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Digital Innovations for Customer Engagement, Management, and Organizational Improvement

Kamaljeet Sandhu

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Digital Innovations for Customer Engagement, Management, and Organizational Improvement

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Preface

The term "Digital and Digital Transformation" in recent times have a profound impact on many businesses, customers, employees, suppliers, and stakeholders. Organisations are categorised as Digitally-ready or Digitally-not ready. Leaders of organisations are fast steering companies towards where the business is Digitally-ready. For an organisation that is 'not' Digitally-ready and to become Digitally-ready is not an easy and straight forward task. Leadership & Management around the organisation have to deal with several issues simultaneously such as technical that is related to IT and non-technical that is related to people e.g. customers, employees, suppliers. Businesses that have adopted both technical and non-technical approach to Digital Service Innovation are successful, and many others are not successful. Main drivers of "Digital Business and Digital Transformation" are people.

The Digital Transformation empowers an organisation and its people, revolves around leadership and management and adoption techniques for digital service innovation. Digital transformation provides an organisation – private or public – to better leverage technology for the customer's, employees, and suppliers benefit and far reaching digital social impact on society through social media. Content development and use is driven by data for digital systems and are created by people. Digital Enterprises seeks to integrate complex processes and functions such as management, marketing, production, manufacturing, accounting & finance, customer relationship management, human resources, logistics, information technology, and many other activities as a core aspect of digital systems. Large investment into digital systems are guided which is based on value for money, real time digital services delivery online, cost effectiveness, and competition among firms to be digitally superior than the others and becoming digitally compliant.

Many governments are also digitalising their core functions and services delivery. Smart phones are increasingly popular and have become the standard platform for digital services delivery for banking, utilities, hospitality, travel, education, healthcare, government, social media, and many more. Organisations that are leading the drive to digitalisation are highly empowering people, as the drivers of digital systems are people creating content and its use, when the digital transformation succeeds people are empowered. This book is a good example of digital research in which every author has used digital tools provided by the publisher to make this book a success. At universities teaching, learning, and research are transformed into essential digital tools that are successfully adopted.

Digital system is not restricted to a particular academic domain, or a geographic region, or a particular industry, rather it is globally widespread phenomenon and merged with many other domains creating a self-evolving digital ecosystem. From traditional mortar brick to new start-up business, are harnessing the power of digital business as a cost-effective model to deliver goods, & services online 24/7. Digital business strategy is adopted for transforming business, for streamline processes, and making best use of technologies to enhance interaction with customers and employees and deliver excellent customer

experience in real time. This book covers a broad area of research for Digital business in which the core emphasis is to bind on important topics such as Leadership, Management, Adoption Techniques, and Service Innovation. These topics are considered important as it provides a clear and a forward-thinking direction for the readership on digital projects. Interesting case studies and empirical research are presented by the authors to demonstrate the importance of Digital Service Innovation.

THE DIGITAL RESEARCH, GLOBAL CHALLENGES, AND NEW DISCOVERIES

The key areas of digitalisation and global challenges are new and unique and requires new knowledge that is gained from a deep understanding of complex issues (technical e.g. technology related, and non-technical e.g. people related) that have been reported in this book. Digital business is not clearly understood at different levels of management and their leaderships (as many top leaders are not IT experts, and not many IT experts are not top leaders, the competencies required are very different), and there is incomplete information around it. The challenges become more complex when data that is required to power digital systems is either non-existent or digitally-not ready to provide useful solutions on a digital platform. The issues related to digital skills, software, hardware, data, internet connectivity, website interaction & access from different devices such as smartphones & tablets, and cybersecurity, also presents complex challenges for the leadership and management of digital service innovation.

The chapters in this book unravel important information, piece by piece, so that the readers can clearly understand, that is driving the requirements for digital transformation for healthcare, universities, banks, hospitality, computing, government and private sector institutions, new start-up, and many others. Prominent researchers have deeply examined areas of digital business models & strategy and have provided the readers with a clear understanding of important issues & challenges being studied, such as problems, literature and theory, research methodology, new research data findings, solutions and recommendations, and future research direction for Digital Service Innovation that adds to the discovery of new knowledge and direction for further research.

The journey for developing and completing this book is a long one in which all authors have made a valuable contribution to the body of new research knowledge, and adopted new research techniques to study the problems, and found innovative solutions to address those complicated problems. This study will be very useful for many researchers to build on new findings that have been reported in this book. This book will also serve as a valuable tool for many students, practitioners, government, managerial staff and other professionals to learn about new developments in digital transformation of business systems from a global perspective. International studies have been presented with important new findings from America, Australia, Asia, Europe, Africa & the Middle east, which demonstrates the far-reaching impact for Digital Service Innovation, and suggests that digital businesses are global and are continuously evolving online into new ecosystems in different parts of the world via internet.

ORGANIZATION OF THE BOOK

A brief description of each of the chapters follows:

Chapter 1 illustrates that business incubators (BIs) are property-based initiatives that provide nascent entrepreneurs access to a mix of business support services and networking opportunities. Those services are expected to foster the idea generation process from inception to commercialization, with the hope they will later develop into self-sustaining, thriving ventures. Digital technologies have enabled BIs to extend their support services, to include new digital services and to expand their geographical coverage, giving rise to the virtual business incubator (VBI). This chapter provides a detailed review of the BI from its origin until the emergence of the VBI, highlighting their main characteristics, differences and benefits. Furthermore, the author argues the view of the VBI as an extension of the BI is insufficient to fully understand its operations, value-added incubation services and contribution to venture success. Therefore, a novel conceptual framework to define the VBI is proposed.

Chapter 2 presents a case study for the application of the Effective Innovation Leadership-Model in a German mid-tier enterprise. Authors argue that Germany is running out of inventions and towards an economic recession. Since 1995, the term innovation leadership is getting increasing attention. Still, there exists no clear definition. The Effective Innovation Leadership (EIL)-Model resulted from a Ph.D. thesis and is grounded in the iteration of six data sets. It has been used in industry since 2014. This book chapter examines the application of the EIL-Model in one German middle-class enterprise in 2018/2019. Core challenges hindering the effectiveness of innovation leadership in the organizational context are people's support across functions and hierarchies as well as non-flexible structures. Especially negative pressure coming from an overvaluation of the shareholder, egos fighting for power, extensive drama triangular, fixed mindsets, and freeloaders hinder the effectiveness of innovation leadership. A comparison of the EIL-Model with rival theory shows that innovation leadership is close to entrepreneurial approaches and an integral part of innovation management.

Chapter 3 is based on the development of a theoretical model to evaluate customer satisfaction of Electronic Service (E-Services). In today advance development in Information Technology and Communication (ICT), customer satisfaction is increasingly recognized as an important aspect of online business activities and is considered as a key determinant for successful e-service. This introduces a new requirement to measure customer satisfaction as a factor for continuous business improvement. In this book chapter, first, all customer satisfaction dimensions are extracted from the literature. Then, the exploratory factor analysis is used to cluster the factors effectively, thereby, further analysis including content validity, discriminate, and constructive testing used to test the proposed survey instrument.

Chapter 4 investigates the digital impacts of user training and education and perceived usefulness on the ERP systems acceptance and the contribution of the ERP systems towards the improved financial performance of Saudi firms. The survey is conducted on the ERP users, who are working in the Saudi based companies. The ERP users are selected for the survey having been using the ERP modules for various digital tasks including finance and accounting, material management, human resource management, quality management and sales and distribution. The research findings show that digital training and perceived usefulness both have a positive relation with the acceptance of the ERP systems.

Chapter 5 examines E-procurement systems, that have been in place for over a decade, have begun incorporating digital tools like big data, cloud computing, Internet of Things, and data mining. Hence, there exists a rich literature on earlier e-procurement systems and advanced digitally enabled e-procurement systems. Existing literature on these systems addresses many research issues (e.g. adoption) associated

with e-procurement. However, one critical issue that has so far received no rigorous attention is about "unit of analysis", a methodological concern of importance, for e-procurement research context. Hence, the aim of this book chapter is twofold: a) to discuss how the notion of "unit of analysis" has been conceptualised in the e-procurement literature, and b) how its use has been justified by e-procurement scholars to address the research issues under investigation. Finally, the chapter provides several interesting findings, and outlines future research directions.

Chapter 6 reports that in the present era of globalization, Information Technology is an innovation opportunity for the management education system in Vietnam for transformation of a global competitive academic system. Many modern university business schools have introduced several features in the management education system by replacing the traditional model of curriculum- teacher-student by introducing problem-coach-problem solver, moral education, and competence-based techniques approach, etc. One of the most vital tools internationally accepted three decades ago is Problem Based Learning (PBL). It is an innovative & new instructional model, which needs to be active, self-directed, self-assessed, in small group, and partially tutored. Problem-based learning founded on the principle of "learning by doing in small group". This chapter presents how the PBL model can be innovatively introduced at the university's business school for management education system, and has made recommendations that focus in the areas, such as, system approach, objectives and constraints of Vietnam education system, learning, instructional model, design, and development of "soft skills" amongst student.

Chapter 7 articulates that digital learning technologies have changed the face of higher education sector and will carry on doing so, and how this sector can use them in our daily work at university. The universities are using the Digital LMS innovation (DLMS) tools that are unique to their environment. Different universities have different DLMS tools that are software driven and allow the users (management, instructors, and students) to use them for regular tasks. This study aims to investigate the acceptance and use of a DLMS at Jordanian universities. It also aims to examine the relationships among users (students and instructors), IT infrastructure, Jordanian culture, perceived usefulness (PU), perceived ease of use (PEOU), and Acceptance of a DLMS. The study focuses on conviction of the users to use the digital system in a way to simplify their regular tasks. Findings are reported from data that were collected from 326 DLMS users.

Chapter 8 describes the term gamification, which is derived from the game concept, is the use of game-design elements (e.g., points, badges, levels, achievements, and leader boards) in non-game contexts, often with the purpose of motivating and directing individuals' certain behaviors to achieve specific goals and outcomes. The contexts in which gamification is being researched and implemented include the following: education, health, marketing, human resources, social networks, logistics, etc. Many studies conducted in various domains tried to understand and explain how gamification can influence or foster individuals' motivation to conduct goal-directed behavior. In most of these conducted studies significant impact of gamification on human behavior has observed and proved. By presenting academic findings from literature and discussing real-world implementation examples from the relevant domain, this chapter assesses the role of gamification in e-commerce domain. This chapter shows how various game design elements can influence consumer behavior in different e-commerce platforms.

Chapter 9 reveals the advantages and disadvantages offered by internet banking to financial institutions and their customers as well as the reasons why customers use/do not use internet banking. For this purpose, customers' perspectives on internet banking are presented to the reader in the past and present by statistics. This research points out that many customers of the bank around the world still do not use the internet, hence internet banking is not an option. Therefore, in this study, suggestions are made to

enable the use of internet banking by the wider masses. In addition to internet banking, technological developments and digital innovations in the banking sector are mentioned in the section and the evolution of internet banking is pointed out.

Chapter 10 demonstrates the multivariate analyses results of the factors that influence students' acceptance and the continuance usage intention of digital learning analytics recommender systems at higher education institutions in Saudi Arabia. Data was collected from 353 Saudi Arabian university students via an online digital survey questionnaire. The research model was then used to examine the hypothesised relationships between user experiences of digital learning analytics recommender system and their intentions for long-term adoption of the system. The research model was primarily based on the Technology Acceptance Model (TAM) developed by Davis – adopting the variables 'perceived usefulness', 'perceived ease of use', and 'acceptance', particularly – with 'continuance usage intention' added as an endogenous construct, and with 'service quality' and 'user experience' added as external variables. Our findings confirmed that user experience positively and directly influenced perceived usefulness, and that service quality positively and directly affects perceived ease of use. Finally, user acceptance was found to positively and directly influence continuance usage intention.

Chapter 11 informs about an assessment for innovation performance as an important determinant of competition power and national progress. Beginning of major innovation, new firms are created to benefit from new technologies and investment and employment in the related industries is increasing. Venture capital (VC) plays an important role in financing venture businesses in the high technology sector. The VC market is now accessible at any point in history for ventures. Partly due to the rise of technical entrepreneur incubators, risk capitalists have spread throughout the spectrum. The new technology creates an almost constant balloon. Known as "Tech Bubble" or "Dot Com Bubble", was one of the biggest economic turmoil in the American stock market in the late '90s. Venture capital companies will be informed about market activity, price bubble history, risk capital and price bubbles.

Chapter 12 explains the deeper meaning of the term lifelong learning (LLL) which is the matter of discussion, then its features, benefits and limitations are also to be derived. In the era of digitization, digital learning is a buzz word for educating people irrespective of age. The concepts of digital learning must be clearly understood before embedding LLL in a digital environment. The contribution of web technology for the fusion of digital learning with LLL cannot be overlooked. To look deeper into it, a methodology is to be derived for LLL to best focus on the features. Framework for knowledge management (KM) has been proposed to create virtual learning communities (VLCs) which in turn will foster collaborative learning. Also, it is to be observed that by inducting the principles and practice of LLL in the digital environment, a blooming educational concept has erupted for the creation of knowledge society (KS). The chapter gives a clear discussion of LLL embedded in a digital learning environment.

Chapter 1
The Digital Value Propositions for Virtual Business Incubators

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ABSTRACT

Business incubators (BIs) are property-based initiatives that provide nascent entrepreneurs access to a mix of business support services and networking opportunities. These services are expected to foster the idea generation process from inception to commercialisation, with the hope they will later develop into self-sustaining, thriving ventures. Digital technologies have enabled BIs to extend their support services to include new digital services, and to expand their geographical coverage, giving rise to the virtual business incubator (VBI). This chapter provides a detailed review of the BI from its origin until the emergence of the VBI, highlighting their main characteristics, differences, and benefits. Furthermore, the author argues the view of the VBI as an extension of the BI is insufficient to fully understand its operations, value-added incubation services, and contribution to venture success. Therefore, a novel conceptual framework to define the VBI is proposed.

INTRODUCTION

The purpose of this chapter is to bring to light the value proposition presented by virtual business incubators (VBIs). Promoting innovation has become an increasingly important aspect of policies for stimulating and diversifying regional economies (Eriksson & McKelvey, 2005). This is reflected in the

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development of several business support programs and schemes to foster entrepreneurship and more importantly, to support the new venture creation process. In developed economies, small and medium size enterprises account for 99% of all firms and unsurprisingly, they face high risk of failure within the first few years of establishment. As a result, business incubators (BIs) were created as mechanisms to support new ventures and counteract their high failure rate. Business incubators provide physical working spaces with shared office services, management services, networking opportunities and access to seed capital. Their mission is to nurture start-ups, improve the success rate of new firms and foster new types of local businesses. Digital technologies have enabled BIs to extend their support services, to include new digital services and to expand their geographical coverage, giving rise to the VBI. The VBI offers similar services to physical incubators without the added cost of maintaining the physical infrastructure. Moreover, one distinctive characteristic of VBIs lies in their potential to support ventures at different business development stages. This chapter describes the origin and evolution of BIs and their changing value proposition over time until the emergence of the VBI, highlighting their main characteristics, differences and benefits. Furthermore, the authors argue that the current conceptualisation of the VBI as an extension of the BI is insufficient to fully understand its operations, value-added incubation services and contribution to venture success. Hence, a novel conceptualisation of the VBI is proposed. This novel conceptualisation draws upon an existing body of knowledge on business incubation, digital technologies, virtual organisation and virtual communities.

RESEARCH METHODOLOGY

An extensive and systematic qualitative literature review was conducted on business incubation processes, business incubator's evolution over time, digital technologies, the virtual organisation and virtual communities. Drawing on the theoretical model developed by Briel et al (2018) on how digital technologies influence the venture creation process, the authors anticipated that for VBIs to be effective and positively impact entrepreneurs, they should employ adequate digital technologies. These technologies should simultaneously enable all stages of the venture creation process (prospecting, developing and exploiting) in the sector targeted by the VBI, facilitate interactive learning and foster relationship building. One way of doing this is through the delivery of business support services and learning resources in virtual communities.

BACKGROUND

The Origin of Business Incubators

The first business incubator in history appears to be the Batavia Industrial Centre, in Batavia, New York (Aerts, Matthyssens & Vandenbempt, 2007; Kilcrease, 2012). In a climate of adverse economic conditions and agricultural recession, the closure of the Massey Ferguson Company, a large tractor manufacturing plant, was unavoidable. This incident left 2,000 employees jobless. In August 1959, Charles Mancuso & Sons purchased the building and planned to get a return on their investment by leasing the space to a large manufacturer. The purpose was to revitalise the neighbourhood. After unsuccessfully trying to lease the space to large corporations, Joseph Mancuso decided to parcel the plant into smaller spaces

in order to attract numerous smaller firms. He also realised that small firms struggled to succeed and subsequently provided services to increase their chances of survival and contribution to the economy (Kilcrease, 2012).

Similarly, during the 1970s in the United Kingdom (UK), pressures of modernisation and privatisation of the steel industry resulted in the loss of 180,000 jobs. The provision of managed workspaces dates back to 1975 when British Steel (Industry) Ltd, a subsidiary of British Steel, used expendable buildings to assist retrenched workers to create work in steel related areas (The Organisation for Economic Co-operation and Development [OECD], 1999). Many of the workers were skilled and, with the support provided by the incubator, were able to develop successful enterprises (Small Business Council, 1989). At this time, incubators in the UK were called business innovation centres and were part of a holistic national strategy for business creation and growth (OECD, 1999).

Business incubation received widespread attention during the 1980s due to the collapse of traditional and established industry sectors such as automobiles and heavy engineering in Western industrialised countries (Reich, 1991; European Commission, 2002), followed by an increased level of unemployment. As a result, a strategy was required to stimulate crisis sectors, communities and regions (European Commission, 2002). Moreover, technology and innovation were increasingly becoming important drivers of economic progress and growth, and new strategies were required to revitalise economies (Fonseca, 2002; Bruneel, Ratinho, Clarysse & Groen, 2012). The rationale behind BIs as a strategic tool for policy makers was that prosperous new incubated firms will eventually create new jobs, revitalise cities and regions, commercialise new products, services and technologies, and transfer technology from universities and major corporations, thereby strengthening local and national economies (Tavoletti, 2013; Harper-Anderson & Lewis, 2018).

Business incubators act as catalysts for entrepreneurship, fostering and supporting the formation of new ventures (Schwartz & Göthner, 2009; Mas-Verdú, Ribeiro-Soriano & Roig-Tierno, 2015). Small and medium size enterprises (SMEs) in developed economies account for 99% of all firms, provide the main source of employment (around 70% of jobs on average), are the major contributors to value creation, contribute to economic diversification, build resilience, and are the driving force behind radical innovations (OECD, 2017). However, it is also noticeable that they face high risk of failure in the first few years of their establishment (Allen & Rahman, 1985; Aerts, et al., 2007). This high failure rate reflects the highly competitive environment in which SMEs operate. The reasons for failure are often related to a combination of deficiencies in the market (e.g. shortage of capital and legal difficulties) and lack of a full array of business and management skills (e.g. experience, poor management and planning) (Allen & Rahman, 1985; Bruneel, et al., 2012).

One instrument to counteract the high failure rate of small firms is the business incubator, an environment especially designed to nurture enterprises (Aerts, et al., 2007). Harper-Anderson and Lewis (2018) suggest that incubators provide several support mechanisms for fragile businesses. The provision of a supportive, growth-oriented environment with a range of business support services can therefore be an important avenue to increase SMEs' chances of survival (Small Business Council, 1989). In fact, positive growth environments may lead to new business opportunities (Allen & Rahman, 1985). As a consequence, BIs emerged as property-based initiatives (Phan, Siegel & Wright, 2005) and as mechanisms to support the development of SMEs, particularly during the early stages of the business lifecycle (Aernoudt, 2004; OECD, 2019).

Evolution of Business Incubators' Value Proposition

A brief overview of the evolution of BIs is provided in this section. Understanding the evolution of BIs' value proposition is important when conducting an impact assessment of incubated firms (Bruneel, et al., 2012). In the 1980s, infrastructure, in the form of affordable office space and shared resources, was the core value of the first generation of BIs (Aerts, et al., 2007; Bruneel, et al., 2012). In this scenario, tenants work under one roof and enjoy complementary business services (e.g. reception services, clerical services and meeting rooms) that would be difficult to access otherwise in the early stages of their operations. These services enabled tenants to focus on their core business activities. During the 1990s, technology and innovation became the cornerstone of economic growth and BIs were used as tools to promote the creation of tech-based enterprises (Bruneel, et al., 2012). The lack of business knowledge and experience became evident and was considered one of the main barriers to success. Thus, BIs expanded their value proposition to include the provision of in-house business support services (e.g. coaching and training) (Aerts, et al., 2007) aimed at accelerating the learning process. Tenants were able to make better and faster decisions, resulting in better strategies and, subsequently, in better firm performance. The third generation of BIs continued to focus on tech-based enterprises (Aerts, et al., 2007) and provided access to more sophisticated services and specialised expertise via external networks. Tenants accessed potential customers, suppliers, technology partners and investors. In doing so, they were able to create new business opportunities, acquire new resources and build up their legitimacy in the market at a faster pace (Bruneel, et al., 2012).

Many scholars agree that networking is the most important factor in BI programs (Hansen, Chesbrough, Nohria & Sull, 2000) and empirical evidence suggests that access to networks is critical for the development of BIs' tenant ventures (McAdam and McAdam, 2008) and is an essential success factor for start-ups (Aerts, et al., 2007). Through networking, entrepreneurs have the ability to link existing social practices into new patterns according to what the situation calls for (Johannisson, 2009). This will bring additional benefits, such as new learning opportunities, pleasure in socialising and the power to realise potentialities (Johannisson, 2009). Likewise, the opportunity to relate and interact with other entrepreneurs enables the emergence of knowledge that, in turn, may impact positively on their entrepreneurial capability and start-up innovativeness (Stacey, 2001). Table 1 presents the evolution of the BIs' value propositions over time, linked to their respective theoretical lenses and the types of incubators that emerged in each generation. The influence of tenants' needs, demands and expectations in the evolution of BIs is also noteworthy.

This chapter examines the third generation of BIs or, more specifically, new economy incubators. New economy BIs are predominantly virtual (European Commission, 2002). While traditional business incubators were policy-driven and focused on enterprise promotion and regional development, new economy incubators were initially focused on accelerating the start and growth of ICT-enabled ventures (European Commission, 2002). The authors argue that VBIs can also be use for enterprise promotion and regional development, particularly in regional and remote locations where VBIs appear to be a feasible and cost-effective option compare to traditional BIs. A more detailed description of virtual business incubators (VBIs) is provided in the next section.

Table 1. Evolution of the business incubator model

Evolution of Busines Incubators

Value Proposition	1st Generation: 1970's Real Estate Provision	2nd Generation: 1980's - mid 1990's Knowledge-based Services	3rd Generation: mid 1990's - 2000's Access to External Resources, Knowledge and Legitimacy
Characteristics	Focus on infrastructure	In-house business support services	Focused on new technology-based firms
	Provide affordable space and shared resources	Acceleration of new firms' learning process	Access to services through external networks (customers, suppliers, technology partners and investors)
	Agglomeration of companies under the same roof	Access to coaching, mentoring and training	Increased legitimacy in the market place
Theoretical Insight	Economies of Scale	Accelerated Learning	Networking Theories
Types of Business Incubators	Managed workshops Enterprise Agencies Industrial Estates	Business Centres Science Parks Multipurpose Incubators	Technology-incubators Sector Specific Incubators **Virtual Incubators**

Source: European Commission, 2002. Benchmarking of business incubators, Brussels, p. 3. & Bruneel, et al., 2012 in the Evolution of Business Incubators: Comparing demand and supply of business incubation across different incubator generations.

The Virtual Business Incubator (VBI)

There is limited academic literature on VBIs. This may be partly because the perception of the VBI as a bona fide incubator was at some stage questionable. Some scholars have argued that if VBIs are considered incubators, then any entity providing business assistance services online can also be considered an incubator (Bearse, 1998; Hackett & Dilts, 2004b); a situation that increases the heterogeneity of incubators and constrains the ability to generalise research findings (Hackett & Dilts, 2004b). For this reason, virtual incubation programs are advocated to be considered as intervention programs rather than business incubation programs (Hackett & Dilts, 2004b). As a BI, the VBI is often briefly described in the literature and acknowledged as one type of BI. Similarly, industry reports on VBI are uncommon.

Virtual business incubators emerged during the 1990s and are considered a third generation of BIs (Bruneel, et al., 2012). The VBI provides business support services via the Internet (Nowak & Grantham, 2000; van Tilburg, van der Sijde, Molero & Casado, 2002; Tzafestas, 2008), focuses on strategic alliance formation (Barbero, Casillas, Ramos & Guitar, 2012) and may work in conjunction with physical incubators (Nowak & Grantham, 2000). The VBI is defined as an integrated support system without a physical infrastructure or physical personal contacts that provides services to entrepreneurs via information and communication technologies (ICT) with the purpose to generate new ventures and accelerate their growth and success (van Tilburg, et al., 2002). The VBI is classified in multiple ways. Based on how services are provided, van Tilburg et al., (2002) described three categories. These are: stand-alone virtual incubators where all functions and activities are fully virtual; virtual incubator as a network partner, where a virtual incubator is linked to one or more physical incubators forming a cooperation network; and a virtual service where a physical incubator provides part of it services virtually. In the industry report titled Lessons on Virtual Incubation Services prepared for Information for Development Program in 2011, three types of VBIs were identified based on the focus and intensity of the service concept. They are hand-holders focused on providing business development services; network boosters, aimed at bringing entrepreneurs, investors, volunteers and service providers together; and seed capital providers focused on providing seed investment capital and mentoring support. Some authors argue that the main

objective of the VBI is to support start-ups and increase the success rate of new businesses (van Tilburg, et al., 2002) as in the case of traditional BIs. Others pinpoint that pooling technical and business talent across all frontiers with focus on wealth creation and strategy to meet the business opportunity at hand should be the main objective of VBIs (Nowak & Grantham, 2000).

