typically imposed at the time of a transaction, as in the case of a sales tax or value-added tax (VAT).

Experience Good: An experience good is a product or service where product characteristics, such as quality or price, are difficult to observe in advance, but these characteristics can be ascertained upon consumption.

Multi-Sided Platform: Multisided platforms are technologies, products or services that create value primarily by enabling direct interactions between two or more customer or participant groups which would have been otherwise very costly in exchange for some membership fee. Prominent examples of MSPs and the participants they connect include, — Alibaba.com, eBay, Taobao, and Rakuten (buyers and sellers); Airbnb (dwelling owners and renters); the Uber app (professional drivers and passengers); Facebook (users, advertisers, third-party game or content developers and affiliated third-party sites); Apple's iOS (application developers and users); Google's Android operating system, etc.

Network Effects: Network effects are those effects that an incremental participant (and participation) has on the value of the network to other participants.

Product Differentiation: Product differentiation is a marketing process that strives to identify and communicate the unique benefits or qualities of a product compared to its competitors.

How to Tax a Monopoly Platform in a Product Differentiation Set-Up?

Salop Circular City Model: A location (spatial) model refers to any monopolistic competition model in economics that demonstrates consumer preference for particular brands of goods and their locations. One of the most popular variants of the Hotelling's location model is Salop's circle model. Similar to the previous spatial representations, the circle model examines consumer preference with regards to the geographic location. However, Salop introduces two significant factors: 1) firms are located around a circle with no endpoints, and 2) it allows the consumer to choose a second, heterogeneous good.

Specific Tax: A per unit tax, or specific tax, is a tax that is defined as a fixed amount for each unit of a good or service sold.

Tax Avoidance: Tax avoidance is the use of legal methods to modify an individual's financial situation to lower the amount of income tax owed. This practice differs from tax evasion, which uses illegal methods, such as underreporting income to avoid paying taxes.

ENDNOTE

- ¹ The benefit of registration is that the members do not have to fill their identity details every time they log on the platform. So, it saves the buyers' transaction cost and herein comes the role of the platform as an intermediary. However, one can drop either the fixed fee or per unit usage fee as per country specificity for simplicity, without any loss of generality. Had there been a finitely large buyer (seller) side, one can manipulate the menu of P_b (P_s) accordingly without any change in the derived results.

Chapter 28

The Effects of Corporate Tax Rate on the Firm Performance

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ABSTRACT

The issue of taxation is one of the key subjects that draw the attention of both policymakers and business executives. This chapter investigates the effects of taxation on the firm performance by using an extensive data set from a panel of 738 companies for 16 different countries over the years between 2000 and 2016. The results suggest that the impact of corporate tax rates on firm performance is significantly negative. The results also show that financial crisis, development levels of countries, and size of firms have a significant effect on this relationship. The results are robust in terms of combining different sets of control variables. These findings are to guide the business executives in the decision-making process, which could increase the firm performance, and the results may help to improve the implementation of fiscal policy in the field of taxation.

INTRODUCTION

The issue of taxation and its effect on firm performance is one of the key issues that draw the attention of both policymakers and firm executives. Performance management in a firm is central to increasing firm performance and achieving goals. In addition, identifying the determinants of firm performance and arranging the resources according to these determinants is also essential. It makes easier for firms to set their goals in realistic terms and timeframes more efficiently.

According to Amendola et al. (2018), firm performance is one of the critical aspects of firm welfare.

The profits of firms translate into income for shareholders and generate spillover and multiplier effects at the individual, household, and economy-wide level. Profitable firms attract more investors and raise greater amounts of capital to finance larger and more sophisticated projects. Profitable firms also tend to employ more workers and have a greater impact on growth and poverty reduction. In this respect, detecting the determinants of firm performance is a way to assess the company's survival and development capability.

DOI: 10.4018/978-1-7998-1125-1.ch028

The Effects of Corporate Tax Rate on the Firm Performance

Studies in the business policy literature on firm performance can be classified into three categories. The first category focuses on the impact of firm-specific variables such as size, liquidity, leverage etc. For example, Stierwald (2009) focuses on the determinants of firm profitability using large Australian firms over the years 1995-2005 and shows that lagged profits, size and productivity level of firms have positive effects on firm profitability. In an effort to answer the question, “Does firm size affect the firm profitability?”, Dogan (2013) analyzes the 200 companies in Istanbul Stock Exchange in Turkey over the 2008-2011 period and uses return on asset as a profitability variable. The findings indicate that there is a positive relationship between firm size and profitability. While a firm’s age and leverage have a negative effect on profitability, liquidity has a positive effect on profitability. Goddart et al. (2005) focus on the determinants of profitability in Belgium, France, Spain, Italy and United Kingdom using a dynamic panel model for the years between 1993 and 2001. In the study, manufacturing and service sector firms are selected and return on asset is used for profitability variable. Their findings also show that size of firms affect profitability negatively. Liquidity and market share have a positive effect on profitability. There is a negative relationship between gearing ratio, which is defined as non-current liabilities plus loans divided by shareholder funds, and profitability. Hansen and Wernerfelt (1989) compare two different groups of determinants of firm performance. Return on asset is used for firm performance. Economic determinants are chosen as industry profitability, size of firms and market share. Organizational determinants are chosen as measures of the employee’s perception of how concerned the organization is with his welfare, work conditions and employee’s perception of relative emphasis on achieving aggressive goals or objectives. Their findings show that organizational determinants on firm performance are twice as effective as economic determinants. Also, Yurtoglu (2004) shows that, for permanent profits, firm characteristics should be taken into account rather than industry characteristics. Moreover, Degryse and Ongena (2001) examine the relationship between banks and firm profitability and conclude that firms with bilateral relationship with banks have much more profitability than those with multiple bank relationships.

The second category focuses on the impact of macroeconomic variables on firm performance such as interest rate, GDP, unemployment, inflation etc. For example, McNamara and Duncan (1995) investigate the relationship between firm performance and macroeconomic variables in Australia over the years between 1978 and 1991. They use data from 41 companies among the top 60 Australian companies and use return on asset (ROA) as a firm performance indicator. Their findings show that firm performance is affected by the prior year’s ROA. In addition, the findings show that there is a positive relationship between gross domestic product and firm performance, while there is a negative relationship between interest rate and firm performance.

McDonald (1999) examines the determinants of firm profitability in manufacturing firms in Australia over the 1984-1993 period. Their findings show that firm profitability is affected by macroeconomic variables. Especially, lagged profitability and unemployment are significant determinants of current profitability. In addition, inflation has a negative effect on firm profitability.

Kanwal and Nadeem (2013) focus on the relationship between macroeconomic variables and bank profitability in Pakistan during the 2001-2011 period using pooled ordinary least squares methodology. Return on equity (ROE), return on asset (ROA) and equity multiplier (EM) are used as firm profitability indicators. Also, inflation rate, real gross domestic product (GDP) and real interest rate are used as macroeconomic variables. They show that there is a significant and positive relationship between real interest rate and all profitability indicators (ROA, ROE and EM) while there is a negative relationship between inflation rate and all profitability indicators (ROA, ROE and EM). Moreover, there is a positive

and insignificant association between real gross domestic product and ROA, but there is a negative and insignificant association between ROE and EM.

Kiganda (2014) examines the effects of macroeconomic variables on the profitability of banks in Kenya during the years 2008-2012. Return on asset (ROA) is used as a firm performance indicator, and gross domestic product, inflation and exchange rate are used as macroeconomic variables. Their findings indicate that there is no significant relationship between the macroeconomic variables and the profitability of banks in Kenya.

Finally, the last category in the business policy literature examines the impact of both firm-specific and macroeconomic variables on firm performance. For example, Athanasoglou, Brissimis and Delis (2008) focus on the bank-specific, industry-specific and macroeconomic determinants of bank profitability in Greece during the 1985-2001 period. Return on asset (ROA) is used as a firm performance indicator. Their findings show that both business cycle and inflation have a positive and significant effect on ROA. In view of bank-specific determinants, capital and productivity growth have a positive and significant effect on profitability, while size has an insignificant effect on profitability. In the light of these considerations, the current chapter is an attempt to fill a gap in the literature by investigating the robust relationship between corporate tax rate and firm performance by using an extensive data set from a panel of 738 companies for 16 different countries over the years between 2000 and 2016. The results indicate that the impact of corporate tax rates on firm performance is significantly negative. Our results are robust in terms of combining different sets of control variables. These findings are to guide the business executives in the decisions making process, which could increase the firm performance, and the results may help to improve the implementation of fiscal policy in the field of taxation.

BACKGROUND

There are many studies in the business policy literature on firm performance. For example, Sufian and Chong (2008) focus on the determinants of bank profitability in the Philippines over the years 1990-2005. The findings show that bank-specific determinants of profitability such as size and credit risk have a negative effect on profitability and that capitalization affect profitability positively. In view of macroeconomic determinants of profitability, the findings indicate that there is negative relationship between inflation and profitability, while economic growth has no significant effect on profitability.

Alexiou and Sofoklis (2009) investigate the relationship between both macroeconomic and bank-specific variables and bank profitability in Greece over the 2000-2007 period. Their findings indicate that there is a statistically significant and positive relationship between inflation rate and profitability, while there is no relationship between gross domestic product and profitability.

Sufian and Habibullah (2009) examine the bank-specific and macroeconomic determinants of bank profitability in Chinese banking sector over the years 2000-2005. They find that liquidity, credit risk and capitalization have positive effects on the banks' profitability. In view of macroeconomic variables, there is a positive relationship between economic growth and bank profitability, while there is a negative relationship between growth in money supply and bank profitability. Also, Ali, Akhtar and Ahmed (2011) investigate the bank-specific and macroeconomic determinants of bank profitability in Pakistan commercial banks during the years 2006-2009. Return on equity (ROE) and return on asset (ROA) are used as profitability indicators. Their findings show that efficient asset management and economic growth have a positive and significant effect on all the profitability indicators (i.e., ROA and ROE). In addition,

high credit risk and capitalization affect return on asset negatively. Moreover, Lee (2014) focuses on the firm-specific and macroeconomic determinants of property-liability insurance industry in Taiwan over the years 1999-2009. When the return on asset (ROA) is used as profitability indicator, both economic growth and inflation rate affects profitability negatively. Saritas, Kangalli-Uyar and Gokce (2016) examine the bank-specific and macroeconomic determinants of bank profitability in Turkey over the years 2002-2013. Their findings show that current year inflation affects profitability positively. In addition, lagged profitability has a negative effect on current year profitability.

Taxes, particularly corporate taxes, have an impact on the economy and firms. There is considerable research on the relationship between corporate taxes and economic growth. Evidence suggests a negative relationship between corporate taxes and economic growth (Lee and Gordon, 2005; Johansson et al., 2009; Arnold et al., 2011; Dackehag and Hansson, 2012). Taxes have effects on firms and their decisions. Levine (1991) argues that tax policy could change investment decisions. Similarly, Graham (2003) indicates that taxes have effects on corporate financial decision. Also, empirical evidence shows that taxes affect multinational investments' location decision negatively (Coughlin et al., 1991; Hines, 1996; Merz et al., 2017). Moreover, Schweltnus and Arnold (2008) show that corporate taxes affect firm productivity and level of investments negatively. Likewise, Vartia (2008) and Johansson et al. (2009) find that increase in corporate tax rate decrease firms' investment levels and productivity. In their study of the effects of political connections on firm performance, Wu et al. (2012) find that *taxation is a channel through which the politically connected managers of private firms help to improve firm performance*.

Amendola et al. (2018) assess the fiscal policy, especially tax incentives, and firm performance relations in the Dominican Republic. The relationship between corporate tax incentives and firm performance is evaluated by panel data over the years 2006-2015. The proxies for firm performance are measures of liquidity, operating structure, profitability, capitalization, and turnover (liquidity, expenses to total assets, gross financial expenses to sales, return on assets, equity ratio, capitalization, turnover). Their findings indicate that corporate tax incentives affect firm's performance positively. In addition, unsteady tax treatment creates negative effects on economy by distorting competition.

Dabla-Norris et al. (2017) evaluate the relationship between tax administration and firm performance in emerging markets and developing economies. Their findings show that lower tax compliance costs provide hints about tax administration's quality and that a tax administration offering better quality services improves the firm performance and growth.

De Schoenmaker et al. (2014) investigate the municipal taxes' effects on firm performance and show that increase in municipal taxes decreases firm profitability. Mironov (2013) attempts to answer the question, "Does income diversion affects firm performance?" using Russian banking data. Corporate tax avoidance and evasion is important for firm performance. In fact, there is a negative relationship between income diversion and firm performance. Moreover, findings show that tighter tax enforcements can increase firm performance. Because of the tax evasion, ratios of revenue to assets and revenue per employee are used instead of common measures of firm performance such as return on asset and return on equity.

Kurawa and Saidu (2018) explore the relationship between corporate tax and firm performance in Nigeria for the 2006-2016 period. The data is collected from consumer goods firms, and return on assets is used as a firm performance variable. The findings suggest a negative but insignificant relationship between corporate tax and firm performance. In addition, firm size has a positive and significant impact on firm performance.

Lazar and Istrate (2018) focus on the relationship between corporate taxes and firm performance in Romania over the years 2000-2011. Return on asset is used as a profitability variable. Their findings show that there is a negative and significant relationship between corporate taxes and firm performance. In addition, tangibility, leverage and firm size have negative effects on firm performance, while lagged profitability, liquidity and growth (i.e., sales growth) have a positive effect.

Pitulice et al. (2016) focus on the relationship between corporate taxes and firm performance in 20 companies listed on the Bucharest Stock Exchange over the years 2012-2014, and they use return on asset as a performance variable. They find that an increase in corporate tax decreases firm's performance.

Belotti et al. (2016) investigate the effects of business property taxes on firm performance during the 2001-2010 period in Italy. They show that business property taxes have a negative effect on firm's employment, capital, sales and total factor productivity.