The use of the Internet extends service provision beyond the confines of a physical building, allowing for a large number of incubatees to be reached and supported. This makes a VBI a feasible alternative to a physically located BI in regional and rural areas where the client base is often spread over large geographical areas (Lewis, Harper-Anderson & Molnar, 2011). Moreover, VBIs tend to be less expensive to operate than traditional BIs that have additional capital expenses (e.g. management of the physical infrastructure) (Lewis et.al., 2011). Furthermore, services delivered in a physical space may not equally suit the needs of all start-up enterprises and given the capabilities of the digital technologies, the authors argue that VBI programs can be flexible and adaptable to the diverse needs of incubates at various stages of the start-up process. This position is supported by van Tilburg, et al., (2002, p. 288) who stated that: A virtual incubator naturally evolves into a virtual innovation centre and can support (better and in a different way) companies in their growth and maturity phase. This is in fact, a shift from the traditional focus of BIs on incubatees in the early stages of the business lifecycle. According to van Tilburg, et al. (2002), a physical incubator needs to focus only on the start-up phase and cannot and should not support ventures at other development stages. In contrast, VBIs have the potential to support emergent as well as more established ventures. Table 2 shows the different characteristics of the VBI when compared to traditional BIs.

Table 2. Differences between BIs and VBIs

Incubator Type/Differences	BI	VBI
Geography and infrastructure	Limited geographical coverage and constrained by the characteristics of the physical working area	Extended geographical coverage (location independent), not constrained by the physical infrastructure
Communication	Social functions and networking activities naturally created	Communication is the most important function and activity. Special attention is needed to provide information about the context, teambuilding, responsibilities and personal feedback
Advantages	Physical proximity and personal contacts (e.g. other entrepreneurs, professionals, suppliers and potential customers). Feeling of being listened to and understood	Savings in customers' time and travel cost, facility costs, economies of scale, access to a wide range of superior external providers, easy access to virtual incubation services and flexibility.
Focus on development stage	Prospecting only (start-up phase)	Prospecting (start-up phase), Developing (maturity phase) and Exploiting (growing phase)

Source: Adapted from van Tilburg et al., (2002).

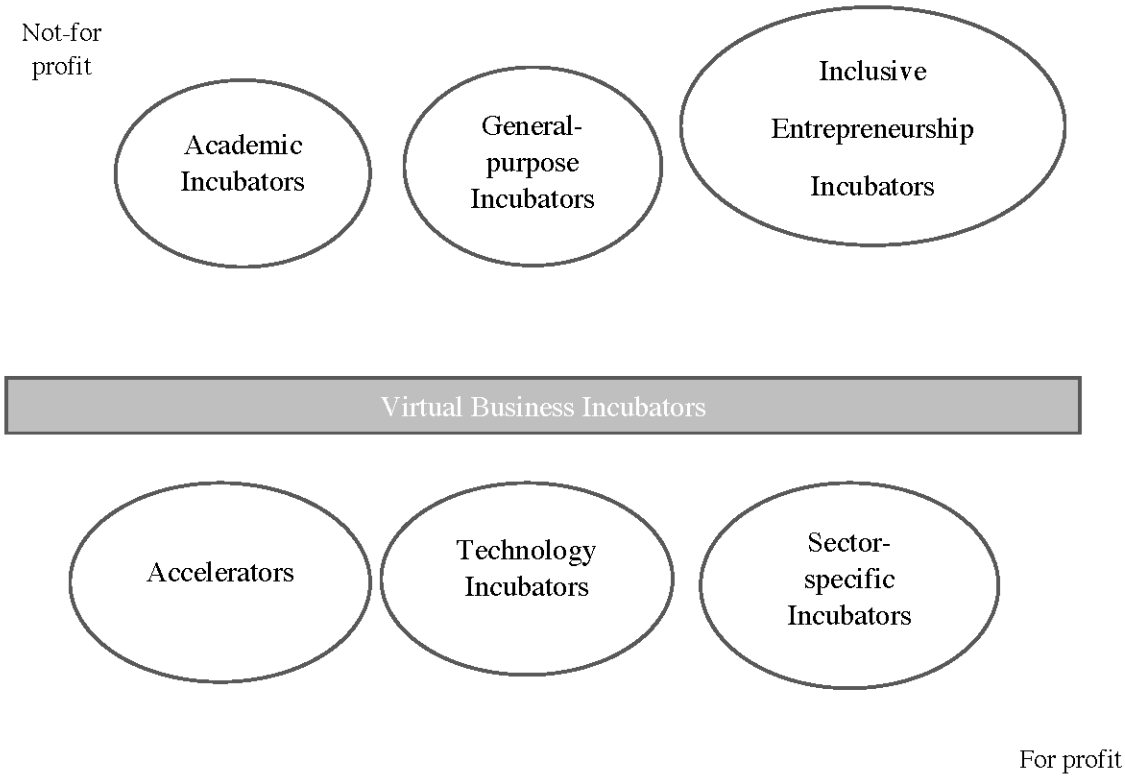
Although VBIs are characterised as for-profit entities (Nowak & Grantham, 2000) offering support to tech-based entrepreneurs mainly (European Commission, 2002), the authors of this chapter argue that VBIs may also be established as not-for profit entities. Both types of VBIs can be designed to tailor business support services to specific target groups, including those under-represented or disadvantaged in entrepreneurship (e.g. women, youth, migrants, seniors, the unemployed and people with disabilities). Both, for-profit BIs (e.g. accelerators, technology incubators and sector specific incubators) and not-for-

profit BIs (e.g. academic incubators, general-purpose incubators and inclusive entrepreneurship incubators) could benefit from the virtual environment of VBIs. It is worth mentioning that general purpose incubators and inclusive entrepreneurship incubators can also be set up as for-profit VBIs. In either case, both types are encouraged to achieve financial self-sustainability. For instance, in the specific case of the academic incubator (not-for-profit), they can derive income from various sources including donors, the universities in which they are located, alumni and government funding. A significant percentage of the management team's time often goes towards looking for funding to support the VBI's operations. Another successful example of a for-profit inclusive entrepreneurship VBI is the Virtual Women's Business Centre in Croatia that provides free business education and training to women entrepreneurs. The centre also facilitates the exchange of knowledge (and experience) between established businesswomen and new entrepreneurs through mentoring. The Centre has currently over 2,300 active members and organised the Congress on Business Women in 2017 and 2018 which was attended by more than 600 participants (OECD, 2019).

The for-profit VBI generates most of its income from members, although the income is supplemented with donations and grants from government and other sources. Figure 1 graphically differentiates common types of not-for-profit BIs from for-profit BIs. The capacity of VBIs to operate as any type of BI alone or to complement or extend traditional incubation services via virtual tools constitute one of the most important attributes they possess. Numerous virtual tools facilitate the delivery of virtual services. These tools can be used in a variety of ways, for example: to provide online learning resources, training materials and information (e-learning); one-on-one ICT exchange (e.g. email, SMS, Skype and other collaboration tools); to recruit incubates and interns; and to mobilise investors and experts to contribute knowledge and finance online (e.g. crowdsourcing and crowdfunding) (Information for Development Program, 2011). Other virtual tools provide a platform for information exchange and collaboration (virtual communities) and enable interaction within and across the various stakeholder groups represented within the VBI constellation network.

Besides exploring and identifying current and emerging models of VBIs, it is also important to be aware of how digital technologies influence the venture creation process and the possibilities VBIs offer in this regard. In a study that theorises how digital technologies enable the venture creation process in the IT hardware sector carried out by von Briel, Davidsson and Recker (2018), it was demonstrated that the number of new independent ventures within the sector was directly affected by the extent to which digital technologies simultaneously enable all stages of the venture creation process. In addition, von Briel et al. (2018) argued that although his study was specific to IT hardware sector, his conclusion is likely to apply to other industry sectors. In this chapter, the authors adopt the three-stage process model suggested by Bakker and Shepherd (2017) for opportunity evaluation in the mining industry, as this model was used by von Briel et al. (2018) in their study. This model has been adapted to suit the business incubation process. According to this model, the venture creation process is classified into three distinctive stages: prospecting, developing and exploiting (Bakker & Shepherd, 2017). The prospecting stage typically requires pre-incubation services such as exploring a business opportunity, refining the business idea and preparing a business plan. This stage also includes entrepreneurship training and individual coaching. The developing stage requires a range of incubation services to continue developing the business idea and may involve gathering information on the target market, product features, production costs and also developing a business model. The exploiting stage calls for support to develop efficient production/service processes, access export markets and continue to innovate. Therefore, the authors argue that VBIs can increase its impact on venture success by enabling all stages of the venture creation

Figure 1. Differentiation of business incubators into not-for-profit and for-profit with the common types under each category. Source: Adapted from Policy Brief on Incubators and Accelerators that Support Inclusive Entrepreneurship
(OECD, 2019).



process. Since VBIs are essentially VOs and VCs, it is important to present and explain the characteristics of VOs and VCs that are essential to effective operation of VBIs.

The VBI as a Virtual Organisation (VO)

The speed of advancement in ICT in the business arena has shaped the world of work in many different ways. In fact, new technologies remove constraints to what is possible (Dejgaard, 1998), giving rise to new ways of interaction in both physical and virtual spaces. These new ways of interaction between people within a single firm and across organisational boundaries have enabled new ways of organising work, resulting in the VO. The VO is an emerging structure (Dejgaard, 1998) created by subjects interacting with each other in the co-evolution of a jointly constructed reality (Stacey, 2001). A VO is constantly evolving and in the process of being created (Dejgaard, 1998). As the subjects of the VO interact, they acquire knowledge, learn from one another and share competencies for mutual benefit, in this way forming meaningful personal relationships (Hagel III & Armstrong, 1997). Therefore, digital value is co-produced by the subjects that interface with each other (Normann & Ramirez, 1993), including the interaction with the external economic actors (suppliers, business partners, allies, mentors, volunteers and

customers). In addition, the fundamental logic of value creation is no longer rooted in the assumptions or models of the industrial economy. It is not about positioning the business in the marketplace with the right products to the right market segment, nor is it about establishing a fixed set of activities in the value chain. It is about mobilising subjects to create their own value from the organisation's various offerings (Normann & Ramirez, 1993). Learning and knowledge are therefore central to the VO. Knowledge is the meanings that emerge in the communicative interaction process within the virtual space, which is continuously reproduced and potentially transformed into action (Stacey, 2001). According to Stacey (2001), learning and knowledge involve the same processes so that there is no point in differentiating between them (Stacey, 2001).

To succeed in the presence of high uncertainty, the VBI as VO requires effective interaction among members, enabled by increased coordination and effective flow of information (Dejgaard, 1998; van Tilburg, et al., 2002); accountability, trust, adaptability (Harvard Management Communication Letter [HMCL], 2000) and high levels of flexibility (Eapen, 2009). Coordination refers to managing dependencies among activities (Malone & Crowton, 1993). Dependencies exist whenever two or more parties share resources, assign tasks and engage in relationships within the interrelated activities (Dejgaard, 1998). In the virtual space, organisations create value by reconfiguring both their activities and the core competencies of other organisations within the value constellation network. Because of the complexity of organisations in the network and the variety of activities they may engage in, coordination may take various forms, ranging from autonomous (mutual adjustment) to authoritarian (e.g. supervision or standardisation of work processes or outputs) (Dejgaard, 1998). Effective operation in the virtual space also requires clear definition of tasks, good understanding of what is required, and performance according to standards and expectations. These are necessary to ensure accountability, which refers to the responsibility of team members when undertaking assigned tasks or activities.

The VO questions the traditional managerial belief that organisations only achieve efficiency by controlling every aspect of employees' work (Handy, 1995). As such, in the context of the VBI, to effectively manage geographically dispersed subjects within the value network, trust must exist (Handy, 1995). Without trust, the virtual work is impossible (HMCL, 2000). Three kinds of trust are identified for any VBI to be successful: contractual, communication and competence (HMCL, 2000). Contractual trust encompasses managing expectations, establishing clear boundaries, delegating appropriately, honouring agreements and being consistent in words and actions. Communication trust is about honesty and disclosure (e.g. voicing difficult truths, admitting mistakes, giving honest feedback and maintaining confidentiality). Competence trust is about recognising and allocating tasks and activities consistent with the knowledge, abilities and skills of individuals in the organisation (HMCL, 2000).

The VBI as a VO must be adaptive to operate effectively. Adaptability requires continuously gathering data to monitor the context-specific environment in which the VBI operates. Data provides organisations with the ability to make fact-based and better-informed decisions (Turban, Sharda & Delen, 2011). It is noteworthy that the value of data is not in the data itself, but in what is done with the data (Marr, 2015). Sorescu (2017) claims that organisations are accumulating an enormous amount of data from many sources, but they lack the expertise to utilise the data profitably. Digital communication and feedback channels across platforms are appropriate for this purpose. The new challenge is then how to apply effective data gathering techniques and analytical methods to create new digital value propositions. The virtual world is characterised by rapid changes and high uncertainty levels. Uncertainty, in turn, offers opportunities for those organisations that have successfully incorporated flexibility into their multiple processes. Therefore, VBIs are required to introduce sufficient flexibility into their processes so changes

can be easily implemented. According to Eapen (2009), it is process flexibility rather than process efficiency that is important in an uncertain world.

Communication lies at the heart of the VBI's essential competencies, and digital technologies that facilitate the communicative act in virtual environments are required (HMCL, 2000; van Tilburg, et al., 2002). Communicative interaction refers to the acts one subject directs to others in a particular situation at a particular time and involves the use of highly sophisticated tools (Stacey, 2001). The introduction or use of a new digital technology may enable distinctive interactions among subjects both within and across organisations interacting in the virtual space (Dejgaard, 1998) based on two intrinsic dimensions: specificity and relationality (Von Briel, Davidsson & Recker, 2018). Specificity refers to a set of actions that can be performed given the digital technology's specific functionalities, whereas relationality refers to the variety of relationships that can be formed given the types and numbers of participating organisations (Von Briel, Davidsson & Recker, 2018). It is worth mentioning that any type of digital technology exhibits varying degrees of specificity and relationality, thus influencing interaction, coordination, adaptability and flexibility in various ways.

Various forms of VO may exist simultaneously (Dejgaard, 1998). This is because of the ICT's effect on constraint removal and the different capabilities offered by digital technologies for enabling interaction and facilitating coordination between the subjects within the value constellation network. The VBI is then regarded as a VO that uses digital technologies to support the development of successful enterprises. The VBI is also conceived as a virtual community and the characteristics of virtual communities that align with the VBI's operation are discussed next.

The VBI as a Virtual Community (VC)

Multiple approaches (e.g. psychology, administrative science and computer science) have been developed around VCs, adding complexity to understandings of what they constitute (Leimeister, Sidiras & Krcmar, 2006). For this reason, VCs are multidimensional research objects whose definitions vary according to the scientific knowledge and perspectives of a specific discipline (Leimeister, Sidiras & Krcmar, 2006). Despite the different perspectives, there is common consensus that a VC is a social aggregation or groups of people with common interests or needs who come together online with the potential to form relationships. For the purpose of this study, the definition of VCs given by Leimeister et al. (2006, p. 281) is used:

"A virtual community consist of people who interact together socially on a technical platform. The community is built on a common interest, a common problem or a common task of its members that is pursued on the basis of implicit and explicit code of behaviour. The technical platform enables and supports the community's interaction and helps to build trust and a common feeling among the members"

Similar to multiple definitions of VCs, multiple dimensions are used in the literature to categorise VCs (Leimeister et al, 2006). For example, VCs can be classified in terms of location (geographical communities), gender, life stage or lifestyle (demographic communities) and topics of interest (topical or theme-centred communities) (Hagel III & Armstrong, 1997; Leimeister et al, 2006). Not surprisingly these categories overlap, making the classification of VCs ambiguous (Leimeister et al, 2006). Moreover, VCs can also be classified according to their financial interest and commercial orientation (commercial and non-commercial communities). As the pressure for incubators to reduce their dependence on public funding continues, it is important to assess financially sustainable models enabled by digital technologies.

The VBI as a VC incorporates randomness as an organising principle (Dejgaard, 1998). Randomness is the result of the network structure made possible by the Internet. It is the unpredictability of how the

interactions among the collaborating firms, institutions, organisations and individuals might develop within the value constellation network. However, every VC is subject to social contracts which may encompass explicit or implicit rules enforced through the actions, interactions and reactions of community members (Spaulding, 2010). In this regard, members of the network both depend on and are autonomous to the network. The interactions also involve randomness of a task specification or even randomness of a specific purpose or goal. Members of one network might be simultaneously members of other networks, shaping or influencing the original intended goal of the network through continuous interaction within the networks. In VCs a common interest or a guiding vision often suffices (Dejgaard, 1998). Hence, The VBI do not depend on goal rationality, but on common or shared interests.

Virtual communities have the potential to aggregate resources (e.g. people and information), facilitate interaction and create financially sustainable VBI models. Virtual communities can leverage the capabilities of the network to connect people with each other and to fulfil their specific needs for communication, information and entertainment (Hagel III & Armstrong, 1997). Entrepreneurs are drawn to VCs because they provide an engaging environment in which they can build new and deeper relationships with each other and with other agents in the network, thus co-creating an environment of trust and real insight (Hagel III & Armstrong, 1997). Through networking, entrepreneurs have the ability to link existing social practices into new patterns according to what the situation calls for (Johannisson, 2009). This will bring additional benefits, such as new learning opportunities, pleasure in socialising and the power to realise potentialities (Johannisson, 2009). Likewise, the opportunity to relate and interact with other entrepreneurs enables the emergence of knowledge that, in turn, may impact positively on their entrepreneurial capability and start-up innovativeness (Stacey, 2001).

Knowing the digital value proposition offered by VCs is crucial. Therefore, five distinctive valued-added characteristics of VCs valuable to VBIs are identified (adapted from Hagel III & Armstrong, 1997):

- Distinctive focus. Virtual communities are built around a specific focus that is aligned to the VBI's mission and objectives. This is necessary to help potential members understand the resources they are likely to find in the community. This also assists the VBI manager to identify the full range of resources likely to be required to meet their members' needs.
- Capacity to integrate content and communication. As virtual communities, VBIs provide a wide range of published content consistent with their distinctive focus. Members have the ability to access and interact with the content by posting messages available to all or communicating with each other, reflecting on the validity and usefulness of the content.
- Appreciation of member-generated content. In addition to published content, VBIs as VCs provide environments for the generation and dissemination of member-generated content. Members can share their knowledge and experience, creating a full range of rich information for the benefit of all.
- Access to external networks. Virtual communities, and therefore VBIs aggregate external actors for their members in such a way that they can access specific high-quality expertise with ease and convenience.
- Commercial orientation. Virtual communities are increasingly organised as commercial enterprises with the objective of earning an attractive financial return by providing members with valuable resources and an environment for learning and growth.

Different classifications of VCs exist based on diverse criteria such as social, professional or commercial orientation (Porter, 2006). Kannan, Chang and Whinston (2000) propose four categories based on the general relationship orientation of the community: transaction oriented communities focused on bringing sellers and buyers together; interest-oriented communities focused on gathering users around a common theme; relationship-oriented communities generally focused on real-life relationships such as business relations; and fantasy-oriented communities focused on virtual worlds. In the context of the virtual business incubation arena, knowing what type of VC is generated clarifies the social contracts relevant to the community. This is of paramount importance because social contracts dictate what practices are acceptable and what are not. However, a thorough list of all social contracts for each category of community is impossible (Spaulding, 2010). Following the classification provided by Kannan et al. (2000), the authors argue that VBIs can create interested-oriented and relationship-oriented communities simultaneously. The themes can be organised around the different stages of the business development lifecycle (e.g. prospecting, developing and exploiting) while relationships are built or nurtured among members and other strategic partners. Table 3 shows the types of VCs created by VBIs, specifying the types of social contracts as well as identifiable and common trust issues.

Table 3. Types of virtual communities created by virtual business incubators

Community	Social Contracts	Trust Issues
Interest-oriented	• Accurate information • Information must be on a relevant topic • Social pressure and moderators are used to reduce negative or irrelevant contributions	• Biased information can negatively affect the credibility and reputation of the VBI • If advice is given showing financial motives or lack of integrity or the source is not reliable, the advice can be ignored
Relationship-oriented	• Use of information for community purposes • Rely on real information to build real relationships • Accurate information and authenticity of contributions are vital because users act on the information	• Misuse of information can negatively affect the reputation of the virtual business incubator • Users feel vulnerable or betrayed when their information is used for purposes beyond the scope of the community

Source: Adapted from Kannan et al. (2000) and Spaulding (2010).

In summary, the authors conclude that VBIs operating as VC are able to build membership audiences and use this to capitalise on knowledge and generate revenue in innovative ways. Thus, representing a powerful new vehicle for digital value creation. However, creating and running a VC within the VBI poses a significant challenge as it differs from running and managing a traditional business. Learning how to master the digital world to effectively engage and receive revenue from the VC is perhaps the most challenging task for the manager of the VBI. Therefore, managers of VBIs need to rethink their notions of where digital value can be created and how they can capture that value (Hagel III & Armstrong, 1997).

Conceptual Framework

The concept of business incubation is based on the premise of increasing the survival and growth of firms (Ayatse, Kwahar & Iyortsuun, 2017). It is a mechanism that identifies new firms with potential for success that are constrained by lack of resources and by conditions within their environment (Ayatse, et.al.,

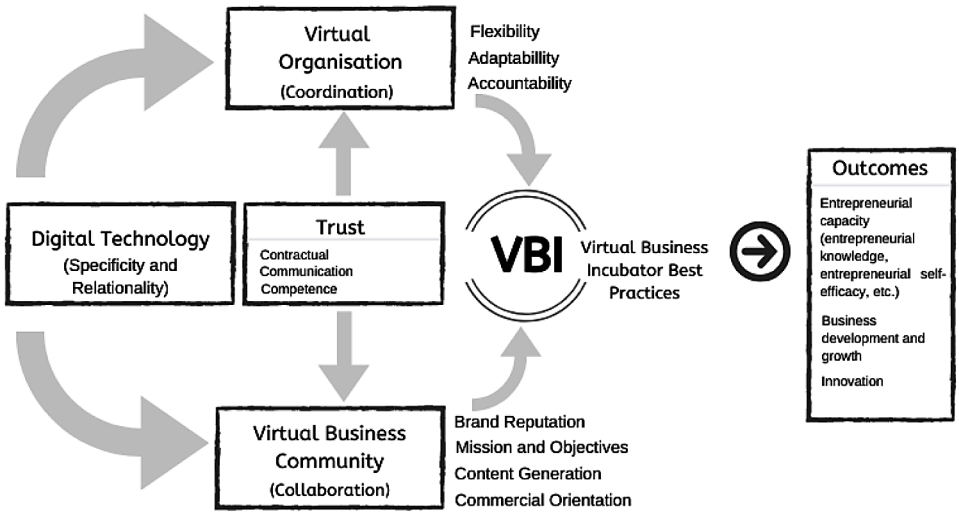
2017). According to the European Commission (2002), new firm success depends on three fundamental factors: entrepreneurial culture and learning environment; ready access to quality support services; and visibility in the marketplace. The concept of business incubation implies the transformation of fledgling new ventures into competitive, profitable and sustainable firms.

Business incubation is primarily concerned with the development of an entrepreneurial culture (Ayatse, et.al., 2017). It is an institutional arrangement aimed at fostering a climate of entrepreneurship by means of launching successful businesses into communities and regions. Successful businesses diversify and revitalise economies through the provision of new or improved product and services and the commercialisation of new technologies. They also foster coopetition (collaboration and competition), increase employment opportunities and boost distressed industry sectors. Therefore, they create a positive entrepreneurial climate and vibrant entrepreneurial ecosystem. These objectives are achieved through both property-based BIs and VBIs.

The complexity of the business incubation process, which varies across regions and countries, poses a real challenge when attempting to offer a clear-cut definition. Business incubators are variously considered, for example, as: facilities that aid the early-stage growth of companies and as enterprise development tools that create a positive environment for business success (Allen & Rahman, 1985); an economic development tool primarily designed to help the creation of new businesses (Sherman & Chappell, 1988); an interactive development process aimed at encouraging people to start their own business (Aernoudt, 2004); support structures to assist entrepreneurs develop their firms and improve their chances of success (Bruneel, Ratinho, Clarysse & Groen, 2012); economic and social programs that assist entrepreneurs in the development of their start-up companies (Al-Mubaraki & Busler, 2013); and a tool for policy makers and economic developer practitioners seeking to create strong and sustainable regional economies (Harper-Anderson & Lewis, 2018). Despite the wide spectrum of definitions, types and objectives, there is a general consensus that the ultimate goal of BIs is to provide firms with the necessary resources so they can be better prepared to face the challenges of competitive marketplaces (Harper-Anderson & Lewis, 2018). In this way, BIs ensure entrepreneurial stability and increase the chance of a firm's survival, particularly during its formative years (Allen & Rahman, 1985; Schwartz & Göthner, 2009).

Business incubation is a problematic concept which, given the broad spectrum of its definition and continuous evolution, requires a framework for reference. This is also the case for VBIs, whose conceptualisation has been overlooked and are still considered as an extension of traditional BIs. As a consequence, a novel conceptualisation of the VBI in is proposed in this chapter to better understand its operations, value-added incubation services and contribution to venture success. The VBI is regarded simultaneously as a VO and a VC that provides virtual incubation services and online learning resources which are, to an extent, enabled and constrained by the properties that characterise the digital technologies adopted (i.e. specificity and relationality). Figure 2 below provides a visual representation of the conceptual framework and is based on the characteristics required for effective performance of VOs and VCs as well at the digital technologies used, as discussed in the previous sections. Where these characteristics are well configured, they should enhance entrepreneurial knowledge and entrepreneurial self-efficacy and prepare clients for their new ventures, which as discussed above are the outcomes pursued.

Figure 2. Conceptualisation of the VBI



SOLUTIONS AND RECOMMENDATIONS

We propose a novel conceptualisation of VBIs that sheds light on how VBIs can perform in accordance with business incubation best practices and achieve their mission (e.g. supporting the venture creation process, business development and growth and innovation) through developing the entrepreneurial capacity of their incubatees. VBIs can achieve these by creating an environment that enables communication and interactions, disseminates information and creates networking opportunities to enhance the entrepreneurial knowledge and self-efficacy of their incubates, thereby building their entrepreneurial capacity. Such an environment should enable prospective entrepreneurs to identify or create opportunities, access meaningful resources and build relationships to successfully turn these opportunities into innovations. The proposed VBI environment should facilitate the new venture creation process, ensuring survival of businesses in their early stages of development and also support further business development and growth of existing businesses.