Gatsi et al (2013) investigate the effects of corporate tax rates on firms' performance in manufacturing firms in Ghana. Return on asset is used as a performance variable. They indicate that there is a negative relationship between corporate tax and firm performance. The size, age and growth of a firm have a positive effect on the firms' performance.

The current chapter is an attempt to fill a gap in the literature by investigating the robust relationship between corporate tax rate and firm performance by using an extensive data set from a panel of 738 companies for 16 different countries over the years between 2000 and 2016.

Data and Empirical Findings

The current chapter investigates the effects of corporate tax rates on firm performance by using panel data regression method for the 2000-2016 period. The analysis included 738 companies for 16 different countries. Table 1 shows these countries.

Table 2 presents the descriptive statistics for all the variables as dependent and independent in three variations as overall, within and between. Overall variation represents variation over years and across countries. Between variation refers to the variation between countries while within variation refers to the variation within each country (over years).

According to Table 2, the mean values for return on asset (ROA) and corporate tax rate (TR) are 4.51998 and 28.747060, respectively. The minimum values are -1952.5 for return on asset (ROA) and 12.7 for corporate tax rate (TR), while the maximum values are 177.3411 for return on asset (ROA)

Table 1. The countries

Belgium	Lithuania
Czech Republic	Netherland
Finland	Portugal
France	Sweden
Germany	Switzerland
Greece	Turkey
Hungary	United Kingdom
Japan	United States

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and 41.7 for corporate tax rate (TR). For return on asset (ROA), the standard deviation of the overall, between and within variations are 23.82511, 7.752013, and 22.32084, respectively. This suggests that we have less between variation from one country to the next than within variation, which means the variation of countries over years.

For corporate tax rate (TR), the standard deviation of the overall, between and within variations are 8.895083, 8.826719, and 2.858317, respectively. This means that we have more between variations from one country to the next than within variation.

The following panel data model is used to test this relationship [see Equation 1]. Panel data is a combination of data cross-section and time-series. It means the model depends on lots of observations. Thus, panel data methodology enhances the degree of freedom and ensures a more reliable model with less multicollinearity problem than classical regression analysis. (Baltagi, 1995; Wooldridge, 2002).

The author adds GDP as a proxy for market size, GDP growth as a proxy for future potential of market, exchange rate as a proxy for international price, inflation as a proxy for macroeconomic stability, interest rate as a proxy for the opportunity cost of capital, unemployment as a proxy for labor availability, government budget balance as a proxy for fiscal policy, current account deficit as a proxy for fiscal foreign savings, return on asset as a proxy for firm performance, and return on equity as a proxy for profitability. The data is derived from Thomson Reuters Data Stream, Taxation Trends in the EU (2016), and ZEW Final Report 2016 (Spengel, et al., 2016).

The author runs 6 different regressions with different sets of independent variables in each. The author does this in order to see the robustness of our estimates to the inclusion of different sets of control variables.

$$ROA_{it} = \beta_0 + B_1 TR_{it} + \sum_{k=2}^n \beta_k CV_{it} + \varepsilon_{it} \quad (1)$$

where

$$\sum_{k=2}^n \beta_k CV_{it} = B_2 ROE_{it} + B_3 EX_{it} + B_4 IR_{it} + B_5 INF_{it} + B_6 CA_{it} + B_7 GD_{it} + B_8 UN_{it} + B_9 GDP_{it} + B_{10} Growth_{it}$$

where for country i in year t , ROA_{it} stands for return on asset. The effective average corporate tax rate is used as an independent variable. Moreover, 9 sets of control variables are used in the regressions: return on equity (ROE_{it}), exchange rate (EX_{it}), interest rate (IR_{it}), inflation (INF_{it}), current account (CA_{it}), government budget balance (GB_{it}), unemployment (UN_{it}), gross domestic product (GDP_{it}), and growth ($Growth_{it}$). The author reports heteroscedasticity-consistent ordinary least squares estimates. In the regressions, the author uses the fixed effects estimator with country and year fixed effects as indicated by F test, LM test and Hausman test for econometric specifications.

Once return on asset (ROA_{it}) has been regressed on the set of different control variables in model 1 to model 6, the author expects to observe a negative relationship between corporate tax rate (TR_{it}) and firm performance (ROA_{it}) (see Schwellnus and Arnold, 2008; Vartia, 2008; Johansson et al., 2009; De Schoenmaker et al., 2014; Lazar and Istrate, 2018). Although it is not the primary concern of this study, in terms of control variables, there is ambiguity about their signs. There are studies in the literature

Table 2. Descriptive statistics

Variable	Variation	Mean	Std. Dev.	Min	Max
ROA	<i>overall</i>	4,51998	23,82511	-1952,5	177,3411
	<i>between</i>		7,752013	-143,978	41,64649
	<i>within</i>		22,32084	-1804	166,5097
ROE	<i>overall</i>	16,8103	891,3894	-4513,85	148543,6
	<i>between</i>		107,1514	-277,528	2622,425
	<i>within</i>		883,3253	-4392,94	145938
EX	<i>overall</i>	65,79776	86,19749	0,59	391,6957
	<i>between</i>		84,62174	1,179124	285,4919
	<i>within</i>		16,38511	-12,129	172,0016
IR	<i>overall</i>	4,844993	9,85675	-0,52	183,2
	<i>between</i>		5,514324	1,117	22,18381
	<i>within</i>		8,152879	-15,8388	166,9593
INF	<i>overall</i>	8,139858	42,10767	-100	100
	<i>between</i>		13,64393	-15,1809	40,5
	<i>within</i>		39,83907	-132,36	112,2207
CA	<i>overall</i>	5372,143	36130,28	-231477	83756,78
	<i>between</i>		33378,98	-126788	42598,73
	<i>within</i>		13769,12	-99317	65070,98
GD	<i>overall</i>	-28358,7	64695,86	-460457	211774
	<i>between</i>		38720,51	-135896	393,4118
	<i>within</i>		51018,72	-352920	319311,1
tax	<i>overall</i>	28,74706	8,895083	12,7	41,7
	<i>between</i>		8,826719	14,24706	39,875
	<i>within</i>		2,858317	20,48824	39,54118
UN	<i>overall</i>	2132,161	1993,442	99,3	14838,67
	<i>between</i>		1816,661	190,2981	9178,826
	<i>within</i>		689,4396	-1577,66	7792,002
GDP	<i>overall</i>	12,85161	3,015973	6,372569	19,88633
	<i>between</i>		3,124577	6,46234	19,69161
	<i>within</i>		0,110912	12,29728	13,36743

suggesting a negative relationship between return on asset (ROA_{it}) and inflation, interest rate, gross domestic product and growth (see McNamara and Duncan, 1995; McDonald, 1999; Kanwal and Nadeem, 2013), while there are also studies which find a positive relationship between return on asset (ROA_{it}) and inflation, interest rate, gross domestic product and growth (Athanasoglou, Brissimis and Delis, 2008; Sufian and Habibullah, 2009; Ali, Akhtar and Ahmed, 2011). On the other hand, there are other studies that find no significant effect between macroeconomic variables and firm performance (Sufian and Chong, 2008; Kiganda, 2014).