To achieve the above aims, VBIs as VOs, need to effectively coordinate various activities of multiple stakeholders which are assembled to provide their clients with the necessary knowledge, resources and networking opportunities that ultimately enhance their entrepreneurial capacity (e.g. entrepreneurial knowledge and entrepreneurial self-efficacy) and support their business development and growth. As a VO, the VBI must operate as a VC with a defined mission, objectives and a brand that communicate its reputation. These factors are necessary to attract the appropriate clientele and stakeholders. At the heart of the VC should be an environment that support the development of a value constellation network, where, through collaboration, the specific needs of members are recognized and met. The challenge is to be able to maintain successful collaboration and if done properly, this will translate into relationship building and mutual support over time. To ensure effectiveness of operations, VBIs need to ensure successful interaction, interaction quality and usability. Successful interaction is dependent on technology infrastructure and design whereas interaction quality relates to the social dynamics that occur in the virtual space (e.g. interaction between members, members and mentors, members and strategic partners). Usability focuses on human-technology interaction and is influential as the design of useful digital interfaces

will determine the accomplishment of members' goals. Appropriate digital technologies are therefore required for the VBI to facilitate and effectively coordinate the functions associated with operating as a VO and VC (specificity) while enabling collaborations and interactions within and among the value constellation network (relationality). The span of networks and complexity of coordinating activities across the various groups means the VBI cannot function effectively without building trust among its members (stakeholders, strategic partners, mentors and clients). As explained above, trust is necessary to manage expectations, establish clear boundaries, delegate responsibilities and tasks appropriately and honour agreements. Trust is also necessary for honest communication and disclosure. Finally, well established VBIs with the characteristics proposed in this chapter should be able to attract fees for their services and operate as commercial organisations.

FUTURE RESEARCH DIRECTIONS

Rapid advancements in ICT are expected to continue influencing the world of work in unpredictable ways. The next stage from the conceptual framework proposed in this chapter is to develop and test hypotheses that investigate the links between the constructs of VOs, VCs, digital technology (specificity and relationality), and trust as independent variables and VBI best practices as well as entrepreneurial capacity (e.g. entrepreneurial knowledge and entrepreneurial self-efficacy) as dependent variables. Future research could also explore and determine the adequate capabilities (i.e. specificity and relationality) that digital technologies should offer for effective networking, including collaborative virtual communities and social learning. Moreover, research studies are required to reveal user interaction with multiple virtual tools to determine the most effective ones. This is particularly important for one-on-one mentoring and coaching over the Internet. Furthermore, empirical studies are necessary to assess the effectiveness of business support programs delivered online.

CONCLUSION

Virtual business incubators are increasingly seen as a feasible entrepreneurial and economic development tool to revitalise and diversify regional economies. This is because of their lower establishment costs compared to property-based business incubators, the ability to cover dispersed geographical areas, and more importantly the capacity to be financially self-sustainable. VBIs can be established as for-profit and not-for-profit organisations and both types can develop support programs targeting specific industry sectors and other groups including those under-represented or disadvantaged in entrepreneurship. Traditional BIs can leverage the capabilities of digital technologies and expand the provision of their business support programs via the Internet. Finally, VBIs have the potential to provide support to entrepreneurs at various stages of their business development, thereby, facilitating development of emergent as well as more established business ventures.

Conceptualising the VBI as a VO and as a VC, provides a better understanding of its operations, value-added incubation services and contribution to venture success. Currently, there are no foundations, conceptual frameworks and methodologies to assess VBIs. Yet, no single theoretical discipline seems sufficient to offer an adequate model to assess VBIs' operations, performance and impact. Therefore, this novel conceptualisation offers the foundation for a framework to evaluate the effectiveness of internal

operations and the influence of virtual business incubation services on entrepreneurial capacity such as entrepreneurial knowledge, creativity, risk taking, motivation and/or intention, self-efficacy, sensemaking and propensity for action.

REFERENCES

Aernoudt, R. (2004). Incubators: Tool for Entrepreneurship. *Small Business Economics*, *23*(2), 127–135. doi:10.1023/B:SBEJ.0000027665.54173.23

Aerts, K., Matthyssens, P., & Vandenbempt, K. (2007). Critical role and screening practices of European business incubators. *Technovation*, *27*(5), 254–267. doi:10.1016/j.technovation.2006.12.002

Al-Mubaraki, H. M., & Busler, M. (2013). Business Incubation as an Economic Development Strategy: A Literature Review. *International Journal of Management*, *30*(1), 362–372.

Allen, D., & Rahman, S. (1985). Small Business Incubators: A Positive Environment for Entrepreneurship. *Journal of Small Business Management*, 1–22.

Ayatse, F., Kwahar, N., & Iyortsuun, A. S. (2017). Business incubation process and firm performance: An empirical review. *Journal of Global Entrepreneurship Research*, *7*(2), 1–17. doi:10.118640497-016-0059-6

Bakker, R., & Shepherd, D. (2017). Pull the Plug or take the Plunge: Multiple opportunities and the speed of venturing decisions in the Australian Mining Industry. *Academy of Management Journal*, *60*(1), 130–155. doi:10.5465/amj.2013.1165

Barbero, J., Casillas, J., Ramos, A., & Guitar, S. (2012). Revisiting incubation performance. How incubation typology affects results. *Technological Forecasting and Social Change*, *79*(5), 888–902. doi:10.1016/j.techfore.2011.12.003

Bearse, P. (1998). A Question of Evaluation: NBIA's Impact Assessment of Business Incubators. *Economic Development Quarterly*, *12*(4), 322–333. doi:10.1177/089124249801200404

Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations. *Technovation*, *32*(2), 110–121. doi:10.1016/j.technovation.2011.11.003

Dejgaard, S. (1998). Complexities of virtual organisation: Towards a framework. In W. Baets (Ed.), *A Collection of Essays on Complexity and Management* (pp. 53–73). London: World Scientific Publishing.

Eapen, G. (2009). *Flexibility: Flexible Companies for the Uncertain World*. CRC Press. doi:10.1201/9781439816332

Eriksson, M., & McKelvey, M. (2005). Industrial development centres (IDCs) as a regional innovation tool: Comparing policy practices in Finspång, Sweden and in the Hunter Valley, Australia. *Innovation (North Sydney, N.S.W.)*, *7*(4), 416–434. doi:10.5172/impp.2005.7.4.416

European Commission. (2002). *Benchmarking of Business Incubators*. Retrieve from https://businessincubation.com.au/wp-content/uploads/benchmarking-incubators.pdf

Fonseca, J. (2002). *Complexity and Innovation in Organisations*. London: Routledge.

Hackett, S. M., & Dilts, D. M. (2004b). A systematic review of business incubation research. *The Journal of Technology Transfer*, *29*(1), 55–82. doi:10.1023/B:JOTT.0000011181.11952.0f

Hagel, J. III, & Armstrong, A. (1997). *Net gain: expanding markets through virtual communities*. Boston: Harvard Business School Press.

Handy, C. (1995). *Trust and the Virtual Organization*. Retrieved from https://hbr.org/1995/05/trust-and-the-virtual-organization

Hansen, M. T., Chesbrough, H. W., Nohria, N., & Sull, D. N. (2000). *Networked incubators: hothouses of the new economy.* Retrieved from https://hbr.org/2000/09/networked-incubators-hothouses-of-the-new-economy

Harper-Anderson, E., & Lewis, D. (2018). What Makes Business Incubation Work? Measuring the Influence of Incubator Quality and Regional Capacity on Incubator Outcomes. *Economic Development Quarterly*, *32*(1), 60–77. doi:10.1177/0891242417741961

Harvard Management Communication Letter. (2000). *Creating Successful Virtual Organizations.* Boston: Harvard Business School Publishing.

Information for Development Program. (2011). *Lessons on Virtual Business Incubation Services.* Retrieved from http://www.infodev.org/articles/lessons-virtual-business-incubation-services

Johannisson, B. (2009). Towards a practice theory of entrepreneuring. *Small Business Economics*, *36*(2), 135–150. doi:10.100711187-009-9212-8

Kannan, P. K., Chang, A. M., & Whinston, A. B. (2000). Electronic communities in e-business: Their role and issues. *Information Systems Frontiers*, *1*(4), 415–426. doi:10.1023/A:1010022226639

Kilcrease, K. (2012). The Batavia Industrial Center: The Hatching of the World's First Business Incubator. *New York History*, *93*(1), 71–93. Retrieved from http://www.jstor.org/stable/23645409

Leimeister, J. M., Sidiras, P., & Krcmar, H. (2006). Exploring Success Factors of Virtual Communities: The Perspectives of Members and Operators. *Journal of Organizational Computing and Electronic Commerce*, *16*(3-4), 279–300. doi:10.1080/10919392.2006.9681204

Lewis, D., Harper-Anderson, E., & Molnar, L. (2011). *Incubating Success. Incubation Best Practices That Lead to Successful New Ventures*. University of Michigan.

Malone, T. W., & Crowton, K. (1993). The Interdisciplinary Study of Coordination. *ACM Computing Surveys*, *26*(1), 87–119. doi:10.1145/174666.174668

Marr, B. (2015). *Big Data: Using Smart Big Data Analytics and Metrics to Make Better Decisions and Improve Performance*. West Sussex: Wiley.

Mas-Verdú, F., Ribeiro-Soriano, D., & Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research*, *68*(4), 793–796. doi:10.1016/j.jbusres.2014.11.030

Mrkajic, B. (2017). Business Incubation models and institutionally void environments. *Technovation*, *68*, 44–55. doi:10.1016/j.technovation.2017.09.001

Normann, R., & Ramirez, R. (1993). Designing Interactive Strategy: From Value Chain to Value Constellation. *Harvard Business Review*, *71*(4), 65–78. PMID:10127040

Nowak, M., & Grantham, C. (2000). The virtual incubator: Managing human capital in the software industry. *Research Policy*, *29*(2), 125–134. doi:10.1016/S0048-7333(99)00054-2

Organisation for Economic Co-operation and Development. (2017). *Enhancing the Contributions of SMEs in and Global and Digitalised Economy.* Retrieved from https://www.oecd.org/mcm/documents/C-MIN-2017-8-EN.pdf

Organisation for Economic Co-operation and Development & European Commission. (1999). *Business Incubation: International Case Studies*. Retrieved from https://read.oecd-ilibrary.org/urban-rural-and-regional-development/business-incubation_9789264173781-en#page1

Organisation for Economic Co-operation and Development & European Commission. (2019). *Policy Brief on Incubators and Accelerators that Support Inclusive Entrepreneurship.* Retrieved from https://www.oecd-ilibrary.org/docserver/d7d81c23-en.pdf?expires=1566536147&id=id&accname=guest&checksum=B658E9721ADB96017371417AA3706D28

Phan, P. H., Siegel, D. S., & Wright, M. (2005). Science Parks and incubators: Observations, synthesis and future research. *Journal of Business Venturing*, *20*(2), 165–182. doi:10.1016/j.jbusvent.2003.12.001

Porter, C. E. (2006). A Typology of Virtual Communities: A Multi-Disciplinary Foundation for Future Research. *Journal of Computer-Mediated Communication*, *10*(1), 00. doi:10.1111/j.1083-6101.2004.tb00228.x

Reich, R. (1991). *The Work of Nations*. London: Simon & Schuster.

Schwartz, M., & Göthner, M. (2009). A multidimensional evaluation of the effectiveness of business incubators: An application of the PROMETHEE outranking method. *Environment and Planning. C, Government & Policy*, *27*(6), 1072–1087. doi:10.1068/c0897b

Sherman, H., & Chappell, D. S. (1998). Methodological challenges in evaluating business incubator outcomes. *Economic Development Quarterly*, *12*(4), 313–321. doi:10.1177/089124249801200403

Small Business Council. (1989). *Business Incubators*. Canberra: Australian Government Publishing Service.

Sorescu, A. (2017). Data-Driven Business Model Innovation. *Journal of Product Innovation Management*, *34*(5), 691–696. doi:10.1111/jpim.12398

Spaulding, T. (2010). How can virtual communities create value for business? *Electronic Commerce Research and Applications*, *9*(1), 38–49. doi:10.1016/j.elerap.2009.07.004

Stacey, R. (2001). *Complex Responsive Process in Organizations: Learning and Knowledge Creation*. London: Routledge.

Tavoletti, E. (2013). Business incubators: Effective Infrastructures or Waste of Public Money? Looking for a Theoretical Framework, Guidelines and Criteria. *Journal of the Knowledge Economy*, *4*(4), 423–443. doi:10.100713132-012-0090-y

Turban, E., Sharda, R., & Delen, D. (2011). *Decision Support and Business Intelligence Systems*. Pearson.

Tzafestas, S. (2008). The Art and Impact of Physical and Virtual Enterprise Incubators: The Greek Paradigm. In *The Open Knowledge Society. A Computer Science and Information Systems Manifesto* (pp. 549–559). Berlin: Springer. doi:10.1007/978-3-540-87783-7_70

van Tilburg, J., van der Sijde, P., Molero, J., & Casado, P. (2002). Virtual Incubation of Research Spin-Offs. *International Journal of Entrepreneurship and Innovation*, *3*(4), 285–293. doi:10.5367/000000002101299330

von Briel, F., Davidsson, P., & Recker, J. (2018). Digital technologies as external enablers of new venture creation in the IT hardware sector. *Entrepreneurship Theory and Practice*, *42*(1), 47–69. doi:10.1177/1042258717732779

Chapter 2
Application of the Effective Innovation Leadership Model in a Digital Innovation Project: Case Study

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ABSTRACT

Germany has become sedate and partially missed digital opportunities generating value. Since 1995, the term innovation leadership is getting increasing attention. Still, there exists no clear definition. The effective innovation leadership (EIL) model resulted from a Ph.D. thesis and is grounded in the iteration of six data sets. It has been used in industry since 2014. This chapter examines the application of the EIL model in one German middle-class enterprise in 2018/2019. Core challenges in the systemic context, which hinder the effectiveness of innovation leadership in the organizational context, are the support of people across functions and hierarchies as well as inflexible structures and digital access. Especially negative pressure coming from an overvaluation of the shareholder, egos fighting for power, extensive drama triangular, fixed mindsets, and freeloaders hinder the effectiveness of innovation leadership. A comparison of the EIL model with rival theory shows that innovation leadership is close to entrepreneurial approaches and an integral part of innovation management.

INTRODUCTION

Germany, the land that had very fast cycles of invention in times of high industrialization has become sedate (Welt, 2019). Especially German family-owned business that generate a large share of wealth in Germany (Statista, 2017b) partially missed the opportunity to use the digital change to generate value. The federal government adjusted its infrastructure late in international comparison (Bundesregierung, 2019; FAZ, 2018). China and the US seem to have left the rest of the world behind (Bertelsmann Stiftung,

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2019). If you believe the IDC predictions, the world needs to prepare itself for the digital innovation explosion (IDC, 2019). Particularly research-intensive and knowledge-intensive companies are looking for new, collaborative, and holistic approaches increasing their (digital) innovation competencies.

In the following book chapter, the construct of effective innovation leadership is explored from various perspectives, enriching the groundwork from Crawford and Kelder (2019), Scharmer (2019), as well as Kaudela-Baum et al. (2014) and adopted in a digital innovation project.

In detail, the procedure follows six steps: First, there is a historical overview of the concept of innovation leadership. Second, the author presents the EIL-Model and explains its emergence. Third, the significance of medium-sized and family-run enterprises in Germany is worked out. Fourth the reason why a case study as the methodology was adopted and a paper-industry case study executed. Fifth, after compiling the findings from the case study, these are compared with related entrepreneurial theories (sixth).

Finally, the findings are summarized, critically discussed, and limitations and future research efforts are listed.

INNOVATION LEADERSHIP

In order to provide a reasonable basis for effective innovation leadership, the main definitions follow.

Amabile (1983) defines **creativity** as the ability of an individual or group to think and act in an imaginative and shaping way to generate novel and useful ideas or solutions to problems.

Inventions are creative achievements based on the application of technical knowledge. **Innovations** in economics are associated with technical, social, or economic change (Gabler, 2019a).

While **innovations** are improvements of the existing without claiming uniqueness or intelligence, **inventions**, on the other hand, produce something new, which is the result of intelligence and goes beyond the obvious. Another criterion of the invention is "surprise" (Potts, 1943).

Innovation Management is a core business activity that is primarily geared to the characteristics of an innovation and thus combines management aspects. Operational innovation management aims at increasing the value of a company. This purpose is achieved by a novel combination of means and purposes, which is expressed in designing new products, process, service, or organization such as a corporate network. The Austrian economist Schumpeter (1883-1950) already pointed to most of the purposes, who also characterized the purpose of innovation management as "creative destruction," i.e., the replacement of an existing one with something better (Gabler, 2019c). The scientists Adams et al. (2006) synthesized a framework of the innovation management process consisting of seven categories: inputs management, knowledge management, innovation strategy, organizational culture and structure, portfolio management, project management and commercialization.

While **innovation management** looks at and addresses several levels of an organization, **innovation leadership** refers to the space of action of an individual who is involved in an organizational context.

Taking a closer look at the term **innovation leadership,** we note that it was first named in 1995 (Rogers 1995) and defined in 2000: Murphy & Murphy (2002), Bossink (2004), Gliddon (2006), Carmeli et. al (2010), Hunter & Cushenbery (2011), Rosing et al. (2011), O`Reilly and Tushman (2013), Kaudela-Baum et al. (2014), Gliddon (2018). The following Table 1 aggregates the spectrum of varying definitions.

There exists no clear and unambiguous definition for the term »innovation leadership«. Innovation leadership was already discussed in the context of leadership style such as ambidextrous, authentic, transactional or transformational leadership (Alsolami et al., 2016) and in the context of diverse man-

Table 1. Aggregation of various Innovation Leadership Definitions

Definition	Publication	Topic	Category
Innovation leaders are innovators, early adopters, opinion leaders, and change agents	Rogers (1995)	People	Values Strengths Practices
Innovation leaders can support the success of the economy and the organizations, products, and employees	Murphy & Murphy (2002)	Context	Practices
Innovation leaders are managers, executives or entrepreneurs who successfully initiate, sponsor, and steer innovation in their organizations	DesChamps (2003)	People	Practices
Innovation leaders are managers driving innovation	Bossink (2004)	People	Practices
Innovation leaders manage people or processes. They are leading the diffusion of innovation within an organization's social system. They hold the following competencies: learning, leading teams, motivation, management, and delegation	Gliddon (2006)	System	Strengths Practices
Innovation leadership is a process of creating direction, alignment, and commitment that is needed to create and implement something new that adds value to an organization. Hence, innovation leadership is about being able to form an integrated overview of innovation and, at the same time, lead the components of innovation in a strategic manner	Ailin & Lindgren (2008)	System	Strengths Practices
Innovation leaders are shaping a working space increasing the learning and absorption capacity in a highly volatile context (system), they 1) encourage individual initiative; 2) clarify individual responsibilities; 3) provide clear and complete performance evaluation feedback; 4) Maintain a strong task orientation, 5) Emphasize group relationships and, 6) Demonstrate trust in organizational members	Carmeli et. al (2010)	System	Values Strengths Practices
Innovation leadership is defined as the process of creating the context for innovation to occur; creating and implementing the roles, decision-making structures, physical space, partnerships, networks, and equipment that support innovative thinking and testing	Porter & Malloch (2010)	System	Practices
Innovation leadership includes several behaviors: 1) Embrace a challenge; 2) Drive change through collective creativity and knowledge; 3) Shape the culture of the organization; 4) Establish a professional learning system; 5) Decide and systematize; 6) Ensure digital access and infrastructure; and 7) Demand accountability	Roscorla (2010)	System	Values Stengths Practices
Innovation leaders directly provide creative input, clear work goals derived from an overall vision as well as resources and tools necessary to fulfill job tasks. Additionally, innovation leaders indirectly influence their employees by establishing a supportive climate, acting as a role model, providing rewards, and compositing an excellent creative team	Hunter & Cushenbery (2011)	System	Strengths Practices
Innovation leaders integrate "two complementary sets of leadership behavior that foster exploration and exploitation in individuals and teams - opening and closing leader behaviors, respectively"	Rosing et al. (2011)	System	Practices
Innovation leadership is constituted from three broad areas: 1) a toolset, 2) a skillset and 3) a mindset	Horth & Vehar (2012)	People	Values: mindset Strengths: skillset Practices: a toolset
Innovation leaders inspire openness, discovery and the right choices	Stevenson (2012)	People	Values
Innovation leaders competencies are, being a: 1) strategist, 2) capacity builder, 3) matchmaker and 4) achiever	Vlok (2012)	People	Strengths

continues on following page

Table 1. Continued

Definition	Publication	Topic	Category
Innovation leadership is the synthesis of different leadership styles in organizations to influence employees to produce creative ideas, products, services, and solutions	Adjei (2013)	People	Practices
Innovation leaders switch intuitively between open and closed leadership. Open leadership includes chaotic structures, intrinsic motivation, risk-taking, playful, dynamic and creative behaviors, based on autonomy and freedom. Closed leadership focuses on target agreements, power, planned task delivery, extrinsic motivation, and ordered structures	O`Reilly and Tushman (2013)	System	Values Strengths Practices
Innovation leaders honor deviations and focus on cultural, communication as well as related factors. They support self-responsible driven initiatives from individuals. Innovation leadership has a strategy orientation, focusing on the long-term development of innovations and knowledge. They build contexts in which learning, and adaptation to constant changes in the surrounding is possible. Innovation leaders work on the development of incremental and radical business models. They deal with paradoxes and complexity. Innovation leaders see employees as partners and provide freedom as well as reflexion cycles	Kaudela-Baum et al. (2014)	System	Values Practices
Innovation leadership is a practice and an approach to organization development and organizational change. Innovation leadership commonly includes six tasks: data creation, best practice review, choice evaluation, innovation application, team training, and trend establishment	Gliddon (2018)	System	Practices
Managers that want to become innovation leaders should develop group norms, design team strategically, manage interactions with those outside the team, show support, display organizational support & use performance management effectively	Kremer et al. (2018)	System	Practices
Innovation leadership incorporates the strategic transformation of innovation inputs (financial resources, human resources, tools, and knowledge) into innovation outputs (form, magnitude, nature, referent, and type)	Nadkarni (2018)	System	Practices

Source: (own representation, 2019)

agement models (Carmeli et al., 2010; Horth & Vehar, 2012; Johannessen et al. 2018; Lindgren & Abdullah, 2013; Nadkarni, 2018; Roscorla, 2010). For this reason, this paper dispenses with a further deepening in this context.

Effectivity describes three aspects: (1) doing the right things (effectivity = goals / results), (2) doing the things right (effectiveness = result / expense), (3) including a moral compass (ethics).

Effective innovation leaders transform unique ideas (goal) into marketable (digital) innovations by cultivating virtues to strengthen a positive human image (ethics). Some role models in that context are Yves Chouinard or Goetz Werner.

Due to the growing importance of digitization as a differentiating factor in global competition, the EIL-Model is applied in a digital innovation project. Digital innovation can be defined as digitization of processes, goods and services, that destroy established business models and disrupt existing value chains. They are driven by digital technologies, creating opportunities for new improved business processes, new products or new services. The marginal cost to distribute digital innovation is near zero (OECD, 2016).

THE EIL-MODEL

The EIL-Model is the result of a doctoral thesis (Schork, 2017), grounded in the iteration of six data sets interpreted from a Grounded Theory Methodology by Corbin & Strauss (2015).

First, a theory was generated based on a literature and journal review enriched with narrative interviews.

One result of this is the historical overview of leadership epochs in the context of the innovation leadership construct. These range from person-centered to relationship-oriented, over systemic approaches, value-based approaches, motivation-theoretical approaches to holistic approaches that pay attention to integral theories in which the environment and its effect on individuals and groups are taken into consideration (Schork, 2017).

As a next step, the items grounded in theory are tested in the field (across three case studies), challenged with diverse innovation managers and innovation leaders from different companies as well as researchers from other universities. Finally, each item is compared to fundamental research. As well, the definitions were checked by an economic and sociological researcher.

The EIL-Theory is held against three existing leadership models resembling different perspectives on the economy (i.e., Otto Scharmer's Theory U, O'Reilly and Tushman's Ambidextrous Leadership Theory, and Malik's Management Theory). The elements and its relationships are specified, interrelations explained, sharp definitions of elements given, and semantic relationships with other constructs proposed. In addition to that, the approach follows the best practice proposed by Crawford and Kelder (2017).

Content validity is stabilized with ten experts that are involved in a focus group workshop or in one of the narrative interviews. Eighty percent of the scholars are leaders and involved in leadership research and studies.

Finally, the researcher executes an assumption test for the relationship between the subcategory »practices« and »effectivity«. To measure internal consistency reliability, The Cronbach's alpha value is considered per variable and construct. All twelve constructs collected in the quantitative survey have a value greater than .7, five even a value greater than .8. Multicollinearity between variables can be excluded. External validity is ensured by a complete record. Furthermore, the normal distribution of the variables is considered as well as mean and standard deviation. Differences in response behavior can be identified between the employees and managers or learners and expert subgroups. An EFA results in correlation results with a KMO greater than .8. The professionalism construct consists of six variables (common goal, success orientation, best efforts, accuracy, quick problem solving and competitiveness). Highly significant correlations with $r > .5$ exist between the constructs Focus & Professionalism,

Co-Creation & Professionalism, Reflexivity & Professionalism, Entrepreneurship & Professionalism and as well as Co-Creation & Well-being, Entrepreneurship & Well-being and Path making &Well-being.

Research steps are documented in several publications Schork 2014a, Schork 2014b, Schork & Terzidis 2014, Schork & Terzidis 2015, Schork et al. 2016.