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This chapter reports the estimation results in Table 3 and 4. Six different regressions with different sets of independent variables in each are run. The author does this to see the robustness of our estimates to the inclusion of different sets of control variables. The author considers testing for the presence of heteroscedasticity and autocorrelation in the within estimated models and do correction to increase efficiency for all the models.

For all regression models, it is observed that corporate tax rate (TR_{it}) is significantly and negatively correlated with return on asset (ROA_{it}). A wide range of empirical literature also yields similar results on the relationship between corporate tax rate (TR_{it}) and return on asset (ROA_{it}).

Regarding the control variables, it is observed that interest rate, inflation and unemployment are significantly and positively correlated with return on asset (ROA_{it}), while exchange rate and current account are significantly and negatively correlated with return on asset (ROA_{it}). Moreover, growth is insignificant.

The Effect of Financial Crisis, Size, and Development Levels of Countries

In order to see the effect of financial crisis size and development levels of countries, the current chapter firstly divides the full sample into sub-samples according to non-crisis and crisis periods. For this, the author firstly estimates the models for the crisis period and re-estimates the same models for non-crisis period to compare the relationship between non-crisis and crisis period. The detection of crisis periods is a controversial issue in the literature. Following the existing literature, the crisis period is defined from 2007 to 2008 based on a news-based framework (Dungey and Gajurel, 2014; NBER 2010; Yalama, 2012). The results indicate that corporate tax rate (TR_{it}) is significantly and negatively correlated with return on asset (ROA_{it}) for all the models during the non-crisis period. Interestingly, however, the results indicate a far less significant relationship between corporate tax rate (TR_{it}) and return on asset (ROA_{it}) except for two cases during the crisis period. It might be concluded that corporate tax rate (TR_{it}) does not have a significant effect on firm performance during the crisis period. In other words, financial crisis has a significant effect on the relationship between corporate tax rate (TR_{it}) and return on asset (ROA_{it}).

This chapter also divides the full sample into two sub-samples according to size of firms: big firms and small firms. The results indicate that corporate tax rate (TR_{it}) is significantly and negatively correlated with return on asset (ROA_{it}) for big firms, which is consistent with the full sample data. Interestingly, however, the results dramatically change for small firms, indicating a significant and positive relationship between return on asset (ROA_{it}) and corporate tax rate (TR_{it}), which is not consistent with the full sample data. It could be concluded that the size of firms has a significant effect on the relationship between corporate tax rate (TR_{it}) and return on asset (ROA_{it}).

Finally, the current chapter divides the full sample into two sub-samples according to development levels of countries: developed¹ and developing² countries. The results indicate that corporate tax rate (TR_{it}) is significantly and negatively correlated with return on asset (ROA_{it}) for developed countries for all cases, which is consistent with the full sample data. Interestingly, however, the results slightly change for developing countries, indicating a significant and positive relationship between return on asset (ROA_{it}) and corporate tax rate (TR_{it}). It could be concluded that the development levels of countries has a significant effect on the relationship between corporate tax rate (TR_{it}) and return on asset (ROA_{it}).

Table 3. Regression results

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.000113* (2.21)		0.000122* (2.35)
EX	-0.0133*** (-15.29)	-0.0111*** (-12.18)	-0.0126*** (-14.93)
IR	0.156*** (8.53)		0.120*** (7.13)
INF	0.00610*** (4.10)	0.00473** (3.09)	0.00723*** (5.05)
CA	-0.0000219*** (-11.57)	-0.0000273*** (-17.40)	-0.0000248*** (-16.63)
GB	-0.00000172 (-1.60)	-0.000000876 (-0.89)	-0.00000194* (-2.13)
tax	-0.0451*** (-4.51)	-0.0371*** (-4.53)	-0.0322*** (-3.82)
UN	0.0000411 (1.01)	- -	
loggdp	-0.0631** (-3.08)	- -	
growth	- -	-0.439 (-0.37)	
_cons	6.849*** (15.58)	6.179*** (29.34)	5.708*** (21.93)
Obs	19412	20480	20336
Heteros. Test	3.2e+08 [0.0000]	6.9e+29 [0.0000]	1.1e+30 [0.0000]
Autocorr. Test	280.127 [0.0000]	287.091 [0.0000]	317.443 [0.0000]
Hausman Test	22.22 [0.0000]	69.43 [0.0000]	40.32 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

FUTURE RESEARCH DIRECTIONS

Future studies may contribute to the literature by expanding the scope of the data set. In addition, future studies may contribute to the literature describing the relationship between tax rates and firm perfor-

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Table 4. Regression results

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.000113*
			(2.18)
EX		-0.00579***	-0.0140***
		(-9.91)	(-16.06)
IR		0.0378*	0.161***
		(2.54)	(9.39)
INF	0.00623***	0.00688***	0.00732***
	(4.53)	(5.04)	(4.91)
CA		-0.0000294***	
		(-21.44)	
GB			-0.000000386
			(-0.36)
tax	-0.100***	-0.0239***	-0.0548***
	(-12.84)	(-3.32)	(-5.87)
UN	0.000436***		0.000330***
	(17.39)		(10.14)
loggdp	-0.0277		
	(-1.62)		
growth		0.846	
		(0.75)	
_cons	6.809***	5.418***	5.676***
	(18.75)	(23.22)	(20.50)
Obs	24146	25245	19412
Heteros. Test	2.2e+08 [0.0000]	1.1e+30 [0.0000]	3.6e+08 [0.0000]
Autocorr. Test	312.116 [0.0000]	350.551 [0.0000]	280.006 [0.0000]
Hausman Test	39.29 [0.0000]	64.21 [0.0000]	43.41 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

mance by focusing on the impact of different types of taxes, and on different characteristics of crises.

CONCLUSION

Taxation has a significant impact on both the micro economy and the macro economy of a country. Thus, taxation issue draws the attention of academics, policy makers and firm executives. The current chapter is an effort to explore the effect of corporate tax on firm performance using data from a panel of 738 companies for 16 different countries over the years between 2000 and 2016. The results indicate that the impact of corporate tax rates on firm performance is significantly negative. Our results are robust in terms of combining different sets of control variables.

The study concludes that financial crisis, development levels of countries and size of firms have a significant effect on the relationship between corporate tax rate and firm performance. These findings are to guide the business executives in the decision-making process and to increase the firm performance. Finally, the results may help to improve the implementation of fiscal policy in the field of taxation.

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KEY TERMS AND DEFINITIONS

Corporate Tax: A corporate tax is a direct tax imposed by a jurisdiction on the income or capital of corporations or similar legal entities.

Firm Performance: The firm performance is a term which may include organizational performance, functioning of the firm and outcomes of its operations.

Fiscal Policy: Fiscal policy refers to the use of government expenditures and tax policies to increase economic growth, reduce income inequality, and ensure economic stability.

Panel Data: Panel data is a combination of data cross-section and time-series. Panel data methodology ensures a more reliable model with less multicollinearity.