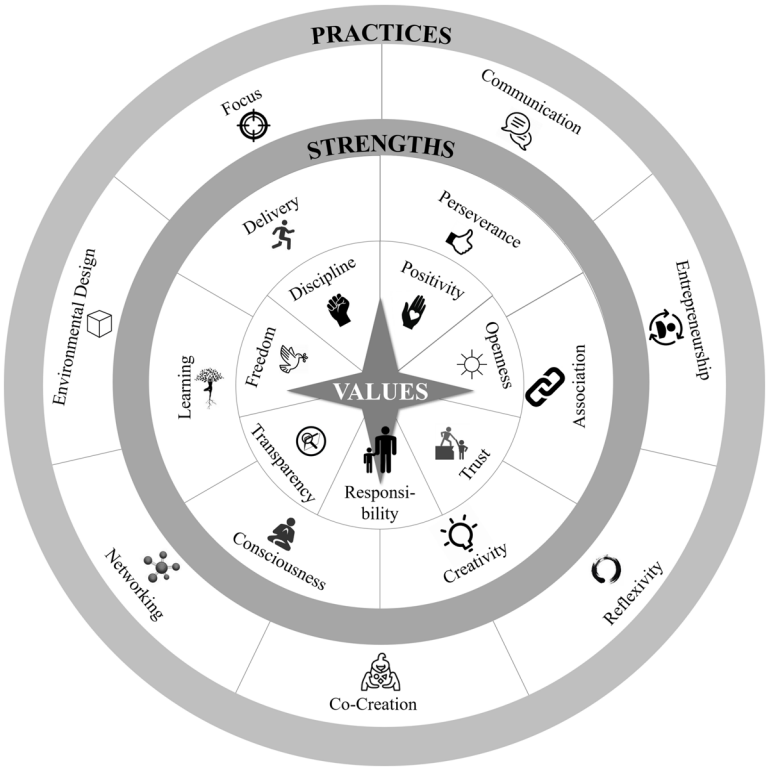
Based on the iteration of six data sources, the EIL-Model emerges. The EIL-Model shows the most frequently mentioned properties of an effective innovation leader. It consists of the three categories values, strengths, and practices. Those three categories have twenty sub-categories (see Fig. 1).

Values are defined as „an enduring belief that a specific mode of conduct or send the state of existence is personally and socially preferable to alternative modes of conduct or end-states of existence" (Rokeach 1973). When specifying values, a person answers the question, "What is important to me?". Because values are guiding principles, providing a direction in decision-making processes, they are symbolized with a compass in Fig. 1.

The second circle in Fig. 1 shows the strengths. Strengths are defined as „the ability to provide consistent, near-perfect performance in a given activity" (Buckingham & Clifton 2001). The underlying assumption of strength theory is that individuals have a unique mixture of talents that filter their thoughts, feelings, and behavioral patterns. There is much potential in talents to be able to provide particularly superior performance. If a person is aware of her/his talents and utilizes them, she/he can develop strengths. When specifying strengths, a person answers the question, "What is easy for me?".

Practices are defined as "specific professional behaviors that a person uses every day to be effective" (Malik 2014). Malik refers to the learned behaviors (also: skills) that a person uses. Tools and methods (such as digital devices, software programs, artificial intelligence, coaching tools, or creativity / business model techniques) can support practices. When specifying practices, a person answers the question, "What I do in my daily practice?".

Figure 1. The Effective Innovation Leadership-Model
Source: (own representation, 2019)



Each category (values, strengths, and practices) are broken down into subcategories, which lead to the following specifications (See Table 2). They answer the question: "what is important to an effective innovation leader, what is (s)he strong in and does (s)he do?". Additionally, the definitions are held against existing definitions.

Table 2. EIL subcategory definitions[1]

Category	Subcategory	Definition	Literature Review
Values	Discipline	It is essential to create something new, despite obstacles.	Innovation leaders are innovators, early adopters, opinion leaders, and change agents (Rogers, 1995) They 1) encourage individual initiative; 2) clarify individual responsibilities; 3) provide manifest and complete performance evaluation feedback; 4) Maintain a strong task orientation, 5) Emphasize group relationships and, 6) Demonstrate trust in organizational members (Carmeli et al., 2010) Innovation leadership includes several behaviors: 1) Embrace a challenge; 2) Drive change through collective creativity and knowledge; 3) Shape the culture of the organization; 4) Establish a professional learning system; 5) Decide and systematize; 6) Ensure digital access and infrastructure (Roscorla, 2010)
Values	Freedom	It is essential to make decisions free from specific personal or social ties.	Innovation leaders see employees as partners and provide freedom (Kaudela-Baum et al., 2014) They encourage individual initiative (Carmeli et al., 2010) Open leadership includes chaotic structures, intrinsic motivation, risk-taking, playful, dynamic and creative behaviors, based on autonomy and freedom (O`Reilly & Tushman, 2013)
Values	Openness	It is important to perceive the environment without judgment.	Being open in the mind, heart & hand, means not being fearful, an ideologist or ignorant, nor living fanatism, hate or cynicism (Scharmer, 2019)
Values	Positivity	It is important to believe that life and people mean well with us.	Innovation leaders are competent in motivation (Gliddon, 2006)
Values	Responsibility	It is important to bring innovations into our world.	Innovation leaders can support the success of the economy (Murphy & Murphy, 2002) They sponsor, steer, and initiate innovation (DesChamps, 2003). They act as a role model (Hunter & Cushenbery, 2011) Innovation leadership is a process of creating direction, alignment, and commitment that is needed to create and implement something new that adds value to an organization (Ailin & Lindgren, 2008)
Values	Transparency	It is important to make decisions visible and traceable.	Innovation leaders directly provide creative input, clear work goals derived from an overall vision as well as resources and tools necessary to fulfil job tasks (Hunter & Cushenbery, 2011) Innovation leaders establish a professional learning system, Decide and systematize and ensure digital access and infrastructure (Roscorla, 2010)
Values	Trust	It is important to trust people unconditionally.	Innovation leaders indirectly influence their employees by establishing a supportive climate (Hunter & Cushenbery, 2011) They demonstrate trust in organizational members (Carmeli et al., 2010)
Strengths	Association	It is easy to link independent concepts in a new way.	Associating or the ability to successfully connect seemingly unrelated questions, problems, or ideas from different fields. It is central to the innovator's DNA an includes the four patterns of action questioning, observing, experimenting, and networking (Dyer et al., 2009) Associating or the ability to successfully connect seemingly unrelated questions, problems, or ideas from different fields. It is central to the innovator's DNA an includes the four patterns of action questioning, observing, experimenting, and networking (Dyer et al., 2009)
Strengths	Consciousness	It is easy to be present, sensing the now.	People-centered innovations need a sense of consciousness also called intentional (Edgeman & Eskildsen, 2012) You cannot change a system unless you transform consciousness (Scharmer, 2019)

continues on following page

Table 2. Continued

Category	Subcategory	Definition	Literature Review
Strengths	Creativity	It is easy to generate useful ideas leading to meaningful innovations.	Creativity is the generation of novel and useful ideas or solutions to problems (Amabile, 1983) According to Guilford (1966), a person's creative behavior is captured by the following basic psychological characteristics: 1. Problem sensitivity (recognize that and where there is a problem) 2. Liquid (produce many ideas in a short time) 3. Flexibility (leaving familiar ways of thinking, developing new perspectives) 4. Re-definition (reuse known objects, improvise) 5. Elaboration (adapting ideas to reality, adding details) 6. Originality (creating unusual novel ideas)
Strengths	Delivery	It is easy to execute self-driven.	Innovation leaders are managers driving innovation (Bossink, 2004) Closed leadership focuses on target agreements, power, planned task delivery, extrinsic motivation, and ordered structures (O`Reilly and Tushman, 2013) They are leading the diffusion of an innovation within an organization's social system (Gliddon, 2006) Innovation leadership is a process of creating direction, alignment, and commitment that is needed to create and implement something new that adds value to an organization (Ailin & Lindgren, 2008; Alsolami et al., 2016)
Strengths	Learning	It is easy to constantly learn by matching personal needs and actions.	Innovation leaders hold the competence to learn (Gliddon, 2006) They build contexts in which learning, and adaptation to constant changes in the surrounding is possible (Kaudela-Baum et al., 2014)
Strengths	Perseverance	It is easy to convince others with to-the-point expressions.	Innovation leaders are role models, provide rewards, and compose a creative team (Hunter & Cushenbery, 2011)
Practices	Co-Creation	In my daily practice, I co-create solutions with non-freeloaders.	Innovation contributes to enterprise excellence through customer-centric collaboration (Edgeman & Eskildsen, 2012) Fundamental change needs co-creation (Scharmer, 2019)
Practices	Communication	In my daily practice, I cultivate (none)verbal understanding of a shared vision.	Innovation leaders honor deviations and focus on cultural, communication as well as relationship factors (Kaudela-Baum et al., 2014)
Practices	Entrepreneurship	In my daily practice, I generate value through my ownership of actions.	Innovation leaders work on the development of incremental and radical business models. They deal with paradoxes and complexity (Kaudela-Baum et al., 2014) Solve big problems (Abbosh et al. 2019) Innovation leaders are managers, executives or entrepreneurs who successfully initiate, sponsor, and steer innovation in their organizations (DesChamps, 2003) Having an entrepreneurial mindset means recognizing opportunities, translating ideas into action, using resources intelligently, managing risks and creating values together (UIIN 2016).
Practices	Environmental design	In my daily practice, I create inspirational maker spaces.	Innovation leaders are shaping a working space increasing the learning and absorption capacity in a highly volatile context (Carmeli et al., 2010) Innovation leadership is defined as the process of creating the context for innovation to occur; creating and implementing the roles, decision-making structures, physical space, partnerships, networks, and equipment that support innovative thinking and testing (Porter & Malloch, 2010)

continues on following page

Table 2. Continued

Category	Subcategory	Definition	Literature Review
Practices	Focus	In my daily practice, I focus my actions on the enterprise purpose and goals.	Innovation leaders are leading the diffusion of innovation within an organization's social system (Gliddon, 2006) They clarify individual responsibilities; provide clear and complete performance evaluation feedback; and maintain a strong task orientation (Carmeli et al., 2010) For being creative, a state of perfect focus must be achieved. persons in this flow did not get any more of their environment with and go completely in the task on (Csíkszentmihályi, 1996)
Practices	Networking	In my daily practice, I integrate qualified people to increase market knowledge.	Networking supports the creative flow (Csíkszentmihályi, 1996) Innovation leaders implement networks (Porter & Malloch, 2010)
Practices	Reflexivity	In my daily practice, I adapt my thoughts through diverse dialogues.	Innovation leaders provide reflexion cycles (Kaudela-Baum et al., 2014)

Source: (own representation, 2019)

THE GERMAN MIDDLE-CLASS

Most small and medium-sized enterprises (SMEs) fulfil the qualitative criteria of the concept of SMEs. However, large enterprises can also belong to the SME category, and the terms "small and medium-sized enterprises" and "small and medium-sized enterprises (SMEs)" are not synonyms (IfM Bonn, 2019).

According to the Institute for SME Research (IfM) in Bonn, around 3.7 million companies belong to the German SME sector. That is 99.6 percent of all private sector companies in Germany. Many medium-sized companies are at the same time family businesses: Around 95 percent of all companies in Germany are family-owned. Their unique way of doing business - long-term, stable, and independent - cannot be captured with a quantitative definition. These companies are characterized by shareholder loyalty and capital commitment. Of the family businesses with an annual turnover of at least 50 million euros, far more than half are in the hands of at least the second or third generation (Bundesverband der Deutschen Industrie e.V., 2015). The German top-selling family-owned companies in 2017 are listed in the following Table 3.

Especially in times of crisis, when the economy is weak, family businesses have a stabilizing effect. From 2007 to 2016, German family businesses increased their headcount by 23%. At the same time, Dax companies increased their workforce by 4%. What family businesses have in common is that they are firmly rooted in their home region. It is precisely this economic structure that distinguishes Germany from other countries and stands for economic strength (Stiftung Familienunternehmen, 2019).

THE APPLICATION OF THE CASE STUDY METHODOLOGY

Doing case studies is a preferred method, compared to others such as experiments, surveys or statistical models, in situations when (1) the main research questions are ***"how"*** *and "why" questions; (2) a*

Table 3. Top-selling family-owned businesses in Germany

Rank	Company Name	Turnover in Millions of Euros
1	Volkswagen	230.682
2	BMW	98.678
3	Schwarz-Gruppe	90.200
4	Aldi Nord/Süd	72.125
5	Continental	44.010
6	Metro	37.140
7	Fresenius	33.886
8	Phoenix Pharmahandel	24.437
9	Ceconomy	22.155
10	Heraeus	21.844
11	Henkel	20.029
12	Boehringer Ingelheim	18.056
13	HeidelbergCement	17.226
14	Bertelsmann	17.190
15	Merck	15.327
16	Schaeffler	14.021
17	Marquard & Bahls	13.509
18	Mahle	12.788
19	Würth	12.722
20	Otto	12.512

Source: (Statista, 2017a)

*researcher has **little or no control over behavioral events**; and (3) the focus of study is a **contemporary** **phenomenon*** (Yin, 2014: 2).

In this case study the research question "**how** can an innovation leader become effective in a German family-owned mid-tier company?" is answered. The study focuses on a single case in which one individual is studied in the context of one company.

Due to the complex environment of enterprises, the researcher has **little control** over the behavioral activities of individuals and groups and **no control over the behavioral activities** of competitors or states. All the aspects influence the effectivity of an individual.

Leadership is as many disciplines depending on consciousness states of individuals and their surroundings. If one looks at the leadership research over the last few years, one sees how the focus on the hierarchy of private room for maneuver refers to group approaches with a focus on the purpose or sense of activities (Schork, 2017). Therefore, leadership contexts are a **contemporary phenomenon** driven by needs, beliefs, and values. (Digital) Innovation is also driving the development of the economy. It is continuously tried to optimize existing and create new ones. (Digital) Innovation meet a prevailing Zeitgeist and therefore depend on the time in which they appear. Thus, the effectiveness of the initiatives of an innovation leader depends on the extent to which they meet with resonance in the environment.

Case studies follow a twofold definition: (1) a case study is an empirical inquiry that ***investigates a contemporary phenomenon (the "case") in depth*** *and within its real-world context (especially when boundaries between phenomenon and context are not clear) and (2) a case study inquiry copes with the* ***technically distinctive situation in which there will be many more variables of interest than data points****, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis (Barkley, 2006; Stjelja, 2013). A case study can include single or multiple cases, can be limited to quantitative evidence and can be a useful method in doing an evaluation. Properly doing case study research means addressing five traditional concerns about case-studies – by conducting the research rigorously, avoiding confusion with teaching cases, knowing how to arrive at generalized conclusions if desired, carefully managing the level of effort, and understanding the comparative advantage of case study research. (Yin, 2014: 17)*

In this case study, a phenomenon of our time is examined, namely »innovation leadership«. In the previous paragraphs, the **contemporary aspect** was already presented.

The case study is a one-year study in which there are **many variables of interest than data points**. The observed company was implementing an innovation strategy, adapting structure and culture, and executing a new portfolio. The researchers were involved weekly in meetings, partly as observers, often active.

CASE STUDY FINDINGS

The EIL-Model was applied for one year in two digital innovation projects of a family-owned medium sized company. The findings from this are listed below.

Dimensions of the Sub-Categories

As Table 2 showed, some of the EIL-Model categories match existing innovation leadership definitions. Nevertheless, the existing definitions do not reflect the depth of each subcategory and sometimes focus too much on technocratic aspects. Therefore, in the following chapter, the dimensions of each sub-category are broken down into five dimensions, also called facets.

The dimensions are a result of the grounded theory analysis, which took place in the framework of the doctoral thesis between 2014 and 2016 (Schork, 2017), as well as subsequent findings generated in the field within the framework of the application of the EIL-Model (Schork, 2018).

The logic linking the data to the propositions are a category matrix specifying each of the sub-categories defined in Table 2 into five dimensions.

Comparison with (Rival) Theory

In the following sub-chapter, a comparison of contemporary entrepreneurial management approaches and the EIL-Model takes place. Germany promotes Entrepreneurship, especially in companies and in science. Similarities between the EIL-Model and entrepreneurial approach will be deepened.

Table 4. Operationalization of the EIL sub-categories[2]

Category	Subcategory	Definition	Operationalization
Values	Discipline	It is essential to create something new, despite obstacles.	Change the existing with power Rule by the will to innovate Clarity about goals
Values	Freedom	It is essential to make decisions free from specific personal or social ties.	Independence Unboundedness Possibility to move freely and unhindered
Values	Openness	It is important to perceive the environment without judgment.	Outspoken nature Integrate other perspectives Adopt and test the new
Values	Positivity	It is important to believe that life and people mean well with us.	See the good sides Attention to positive intentions Be positive without being naïve
Values	Responsibility	It is important to bring (digital) innovations into our world.	Active search for new opportunities Change the status-quo Constant value creation activation
Values	Transparency	It is important to make decisions visible and traceable.	Establish traceable infrastructure Ask for sincerity Act transparent
Values	Trust	It is important to trust people unconditionally.	Instill confidence in others High uncertainty tolerance Belief in life
Strengths	Association	It is easy to link independent concepts in a new way.	Connect unrelated ideas Integrate different fields Question the existing
Strengths	Consciousness	It is easy to be present, sensing the now.	The activity of all senses Perceiving reality (i.e., feelings of others) Real interest in the surrounding
Strengths	Creativity	It is easy to generate useful ideas leading to meaningful (digital) innovations.	Recognize that and where there is a problem Leaving familiar ways of thinking, developing new perspectives Creating many unusual novel ideas
Strengths	Delivery	It is easy to execute self-driven.	Self-responsibly initiate projects Ability to bring initiatives forward Urge to finish things
Strengths	Learning	It is easy to constantly learn by matching personal needs and actions.	Search for new information about a problem Reflect until new information is understood Enrich new knowledge with new perspectives
Strengths	Perseverance	It is easy to convince others with to-the-point expressions.	Provide plausible arguments Using a clear language Meeting the expectations of others
Practices	Co-Creation	In my daily practice, I co-create solutions with non-freeloaders.	Working together in a particular field Co-creation of solutions Participation at eye level
Practices	Communication	In my daily practice, I cultivate (none)verbal understanding of a shared vision.	Empathic listening Awareness of needs Name facts
Practices	Entrepreneurship	In my daily practice, I generate value through my ownership of actions.	Solve big problems Taking risks Focus on generating value

continues on following page

Table 4. Continued

Category	Subcategory	Definition	Operationalization
Practices	Environmental Design	In my daily practice, I create inspirational maker spaces.	Establish agile processes and structures Provide essential tools and methods Offer facilities for self-organized (remote) work
Practices	Focus	In my daily practice, I focus my actions on the enterprise purpose and goals.	Articulate a clear vision Drive individual tasks Act towards a shared purpose Adopt priorities to continuous changes Provide feedback according to a shared purpose
Practices	Networking	In my daily practice, I integrate qualified people to increase market knowledge.	Establish weak ties to experts Gather information from knowledge carriers Focus on people with a deep understanding of a certain topic
Practices	Reflexivity	In my daily practice, I adapt my thoughts through diverse dialogues.	Active search for diverse dialogue Execution of dialogues with friction Thinking practices through

Source: (own representation, 2019)

Due to the breadth of leadership theories, many researched approaches such as servant leadership, transformational leadership, or authentic leadership, all of which have been put into focus in the context of the doctoral thesis in epochal contemplation, gain no attention in this publication.

Entrepreneurial Leadership (EL)

On the surface, one can associate entrepreneurs with ***leadership functions*** *such as* ***providing vision to the development of a new product, service, or organization****. A leader must be* ***entrepreneurial*** *as well. It has been written that entrepreneurial leadership* ***deals with concepts and ideas****, and these are often related to problems that are not of an organizational nature. (El-Namaki 1992)*

Innovation leaders are responsible for the **creation of unique ideas** and the development of product, service, or process innovations. They struggle but need to **provide a vision**, so that employees know what their functions along the process are.

In summary, based on the literature, both leaders and entrepreneurs are successful[3] *largely to the extent that they provide* ***(1) strategic leadership (vision and long-term goals), (2) problem-solving skills,*** **(3) timely decision-making, (4) a willingness to accept risks, and (5) good negotiation skills.** *(Fernald et al., 2005)*

Because effective innovation leaders create **new solutions for existing problems**, they always need to **make decisions** on how to solve problems and **negotiate with stakeholders** so that they can deliver something new. Since the new is unpredictable, they **must take risks**.

By comparing a common definition of entrepreneurial leadership, it becomes visible that subcategories such as discipline, freedom, creativity, communication and entrepreneurship of the EIL-Model are related.

There are two fundamental differences between the two constructs. Entrepreneurs do not necessarily have to offer (digital) innovation in the market in order to create value. They can also copy existing busi-

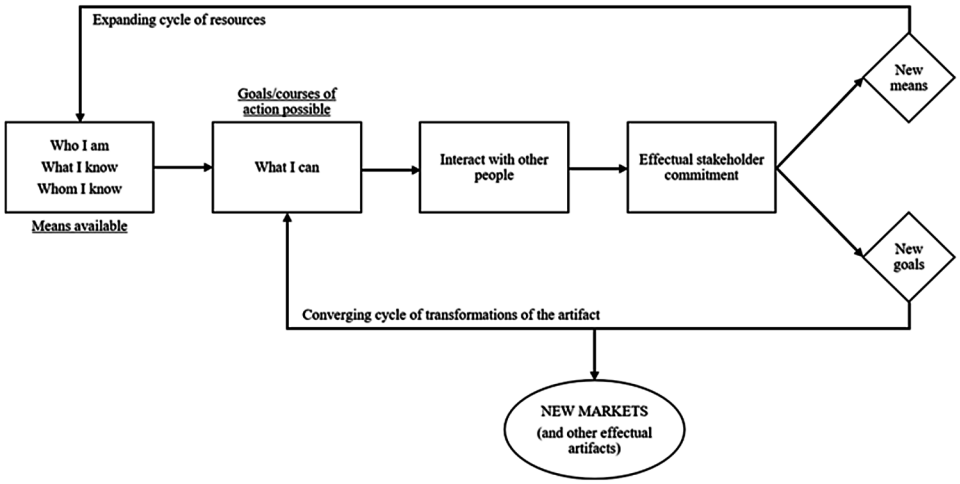
ness models (i.e., franchising systems) or consciously applying a follower strategy. Innovation leaders, on the other hand, do not have to be the owner of a company, they can be employed like Steve Jobs, or own their shares in a company without being the CEO, like Elon Musk. They develop something new in each case and thus lead the market.

Effectuation (EF)

Effectuation is a term that Saras D. Sarasvathy researched on in her Ph.D. thesis, answering the question "how do entrepreneurs take decisions and take action?". The effectuation approach describes an approach used by (experienced) entrepreneurs to solve problems and make decisions. Does an entrepreneur a) offer new products in a new market, or (b) a new product in an established market; or c) an established product in a new market, it can shape or control the market. The effectuation approach assumes that market forecasts cannot be made for the scenarios described in a) to c) because the future is not predictable but can be shaped. Effectuation describes a ***dynamic and interactive process that allows the creation of new artefacts*** *(artificially induced changes or conditions). Further features of the effectuation approach are that* ***the entrepreneur makes his decisions based on the resources available to him and specifically tries to enter into partnerships with stakeholders to implement his business idea.*** *He does not make decisions about an expected return but depending on his loss expectations within the framework of a predefined individual limit.* ***He does not try to avoid imponderability by strict planning, but to use them profitably for himself and his business idea and reacts accordingly flexible to changes****. (Gabler, 2019b)*

The dynamic model of effectuation assumes that new objectives are directly related to the sphere of action of an entrepreneur (See Fig. 2).

Figure 2. Dynamic model of effectuation
Source: (Sarasvathy, 2008: 101)



The statement "Who I am" is an expression of a person's identity, which includes, among other things, their values. Therefore, this statement is closely linked to "What is important to me," which stands for values in the EIL-Model.

The statement "Who / Whom I know" can be understood as a network with relevant decision-makers, which is expressed in the subcategory "Networking" in the EIL-Model.

The effectuation statement "What I can" connects to the statement "What is easy for me," which resembles the strengths in the EIL-Model.

New markets are one of the strategies innovation leaders can follow on but do not have to. Thus, this can be regarded as one of the distinguishing features of the two models Effectuation and EIL-Model.

The flexible reaction of entrepreneurs to changes is closely linked to the EIL subcategory "openness" and "freedom." As well, the creation of new artefacts is one aspect of the EIL subcategory "association," and the dynamic and interactive process is an aspect of the EIL subcategory "delivery."

The use of imponderability has an interrelation to "learning." The statement "an entrepreneur engages his environment" is related to "environmental design." Moreover, the statement "tries to enter into partnerships" with "networking."

Social Entrepreneurial Leadership (SE)

Social entrepreneurial leaders are persons who ***create and manage innovative entrepreneurial organizations or ventures*** *whose* ***primary mission is the social change and development of their client group****. The social enterprise's activities and its client group's activities* ***can primarily be either economic or non-economic****, but the mission is social change and development. (Prabhu, 1999)*

In Germany, non-profit organizations include associations, federations, self-governing bodies, non-profit organizations (gGmbH, gUG or gAG), cooperatives, or foundations, which are run by elected volunteers and can be supported in their work by volunteers. Non-profit organizations pursue the promotion of: science and research, education and training, art and culture, international understanding, help from politically, racially or religiously persecuted, for refugees, displaced persons, repatriates, late repatriates and others, monument protection and preservation, nature conservation and landscape conservation, local history and geography, traditional customs, animal protection, sports, development cooperation, civic engagement in favor of charitable, charitable and ecclesiastical purposes.

Few companies in Germany operate on a non-profit basis, e.g., Robert Bosch AG (92% non-profit), the consulting company PHINEO or research-oriented tech startups.

Motivations of social entrepreneurs are (McClelland, 1967):

- A deep feeling of uneasiness with the status quo
- Altruism
- Be true to one's values and beliefs
- Social responsibility

In brackets, related EIL-Model sub-categories are added to the upcoming motivators and abilities.

Swamy (1990) is writing about the following motivators:

- Urge to experiment (learning)

- Urge to fight injustice (responsibility)
- Ability and will to take high risks (entrepreneurship)
- High uncertainty tolerance (trust)
- Value the lifestyle from both the client group and society (openness)

As well, the researcher refers to certain abilities of a social entrepreneur (in brackets related EIL subcategories are added):

- Courage to withstand social censure (positivity)
- Sensitivity to feelings of others (consciousness)
- Ability to persevere (perseverance)
- Ability to develop and articulate a clear vision (focus)
- Ability to instill confidence in others (trust)
- Ability to think creatively (association)
- Ability to identify and meet the needs of the client group (co-creation)
- Ability to put in long hours of work (discipline) (Prabhu, 1999)

By comparing the EIL-Model with the construct social entrepreneurial leadership, it becomes transparent that the category "value" seems to be of great importance for social entrepreneurs.