Profitability: Profitability is ability of a company to use its resources to generate revenues in excess of its expenditures.

Return on Asset (ROA): A profitability ratio that shows how efficiently a company can manage its assets to produce profits during a period.

Return on Equity (ROE): A profitability ratio that measures of a company's annual return divided by the value of its total shareholder's equity.

APPENDIX

Table 5. Regression results for crisis period

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.0469*** (14.28)		0.0516*** (15.87)
EX	-0.00672 (-1.53)	-0.0107* (-2.44)	-0.00526 (-1.26)
IR	0.298* (2.56)		0.264*** (6.32)
INF	0.00375 (0.76)	-0.00904 (-1.87)	-0.000353 (-0.08)
CA	-0.0000264*** (-4.32)	-0.0000236*** (-5.77)	-0.0000178*** (-4.55)
GB	-0.00000191 (-0.51)	0.00000311 (0.88)	0.00000172 (0.51)
tax	0.0530 (0.84)	-0.0532* (-1.97)	0.0415 (1.33)
UN	-0.000397 (-1.46)		
loggdp	-0.0362 (-0.29)		
growth		5.423 (1.19)	
_cons	3.909* (2.28)	8.810*** (13.46)	3.121** (3.11)
Obs	2263	2396	2390
Heteros. Test	1.0e+08 [0.0000]	4.3e+35 [0.0000]	2.0e+35 [0.0000]
Autocorr. Test	126.368 [0.0000]	182.447 [0.0000]	142.185 [0.0000]
Hausman Test	66.77 [0.0000]	19.26 [0.0017]	93.31 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 6. Regression results for crisis period

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.0479*** (14.57)
EX		-0.000850 (-0.43)	-0.00736 (-1.70)
IR		0.245*** (6.20)	0.150** (2.65)
INF	0.00297 (0.73)	-0.0000705 (-0.02)	0.000881 (0.18)
CA		-0.0000226*** (-6.85)	
GB			-0.000000280 (-0.08)
tax	-0.132*** (-3.77)	0.0222 (0.82)	-0.0760 (-1.46)
UN	0.000638*** (6.14)		0.000430** (2.69)
loggdp	0.191*** (3.53)		
growth		5.878 (1.35)	
_cons	6.726*** (5.04)	4.573*** (5.12)	6.561*** (4.49)
Obs	2956	3083	2263
Heteros. Test	4.5e+08 [0.0000]	6.3e+08 [0.0000]	7.2e+07 [0.0000]
Autocorr. Test	158.886 [0.0000]	182.013 [0.0000]	127.934 [0.0000]
Hausman Test	15.08 [0.0018]	17.91 [0.0031]	70.10 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

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Table 7. Regression results for non-crisis period

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.0000982*		0.000105*
	(1.98)		(2.10)
EX	-0.0117***	-0.0101***	-0.0113***
	(-13.24)	(-11.00)	(-13.28)
IR	0.0473*		0.00794
	(2.14)		(0.38)
INF	0.00352*	0.00397*	0.00520***
	(2.22)	(2.44)	(3.39)
CA	-0.0000222***	-0.0000268***	-0.0000268***
	(-10.47)	(-15.22)	(-16.02)
GB	-0.00000157	-0.00000224*	-0.00000278**
	(-1.40)	(-2.17)	(-2.95)
tax	-0.0641***	-0.0318***	-0.0556***
	(-6.26)	(-3.68)	(-6.37)
UN	0.0000979*		
	(2.35)		
loggdp	-0.0500*		
	(-2.41)		
growth		-0.201	
		(-0.17)	
_cons	7.237***	5.701***	6.527***
	(15.89)	(25.56)	(23.99)
Obs	17149	18084	17946
Heteros. Test	8.0e+08 [0.0000]	2.3e+34 [0.0000]	2.6e+08 [0.0000]
Autocorr. Test	198.062 [0.0000]	207.399 [0.0000]	220.531 [0.0000]
Hausman Test	78.31 [0.0000]	47.32 [0.0017]	50.10 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 8. Regression results for non-crisis period

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.0000972
			(1.95)
EX		-0.00446***	-0.0124***
		(-7.10)	(-14.03)
IR		-0.0794***	0.0722***
		(-4.53)	(3.44)
INF	0.00391**	0.00276	0.00543***
	(2.68)	(1.86)	(3.43)
CA		-0.0000317***	
		(-20.68)	
GB			-0.000000481
			(-0.43)
tax	-0.0836***	-0.0345***	-0.0743***
	(-10.52)	(-4.60)	(-7.79)
UN	0.000424***		0.000363***
	(16.60)		(10.89)
loggdp	-0.0562**		
	(-3.12)		
growth		1.012	
		(0.88)	
_cons	6.451***	5.879***	6.200***
	(17.08)	(24.03)	(21.57)
Obs	21190	22162	17149
Heteros. Test	1.1e+31 [0.0000]	5.3e+08 [0.0000]	3.3e+33 [0.0000]
Autocorr. Test	234.960 [0.0000]	260.727 [0.0000]	197.959 [0.0000]
Hausman Test	107.50 [0.0018]	110.98 [0.0031]	51.16 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

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Table 9. Regression results for big firms

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.102*** (47.28)		0.104*** (48.34)
EX	0.00618*** (6.87)	0.00303*** (3.32)	0.00534*** (6.50)
IR	-0.0753** (-2.92)		-0.0938*** (-3.85)
INF	-0.00101 (-0.84)	-0.000668 (-0.51)	-0.000829 (-0.70)
CA	-0.0000161*** (-11.97)	-0.0000261*** (-24.42)	-0.0000200*** (-18.84)
GB	0.000000480 (0.74)	-0.00000202** (-3.22)	-0.000000899 (-1.60)
tax	-0.0415*** (-5.02)	-0.0505*** (-7.15)	-0.0318*** (-4.29)
UN	0.000116*** (3.78)		
loggdp	-0.0425 (-1.64)		
growth		-1.712 (-0.81)	
_cons	3.990*** (9.37)	5.089*** (23.51)	3.431*** (12.89)
Obs	9037	9184	9160
Heteros. Test	2.9e+09 [0.0000]	2.2e+09 [0.0000]	5.2e+09 [0.0000]
Autocorr. Test	283.145 [0.0000]	269.638 [0.0000]	280.982 [0.0000]
Hausman Test	101.19 [0.0000]	35.51 [0.0000]	111.08 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 10. Regression results for big firms

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.104***
			(47.72)
EX		0.00296***	0.00385***
		(3.69)	(4.53)
IR		-0.0448*	0.00266
		(-1.99)	(0.11)
INF	0.00243*	0.000771	0.00125
	(1.99)	(0.64)	(1.05)
CA		-0.0000276***	
		(-27.29)	
GB			0.00000132*
			(2.04)
tax	-0.0742***	-0.0205**	-0.0499***
	(-12.80)	(-3.27)	(-6.01)
UN	0.000526***		0.000344***
	(27.01)		(14.57)
loggdp	0.129***		
	(6.09)		
growth		-0.791	
		(-0.39)	
_cons	2.837***	4.117***	3.048***
	(8.81)	(18.60)	(11.19)
Obs	10220	10427	9037
Heteros. Test	2.0e+08 [0.0000]	1.1e+08 [0.0000]	1.2e+10 [0.0000]
Autocorr. Test	298.293 [0.0000]	305.875 [0.0000]	286766 [0.0000]
Hausman Test	8.30 [0.0157]	38.90 [0.0000]	99.98 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

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Table 11. Regression results for small firms

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.0000971 (1.51)		0.000104 (1.63)
EX	-0.0202*** (-15.05)	-0.0153*** (-11.45)	-0.0174*** (-14.20)
IR	0.195*** (7.09)		0.126*** (5.52)
INF	0.0132*** (5.37)	0.0119*** (4.87)	0.0148*** (6.53)
CA	-0.0000351*** (-8.48)	-0.0000270*** (-7.27)	-0.0000286*** (-8.39)
GB	-0.00000750** (-2.85)	-0.00000422 (-1.84)	-0.00000489* (-2.34)
tax	-0.0258 (-0.90)	0.0681*** (4.00)	0.0448** (2.78)
UN	-0.000127 (-1.63)		
loggdp	-0.140** (-3.01)		
growth		-0.631 (-0.41)	
_cons	8.063*** (6.82)	4.305*** (11.13)	4.379*** (10.37)
Obs	10375	11296	11176
Heteros. Test	4.7e+29 [0.0000]	4.4e+07 [0.0000]	8.1e+29 [0.0000]
Autocorr. Test	216.172 [0.0000]	228.463 [0.0000]	248.399 [0.0000]
Hausman Test	7.83 [0.0980]	5.25 [0.2630]	6.33 [0.3870]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 12. Regression results for small firms

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.0000965
			(1.50)
EX		-0.00834***	-0.0185***
		(-10.75)	(-14.39)
IR		0.0161	0.157***
		(0.80)	(6.54)
INF	0.0158***	0.0134***	0.0147***
	(7.51)	(6.44)	(6.08)
CA		-0.0000293***	
		(-10.62)	
GB			-0.00000970***
			(-3.77)
tax	0.164***	0.0940***	0.0588**
	(7.37)	(6.53)	(3.25)
UN	0.000231***		0.000120
	(4.78)		(1.86)
loggdp	0.172***		
	(5.58)		
growth		0.320	
		(0.22)	
_cons	-1.037	3.578***	4.018***
	(-1.23)	(9.11)	(8.60)
Obs	13926	14818	10375
Heteros. Test	2.5e+07 [0.0000]	5.3e+29 [0.0000]	5.1e+29 [0.0000]
Autocorr. Test	249.336 [0.0000]	282.018 [0.0000]	216.143 [0.0000]
Hausman Test	59.77 [0.0000]	8.14 [0.1488]	10.048 [0.0628]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 13. Regression results for developing countries

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.0000468 (0.71)		0.0000491 (0.74)
EX	-0.0279*** (-3.52)	-0.00904*** (-3.87)	-0.00240 (-1.10)
IR	0.202*** (4.82)		0.251*** (7.66)
INF	0.00289 (0.75)	0.00313 (0.81)	0.00498 (1.52)
CA	-0.000112** (-2.95)	-0.0000549 (-1.90)	-0.000164*** (-6.30)
GB	-0.000191 (-0.45)	0.000535 (1.20)	0.000646 (1.69)
tax	-0.188** (-3.16)	0.129* (2.44)	-0.108* (-2.16)
UN	-0.00233*** (-6.49)		
loggdp	-0.298 (-1.32)		
growth		-0.314 (-0.19)	
_cons	18.42** (3.13)	2.726** (2.99)	4.356*** (5.58)
Obs	5370	6066	6003
Heteros. Test	2.6e+06 [0.0000]	7.8e+07 [0.0000]	2.7e+06 [0.0000]
Autocorr. Test	187.804 [0.0000]	217.383 [0.0000]	217.523 [0.0000]
Hausman Test	5.58 [0.2331]	6.59 [0.3607]	1.07 [0.9937]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 14. Regression results for developing countries

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.0000460
			(0.69)
EX		-0.00866***	-0.0276***
		(-6.37)	(-10.16)
IR		0.0653*	0.147***
		(2.56)	(4.45)
INF	0.00348	0.0116***	0.00550
	(1.14)	(3.93)	(1.49)
CA		-0.0000980***	
		(-4.33)	
GB			-0.000568
			(-1.38)
tax	0.187***	0.241***	-0.117*
	(5.17)	(7.08)	(-2.30)
UN	-0.00202***		-0.00238***
	(-8.90)		(-8.52)
loggdp	0.743***		
	(12.66)		
growth		0.507	
		(0.33)	
_cons	-7.426***	-0.269	13.08***
	(-5.81)	(-0.39)	(10.93)
Obs	7878	8489	5370
Heteros. Test	5.5e+07 [0.0000]	1.2e+06 [0.0000]	3.2e+06 [0.0000]
Autocorr. Test	248.512 [0.0000]	270.429 [0.0000]	187.950 [0.0000]
Hausman Test	30.95 [0.0000]	11.34 [0.0451]	10.52 [0.1610]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

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Table 15. Regression results for developed countries

	(1)	(2)	(3)
	ROA	ROA	ROA
ROE2	0.0236*** (30.72)		0.0242*** (31.53)
EX	-0.0121*** (-8.83)	-0.0144*** (-10.81)	-0.0133*** (-10.33)
IR	0.0983** (2.60)		0.0185 (0.52)
INF	0.00744*** (4.99)	0.00778*** (5.11)	0.00783*** (5.32)
CA	-0.0000144*** (-7.89)	-0.0000256*** (-19.01)	-0.0000231*** (-16.35)
GB	0.00000124 (1.34)	-0.00000242** (-3.06)	-0.00000240** (-3.07)
tax	-0.0906*** (-7.45)	-0.0745*** (-7.46)	-0.0580*** (-5.83)
UN	0.000306*** (6.87)		
loggdp	0.113** (3.08)		
growth		1.532 (0.39)	
_cons	5.405*** (10.02)	7.472*** (26.88)	6.484*** (20.33)
Obs	14042	14414	14333
Heteros. Test	8.8e+07 [0.0000]	7.7e+07 [0.0000]	9.5e+07 [0.0000]
Autocorr. Test	228.000 [0.0000]	248.765 [0.0000]	232.763 [0.0000]
Hausman Test	138.06 [0.0000]	65.67 [0.0000]	44.58 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