The following table shows the overlaps of the entrepreneurial approaches and the EIL-Model.

The category practices, as well as the subcategories reflexivity and transparency are not reflected in the entrepreneurial models.

Innovation Management

Adams et al. (2004) and several other researchers such as Burgelman et al. (2004), Chiesa et al. (1996), Cooper & Kleinschmidt (1995), Cormican & O'Sullivan (2004), Goffin & Pfeiffer (1999), Verhaeghe & Kfir (2002) see in innovation management a conceptual framework of process that provides the basis for a general measurement framework which aims to assess the successful exploitation of new ideas within an organization (Alsolami et al., 2016). The authors propose a seven-dimensional conceptualization of the innovation management phenomenon: (1) inputs (people, physical and financial resources, tools), (2) knowledge management (idea generation, knowledge repository, information flows), (3) innovation strategy (strategic orientation, strategic leadership), (4) organization & culture (culture, structure), (5) portfolio management (risk/return balance, optimization tool use), (6) project management (project efficiency, tools, communication, collaboration), and (7) commercialization (market research, market testing, marketing and sales).

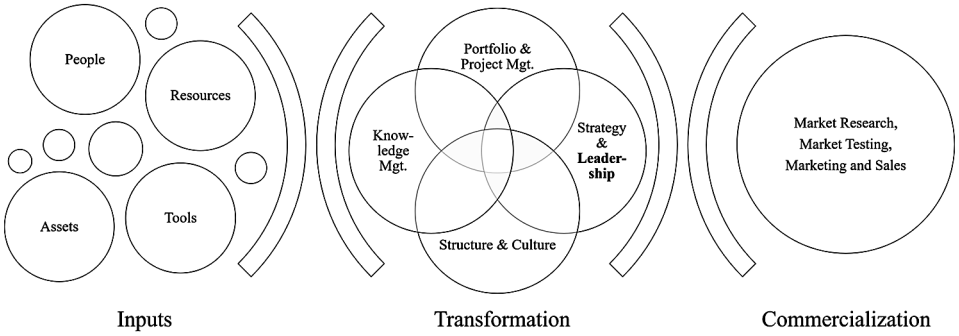
LEADERSHIP in the innovation management framework is part of the dimension "innovation strategy." This insight leads to the assumption that leadership must always be thought of in the context of the organizational set-up (See Fig. 3).

Table 5. Operationalization of the EIL sub-categories[4]

Subcategory	Definition	Entrepreneurial Approaches
Values	Values are guiding principles providing a direction in decision-making processes	EF: Who I am SE: Be true to one's values and beliefs
Discipline	It is essential to create something new, despite obstacles.	SE: Ability to put in long hours of work
Freedom	It is important to take decisions free from certain personal or social ties.	EF: Reacts flexible to changes
Openness	It is important to perceive the environment without judgment.	SE: Values the lifestyle from both the client group and society EF: Reacts to changes in the outside world
Positivity	It is important to believe that life and people mean well with us.	SE: Courage to withstand social censure
Responsibility	It is important to bring (digital) innovations into our world.	SE: Urge to fight injustice
Transparency	It is important to make decisions visible and traceable.	
Trust	It is important to trust people unconditionally.	SE: Ability to instil confidence in others SE: High uncertainty tolerance
Strengths	If a person is aware of her/his talents and utilizes them, she/he can develop strengths.	EF: What I know
Association	It is easy to link independent concepts in a new way.	EF: Creation of new artefacts
Consciousness	It is easy to be present, sensing the now.	SE: Sensitivity to feelings of others
Creativity	It is easy to generate useful ideas leading to meaningful (digital) innovations.	SE: Ability to think creatively
Delivery	It is easy to execute self-driven.	EF: dynamic and interactive process
Learning	It is easy to constantly learn by matching personal needs and actions.	SE: Urge to experiment EF: uses imponderability his/her business idea
Perseverance	It is easy to convince others with to-the-point expressions.	SE: Ability to persevere
Practices	Learned behaviors that a person uses	
Co-Creation	In my daily practice, I co-create solutions with non-freeloaders.	SE: Ability to identify and meet the needs of the client group
Communication	In my daily practice, I cultivate (none)verbal understanding.	EL: Providing vision
Entrepreneurship	In my daily practice, I generate value through my ownership of actions.	EL: strategic leadership, problem-solving skills, timely decision-making, willingness to accept risks, good negotiation skills SE: Ability and will to take high risks, makes his decisions based on the resources available SE: A deep feeling of uneasiness with the status quo
Environmental design	In my daily practice, I create inspirational maker spaces.	EF: An entrepreneur engages his environment
Focus	In my daily practice, I focus my actions on the enterprise purpose and goals.	SE: Ability to develop and articulate a clear vision
Networking	In my daily practice, I integrate qualified people to increase market knowledge.	EF: Tries to enter into partnerships with stakeholders
Reflexivity	In my daily practice, I adapt my thoughts through diverse dialogues.	

Source: (own representation, 2019)

Figure 3. Innovation Management based on Adams et al. (2004)
Source: (own representation, 2019)



SOLUTIONS AND RECOMMENDATIONS

If innovation management is seen as an organizational model, innovation leadership is part of the design of an innovation strategy. Behavior and ways of thinking of individuals must therefore always be thought and understood in the system as well as context. Innovation leadership approaches still need to catch up in this context and could, for example, orientate themselves on holistic approaches such as the Theory U from Otto Scharmer (2019) or the AQAL Model from Ken Wilber (2005).

Single leaders can only be successful if they have peer or top management support on a broad basis. If no one recognizes the leader decision space or if (s)he is overruled by higher hierarchies, the person is not able to act.

As well, the creative team around the innovation leader must be open-minded, flexible instead of being dogmatically or compulsively. Graduates of schools and universities rarely bring these properties. Ego and inflexible or fixed mindsets are large troubles.

Especially power and performance systems have an impact on innovation leader's initiatives. Often, they have grown historically and are therefore difficult to break through, especially because networks try to prevent this.

Effective innovation leaders know how to adopt methodologies when needed to increase the association skills of their team. Here they often must act against the creativity-minimizing consequences of education systems and false beliefs.

Still, innovation leadership needs to be understood as an individual task. Individuals can only control their own and not the behavior of others. To some extent, they may influence others. Manipulation is not allowed from an ethical and moral point of view. In a work environment based on freedom and not compulsion, which is indispensable for digital innovation projects, the decision ultimately rests with the individual.

Finally, the unifying element of a working group based on autonomy is a common vision or purpose which is indispensable for an effective interrelationship. That is why telling the "why" behind activities is so relevant. In order to gain clarity in this area, the ikigai model can be recommended (Lemke, 2017).

In order to enable new forms of entrepreneurship, ego models must be replaced by community models. Existing companies often find themselves in crisis, making new forms of economic management inevitable. Unfortunately, these approaches are still in the minority and are not understood by the broad mass or ironed out as hocus-pocus.

On a meta-level, we can summarize the following about effective innovation leadership: people with a positive image of the human being are taking responsibility for innovation and are doing meaningful jobs to transform unique ideas into marketable (digital) innovations by cultivating virtues in order to achieve a shared higher goal (purpose). Therefore, they interact with internal and external stakeholders. The combination of all activities in the system creates new meaningful solutions generating market share and revenues without bypassing social and environmental factors.

FUTURE RESEARCH DIRECTIONS

Future research should:

- integrate sense of life - what it is worth living for.
- relate more to the relationship of the individual with its environment.
- focus more on proximity and the distinction between innovation and entrepreneurial models and embed the insights in a contextual model.
- establish new economic models taking both capitalism and socialism into account.
- understand how far the degree of individual leaders can be in an innovation management system.

CONCLUSION

The economic importance of thinking about new forms of leadership and economics is undisputed.

However, reality shows how difficult it is for established businesses in Germany to break out of old patterns and to find fruitful co-creation processes.

It is promising to build a group of leaders who together advance a vision for the company and provide their colleagues with security in difficult times through, for example, personality development or methodological support or mentoring.

The environment and its support are crucial to the success of an enterprise. Neither Greta Thunberg, Steve Jobs nor Elon Musk did it alone. They had supporters, door openers, and gatekeepers believing in and supporting their vision.

In order to be effective, the meaning of one's own sphere of action must be clear, and a co-creative environment must be created, in which people meet not in the EGO, but with a holistic openness. Once this is the case, processes can help increase the effectiveness of the group and facilitate coexistence. Leaders are not there to control or cynically evaluate or to incite fear or ignorance, but to inflame curiosity, courage and commitment. Toxic companies moving in the drama triangle will not make the leap into the future.

LIMITATIONS

This book chapter focuses on digital innovation projects in one German case study. Cultural characteristics and market events thus influence the results.

OUTLOOK

In this paper, from the iteration of the qualitative data already collected and newly added, each construct with five dimensions was operationalized in Table 2. These dimensions become the basis of a later focus group pre-test with minimum thirty leadership scholars covering three to five different perspectives. The insights generated from the focus groups build the basis for a quantitative survey that will be adopted in Germany enterprises and analyzed with a CFA. The empirical study will take note of the seven recommended steps of Crawford & Kelder (2017): (1) Report on, and factor in, assumptions of normality; (2) Test internal reliability using tests designed for the model specification; (3) Use factor analysis appropriately, (4) Report on, at least, SRMR, Chi-square test, RMSEA, and CFI; (5) Demonstrate, at minimum, predictive validity that equals or exceeds existing leadership theories; (6) Consider sample size based on the tests to be used, with 150 being the bare minimum responses; and (7) Report methods and justify assumptions clearly.

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REFERENCES

Abbosh, O., Savic, V. & Moore, M. (2019, August 3). What Sets the Most Effective Innovators. *Harvard Business Review.*

Adams, R., Bessant, J., & Phelps, R. (2006). Innovation Management Measurement: A Review. *International Journal of Management Reviews*, *8*(1), 21–47. doi:10.1111/j.1468-2370.2006.00119.x

Adjei, D. (2013). Innovation leadership management. *International Journal of ICT and Management*, *1*(2), 103–106.

Ailin, M., & Lindgren, P. (2008). Conceptualizing Strategic Innovation Leadership for Competitive Survival and Excellence. *Journal of Knowledge Globalization*, *1*, 87–107.

Alsolami, H. A., Cheng, K. T. G., & Twalh, A. A. M. I. (2016). Revisiting Innovation Leadership. *Open Journal of Leadership*, *5*, 31–38. doi:10.4236/ojl.2016.52004

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*(2), 357–377. doi:10.1037/0022-3514.45.2.357

Barkley, D. L. (2006). *The value of case study research on rural entrepreneurship: Useful method.* Paper presented at the Joint ERS-RUPRI Conference, Exploring Rural Entrepreneurship: Imperatives Opportunities Res., Washington, DC.

Bossink, B. A. (2004). Effectiveness of innovation leadership styles: A manager's influence on ecological innovation in construction projects. *Construction Innovation*, *4*(4), 211–228.

Buckingham, M., & Clifton, D. O. (2001). *Now, discover your strengths*. New York: Simon and Schuster.

Bundesregierung. (2019). *Digitalisierungs-Index 2019: So digital ist Deutschland.* Retrieved from https://www.bundesregierung.de/breg-de/themen/digitalisierung/so-digital-ist-deutschland-1588792

Bundesverband der Deutschen Industrie e.V. (2015). *Faktencheck: Mittelstand und Familienunternehmen*. Retrieved from file:///C:/Users/e01132/Desktop/Faktencheck_Mittelstand_Familienunternehmen_230915.pdf

Burgelman, R. A., Christensen, C. M., & Wheelwright, S. C. (2004). *Strategic Management of Technology and Innovation* (4th ed.). New York: McGraw Hill/Irwin.

Carmeli, A., Gelbard, R., & Gefen, D. (2010). The importance of innovation leadership in cultivating strategic fit and enhancing firm performance. *The Leadership Quarterly*, *21*(3), 339–349. doi:10.1016/j.leaqua.2010.03.001

Chiesa, V., Coughlan, P., & Voss, A. (1996). Development of a technical innovation audit. *Journal of Product Innovation Management*, *13*(2), 105–136. doi:10.1111/1540-5885.1320105

Cooper, R. G., & Kleinschmidt, E. J. (1995). Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management*, *12*(5), 374–391. doi:10.1111/1540-5885.1250374

Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. London: Sage Publications.

Cormican, K., & O'Sullivan, D. (2004). Auditing best practice for effective product innovation. *Technovation*, *24*(10), 819–829. doi:10.1016/S0166-4972(03)00013-0

Crawford, J. A., & Kelder, J.-A. (2019). Do we measure leadership effectively? Articulating and evaluating scale development psychometrics for best practice. *The Leadership Quarterly*, *30*(1), 133–144. doi:10.1016/j.leaqua.2018.07.001

Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, *47*(6), 1154–1191. doi:10.1111/j.1467-6486.2009.00880.x

Csíkszentmihályi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention*. New York: HarperCollins.

Deschamps, J. P. (2003). Innovation and leadership. In The international handbook on innovation. Oxford: Pergamom. doi:10.1016/B978-008044198-6/50056-5

Dodgson, M. (2018). Innovation Leadership. In K. Wiltshire, A. Malhotra, & M. Axelsen (Eds.), *Transformational Leadership and Not for Profits and Social Enterprises, United Kingdom/Abingdon-on-Thames*. Oxfordshire: Routledge. doi:10.4324/9781315468570-18

Dyer, J.H., Gregersen, H. & Christensen, C.M. (2009, Dec.). The Innovator's DNA. *Harvard Business Review*.

Edgeman, R. L., & Eskildsen, J. K. (2012). The C4 model of people-centered innovation: Culture, consciousness, and customer-centric co-creation. *Journal of Innovation and Business Best Practices*, *2012*, 1–14. doi:10.5171/2012.932564

El-Namaki, M. S. S. (1992). Creating a corporate vision. *Long Range Planning*, *25*(6), 25–29. doi:10.1016/0024-6301(92)90166-Y

Familienunternehmen, S. (2019). *Die volkswirtschaftliche Bedeutung der Familienunternehmen* (5th ed.). Retrieved from https://www.familienunternehmen.de/media/public/pdf/publikationen-studien/studien/Die-volkswirtschaftliche-Bedeutung-der-Familienunternehmen-2019_Stiftung_Familienunternehmen.pdf

Familienunternehmen. (2019). *Daten, Fakten, Zahlen zur volkswirtschaftlichen Bedeutung von Familienunternehmen*. Retrieved from https://www.familienunternehmen.de/de/daten-fakten-zahlen

FAZ. (2018). *Europaweiter Vergleich: Darum liegt Deutschland bei der Digitalisierung hinten*. Retrieved from https://www.faz.net/aktuell/politik/inland/digitalisierung-darum-liegt-deutschland-im-eu-vergleich-hinten-15480625.html

Fernald, L. W., Solomon, G. T., & Tarabishy, A. (2005). A New Paradigm: Entrepreneurial Leadership. *Southern Business Review*, *30*(2), 1–10.

Gabler. (2019a). *Creativity.* Retrieved from https://wirtschaftslexikon.gabler.de/definition/kreativitaet-40039

Gabler. (2019b). *Effectuation.* Retrieved from https://wirtschaftslexikon.gabler.de/definition/effectuation-52245

Gabler. (2019c). *Innovation Management.* Retrieved from https://wirtschaftslexikon.gabler.de/definition/innovationsmanagement-39822

Gliddon, D. G. (2006). *Forecasting a competency model for innovation leaders using a modified delphi technique*. Retrieved from https://etda.libraries.psu.edu/files/final_submissions/1385

Gliddon, D. G. (2018). Innovation Leadership. In D. Lang, M. Handley, & K. Jablokow (Eds.), *W.: The competencies of innovation leaders*. Abington: Taylor and Francis. doi:10.4324/9781315178219

Gliddon, D. G., & Rothwell, W. J. (2018). *Innovation leadership.* Routledge. doi:10.4324/9781315178219

Goffin, K. & Pfeiffer, R. (1999). *Innovation Management in UK and German Manufacturing Companies.* London: Anglo-German Foundation for the Study of Industrial Society.

Guilford, J. P. (1966). Measurement and creativity. *Theory into Practice*, *5*(4), 185–189. doi:10.1080/00405846609542023

Handelsblatt. (2019). *Der deutschen Wirtschaft droht längere Rezession*. Retrieved from https://www.handelsblatt.com/politik/konjunktur/nachrichten/hri-konjunkturprognose-der-deutschen-wirtschaft-droht-laengere-rezession/25058770.html?ticket=ST-39690048-Zafj6Bb1CYxAgWF4qjyj-ap2

Horth, D. M., & Vehar, J. (2012). *Becoming a Leader Who Fosters Innovation*. Center for Creative Leadership. Retrieved from https://www.ccl.org/wp-content/uploads/2014/03/BecomingLeaderFostersInnovation.pdf

Hunter, S. T., & Cushenbery, L. (2011). Leading for innovation: Direct and indirect influences. *Advances in Developing Human Resources*, *13*(3), 248–265. doi:10.1177/1523422311424263

Hunter, S. T., Thoroughgood, C. N., Myer, A. T., & Ligon, G. S. (2011). Paradoxes of Leading Innovative Endeavors: Summary, Solutions, and Future Directions. *Psychology of Aesthetics, Creativity, and the Arts*, *5*(1), 54–66. doi:10.1037/a0017776

IDC. (2019). *Top predictions for global digital transformation in 2019.* Retrieved from https://www.analyticsinsight.net/top-predictions-for-global-digital-transformation-for-2019/

IfM Bonn. (2019). *Definitionen*. Retrieved from https://www.ifm-bonn.org/definitionen/

Johannessen, J., Stokvik, H., Johannessen, J., & Stokvik, H. (2018). Innovation and Value Creation. In Evidence-Based Innovation Leadership. Emerald Publishing Limited. doi:10.1108/978-1-78769-635-820181004

Kaudela-Baum, S., Holzer, J., & Kocher, P.-Y. (2014). *Innovation Leadership: Führung zwischen Freiheit und Norm*. Berlin: Springer.

Kremer, H., Villamor, I., & Aguinis, H. (2019). Innovation leadership: Best-practice recommendations for promoting employee creativity, voice, and knowledge sharing. *Business Horizons*, *62*(1), 65–74. doi:10.1016/j.bushor.2018.08.010

Lindgren, P., & Abdullah, M. (2013). Conceptualizing Strategic Business Model Innovation Leadership for Business Survival and Business Model Innovation Excellence. *Journal of Multi Business Model Innovation and Technology*, *1*, 115–134.

Malik, F. (2014). *Führen, Leisten, Leben - Wirksames Management für eine neue Welt*. Frankfurt am Main: Campus Verlag.

McClelland, D. C. (1967). *The Achieving Society*. New York: Free Press.

Murphy, E. C., & Murphy, M. A. (2002). *Leading on the edge of chaos: The 10 critical elements for success in volatile times.* Prentice-Hall.

Nadkarni, S. (2017). An integrative innovation leadership framework. In *The Relationship of Leadership and Innovation in Family Businesses. BestMasters*. Wiesbaden: Springer Gabler. doi:10.1007/978-3-658-16255-9_4

O'Reilly, C. A. III, & Tushman, M. L. (2013). Organizational ambidexterity: Past, present and future. *The Academy of Management Perspectives*, *27*(4), 324–338. doi:10.5465/amp.2013.0025

Obama, B. (2019). *Bits & Pretzels.* ICM.

OECD. (2016). *Insights: the marginal cost of such distribution is near zero*. Retrieved from http://oecdinsights.org/2016/06/03/digital-innovation-what-does-it-really-mean/

Porter-O'Grady, T., & Malloch, K. (2010). *Innovation leadership: Creating the landscape of healthcare*. Burlington: Jones & Bartlett Learning.

Potts, H. E. (1944). The Definition of Invention in Patient Law. *The Modern Law Review*, *7*(3), 113–124. doi:10.1111/j.1468-2230.1944.tb00974.x

Prabhu, G. (1999). Social entrepreneurial leadership. *Career Development International*, *4*(3), 140–145. doi:10.1108/13620439910262796

Rogers, E. M. (2010). Diffusion of Innovations (5th ed.). Free Press.

Rokeach, M. (1973). *The nature of human values*. New York: Free Press.

Roscorla, T. (2010). *The 7 Steps to Innovative Leadership*. Retrieved from http://www.convergemag.com/policy/The-7-Elements-of-Innovative-Leadership.html

Rosing, K., Frese, M., & Bausch, A. (2011). Explaining the heterogeneity of the leadership-innovation relationship: Ambidextrous leadership. *The Leadership Quarterly*, *22*(5), 956–974. doi:10.1016/j.leaqua.2011.07.014

Sarasvathy, S. D. (2008). *Effectuation: Elements of entrepreneurial expertise*. Cheltenham, UK: Edward Elgar Publishing. doi:10.4337/9781848440197

Scharmer, C. O. (2019). Theorie U. Berlin: Entrepreneurship Summit.

Schein, E. H. (2010). *Organizational culture and leadership* (2nd ed.). New York: John Wiley & Sons.

Schork, S. (2014a). Arbeiten in einer innovationsgetriebenen Wirtschaft. In T. Arns, M. Bentele, J. Niemeier, P. Schütt, & M. Weber (Eds.), *Zukunft der Wissensarbeit* (pp. 51–58). Berlin: BITKOM.

Schork, S. (2014b). *Berufung Innovator: Wahrer des gesellschaftlichen Fortschritts.* Paper presented at the Digital Leadership Forum, Frankfurt am Main, Germany.

Schork, S. (2015). *Descriptive Online Study Report.* Retrieved from https://sabrinaschork.files.wordpress.com/2015/06/20150615_descriptive-report_leadership-innovation_sabrina-schork.pdf

Schork, S. (2017). *Wirksame Führung von Innovation: Werte, Stärken und Praktiken*. Berlin: Pro Business.

Schork, S. (2018). The Application of the Effective Innovation Leadership Model in ICT Practice. In A. Press & O. Terzidis (Eds.), *Technology Entrepreneurship* (pp. 99–109). Cham: Springer. doi:10.1007/978-3-319-73509-2_5

Schork, S., Heblich, B., & Terzidis, O. (2016). *Effective Innovation Leadership.* Paper presented at the University-Industry-Innovation-Network, Amsterdam, The Netherlands.

Schork, S., & Terzidis, O. (2014). *Guiding behavior favoring Sustainable Enterprise Innovation Capability*. Paper presented at the 8th Interdisciplinary Entrepreneurship Conference, Oldenburg, Germany.

Schork, S., & Terzidis, O. (2015). *Erfolgreiche Führungsprinzipien im Innovationsbereich*. Paper presented at the 19th Interdisciplinary Entrepreneurship Conference, Kassel, Germany.

Sergeeva, N. (2018). *Making Sense of Innovation in the Built Environment*. Routledge.

Shavinina, L. V. (2011). Discovering a Unique Talent: On the Nature of Individual Innovation Leadership. *Talent Development & Excellence*, *3*(2), 165–185.

Statista. (2015). *Was waren die zentralen Themen in Ihren Coachings letztes Jahr (2015)?* Retrieved from https://de.statista.com/statistik/daten/studie/398769/umfrage/umfrage-zu-top-coaching-themen-in-deutschland/

Statista. (2017a). *Größte Familienunternehmen Deutschlands nach Umsatz im Jahr 2017 (in Millionen Euro).* Retrieved from https://de.statista.com/statistik/daten/studie/198382/umfrage/top-deutsche-familienunternehmen-nach-umsatz/

Statista. (2017b). *Mittelstand in Deutschland.* Retrieved from https://de.statista.com/themen/3996/mittelstand-in-deutschland/

Stevenson, J. E. (2012). Breaking Away - A New Model for Innovation Leadership. *Employment Relations Today*, *39*(2), 17–25. doi:10.1002/ert.21361

Stiftung, B. (2019). *China 2013: Szenarien und Strategien für Deutschland*. Retrieved from https://china-szenarien.bertelsmann-stiftung.de/images/China_Szenarien_Digital.pdf

Stjelja, M. (2013). The case study approach: Some theoretical, methodological and applied considerations. Adelaide: Defence Science and Technology Organisation Edinburgh (Australia) Land Operations Div.

Swamy, R. (1990). The making of a social entrepreneur: The case of Baba Amte. *Vikalpa*, *15*(4), 29–39. doi:10.1177/0256090919900404

Verhaeghe, A., & Kfir, R. (2002). Managing innovation in a knowledge intensive technology organization (KITO). *R & D Management*, *32*(5), 409–417. doi:10.1111/1467-9310.00272

Vlok, A. (2012). A leadership competency profile for innovation leaders in a science-based research and innovation organization in South Africa. *Procedia: Social and Behavioral Sciences*, *41*, 209–226. doi:10.1016/j.sbspro.2012.04.025

Welt. (2019). *50 Erfindungen, die die Welt veränderten*. Retrieved from https://www.welt.de/wirtschaft/karriere/leadership/gallery12202607/50-Erfindungen-die-die-Welt-veraenderten.html

Yin, R. K. (2014). *Case Study Research: Design and Methods*. Thousand Oaks, CA: SAGE Publications, Inc.

ADDITIONAL READING

Fowler, C. (1990). Recognizing the Role Artistic Intelligences. *Music Educators Journal*, *77*(1), 24–27. doi:10.2307/3397791

Harland, L., Harrison, W., Jones, J. R., & Reiter-Palmon, R. (2005). Leadership behaviors and subordinate resilience. *Journal of Leadership & Organizational Studies*, *11*(2), 2–14. doi:10.1177/107179190501100202

Kotter, J. P. (2000). What leaders really do. *The Bottom Line (New York, N.Y.)*, *13*(1), bl.2000.17013aae.001. doi:10.1108/bl.2000.17013aae.001

Mourkogiannis, N. & Fisher, R. (2004). Purpose: The Starting Point of Great Companies

Newton, P. W. (2007). Horizon 3 planning: Meshing liveability with sustainability. *Environment and Planning. B, Planning & Design*, *34*(4), 571–575. doi:10.1068/b3404com

Scharmer, C. O. (2013). Theorie U: Von der Zukunft her führen (3. unver. Ausg.). Deutschland/Baden-Württemberg, Heidelberg: Carl-Auer Verlag.

Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle (55th Issue)*. Piscataway: Transaction Publishers.

Spiekemann, S. (2019). *Digitale Ethik*. München, Bayern, Deutschland: Droemer Knaur Verlag.

Wilber, K. (2005). Toward A Comprehensive Theory of Subtle Energies. *The Journal of Science and Healing*, *1*(4), 252–270. doi:10.1016/j.explore.2005.04.016 PMID:16781546

KEY TERMS AND DEFINITIONS

Digital Innovation: Digitization of processes, goods and services, leading to new business models and value chains.

Effective Innovation Leadership: Transformation of a meaningful and useful idea into a marketable innovation for which the buyer is willing to pay a price that exceeds the expenses.

Effectivity: Realization of planned activities. The actions of the innovation leader create effects that contribute to value creation.

Innovation: The creation of new forms of solutions (such as products, services or processes).

Innovation Leadership: Power bringing innovation into the world.

Leadership: Point of orientation that drives itself and others.

Practices: Methods, tools, and instruments adopted in daily practice to get jobs done.

Purpose: The intention of why jobs are done.

Resilience: The ability to cushion problems.

Strengths: Potentials that have been trained and thus developed into excellence.

Values: Belief systems that are driving decisions and actions.

ENDNOTES

[1] The author excluded dimensions such as ethics, tolerance, or wisdom although those three facets can have a high impact on the leadership effectiveness.

2 "Successful" is a key adverb and a vital factor in this review. Many leaders and entrepreneurs fail. Whenever possible, the authors have tried to include only those behavioral characteristics shared by leaders and entrepreneurs that lead to successful attainment of visions and goals.

Chapter 3
Developing and Validating a Theoretical Model to Evaluate Customer Satisfaction of E-Services

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ABSTRACT

Today's advanced development in information technology and communication (ICT) has led to customer digital satisfaction being highly recognized as an important aspect of online business activities and considered a key determinant for successful electronic service (e-service). This introduces a new requirement to measure customer digital satisfaction as a factor for continuous business improvement. In this chapter, first, all customer digital satisfaction dimensions are extracted from the literature. Then, the exploratory factor analysis is used to cluster the factors effectively. Then further analysis including content validity, discriminate, and constructive testing is used to test the proposed survey instrument. After that, in order to verify the proposed instrument and model, structural equation modelling is applied using Amos. The contribution of this chapter relates to the fact that the proposed theoretical survey instrument integrates in a holistic way various relevant factors affecting customer digital satisfaction of e-service into a single template.

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INTRODUCTION

In today advance development in ICT, Internet become as an important tool to deliver the products, information, and services of organizations, governments and also individuals (Alawneh, Al-Refai, & Batiha, 2013). The Internet is one of the major means for communication between companies and clients. Its main feature is the ability to exchange complex information in a friendly environment (NIST-Special-Publication-800-16). Generally, businesses and organizations use the Internet for customer service (IS07498-2). Most companies place great emphasis on customer's digital satisfaction. This introduces a new requirement to measure customers digital satisfaction as a factor for continuous business improvement (Thomas, Basil, Christina, Fedra, & Manuela, 2013).

Customers digital satisfaction is a key dimension driving business outcomes and performance of processes in service and product organizations (Kenett & Salini, 2011). Customers digital satisfaction as a baseline standard of performance will help organizations to achieve their goals and objectives (Hussain, Nasser, & Hussain, 2014). Firm's future profitability depends on satisfying current customers (Lee et al., 2016). S.-C. Chen (2012) articulated that customer satisfaction is one of the factors that influence on clients' intention to use e-service and also repeating the usage. On the other hand, according to Boulter (2014), keeping current customers is more profitable than acquiring new clients. Thus, it can be realized that customers digital satisfaction is a key factor for e-service usage and will lead to loyalty (Gummerus, Liljander, Pura, & Riel, 2004).

Consumer's digital satisfaction is not a new concept and many studies try to find its antecedents and consequences, because it is considered as a significant measure of an organization's success (Ramasubbu, Mithas, & Krishnan, 2008) especially in Information System (DeLone & McLean., 1992; Montesdioca & Maçada, 2014), however, customer satisfaction is multi-dimensional factor including marketing, behavioural and technical aspects (Alawneh et al., 2013; Stamenkov & Dika, 2016). It is vital to understand what customers value most and helps firms allocating resource utilization for continuously improvement based on their needs and wants (Lee et al., 2016).

In order to explain the system use, it is essential to develop tools to measure and analysing customers' satisfaction (Legris, Ingham, & Collerette, 2003) although there are some scholars that developed instruments to evaluate user satisfaction based on the information and system characteristics (Bailey & Pearson, 1983; Baroudi & Orlikowski., 1988; Doll & Torkzadeh., 1988; Ives, Olson, & Baroudi., 1983). Furthermore, although there are some developed tools to assess web-based services (Cho & Park, 2001; Huang, Yang, Jin, & Chiu, 2004; Muylle, Moenert, & Despontin, 2004) still certain modifications are needed to provide more accurate instrument relevant to web-based service (Tojib, Sugianto, & Sendjaya, 2006). However, there is still not widely accepted the consensus on the satisfaction constructs thus it is significant to provide a set of dimensions which influence customer satisfaction (Al-Kasasbeh, Dasgupta, & AL-Faouri, 2011).

Information technology researchers evaluated the processes and factors influencing on information technology success and value from the perspective of user perceptions about information technology and how it impacts their work (Wixom & Todd, 2005), however, this examinations have been done in various studies (such as general computing by (Doll & Torkzadeh., 1988), data warehouse (L. D. Chen, Soliman, Mao, & Frolick, 2000) and decision support system (McHaney & Cronan, 1998)) in different ways (DeLone & McLean., 1992). Hoffman and Bateson (2010) articulated that every client shares his/her usage experience with nine people, so if they are unsatisfied with the provided service, others may not intend to use the service and the system may fail.

Although measuring the satisfaction of e-services is more complex than good/product, there is no specific method to evaluate the e-service satisfaction. In order to achieve customers' digital satisfaction, managers of companies with Web presences must first understand how customers perceive and evaluate electronic service. This involves defining what e-service satisfaction is, identifying its underlying dimensions, and determining how it can be conceptualized and measured.

In this research, the theoretical foundation of e-service satisfaction is reviewed and examine through comprehensive exploratory analysis in order to gather all motioned characteristic in a comprehensive pattern. This article has the following structure. First, it examines and discusses the concept, special characteristics and definitions of service satisfaction. Then, it extracted the e-service satisfaction dimensions based on literature review analysis. Third, the survey distributed among e-service users to categorize the satisfaction dimensions and highlights the related factors based on exploratory factor analysis. Formerly, after introducing the e-service satisfaction factors, related measurement items are extracted via previous studies then content validity survey is conducted among experts in the field of e-service satisfaction. Finally, exploratory factor analysis is conducted to approach validity testing via discriminate and convergent validity in order to introduce a reliable and valid instrument.

The contribution of this article relates to the fact that the proposed theoretical survey instrument integrates in a holistic way various relevant factors affecting e-service satisfaction into a single template. These factors are characteristics common to both traditional and e-service, distinctive characteristics of e-services, relevant e-service satisfaction dimensions.

Although there are various definition for the satisfaction in the field of information system Bailey and Pearson (1983); Bitner (1990); Chang and Chen (2008); (S.-C. Chen, 2012); Doll and Torkzadeh. (1988); Ives et al. (1983); Johnson, Anderson, and Fornell (1995); Legris et al. (2003); Oliver (1980, 1997); Szymanski and Hise (2000), in this study satisfaction is defined as the extent to which users believe that the provided electronic service meets their needs and expectation.

METHODOLOGY

In order to develop the survey to assess the user satisfaction of e-service, a comprehensive literature review is carried out to extract the satisfaction dimensions. In the next step, Exploratory Factor Analysis is applied to categorize and reduce the number of dimensions and extract the factors affecting satisfaction. A structured questionnaire is used as a data collection instrument and an online survey is conducted. To verify the reliability of the measurement instrument, the Cronbach Alpha Coefficient is calculated. Furthermore, the KMO (Kaiser-Meyer-Olkin) index which is a measure of sampling adequacy and the Sphericity statistic tests to check the correlations among variables are applied.

After proposing the factors effecting satisfaction, a conceptual model is proposed. After that, a comprehensive literature review will be carried out to extract the existing items for each of the constructs of e-service satisfaction. Then the content validity survey is conducted to reduce the number of items and keep the most related measures in the final questionnaire so a total of twelve experts (Dwivedi, Choudrie, & Brinkman, 2006; Taherdoost, 2018) are identified on the basis of their experience in the field of e-services. After data collection the content validity ratio (CVR) for each of the items is calculated to eliminate items below the level of 0.05. Afterward, a pilot study between 30 students will be conducted to determine the response rate and any disharmony within the questions such as questionnaire format and questions' understandability. Next, the data will be collected using online survey among e-service

users in Malaysia. Then, the Cronbach Alphas is considered to measures of reliability and KMO and Bartlett test to measure the sampling adequacy. In the next step, factor analysis using PCA is applied to verify the construct validity (discriminant and convergent validity). After that, the Structural Equation Modelling is applied to evaluate the plausibility of the proposed model and test the causal relations between the constructs. Finally, the model fit is assessed. Figure 1 summarizes the research process.

E-SERVICE DIMENSIONS

Since the main difference between traditional services and e-service is the channel of communication and the replacement of the human to human interaction with human to machine interaction so new measurement method is required to measure customers digital satisfaction of the e-service (Evanschitzky, Iyer, Hesse, & Ahlert, 2004). According to the comprehensive literature review, thirty-six dimensions have been extracted from previous studies in the field of information system namely; Accessibility, Accuracy, Adequacy, Assistance, Assurance, Attentiveness, Availability, Communication, Commitment, Completeness, Convenience, Credibility, Currency, Delivery, Ease of Use, Efficiency, Expectation, Flexibility, Format, Friendliness, Fulfillment, Integration, Precision, Price, Product Information, Product Offerings, Quality, Relevancy, Reliability, Responsiveness, Security, Speed, Timeliness, Training, Usefulness, and Website Design.

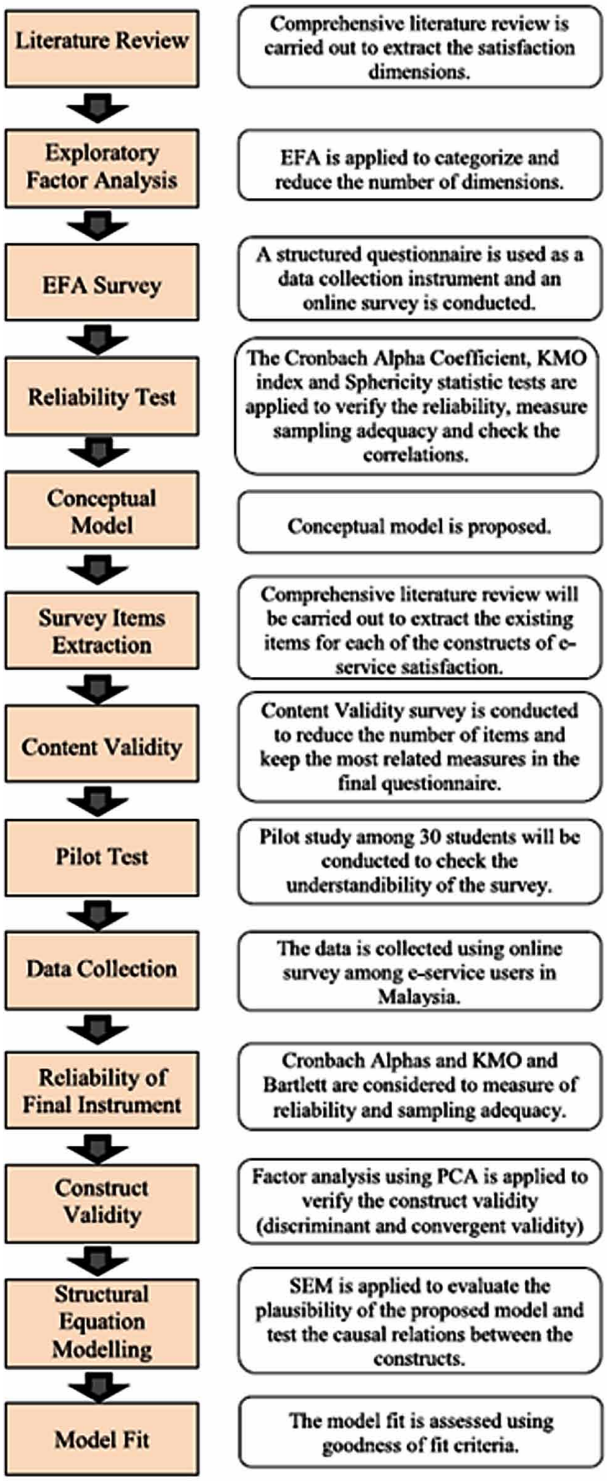
FACTORS INFLUENCE ON E-SERVICE SATISFACTION

As mentioned earlier, by conducting a comprehensive literature review in the field of information system, thirty-six dimensions have been extracted. In the next step and in order to categorize and reduce the number of dimensions, Exploratory Factor Analysis (EFA) as a theory generating procedure (Stevens, 2001), is applied. The reason for applying exploratory factor analysis to this study is to determine factors that are affecting e-service satisfaction and to identify the constructs that characterize the user satisfaction of e-service. Thus, it is used to identify the number of key factors (known as principal factors) that explain the majority of variance (Kline, 1997) among defined satisfaction dimensions.

A structured questionnaire was used as data collection instrument, because questionnaire is very flexible to use (Moore, 2006). An online survey was conducted and the subjects of the study were a group of students who had relevant knowledge to respond regarding the context of the study. Using student subjects is highly acceptable for e-service research since, (a) e-services are technology-based and students are much more into technology than the old generation, and (b) the most frequent users of Internet and e-services are students and this has become part of their daily routine, and consequently, they are considered better candidates to assess the issues related to e-services (Alawadhi & Morris, 2008; Taherdoost, 2017b; Zhang, Prybutok, & Huang, 2006).

Hair, Anderson, Tatham, and Black (1995a) suggested that the sample size for EFA should be 100 or greater. For the current study, the researcher obtained 193 questionnaires after data filtering to eliminate invalid responses. Almost the same sample size has been chosen by other researchers (Lai & Lai, 2013; Lean, Zailani, Ramayah, & Fernando, 2009; Semeijn, Riel, Birgelen, & Streukens, 2005). Each item of the survey was evaluated using a 5-point Likert scale with strongly agree, agree, neutral, disagree and strongly disagree (Taherdoost, 2016a, 2017a).

Figure 1. Research Process



It is very important to evaluate the reliability of a measuring instrument to make sure it is consistent across the parts (Huck, 2007). Cronbach Alpha Coefficient is known as the most appropriate for measuring reliability while Likert Scales is used. Following recommendations by Nunnally (Nunnally, 1978) values for Cronbach's alpha α ranging from 0.80 to 0.95 are considered as representing very good reliability, Cronbach's alpha α ranging from 0.70 to 0.80 are considered as representing good reliability, Cronbach's alpha α ranging from 0.60 to 0.70 are considered as representing fair reliability. The Cronbach Alphas range from 0.931 to 0.941, so the dimensions are deemed to have adequate reliability.

On the other hand, the KMO (Kaiser-Meyer-Olkin) index is a measure of sampling adequacy and the Sphericity statistic tests whether the correlations among variables are too low for the factor model to be appropriate. Kaiser-Meyer-OIkin (KMO) measure should be greater than .70 (Leech, Barrett, & Morgan, 2005). The KMO = 0.883. This shows that the degree of common variance among the variables is quite high.

In the next step, it should be decided that how many factors must be retained for rotation. In order to make this decision, the Kaiser criterion (Kraiser, 1958) was applied and factors with eigenvalues greater than 1.0 are selected. the Kaiser criterion is the most used approach since it is easy to use (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Gorsuch, 1983). According to the result, eight constructs should be retained. Since the variance for the first dimension (Performance) is high (33.45%), a potential common method variance (CMV) should be examined. Using SPSS and using method extract 1 factor results a Total Variance Explained of 29.26% in only one factor, and according to Podsakoff, MacKenzie, Lee, and Podsakoff (2003), since it is less than 50% thus results have no CMV problem within factors. Varimax rotation which was developed by Thompson (2004) and is the most common form of rotational methods for exploratory factor analysis is utilized in this study. The items with loading factor less than 0.4 are the minimum value suggested for Information System studies (Straub, Boudreau, & Gefen, 2004; Taherdoost, 2017b) and cross-loading greater than 0.4 are eliminated (Straub et al., 2004; Taherdoost, 2017b). Therefore, a total of eleven items are deleted.

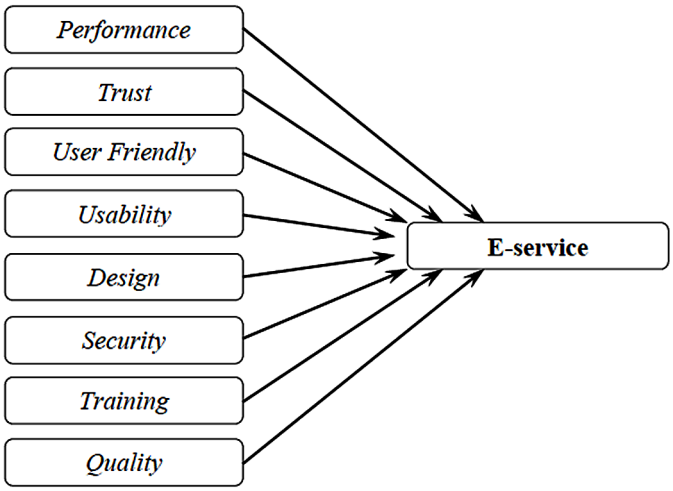
SATISFACTION MEASUREMENT DEVELOPMENT

Figure 2 shows the conceptual model of satisfaction of e-service. In order to develop the survey, a comprehensive literature review has been done to extract the existing items for each of the constructs of e-service satisfaction model. Although some of the items were specifically composed for the purpose of this research, since measures suitable for this study were not available.

CONTENT VALIDITY OF FINAL SURVEY

Engaging a comprehensive review of the literature helps to identify a sample of items for each construct. A total of 325 items for eight constructs related to the e-service satisfaction and its own were identified. Then, a content validity questionnaire was generated that comprised definitions of the constructs and associated items on a three-point scale (not necessary, useful but not essential and essential). A total of twelve experts (Taherdoost, 2017b) were identified on the basis of their experience in the field of e-services.

Figure 2. E-service Satisfaction Model (ESM)



Then, a survey was sent to them and responses have been collected. In next step, the content validity ratio (CVR) for each of the items was calculated and was estimated and items that were not significant at the 0.05 level were eliminated (Lawshe, 1975; Taherdoost, 2016b). The finding illustrates that among the 325 items, 33 items remained for the final survey instrument. The experts also suggested using 7-point scale to test the validity of the proposed instrument because its values are widely spread in comparison to 5 points scale and respondents would have more choices to select (Taherdoost, 2017a).

PILOT STUDY

A pilot study was conducted before distribution of the final questionnaire to determine the response rate and any disharmony within the questions such as questionnaire format and questions' understandability. Survey was sent to thirty (Luo, Remus, & Chea, 2006) postgraduate students in Malaysia by email. The majority of the respondents reported that the questionnaire was easily understandable and required 15-20 minutes for completion.

DATA COLLECTION

Data were collected from e-service users in Malaysia using online survey. The survey website has been introduced to 2450 e-service users and 426 responses have been received (response rate of 17%). The response rate is close to the study done by Abreu and Oliveira (2014) as 16% and report from Fryrear (2015). The collected data was filtered and improper responses were removed. The remaining data was 403 valid responses which were taken as the sample of the study. Although referring to Fan and Yan (2010) the estimated response rate for Web survey on average is approximately 11% lower than that of other survey modes, in order to verify that if the non-response bias effect the study measures or not, the collected data was splitted to two response waves; early and late reply (50 early responses and 50 late

Table 1. T-test results for the first and last 50 cases

	First 50	Last 50
Mean	3.9836	3.9861
SD	0.517`	0.476
N	50	50
T-test within group	13.453*	14.618*
T-test between groups	F= 0.117 (Sig:.733)	
Df	49	49

* p-value >.05

responses) (Mat Roni, 2014). Then the t-test applied to find if there is any difference. As shown in Table 1, results indicate that the collected data can be generalized over the population.

The first part of the survey was about the demographic information of participants such as age, gender and education. There were more female respondents than male with almost 60% than 40%. Moreover, the majority of respondents were young generation aging 20-29 with almost half participants and then 30-39 with almost one-third of respondents. Almost half of the e-service users are using e-service for more than five years and the interesting point is that all respondents have experience using e-services. Besides, more than two-third of respondents are using e-service once or more than once a day.

RELIABILITY OF FINAL SURVEY

In the case, Likert Scales are utilized for a study; Cronbach Alphas are considered the most appropriate measures of reliability (Robinson, 2009). As it is shown in Table 2, the Cronbach's Alphas range from .921 to .927, thus, the constructs are deemed to have adequate reliability. Furthermore, to measure the sampling adequacy, a KMO and Bartlett test was conducted. The KMO overall (0. 872) is higher than the conventional cut-off point (0.60) and the Bartlett has a significant value ($p = .000$). This indicates that the correlations observed in the variables are likely to contain common variance and the data are likely to factor well.

PCA was applied with SPSS software (v.25) to verify the construct validity (discriminant and convergent validity According to (Straub et al., 2004), only factors with eigenvalues greater than one are considered for further analysis. Results indicate that all nine factors possess eigenvalues greater than one. Results from the analysis also suggest that no extracted new factor consisted of an eigenvalue greater than 1 (Table 3).

Table 4 presents the factor loadings for all nine factors. Results clearly suggest that all nine components loaded on their corresponding factor to be remained in the survey instrument. Since all items loaded are above 0.40. Therefore, both convergent and discriminant validity met the baseline criteria in information system research.

Table 2. Cronbach's Alpha Statistics and Descriptive Analysis for Final Satisfaction Survey

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FRND1	116.42	261.408	0.438	0.192	0.924
FRND2	116.43	261.698	0.514	0.264	0.923
FRND3	116.5	262.275	0.432	0.187	0.924
PERF1	116.46	256.319	0.559	0.312	0.922
PERF2	116.35	252.944	0.666	0.444	0.921
PERF3	116.31	255.283	0.597	0.356	0.922
PERF4	116.36	254.171	0.681	0.464	0.921
PERF5	116.33	254.531	0.653	0.426	0.921
PERF6	116.26	252.548	0.652	0.425	0.921
PERF7	116.21	257.051	0.572	0.327	0.922
QUAL1	116.55	257.696	0.563	0.317	0.922
QUAL2	116.63	260.483	0.504	0.254	0.923
QUAL3	116.61	261.323	0.463	0.214	0.923
SEC1	116.54	260.294	0.506	0.256	0.923
SEC2	116.64	262.001	0.516	0.266	0.923
SEC3	116.65	261.118	0.556	0.309	0.922
SEC4	116.57	262.167	0.468	0.219	0.923
TRAIN1	116.3	264.432	0.27	0.073	0.926
TRAIN2	116.35	264.855	0.265	0.070	0.926
TRUST1	115.93	268.053	0.251	0.063	0.926
TRUST2	115.92	268.999	0.216	0.047	0.926
TRUST3	116.15	271.134	0.135	0.018	0.927
USAB1	116.49	260.36	0.511	0.261	0.923
USAB2	116.44	259.113	0.537	0.288	0.922
USAB3	116.51	258.28	0.563	0.317	0.922
USAB4	116.49	259.942	0.483	0.233	0.923
DESGN1	116.22	255.826	0.581	0.338	0.922
DESGN2	116.21	255.99	0.557	0.310	0.922
DESGN3	116.16	254.583	0.607	0.368	0.921
DESGN4	116.31	257.121	0.492	0.242	0.923
SAT1	116.59	260.591	0.577	0.333	0.922
SAT2	116.6	258.595	0.663	0.440	0.921
SAT3	116.56	259.819	0.634	0.402	0.922

Table 3. Total Variance Explained for Final Survey

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cum %	Total	% of Variance	Cum %	Total	% of Variance	Cum %
1	10.487	31.779	31.779	10.487	31.779	31.779	5.333	16.160	16.160
2	3.073	9.312	41.091	3.073	9.312	41.091	3.277	9.931	26.091
3	2.689	8.147	49.238	2.689	8.147	49.238	2.948	8.935	35.025
4	2.269	6.875	56.113	2.269	6.875	56.113	2.903	8.797	43.822
5	1.922	5.824	61.937	1.922	5.824	61.937	2.614	7.922	51.744
6	1.540	4.667	66.605	1.540	4.667	66.605	2.487	7.536	59.280
7	1.516	4.593	71.197	1.516	4.593	71.197	2.292	6.944	66.224
8	1.266	3.837	75.034	1.266	3.837	75.034	2.249	6.815	73.039
9	1.245	3.772	78.806	1.245	3.772	78.806	1.903	5.767	78.806
10	0.695	2.105	80.911						
11	0.536	1.625	82.536						
12	0.519	1.574	84.110						
13	0.491	1.488	85.598						
14	0.446	1.351	86.949						
15	0.393	1.192	88.141						
16	0.352	1.068	89.208						
17	0.331	1.002	90.211						
18	0.323	0.977	91.188						
19	0.320	0.969	92.157						
20	0.288	0.872	93.029						
21	0.281	0.852	93.881						
22	0.248	0.751	94.632						
23	0.231	0.701	95.333						
24	0.208	0.631	95.965						
25	0.193	0.585	96.550						
26	0.191	0.580	97.129						
27	0.171	0.519	97.648						
28	0.161	0.486	98.135						
29	0.152	0.462	98.596						
30	0.148	0.449	99.046						
31	0.133	0.402	99.448						
32	0.101	0.305	99.753						
33	0.082	0.247	100.000						

Extraction Method: Principal Component Analysis.