Table 16. Regression results for developed countries

	(4)	(5)	(6)
	ROA	ROA	ROA
ROE2			0.0239*** (31.04)
EX		-0.0136*** (-11.33)	-0.0135*** (-9.89)
IR		0.0631* (2.04)	0.191*** (5.66)
INF	0.00783*** (5.58)	0.00867*** (6.26)	0.00843*** (5.66)
CA		-0.0000263*** (-21.98)	
GB			0.00000127 (1.39)
tax	-0.202*** (-24.15)	-0.0337*** (-4.19)	-0.0947*** (-8.01)
UN	0.000680*** (27.56)		0.000447*** (14.09)
loggdp	0.158*** (5.68)		
growth		1.908 (0.51)	
_cons	7.224*** (20.77)	5.948*** (23.15)	6.403*** (18.90)
Obs	16268	16756	14042
Heteros. Test	2.2e+08 [0.0000]	2.1e+31 [0.0000]	9.1e+30 [0.0000]
Autocorr. Test	267.467 [0.0000]	282.715 [0.0000]	229.479 [0.0000]
Hausman Test	59.43 [0.0000]	13.68 [0.0178]	68.94 [0.0000]
Heteros. Test represents Modified Wald test for groupwise heteroskedasticity. Autocorr. Test represents Wooldridge test for autocorrelation in panel data. The author examine whether the presence of heteroscedasticity and autocorrelation in the Within estimated models. The author does this by using Modified Wald test for groupwise heteroskedasticity, and Wooldridge test for autocorrelation. The null hypotheses are rejected for all the models. Therefore, the author uses GLS estimator to increase efficiency of models. <i>t</i> statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.			

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Table 17. Company codes of DataStream

1332.T	4021.T	5411.T	6762.T	8035.T	9104.T	AIRP.PA	AYGAZ.IS	CCH.L
1333.T	4042.T	5413.T	6770.T	8053.T	9107.T	AKBNK.IS	AZN.L	CCL.L
1605.T	4043.T	5541.T	6773.T	8058.T	9202.T	AKENR.IS	AZN.ST	COLA.IS
1721.T	4061.T	5631.T	6841.T	8233.T	9301.T	AKSA.IS	BA.N	CEMTS.IS
1801.T	4063.T	5703.T	6857.T	8252.T	9412.T	AKSEN.IS	BABr.AT	CETV.PR
1802.T	4151.T	5706.T	6902.T	8253.T	9432.T	AKZO.AS	BAGFS.IS	CEZP.PR
1803.T	4183.T	5707.T	6952.T	8267.T	9433.T	ALARK.IS	BANVT.IS	CGCBV.HE
1808.T	4188.T	5711.T	6954.T	8303.T	9437.T	ALCTL.IS	BARC.L	CIGP.BU
1812.T	4208.T	5713.T	6971.T	8304.T	9501.T	ALFA.ST	BASFn.DE	CLEBI.IS
1925.T	4272.T	5714.T	6976.T	8306.T	9502.T	ALGYO.IS	BASFn.DE	COFB.BR
1928.T	4324.T	5715.T	6988.T	8308.T	9503.T	ALIVsdb.ST	BATS.L	COLR.BR
1963.T	4452.T	5801.T	7003.T	8309.T	9531.T	ALKIM.IS	BAYGn.DE	CONG.DE
2002.T	4502.T	5802.T	7004.T	8316.T	9532.T	ALSS.LS	BAYGn.DE	CORA.LS
2269.T	4503.T	5803.T	7011.T	8331.T	9602.T	ALVG.DE	BBVA.MC	CRDA.L
2282.T	4506.T	5901.T	7012.T	8354.T	9613.T	ALVG.DE	BCPLS	CRFSA.IS
2432.T	4507.T	6098.T	7013.T	8355.T	9681.T	AMCr.AT	BEIG.DE	CSCO.OQ
2501.T	4519.T	6103.T	7186.T	8411.T	9735.T	AMEAS.HE	BEKB.BR	CTT.LS
2502.T	4523.T	6113.T	7201.T	8601.T	9766.T	ANACM.IS	BIMAS.IS	CVX.N
2503.T	4543.T	6178.T	7202.T	8604.T	9983.T	ANELE.IS	BIZIM.IS	DAIGn.DE
2531.T	4568.T	6301.T	7203.T	8628.T	9984.T	ANEMr.AT	BJKAS.IS	DAIGn.DE
2768.T	4578.T	6302.T	7205.T	8630.T	AAPL.OQ	ANTO.L	BKOM.PR	DANO.PA
2801.T	4689.T	6305.T	7211.T	8725.T	ABB.ST	ANYB.BU	BLND.L	DANO.PA
2802.T	4704.T	6326.T	7261.T	8729.T	ABl.BR	APAM.AS	BMWG.DE	DB1Gn.DE
2871.T	4755.T	6361.T	7267.T	8750.T	ABl.BR	APG1L.VL	BMWG.DE	DBKGn.DE
2914.T	4901.T	6366.T	7269.T	8766.T	ABNd.AS	APPB.BU	BNPP.PA	DBKGn.DE
3086.T	4902.T	6367.T	7270.T	8795.T	ACBr.AT	ARCLK.IS	BNPP.PA	DEHr.AT
3099.T	4911.T	6471.T	7272.T	8801.T	ACCP.PA	ASELS.IS	BOAr.AT	DEVA.IS
3101.T	5002.T	6472.T	7731.T	8802.T	ACKB.BR	ASML.AS	BOL.ST	DIS.N
3103.T	5020.T	6473.T	7733.T	8804.T	AD.AS	ASML.AS	BOPr.AT	DLGD.L
3105.T	5101.T	6479.T	7735.T	8830.T	AD.AS	ASSAb.ST	BOUY.PA	DOAS.IS
3289.T	5108.T	6501.T	7751.T	9001.T	ADSGn.DE	ATCA.AS	BPL	DOHOL.IS
3382.T	5201.T	6503.T	7752.T	9005.T	ADSGn.DE	ATCOa.ST	BPOST.BR	DPWGn.DE
3401.T	5202.T	6504.T	7762.T	9007.T	AEFES.IS	ATCOb.ST	BRBY.L	DPWGn.DE
3402.T	5214.T	6506.T	7911.T	9008.T	AEGN.AS	ATOS.PA	BRISA.IS	DSMN.AS
3405.T	5232.T	6674.T	7912.T	9009.T	AFYON.IS	AUG1L.VL	BT.L	DTEGn.DE
3407.T	5233.T	6701.T	7951.T	9020.T	AGES.BR	AUTr.AT	CAGR.PA	DTEGn.DE
3436.T	5301.T	6702.T	8001.T	9021.T	AGNr.AT	AV.L	CAMr.AT	DWDP.N
3861.T	5332.T	6703.T	8002.T	9022.T	AHT.L	AVAr.AT	CAPP.PA	ECILC.IS
3863.T	5333.T	6724.T	8015.T	9062.T	AIR.PA	AXAF.PA	CARR.PA	EDPLS
4004.T	5401.T	6752.T	8028.T	9064.T	AIR.PA	AXAF.PA	CAT.N	EDPR.LS
4005.T	5406.T	6758.T	8031.T	9101.T	AIRP.PA	AXP.N	CBKG.DE	EEEr.AT