Table 4. Rotated Component Matrix for Final Survey

	Component								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
FRND1						0.875			
FRND2						0.771			
FRND3						0.837			
PERF1	0.764								
PERF2	0.836								
PERF3	0.809								
PERF4	0.817								
PERF5	0.828								
PERF6	0.796								
PERF7	0.846								
QUAL1								0.766	
QUAL2								0.773	
QUAL3								0.837	
SEC1			0.747						
SEC2			0.832						
SEC3			0.772						
SEC4			0.779						
TRAIN1									0.917
TRAIN2									0.925
TRUST1					0.940				
TRUST2					0.935				
TRUST3					0.890				
USAB1		0.816							
USAB2		0.790							
USAB3		0.872							
USAB4		0.859							
DESGN1				0.835					
DESGN2				0.705					
DESGN3				0.785					
DESGN4				0.783					
SAT1							0.717		
SAT2							0.784		
SAT3							0.786		

a. Rotation converged in 7 iterations.

VALIDATION OF E-SERVICE SATISFACTION MODEL

In this section the proposed conceptual model is tested using Structural Equation Modelling (SEM). SEM as a confirmatory approach was applied. SEM is a second generation multivariate modelling technique. Furthermore, the focuses of study by mentions that the term Structural Equation Modelling relates two important characteristics of the procedure: (a) the causal processes subordinate to study is illustrated next to a series of structural (i.e., regression) equations, in addition to (b) that these structural relationships can be modelled pictorially to empower a clearer conceptualization of the theory under study. Additionally, Swanson and Holton (2005) demonstrated that SEM is considered an integration of path analysis and confirmatory factor analysis that studies measured variables. The advantage of path analysis is that it concurrently performs multiple regression analyses while it produces an overall assessment of the model's fit, usually based on a chi square statistic (Singh & Wilkes, 1996). In addition, several goodness-of-fit indexes are available to better judge the model's fit. In order to test and evaluate the model proposed, a path Analysis was performed using SPSS AMOS version 24 was employed, to fit a structural equation model to the values of a sample, the dataset used was extracted from analysis results after the CFA performed. Figure 3 shows the results of Structural Equation Modelling analysis.

The estimated path coefficients support the argument that all the dimensions are positively affected customer satisfaction, the dimensions managed to explain 42 percent (R2= 0.416) of variance of overall as dependent variable (customer satisfaction). The coefficients of Performance, Training, Trust and User Friendliness were all significant (standardized value = .113 *, .107*, .427*, .115* respectively), same for Design, Quality, Security and Usability all were significant.

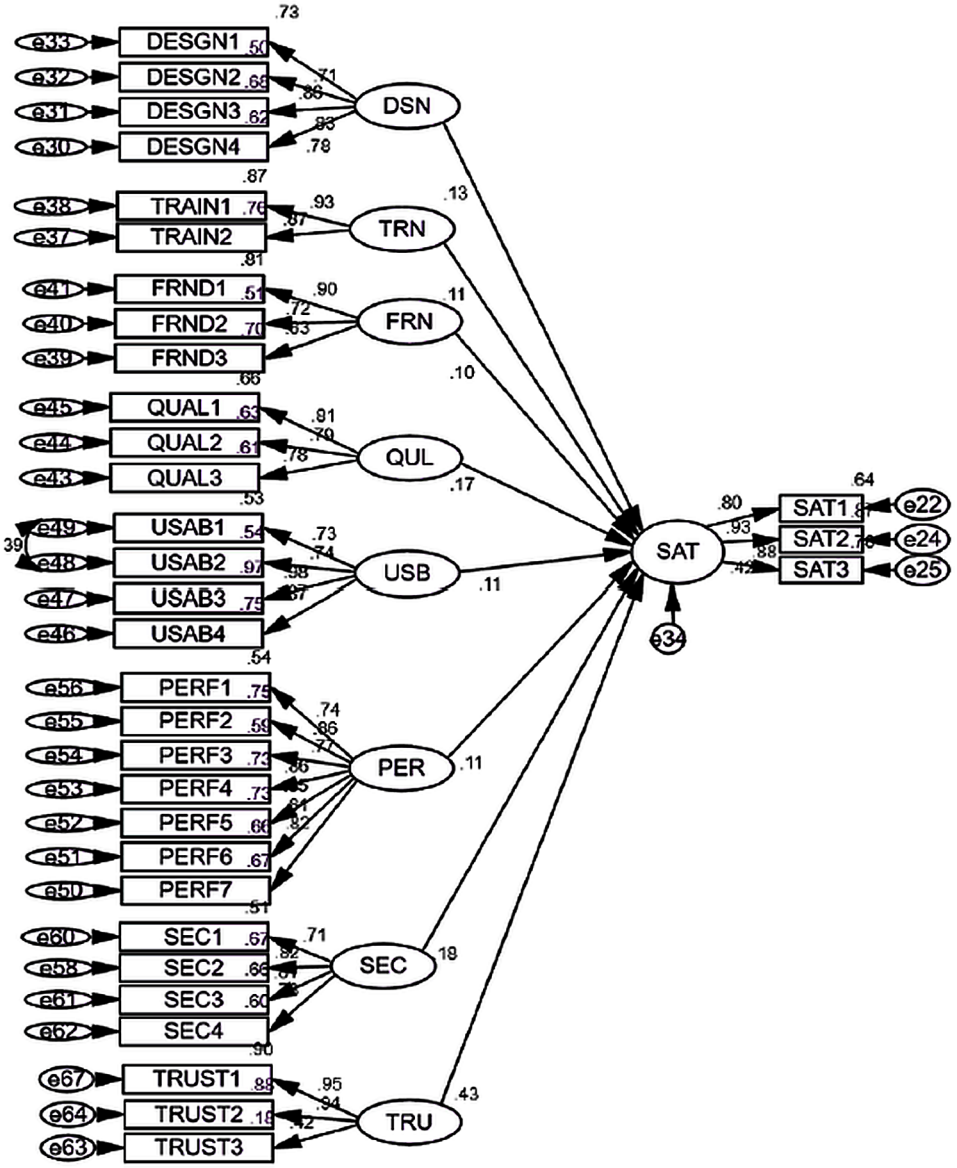
All the constructs presented higher values to the level proposed by (Chin, 1998) for evaluation of the measurement model, which is 0.7 for composite reliability (Table 5). Besides, they presented convergent validity, with AVE (average extracted variance) above 0.5 (Fornell & Larcker, 1981) and discriminant validity, with validation through the criterion of cross-loads, where each item showed greater factorial load for the construct to which it belongs. Table 5 shows the results of the model validation for E-service Satisfaction Model.

The Goodness-of-Fit Index (GFI) indicates the overall degree of model fit. The GFI should be greater than .90 (Bagozzi & Yi, 1988) and the Adjusted Goodness of Fit Index (AGFI) preferably greater than .80 (Etezadi-Amoli & Farhoomand, 1996; Saha, Nath, & Salehi-Sangari, 2010). In this case, GFI is 0.91 and AGFI 0.87 and indicating that the model fits the sample data reasonably well. The Normed Fit Index (NFI) measures the fit of the proposed model against the null model (P. M. Bentler & Bonet, 1980).The NFI for this study is 0.92, exceeding the acceptable value of 0.9 (Fornell & Larcker, 1981), once again indicating that the model fits the sample data well. Moreover, the Comparative Fit Index (CFI) is another index of overall fit (Gerbing, Anderson, & Carlo, 1993). The recommended threshold for CFI is 0.90 (P.M. Bentler, 1990; Gefen, Straub, & Boudreau, 2000) and for this study the CFI is 0.97. Therefore, it can be concluded that the measurement model has a good fit with the data collected.

SOLUTIONS AND RECOMMENDATIONS

In this chapter, concepts and special characteristics of e-service satisfaction based on the existing literature has discussed. It discussed the concept of e-service satisfaction considering its features and dimensions. In order to develop a survey instrument to assess customers' digital satisfaction of e-services, it exam-

Figure 3. Results of SEM for E-service Satisfaction Model (ESM)



ined various research findings on e-service satisfaction dimensions in which they categorized through exploratory factor analysis. It is also provided a concluding big data table on them. Thus, thirty-six dimensions of satisfaction have been extracted from previous studies in the field of information system (accessibility, aesthetic design, appearance of website, assurance, credibility, currency, communication, content quality, customer service, customer support, customization, delivery, empathy, ease of use, efficiency, enjoyment, flexibility, fulfillment, functionality, information accuracy, information quality, navigation, processing speed, recovery, relevancy, responsiveness, reliability, security, site attraction, site presentation, structure and layout, tangibility, timeliness, user control, and web usability). Then exploratory factor analysis has been carried out to reduce and categorized the satisfaction dimensions.

Table 5. Summary of the Model Fit Statistics

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Design	0.896	0.86	0.606
E-service Satisfaction	0.88	0.807	0.582
Performance	0.938	0.932	0.663
Quality	0.845	0.835	0.628
Security	0.867	0.864	0.613
Training	0.898	0.918	0.848
Trust	0.919	0.944	0.85
Usability	0.909	0.902	0.697
User Friendly	0.862	0.868	0.687

Therefore, eight factors namely (1) Performance, (2) Trust, (3) User Friendly, (4) Usability, (5) Design, (6) Security, (7) Training and (8) Quality proposed as the main constructs to measure customers' digital satisfaction of e-service. In the final step, in order to develop the final e–service satisfaction survey below steps were followed:

- A literature review has been done to extract the related items for each factor and new questions were designed.
- Content Validity Survey was conducted to develop the final survey. A total of 12 experts were identified and the content validity questionnaire was then sent to them. For each item the CVR was evaluated and estimated for a statistical significance level of 0.05.
- Reliability which refers to the consistency across the parts of a measurement tool, applied using Cronbach Alpha coefficient that is known as the most proper internal consistency measure while using Likert scales. All items have the minimum internal consistency coefficient of .70.
- Factor analysis as a statistical technique was employed to confirm the construct validity utilizing principal component analysis with varimax rotation method. Both the discriminant validity (loading of at least 0.40, no cross-loading of items above 0.40) and convergent validity (eigenvalues of 1, loading of at least 0.40, items that load on posited constructs) were calculated.
- Structural Equation Modelling is applied to test the proposed model. Path Analysis was performed using SPSS AMOS v.24.

After conducting above mentioned steps, the final survey instrument to assess customers' digital satisfaction of e-services includes 28 items.

FUTURE RESEARCH DIRECTIONS

This research surveyed in Malaysia, and they may not be representative of the entire population so further quantitative studies on e-service satisfaction are needed. Besides, e-service satisfaction could be investigated in other countries. Besides, the sample size for this study was 403 e-service users and this

may affect the statistical power of the findings. However, the results seem to suggest that the sampling method used has a good exploratory power. Nevertheless, future studies may be conducted with a larger sample size to gain a higher statistical power of the findings.

CONCLUSION

Findings indicated that performance (including; accessibility, delivery, ease of use, flexibility, fulfillment, functionality, and processing), trust (including; assurance, credibility and reliability), usability (including; efficiency and web usability), user friendliness (including; ease of use and convenience), design (including; aesthetic design, appearance of website, customization, navigation, site presentation, site attraction, and structure and layout), training, security and quality are most important characteristics of e-service satisfaction in which should be taken into consideration in order to have high customers digital satisfaction of provided e-service.

Measuring the customers' digital satisfaction of e-service is the concern of both researchers and practitioners. Thus, some tools have been developed to assess customers' digital satisfaction but there is no specific theoretical framework that defines the e-service satisfaction construct and its dimensions consistently.

Service-focused firms may give more attention to their customers' digital satisfaction in eight e-service canon of performance, trust, design, usability, user friendliness, training, security and quality. However, for more specific gauging of service maturity, users, IT experts, and other audiences can refer to sub-clusters of each canon. Therefore, it will be valuable to find out the customer expectation and fill gaps to investigate customers' digital satisfaction. The findings will help e-service policy makers in which they can increase their customers' satisfaction.

On the other hand, the knowledge generated from this research can be used as a platform for e-service providers on how to increase the customers' digital satisfaction of their e-service. With careful strategy implementation by policy makers, agencies, and system developers, high quality and secure e-services could be successfully implemented to increase customers' digital satisfaction. However, additional steps need to be taken to encourage users to use e-service more frequently.

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REFERENCES

Abreu, B. R. A., & Oliveira, L. K. (2014). The potential of response rate in online transportation surveys. *Procedia: Social and Behavioral Sciences*, *162*, 34–41. doi:10.1016/j.sbspro.2014.12.183

Al-Kasasbeh, M. M., Dasgupta, S., & Al-Faouri, A. H. (2011). Factors Affecting E-Service Satisfaction. *Communications of the IBIMA, 2011*, 12.

Alawadhi, S., & Morris, A. (2008). The Use of the UTAUT Model in the Adoption of E-government Services in Kuwait. *Proceedings of the 41st Hawaii International Conference on System Sciences*. 10.1109/HICSS.2008.452

Alawneh, A., Al-Refai, H., & Batiha, K. (2013). Measuring user satisfaction from e-Government services: Lessons from Jordan. *Government Information Quarterly*, *30*(3), 277–288. doi:10.1016/j.giq.2013.03.001

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94. doi:10.1007/BF02723327

Bailey, J. E., & Pearson, S. W. (1983). Development of a tool for measuring and analyzing computer user satisfaction. *Management Science*, *29*(5), 530–544. doi:10.1287/mnsc.29.5.530

Baroudi, J., & Orlikowski, W. (1988). A short-form measure of user information satisfaction: A psychometric evaluation and notes on use. *Journal of Management Information Systems*, *4*(4), 44–59. doi:10.1080/07421222.1988.11517807

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238–246. doi:10.1037/0033-2909.107.2.238 PMID:2320703

Bentler, P. M., & Bonet, D. G. (1980). Significant tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588–606. doi:10.1037/0033-2909.88.3.588

Bitner, M. J. (1990). Evaluating Service Encounters: The Effects of Physical Sur-roundings and Employee Responses. *Journal of Marketing*, *54*(2), 69–82. doi:10.1177/002224299005400206

Boulter, J. (2014). *How to build profitable customer relationships*. Retrieved 7 Nov 2014 http://www.businessexpertwebinars.com/content/view/1033/29/

Chang, H. H., & Chen, S. W. (2008). The impact of customer interface quality, satisfaction and switching costs on e-loyalty: Internet experience as a moderator. *Computers in Human Behavior*, *24*(6), 2927–2944. doi:10.1016/j.chb.2008.04.014

Chen, L. D., Soliman, K. S., Mao, E., & Frolick, M. N. (2000). Measuring user satisfaction with data warehouses: An exploratory study. *Information & Management*, *37*(3), 103–110. doi:10.1016/S0378-7206(99)00042-7

Chen, S.-C. (2012). The customersatisfaction–loyaltyrelationinaninteractivee-servicesetting: The mediators. *Journal of Retailing and Consumer Services, 19*, 202-210.

Chin, W. W. (1998). Issues and opinions on structural equation modeling. *Management Information Systems Quarterly*, *22*(1), 7–16.

Cho, N., & Park, S. (2001). Development of Electronic Commerce User-Consumer Satisfaction Index (ECUSI) for Internet Shopping. *Industrial Management & Data Systems*, *101*(8), 400–405. doi:10.1108/EUM0000000006170

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95. doi:10.1287/isre.3.1.60

Doll, W. J., & Torkzadeh, G. (1988). The measure of end-user computing satisfaction. *Management Information Systems Quarterly*, *12*(2), 259–274. doi:10.2307/248851

Dwivedi, Y. K., Choudrie, J., & Brinkman, W.-P. (2006). Development of a survey instrument to examine consumer adoption of broadband. *Industrial Management & Data Systems*, *106*(5), 700–718. doi:10.1108/02635570610666458

Etezadi-Amoli, J., & Farhoomand, A. F. (1996). A structural model of end user computing satisfaction and user performance. *Information & Management*, *30*(2), 65–73. doi:10.1016/0378-7206(95)00052-6

Evanschitzky, H., Iyer, G. R., Hesse, R. J., & Ahlert, D. (2004). E-satisfaction: A Re-Examination. *Journal of Retailing*, *80*(3), 239–247. doi:10.1016/j.jretai.2004.08.002

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*(3), 272–299. doi:10.1037/1082-989X.4.3.272

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, *26*(2), 132–139. doi:10.1016/j.chb.2009.10.015

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Fryrear, A. (2015). *Survey Response Rates*. SurveyGizmo.

Gefen, D., Straub, D. W., & Boudreau, M. (2000). Structural equation modeling techniques and regression: Guidelines for research practice. *Communications of AIS*, *4*(7), 1–79.

Gerbing, D. W., Anderson, J. C., & Carlo, M. (1993). Evaluation of goodness-of-fit indeces for Stractural Equations Models. *Sociological Methods & Research*, *21*(2), 132–160. doi:10.1177/0049124192021002002

Gorsuch, R. (1983). *Factor Analysis*. Hillsdale, NJ: Erlbaum.

Gummerus, J., Liljander, V., Pura, M., & Riel, A. V. (2004). Customer loyalty to content-basedWeb sites: The case of an online healthcare service. *Journal of Services Marketing*, *18*(3), 175–186. doi:10.1108/08876040410536486

Hair, J., Anderson, R., Tatham, R., & Black, W. (1995a). Multivariate data analysis. (4th ed.). Prentice-Hall Inc.

Hoffman, K. D., & Bateson, J. E. G. (2010). Services Marketing: Concepts, Strategies, & Cases (4th ed.). Cengage Learning.

Huang, J. H., Yang, C., Jin, B. H., & Chiu, H. (2004). Measuring satisfaction with business-to-employee systems. *Computers in Human Behavior*, *20*(1), 17–35. doi:10.1016/S0747-5632(03)00047-5

Huck, S. W. (2007). Reading Statistics and Research (5th ed.). Allyn & Bacon.

Hussain, R., Nasser, A. A., & Hussain, Y. K. (2014). (in press). Service quality and customer satisfaction of a UAE-based airline: An empirical investigation. *Journal of Air Transport Management*, 1–9.

IS07498-2. (Ed.). (2004). International Organization for Standardization.

Ives, B., Olson, M. H., & Baroudi, J. J. (1983). The measurement of user information satisfaction. *Communications of the ACM*, *26*(10), 785–793. doi:10.1145/358413.358430

Johnson, M. D., Anderson, E. W., & Fornell, C. (1995). Rational and adaptive performance expectations in a customer satisfaction framework. *The Journal of Consumer Research*, *21*(March), 128–140. doi:10.1086/209428

Kenett, R. S., & Salini, S. (2011). Modern analysis of customer satisfactionsurveys: Comparison of models andintegrated analysis. *Applied Stochastic Models in Business and Industry*, *27*(5), 465–475. doi:10.1002/asmb.927

Kline, P. (1997). *An Easy Guide to Factor Analysis*. London: Routledge.

Kraiser, H. (1958). The varimax criterion for analytic rotation in factor analysis. *Psychometrika*, *23*(3), 187–200. doi:10.1007/BF02289233

Lai, I. K. W., & Lai, D. C. F. (2013). User acceptance of mobile commerce: An empirical study in Macau. *International Journal of Systems Science*, *45*(6), 1321–1331. doi:10.1080/00207721.2012.761471

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, *28*(4), 563–575. doi:10.1111/j.1744-6570.1975.tb01393.x

Lean, O. K., Zailani, S., Ramayah, T., & Fernando, Y. (2009). Factors influencing intention to use e-government services among citizens in Malaysia. *International Journal of Information Management*, *29*(6), 458–475. doi:10.1016/j.ijinfomgt.2009.03.012

Lee, Y. C., Wang, Y. C., Lu, S. C., Hsieh, Y. F., Chien, C. H., Tsai, S. B., & Dong, W. (2016). An empirical research on customer satisfaction study: A consideration of different levels of performance. *SpringerPlus*, *5*(1), 1577–1586. doi:10.118640064-016-3208-z PMID:27652150

Leech, N., Barrett, K., & Morgan, G. A. (2005). *SPSS for intermediate statistics: Use and interpretation* (2nd ed.). London: Lawrence Erlbaum Associates.

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, *40*(3), 191–204. doi:10.1016/S0378-7206(01)00143-4

Luo, M. M.-l., Remus, W., & Chea, S. (2006, August 4-6, 2006). *Technology Acceptance of Internet-based Information Services: An Integrated Model of TAM and U&G Theory.* Paper presented at the Proceedings of the Twelfth Americas Conference on Information Systems, Acapulco, Mexico.

Mat Roni, S. (2014). *Introduction to SPSS*. School of Business, Edith Cowan University.

McHaney, R., & Cronan, T. P. (1998). Computer simulation success: on the use of the end-user computing satisfaction instrument: a comment. *Decision Sciences*, *29*(2), 525–534. doi:10.1111/j.1540-5915.1998.tb01589.x

Montesdioca, G. P. Z., & Maçada, A. C. G. (2014). (in press). Measuring User Satisfaction with Information Security Practices. *Computers & Security*. doi:10.1016/j.cose.2014.10.015

Moore, N. (2006). *How to do research: a practical guide to designing and managing research projects* (3rd ed.). London: Facet Publishing.

Muylle, S., Moenert, R., & Despontin, M. (2004). The conceptualization and empirical validation of web-site user satisfaction. *Information & Management*, *41*(5), 543–560. doi:10.1016/S0378-7206(03)00089-2

NIST-Special-Publication-800-16. (1998). *Information Technology Security Training Requirements: A Role-and Performance-Based Model*. Gaithersburg: National Institute of Standards and Technology.

Nunnally, J. (1978). Psychometric Theory (2nd ed.). New York: NY: McGraw-Hill.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *JMR, Journal of Marketing Research*, *17*(4), 460–469. doi:10.1177/002224378001700405

Oliver, R. L. (1997). *Satisfaction: A Behavioral Perspective on the Consumer*. New York: McGraw-Hill.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–904. doi:10.1037/0021-9010.88.5.879 PMID:14516251

Ramasubbu, N., Mithas, S., & Krishnan, M. (2008). High tech, high touch: The effect of employee skills and customer heterogeneity on customer satisfaction with enterprise system support services. *Decision Support Systems*, *44*(2), 509–523. doi:10.1016/j.dss.2007.06.005

Robinson, J. (2009). Triandis theory of interpersonal behaviour in understanding software privace behaviour in the South African context (Masters degree). University of the Witwatersrand, Johannesburg, South Africa.

Saha, P., Nath, A., & Salehi-Sangari, E. (2010). Success of Government E-Service Delivery: Does Satisfaction Matter? In EGOV 2010 LNCS (Vol. 6228, pp. 204-215). IFIP International Federation for Information Processing.

Semeijn, J., Riel, A. C. R., Birgelen, M. J. H., & Streukens, S. (2005). E-services and offline fulfilment: How e-loyalty is created. *Managing Service Quality*, *15*(2), 182–194. doi:10.1108/09604520510585361

Singh, J., & Wilkes, R. (1996). When consumers complain: A path analysis of the key antecedents of consumer complaint response estimates. *Journal of the Academy of Marketing Science*, *24*(4), 350–365. doi:10.1177/0092070396244006

Stamenkov, G., & Dika, Z. (2016). Bank employees' internal and external perspectives on e-service quality, satisfaction and loyalty. *Electronic Markets*, *26*(3), 291–309. doi:10.100712525-016-0221-6

Stevens, J. (2001). Applied multivariate statistics for the social sciences (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Straub, D., Boudreau, M.-C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information Systems*, *13*, 380–427. doi:10.17705/1CAIS.01324

Swanson, R. A., & Holton, E. F. (2005). *Research in organizations: Foundations and methods in inquiry*. Berrett-Koehler Publishers.

Szymanski, D. M., & Hise, R. T. (2000). E-satisfaction: An initial examination. *Journal of Retailing*, *76*(3), 309–322. doi:10.1016/S0022-4359(00)00035-X

Taherdoost, H. (2016a). How to Design and Create an Effective Survey/Questionnaire; A Step by Step Guide. *International Journal of Academic Research in Management*, *5*(4), 37–41.

Taherdoost, H. (2016b). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management*, *5*(3), 28–36. doi:10.2139srn.3205040

Taherdoost, H. (2017a). Measurement and Scaling Techniques in Research Methodology; Survey / Questionnaire Development. *International Journal of Academic Research in Management*, *6*(1), 1–5.

Taherdoost, H. (2017b). Understanding of E-service Security Dimensions and its effect on Quality and Intention to Use. *Information and Computer Security*, *25*(5), 535–559. doi:10.1108/ICS-09-2016-0074

Taherdoost, H. (2018). Development of an adoption model to assess user acceptance of e-service technology: E-Service Technology Acceptance Model. *Behaviour & Information Technology*, *37*(2), 173–197. doi:10.1080/0144929X.2018.1427793

Thomas, B., Basil, M., Christina, M., Fedra, K., & Manuela, T. (2013). Measuring Users Satisfaction of an e-Government portal. *Procedia Technology*, *8*, 371–377. doi:10.1016/j.protcy.2013.11.049

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: understanding concepts and applications*. Washington, DC: American Psychological Association. doi:10.1037/10694-000

Tojib, D. R., Sugianto, L.-F., & Sendjaya, S. (2006). A Conceptual Model for B2E Portal User Satisfaction. *Proceedings of the International Conference on Business and Information*.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, *16*(1), 85–102. doi:10.1287/isre.1050.0042

Zhang, X., Prybutok, V., & Huang, A. (2006). An empirical study of factors affecting e-service satisfaction. *Human Systems Management*, *25*, 279–291.

Chapter 4
A Study of Digital Acceptance of ERP Systems for Improved Financial Performance

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ABSTRACT

The main purpose of this study is to investigate the digital impacts of user training and education and perceived usefulness on the ERP systems acceptance and the contribution of the ERP systems towards the improved financial performance of Saudi firms. The survey is conducted on the ERP users, who are working in Saudi-based companies. The ERP users are selected for the survey by having been using the ERP modules for various digital tasks including finance and accounting, material management, human resource management, quality management, and sales and distribution. The research findings show that digital training and perceived usefulness both have a positive relation with the acceptance of the ERP systems.

INTRODUCTION

The organisations 'process efficiency' is the advancing force for integrating digital transformation in the workplace. Technologies such as ERP, AI, machine learning, big data, analytics, and IoT (Internet of Things) are integrated to achieve the desired advanced outcome from digital transformation (Slimov, 2019). In this process digital transformation aims to bring higher growth for the company. It helps companies to improve customer services management and streamlining other business processes. The important goals of digital transformation are to transform 'ineffective processes' to 'highly efficient &

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effective processes' in which the outcome is beneficial to the organisation, employees, customers, suppliers, and other stakeholders (Mason 2019). Modern ERP can enable companies to offer the benefits of mobile apps and cloud-based solutions to employees and stakeholders. The implementation of the ERP software can improve key business functions like finance management, accounting, and inventory management. Integrating ERP tools into main business applications can link with social media platforms for transforming the user's social accounts and important digital data that can be analysed in real time online (Al-Amoush and Sandhu, 2020).