Table 18. Company codes of DataStream

EGEEN.IS	GBLB.BR	IBS.LS	KLUr.AT	MRK.N
EKGYO.IS	GDRB.BU	ICAG.L	KNEBV.HE	MSFT.OQ
ELISA.HE	GE.N	ICBCT.IS	KNFIL.VL	MT.AS
ELNr.AT	GETIb.ST	IFXGn.DE	KO.N	MT.AS
ELSRr.AT	GKN.L	IHG.L	KOFOL.PR	MTEL.BU
ELUXb.ST	GLEN.L	IHLAS.IS	KONU.BU	MUVGn.DE
EMAS.BU	GLPG.AS	IKTr.AT	KONYA.IS	MUVGn.DE
ENEL.MI	GLPG.AS	IMB.L	KORDS.IS	MYTr.AT
ENGIE.PA	GLYHO.IS	INC1L.VL	KOZAA.IS	NBA.LS
ENGIE.PA	GOLTS.IS	INGA.AS	KOZAL.IS	NBGr.AT
ENGIE.PA	GOODY.IS	INGA.AS	KPN.AS	NDA.ST
ENI.MI	GOZDE.IS	INGA.AS	KRDMD.IS	NDA1V.HE
ENKAL.IS	GRG1L.VL	INL1L.VL	KRIr.AT	NESTE.HE
EONGn.DE	GRIr.AT	INLr.AT	KRTr.AT	NETAS.IS
EONGn.DE	GS.N	INR1L.VL	LAMr.AT	NIRr.AT
ERBOS.IS	GSDHO.IS	INRr.AT	LEGD.PA	NKE.N
EREGL.IS	GSK.L	INTC.OQ	LHAG.DE	NMC.L
EREr.AT	GSPA.BU	INVEb.ST	LHN.PA	NN.AS
ERICb.ST	GSRAY.IS	IPEKE.IS	LIN1.DE	NOKIA.HE
ERST.PR	GTO.AS	IQTr.AT	LLOY.L	NOKIA.HE
ESSI.PA	GUB1L.VL	ISCTR.IS	LMDr.AT	NOS.LS
ESSI.PA	GUBRF.IS	ISGYO.IS	LNA1L.VL	NRE1V.HE
ESSITYb.ST	HALKB.IS	ISP.MI	LNS1L.VL	NVGR.LS
EURBr.AT	HD.N	ITV.L	LSE.L	ODAS.IS
EXCr.AT	HDFr.AT	ITX.MC	LVMH.PA	OLPr.AT
EXHO.PA	HEIG.DE	IVL1L.VL	LVMH.PA	OLTr.AT
EYDr.AT	HEIN.AS	IZMDC.IS	MCD.N	OLYr.AT
EZJ.L	HELr.AT	JMAT.L	MDCM.L	ONTEX.BR
FENER.IS	HEPr.AT	JMT.LS	METRO.IS	OPAr.AT
FERG.L	HLGYO.IS	JNJ.N	METSB.HE	OPUSG.BU
FHBK.BU	HMb.ST	JPM.N	METSO.HE	ORAN.PA
FINGb.ST	HNKG_p.DE	KARSN.IS	MGROS.IS	ORAN.PA
FMEG.DE	HRGV.L	KARTN.IS	MICP.PA	OREP.PA
FORTUM.HE	HRMr.AT	KBC.BR	MLSr.AT	OREP.PA
FREG.DE	HSBA.L	KCHOL.IS	MMM.N	ORNBV.HE
FREG.DE	HUH1V.HE	KCRA.HE	MOLB.BU	OTE1V.HE
FRLr.AT	HURGZ.IS	KESKOB.HE	MONET.PR	OTEr.AT
FROTO.IS	HYGr.AT	KGF.L	MORr.AT	OTKAR.IS
FTL.PA	IASr.AT	KINVb.ST	MOTA.LS	OTPB.BU
GALPLS	IBE.MC	KIPA.IS	MRCG.DE	OUT1V.HE
GARAN.IS	IBM.N	KLGYO.IS	MRFr.AT	PANP.BU

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Table 19. Company codes of DataStream

PER.PA	SAND.ST	STM.PA	UNH.N
PETKM.IS	SAPG.DE	SWEDa.ST	UNPE.PR
PEUP.PA	SAPG.DE	SWMA.ST	UNc.AS
PFE.N	SASA.IS	TABK.PR	UNc.AS
PG.N	SASY.PA	TATGD.IS	UPM.HE
PGSN.PR	SASY.PA	TAVHL.IS	UTRIL.VL
PGSUS.IS	SBMO.AS	TCELL.IS	UTX.N
PHG.AS	SCAb.ST	TEF.MC	V.N
PHG.AS	SCHN.PA	TEL1L.VL	VAKBN.IS
PHRA.LS	SCHN.PA	TEL2b.ST	VALMT.HE
PLAKR.AT	SDR.L	TELIA.ST	VL1L.VL
PLAr.AT	SEBa.ST	TELIA1.HE	VESTL.IS
PRKME.IS	SECUb.ST	TENr.AT	VIE.PA
PROX.BR	SELr.AT	THRr.AT	VIGR.PR
PRT.PA	SEM.LS	THYAO.IS	VIV.PA
PSMGn.DE	SGEF.PA	TIE1V.HE	VIV.PA
PTR1L.VL	SGEF.PA	TKAG.DE	VKGYO.IS
PTRr.AT	SGOB.PA	TKFEN.IS	VLOF.PA
PUBP.PA	SGOB.PA	TKNSA.IS	VLP1L.VL
PZV1L.VL	SHBa.ST	TMSN.IS	VNAa.DE
RABA.BU	SHPL	TNET.BR	VOD.L
RAND.AS	SIEGn.DE	TOASO.IS	VOLVb.ST
RB.L	SIEGn.DE	TOTF.PA	VOPA.AS
RBS.L	SISE.IS	TOTF.PA	VOWG_p.DE
RDSa.AS	SKAb.ST	TRCAS.IS	VOWG_p.DE
RDSa.L	SKBNK.IS	TRKCM.IS	VZ.N
RDSb.L	SKFb.ST	TRV.N	WABE.BU
RENA.PA	SKG.L	TSKB.IS	WLSNc.AS
RENE.LS	SKYB.L	TSPOR.IS	WMT.N
RIO.L	SN.L	TTKOM.IS	WPG.L
RRS.L	SODA.IS	TTNr.AT	WPPL
RSA.L	SOGN.PA	TTRAK.IS	WRT1V.HE
RSU1L.VL	SOGN.PA	TUIT.L	XOM.N
RTO.L	SOLB.BR	TUPRS.IS	YATAS.IS
RWEG.DE	SOLB.BR	TWSr.AT	YAZIC.IS
SAB1L.VL	SONAC.LS	UCB.BR	YKBNK.IS
SAF.PA	SPAr.AT	ULKER.IS	YSO.LS
SAF.PA	SPTT.PR	ULVR.L	YTY1V.HE
SAHOL.IS	SRSr.AT	UNBP.AS	ZMP1L.VL
SAMPO.HE	SSABa.ST	UNBP.AS	ZOREN.IS
SAN.MC	STERV.HE	UNBP.AS	ZWCG.BU

¹Belgium, Finland, France, Germany, Japan, Netherland, Portugal, Sweden, Switzerland, United Kingdom, United States

²Czech Republic, Greece, Hungary, Lithuania, Turkey.

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