There are number of studies which have been conducted in order to identify the appropriate use of the ERP systems for digitalisation and the ways in which the companies accept them (Al-Mashari and Okazawa, 2006). The digital acceptance process is mainly focused on the various needs of the users. However, it is important to identify the return on investments for digitalisation which are made in order to introduce ERP systems within the organisation (Akkermans and Van Helden, 2002). The majority of the studies related to ERP systems are focused on discussing the digital needs of the users. However, the link between the acceptance of the ERP systems and financial performance of the firms is not very well researched (Aiken, 2002). It is a fact that the basic purpose of introducing the ERP systems within the organisation is to improve the overall digital performance of the firm, which also results in improved digital business profitability (Al-Mashari and Zairi, 2003). Therefore, it is important to identify that whether the organisation is successful in gaining financial returns from the implementation of the ERP systems or not (Allen and Havenhand, 2002). This research paper helps to identify the link between the digital issues which are faced by the user with the financial performance of the company during the acceptance and implementation of the ERP systems for digitalisation of business process.

This chapter emphasizes on the ERP acceptance for business digitalisation that is also helpful in discussing the tangible and intangible benefits of the ERP systems for the organisation. The business managers nowadays need to identify the strategic benefits of introducing the ERP systems as it is helpful in convincing the investors to make investments in the ERP systems (Adam and O'Doherty, 2000). The technology acceptance model helps to identify that why introduction of the new technologies such as ERP systems is crucial for the digital business success of the firm (Ash and Burn, 2003). There is no other opinion on the fact that implementation of new technologies enables the companies to improve their overall financial performance and provide better returns to the shareholders or investors (Al-Mashari and and Zairi, 2003). This also results in satisfaction of the shareholders of the company (Wee, 2000). Therefore, it can be stated that the financial needs of the firm need to be considered before introducing new technologies (Ash and Burn, 2003). This research aims to enhance the understanding of the various literatures that have been written on ERP acceptance for business digitalisation and it also helps to identify the link between ERP acceptance and financial performance of the company. An important aim of this research study is to analyse the need of implementation of ERP systems in the Saudi organisations and its impact on the financial results of the companies. This is a major gap in the research area and this chapter will attempt to bridge this gap. The next section of this research paper presents the theoretical background and the literature review with hypothesis. The methodology has been presented in the section three of this article and section four presents the brief analysis. In the last section of the article, the solutions and recommendations of the key findings has been made, followed by future research directions, and final conclusion has been presented.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Technology Acceptance Model

There are numerous academic literatures (Wieder and Ossimitz, 2006) which shows that acceptance of new technology by the organisations is based on the theory of technology acceptance model (TAM) (Brown and Vessey, 2003). The technology acceptance model helps to discuss the perceived usefulness of information and communication technology and the major determinants of the use of new systems (Bajwa and Mooney, 2004). This shows that acceptance of new technology main depends upon the usefulness of the new technology, ease of use and user acceptance (Bingi and Godla, 1999). If the users of the system are conformable with the new technology then they are more likely to utilize it (Wah, 2000). However, it seems that very limited attention has been given by the researchers and scholars in order to identify the factors that can create an influence on the perceived usefulness and the ease of use of the technology-based systems (Bernroider and Koch, 2001).

The intended use of information technology needs be considered by the organisations before making investments in the IT systems because it enables them to identify that whether the IT based systems can contribute to the business success of the firm or not (Brehm and Markus, 2001). The technology acceptance model helps to explain the theory of reasoned actions (Bingi and Godla, 1999). This model explains that the diffusion of system depends upon the requirements of the users (Wei, 2008). Therefore, the implementation of the new systems within the organisation is based on the acceptance of change (Bingi and Godla, 1999). The acceptance process has various stages which are focused on ensuring that implementation of the new system can become the full part of the organisational environment (Boersma and Kingma, 2005). The acceptance of the new technologies is important for the organisations in the modern business era as they are helpful in improving the overall performance of the firms (Berchet and Habchi, 2005). This also helps to implement the change management processes in a successful manner (Velcu, 2010).

LITERATURE REVIEW

There are numerous studies that have been conducted by eminent scholars and researchers in order to discuss the use of enterprise resource planning systems within the organisational digital settings (Botta-Genoulaz and Millet, 2005). The majority of the studies reflect that ERP systems refers to software based applications that are helpful in managing the resources of the organisation in an efficient manner which ultimately result in improved business performance (Bradley, 2008). Research shows that in majority of the cases, the implementation of change process within the organisation also led to the implementation of ERP systems as they are helpful in achieving the desired objectives of the change management process (Buckhout and Nemec, 1999). However, it is essential to identify the ways and methods through which ERP systems are adopted by the organisations as implementation of the ERP systems requires significant amount of investments and the organisations expect a return in the form of improved business performance (Cotteleer and Bendoly, 2006). If the overall business performance of the firm is not improved with the help of ERP systems then it could result in waste of the investments of the company (Umble and Umble, 2003).

According to Chen and Jih (2008), the implementation of ERP systems is also critical as the modern world organisations seek to achieve a strategic competitive advantage over their industry rivals, therefore, it is essential to ensure that implementation of the ERP systems is carried out in an effective manner. The improved financial outcomes which can be generated with the help of the implementation of the ERP systems is considered as one of the most important benefit that motivates the organisations to make investments in the ERP systems for digitalisation (Deep and Burns, 2008). This reflects that financial factors are more likely to increase the acceptance of the ERP systems within the organisation (Dai, 2008). However, it is also important to identify the other factors which require the organisation to introduce ERP systems (Esteves, 2009). The review of the literature helps to explain the different factors that increase the importance of implementing the ERP systems for digital transformation within the organisation (Dillard and Yuthas, 2006).

Hypothesis Development

ERP User Training and Education

The acceptance of new technologies within the organisation also determines the implementation of the ERP systems within the digital firm (Everdingen and Waarts, 2000). The companies in which new technologies are easily accepted can also ensure the effective implementation of ERP systems (Uwizeyemungu and Raymond, 2010). The benefits which the users can achieve from the implementation of ERP systems also depend upon the training and education of the users regarding the ERP systems (Federici, 2009). However, it is also important for the management of the firm to arrange the training and development programs that are helpful in enhancing the understanding of the users regarding the usage of ERP systems (Fub and Strahringer, 2007). The digital training and education of the users will enable them to achieve the desired objectives of the ERP systems (Finney and Corbett, 2007). The managers are required to establish the learning and training sessions in order to improve training to the users to effectively use the ERP systems (Glover and Romney, 1999). The web based training is considered to be very effective in order to improve the cognitive process of the users (Granlund and Malmi, 2002).

There are many studies (Somers and Nelson, 2001) which reflect that digital training element is very crucial in order to ensure the effective usage of the information systems and successful implementation of the ERP systems within the firm (Grabski and Leech, 2007). However, the budgets of the organisations or financial constraints are also important because the organisations with lower budgets are not able to effectively implement the information systems (Huang and Lin, 2004). The financial constraints also don't allow the organisations to provide appropriate digital training to the employees which are essential to use the information systems in an effective manner (Huin, 2004). The organizations with low budgets are very less likely to arrange the training programs on regular basis in order to provide training to the staff members (Soja and Paliwoda-Pękosz, 2009). However, the organisations can also use innovative digital training methods which could include web based training in order to provide appropriate training to the employees (Holland and Gibson, 1999). The education level of the users within the firm also helps to determine that whether they will be able to implement the ERP systems effectively or not (Hong and Kim, 2002). Rosario (2000) while highlighting the importance of training and development stated that training enables the employees to use the information systems such as ERP systems in an effective manner which impact the overall performance of the firm positively. This also creates a significant influence on the success or failure of the information systems (Hakkinen and Hilmola, 2008).

Hypotheses 1: ERP User training and education is positively affects ERP perceived Usefulness
Hypotheses 2: ERP User training and education is positively affects ERP Acceptance

ERP Perceived Usefulness

According to Hunton and Reck (2003), perceived usefulness is the perception of the individuals which helps to determine that whether a particular digital system is useful for them or not. The organisations need to create awareness among the employees that the use of ERP systems can be helpful in improving their overall performance at the workplace (Hitt and Zhou, 2002). The employees working within the firm are more likely to accept the ERP system for digital transformation when they believe that implementation of the ERP systems is beneficial for them (Jones and Ryan, 2006). Although, the implementation of the ERP system is beneficial for the firm but the leadership of the organisation can communicate to the employees that improved performance of the company is also beneficial for the employees in the long run (Kallunki and Silvola, 2011). The implementation of the ERP systems increases the financial performance of the firm which enables the management to provide appropriate returns to the employees (Themistocleous and Paul, 2001). Majed (2000) believes that perceptions of the employees regarding the usefulness of the systems influence their attitude and behavior which significantly affect the implementation of the ERP systems. Langenwalter (2000) has identified some factors which can create an impact on the implementation of the ERP systems which could include education level, perceived usefulness and subjective norms.

Hypotheses 3: ERP Perceived Usefulness is positively affects ERP Acceptance

ERP Acceptance and Improved Financial Performance

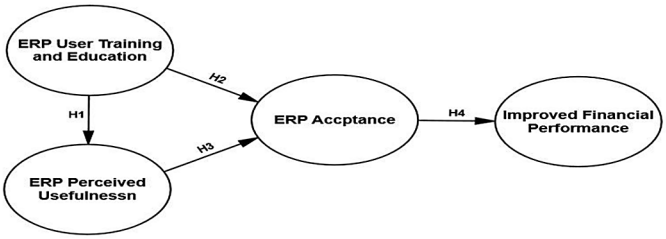
During the last few years, the use of the ERP systems has been increased digitally in different countries of the world and one of the main reasons behind this is that it impacts the overall performance of the firm in a positive manner (Kang and Yang, 2008). The organisations which are not ensuring the effective use of ERP systems and similar technologies might not be able to survive in the competitive business environments (Finney and Corbett, 2007). Sumner (2000) believes that implementation of ERP systems help to minimize the risk element from the organizational projects. Therefore, it is essential to introduce the ERP systems within the firm and the employees need to be encouraged so that they accept the ERP systems within the digital firm (Mabert and Venkataramanan, 2003). The positive response from the employees enables the organisations to successfully implement technology based business systems within the firm (Majed and Mohamed, 2003). It is a fact that when the employees are not accepting the new technology then it could result in failure of the ERP system which also result in waste of the important organisational resources (Mabert and Venkataramanan, 2003).

The impact of ERP systems on the financial performance of the organisations has been studied in this article. There is no second opinion on the fact that ERP systems help to manage the capital flow of the organisation and it also result in effective financial management (Mandal and Gunasekaran, 2003). The expected financial benefits through the implementation of the ERP systems also enable the digital managers to justify the investments which are made on the ERP systems (Nah and Kuang, 2001). However, it is essential that once the ERP systems are introduced with the organisation then they should

be effectively implemented in order to achieve the required digital results (Nicolaou and Bajor, 2004). Oliver (1999) believes that perceived benefits of the ERP systems mainly determines that whether the organisation should introduce the ERP systems within the organisation or not.

Hypotheses 4: ERP Acceptance is positively affects improved financial performance

Figure 1. ERP Acceptance Model



METHODOLOGY

Sample and Procedure

The research methodology that is adopted for this particular research is the survey method and the survey is conducted with the ERP users, which are working in the Saudi companies. The ERP users which were selected for the survey having been using the ERP modules for various tasks including finance and accounting, material management, human resource management, quality management and sales and distribution. They are also using the different ERP software brands including Oracle, JDA, SAP and Microsoft Dynamics, etc. Both English and Arabic versions of questionnaires were prepared and handed over to the employees as the survey was conducted with the employees who are working in Saudi Arabia and some of them might not be able to understand English effectively. This was helpful in ensuring that all the participants of the survey can effectively understand the questions of the survey and provide appropriate responses against the questions of the survey. The expert of the Arabic language also examined the Arabic version of the questionnaire in order to avoid any mistake.

DATA COLLECTION

The questionnaires were handed over to the participants both face to face and I have also sent the questionnaires through digital email to some of the research participants. The employees of those organisations were contacted which are already using the ERP systems or interested in introducing the ERP systems. We have contacted those employees who are working in the telecommunication, manufacturing, petroleum and the banking industries. We have contacted the top management of the organisations in order to get an approval to distribute the questionnaires and conduct the survey with the employees. We have also used some personal resources in order to get approval from the top management to conduct the survey. The reason behind this is without the approval of the management of the organization, the survey cannot

be conducted with the employees. The total 1500 questionnaire were handed over to the participants and approximately 526 employees have filled the questionnaire and have been returned. Some of the participants of the survey have not sent back the questionnaire and some have sent incomplete questionnaires so the total number of questionnaires, which were complete and available for data analysis, was 526. The responses received against these questionnaires were used in order to analyse the research data digitally and generate the study outcomes. Table 1 presents the demographic characteristics of the survey subjects.

Table 1. Demographic characteristics of the survey

ERP Participants	Category	Percentage (%)
Gender	Male	82.9
	Female	17.1
Education	High-School	6.5
	Bachelor	67.7
	Master's	22.4
	PhD	3.4
Experience	<5	15.8
	5–10	73.4
	>10	10.8
Job Level	Top	13.3
	Mid	36.7
	Supervisory	50

Table 1 shows that vast majority of respondents who have participated in the survey are and very females have participated in the survey. Approximately 82.9% of participants were male and only 17.1% of the females have participated in the survey. This also helps to understand that females are usually lesser in numbers especially when it comes to professional business organisations of

the Saudi Arabia. Therefore, for this particular survey, the male participants were more in numbers. An important reason behind this is Saudi society does not allow the woman to make their careers and work in the professional business organisations. The analysis of the sample also shows that majority of the respondents (67.7%) have completed their Bachelor degree, 22.4% of the participants were Master Degree holders and then 6.5% of the participants have only finished High school. There were also 3.4% of the participants who were PHD holders. The Table 1 also shows that approximately 73.4% of the respondents had an experience "5 – 10" years, about 15.8% of research participants had an experience between "less than Concerning the job level of respondents, 50% of the respondents have the supervisory level working experience. Approximately 36.7% of the participants have middle level management experience and 13.3% of the respondents have top level of management experience. There were also 10.8% of the respondents who had an experience more than ten years.

DATA ANALYSIS AND HYPOTHESIS TESTING

Structural Equation Modeling

The Smart PLS virgin 3 has been used for digital data analysis in order to analyse the measurement quality and the path model for hypothesis testing. The measurement model has been used in order to ensure the internal consistency reliability and validity and of the measurements. After this, the structural model has been analysed in order to test the research hypotheses and the overall quality of the structural model.

Quality of Measurement Model

In order to analyse the measurement model, the researchers are usually analyzing the convergent validity and internal consistency reliability. The average variance extracted (AVE) is usually checked in order to analyse the convergent validity. AVE was calculated by averaging the percentage of variance extracted of each construct from its indicators, and it is reported that average variance extracted should be 0.5 or greater to suggest adequate convergent validity. The Table 2 shows that except perceived organisational learning culture all the other constructs are greater than 0.9. Discriminant validity helps to explain that how the measures of the different model construct are unique (Pairat and Jungthirapanich, 2005). There are mainly two methods that can be used in order to assess discriminant validity. In this paper, we test the discriminant validity by comparing the square root of the average variance extracted (AVE) of each construct and this construct's correlation with other constructs. Discriminant validity is supported if the square root of the constructs' AVE is greater than the correlations of the construct with all other constructs. As shown in Table 3, the diagonal values are AVEs of each construct, which suggest good discriminant validity. In addition, Table 4 provides the cross loadings of the items on all latent variable, also indicating good discriminant validity.

STRUCTURAL MODEL

Follow the structural model, some data about the path coefficients (P), T-values (T), P-values (P) and squared R (R2) are identified in detail. Path coefficients (β): discusses about the dependent and independent variables and the associated relationships between them. Since a Path coefficient can be identified based on the correlation, it is standardized while a path regression coefficient cannot be considered standardized. T-Value: the path significance can be determined via t-tests values by employing the boot strapping method. Generally, the acceptable value for T-values larger than two means significant level. P-value: The P-value can be considered as a quantitative measure of the numerical importance of testing a hypothesis. Furthermore, regarding the studies conducted formerly, P-value < 0.05 implies the significance of the related hypothesis. Squared R (R2): The R2 Shows the expected effect of the model of dependent variables through estimating the percentage of a construct's variance in the model.

As shown in the table 5, the result of this study confirm H1 to H4 hypotheses are accepted at $P<0.001$.

Table 2. Measurement Quality Indicators

Latent Verbal	Items	Loadings	Cronbach's Alpha	Composite Reliability	(AVE)
ERP User training and education (TE)	TE1	0.822	0.900	0.921	0.625
	TE2	0.785			
	TE3	0.836			
	TE4	0.778			
	TE5	0.745			
	TE6	0.812			
	TE7	0.753			
ERP perceived usefulness (EPU)	PUS1	0.882	0.935	0.947	0.693
	PUS2	0.873			
	PUS3	0.882			
	PUS4	0.641			
	PUS5	0.795			
	PUS6	0.831			
	PUS7	0.837			
	PUS8	0.893			
ERP Acceptance (ERPA)	ERPA1	0.848	0.940	0.952	0.768
	ERPA2	0.884			
	ERPA3	0.904			
	ERPA4	0.906			
	ERPA5	0.873			
	ERPA6	0.843			
Intention to improved financial performance (IFP)	IFP1	0.979	0.980	0.985	0.927
	IFP2	0.970			
	IFP3	0.960			
	IFP4	0.948			
	IFP5	0.957			

Table 3. Discriminant validity

	ERP Acceptance (ERPA)	Intention to Improved Financial Performance (IFP)	ERP Perceived Usefulness (EPU)	ERP User Training and Education (TE))
ERP Acceptance (ERPA)	**0.877**			
Intention to improved financial performance (IFP)	0.794	**0.963**		
ERP perceived usefulness (EPU)	0.813	0.722	**0.833**	
ERP User training and education (TE)	0.369	0.323	0.325	**0.791**

Table 4. Cross loadings of each construct

Items	ERP Acceptance (ERPA)	Intention Financial (IFP) to Improved Performance	ERP Perceived Usefulness (EPU)	ERP User Training and Education (TE))
ERPA1	**0.848**	0.825	0.714	0.325
ERPA2	**0.884**	0.762	0.708	0.354
ERPA3	**0.904**	0.701	0.706	0.321
ERPA4	**0.906**	0.629	0.709	0.336
ERPA5	**0.873**	0.664	0.764	0.308
ERPA6	**0.843**	0.559	0.669	0.294
IFP1	0.756	**0.979**	0.691	0.314
IFP2	0.758	**0.970**	0.683	0.325
IFP3	0.779	**0.960**	0.710	0.308
IFP4	0.777	**0.948**	0.713	0.299
IFP5	0.752	**0.957**	0.681	0.309
PUS1	0.700	0.680	**0.882**	0.322
PUS2	0.731	0.639	**0.873**	0.278
PUS3	0.688	0.646	**0.882**	0.286
PUS4	0.563	0.405	**0.641**	0.223
PUS5	0.611	0.578	**0.795**	0.277
PUS6	0.722	0.642	**0.831**	0.279
PUS7	0.677	0.531	**0.837**	0.226
PUS8	0.703	0.653	**0.893**	0.264
TE1	0.287	0.261	0.262	**0.822**
TE2	0.252	0.222	0.217	**0.785**
TE3	0.305	0.249	0.276	**0.836**
TE4	0.265	0.243	0.255	**0.778**
TE5	0.262	0.240	0.224	**0.745**
TE6	0.299	0.242	0.249	**0.812**
TE7	0.352	0.313	0.296	**0.753**

Table 5. hypotheses results

Hypotheses	Causal Path	Path Coefficient	T-Value	P-Value	Remark
H1	ERP User training and education Positively affects ERP perceived Usefulness	0.325	7.549	0.000*	Supported
H2	ERP User training and education is positively affects ERP Acceptance	0.118	3.993	0.000*	Supported
H3	ERP Perceived Usefulness is positively affects ERP Acceptance	0.775	41.038	0.000*	Supported
H4	ERP Acceptance is positively affects improved financial performance	0.794	51.938	0.000*	Supported

*significant at the 0.001 level; **significant at the 0.01 level; ***significant at the 0.05 level

SOLUTIONS AND RECOMMENDATIONS

This study is mainly focused on discussing the role of ERP systems in achieving greater financial performance of the company through complete digitalisation of business process. It also discusses the importance of digital education and training which needs to be provided to the users of ERP systems so that they can effectively use the ERP systems and perceived usefulness of the ERP systems will increase. The analysis of the digital data reflects that the employees which are more digitally educated are more likely to shows a positive response towards the implementation of the ERP systems. The data analysis shows that digital training and perceived usefulness both have a positive relation with the acceptance of the ERP systems. Therefore, it is very important for the companies to provide digital training and education to their employees in order to develop their positive perceptions regarding the ERP systems for digitalisation of business process. This means that by creating digital positive perceptions of the employees regarding the use of ERP systems and by providing necessary digital training to the staff members working within the firm, the organisations can increase the digital acceptance of the ERP systems (Quiescenti and and Perrone, 2006).

The data analysis also shows that the organisations can significantly improve their digital business performance by using the ERP systems which is more likely to create a positive impact on the overall financial performance of the company streamlining digital business processes that will be economically beneficial. However, it is very important that the organisations must be capable of using the ERP systems in an effective manner and necessary steps must be taken by the management of the firm in order to ensure the effective implementation of the ERP systems (Rom and Rohde, 2007) for complete digitalisation of business process. The employees must have the necessary digital skills and tools to interact on a digital platform.

FUTURE RESEARCH DIRECTIONS

This study also provides some important digital guidance in order to manage the ERP systems in an effective manner and to increase its acceptance in the post implementation stages of the life cycle. In order to ensure the digital acceptance of the ERP systems, it is the responsibility of the digital managers to motivate the employees and communicate them the benefits of using the ERP systems (Roztocki and Weistroffer, 2008). The digital managers can communicate to the employees that the implementation of the ERP systems is not only beneficial for the organisation but it is more likely to generate several benefits for the employees working within the firm (Scott and Vessey, 2000). This could include improved skills of the employees and their improved performance which enable them to get more number of rewards from the firm.

The digital training programs can be arranged on regular basis in order to update the skills of the employees which is helpful for them to use the ERP systems in a more effective manner and encounter the difficulties or challenges that are faced by them while using the ERP systems (Siriginidi, 2000). It is a fact that use of ERP systems is not very easy for the employees in majority of the cases and it is essential for the staff members to have necessary skills to use the ERP systems effectively (Shang and Seddon, 2002).

The digital managers can also set up the financial performance objectives that can be achieved through the digital training and development of the employees and the implementation of the ERP sys-

tems (Soh and Tay, 2000). This help to ensure that desired level of financial results can be achieved by the organisations through the ERP system (Shanks and Seddon, 2000). However, it also depends upon the management of the organization that how it is guiding the employees to use the ERP systems in an effective manner (Shanks and Seddon, 2000).

CONCLUSION

This chapters has revealed that ERP systems can contribute significantly in order to improve the financial performance of the digital firm. It is also concluded that digital training and education of the users is essential to ensure that can use the ERP systems in an effective manner. The research model has been developed in this paper in the context of the ERP system acceptance for digital transformation of business process. With the help of the research data which is generated through the survey and the structural equation modeling, the hypotheses have been tested which explains that how digital training and education and the perceived usefulness can improve the ERP acceptance within the organisation.

This has been supported by the empirical data. However, there are also few limitations of this study which includes the survey is only conducted with the employees who are currently working in Saudi Arabia. In order to validate the research results, the survey also needs to be conducted with the employees who are working in the other countries. This helps to get different versions of the employees which are living in other parts of the world. The future studies can also consider the other factors that can influence the implementation of the ERP systems for digital transformation of business process. It is not necessary that only digital training and education is the only factor that can create an influence on the users regarding the effective use of the ERP systems, a whole range of other factors need attention.

REFERENCES

Adam, F., & O'Doherty, P. (2000). Lessons from enterprise resource planning implementations in Ireland – towards smaller and shorter ERP projects. *Journal of Information Technology*, *15*(4), 305–316. doi:10.1177/026839620001500406

Aiken, P. (2002). *Enterprise resource planning (ERP) considerations*. VCU/Institute for Data Research.

Akkermans, H., & Van Helden, K. (2002). Vicious and Virtuous Cycles in ERP implementation: A Case Study of Interrelations between Critical Success Factors. *European Journal of Information Systems*, *11*(1), 35–46. doi:10.1057/palgrave.ejis.3000418

Al-Amoush, A., & Sandhu, K. (2020). Digital Learning Analytics Management Systems Innovation: New Findings from A Study of major Jordanian Universities. *International Journal of Innovation in the Digital Economy, 11*(1).

Al-Mashari, M., & Okazawa, K. (2006). Enterprise resource planning (ERP) implementation: A useful road map. *International Journal of Management and Enterprise Development*, *3*(1/2), 169–180. doi:10.1504/IJMED.2006.008248

Al-Mashari, M., & Zairi, M. (2003). Enterprise Resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, *146*, 352–364.

Al-Mashari, M., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, *146*(2), 352–364. doi:10.1016/S0377-2217(02)00554-4

Allen, D., & Havenhand, M. (2002). ERP critical success factors: An exploration of the contextual factors in public sector institutions. System Sciences, 2002. HICSS. *Proceedings of the 35th Annual Hawaii International Conference on*, 3062-3071.

Ash, C., & Burn, J. (2003). A strategic framework for the management of ERP enabled e-business change. *European Journal of Operational Research*, *146*(2), 374–387. doi:10.1016/S0377-2217(02)00556-8

Ash, C., & Burn, J. (2003). A strategic framework for the management of ERP enabled ebusiness change. *European Journal of Operational Research*, *146*(2), 374–387. doi:10.1016/S0377-2217(02)00556-8

Bajwa, D., & Mooney, T. (2004). An integrative framework for the assimilation of enterprise resource planning systems: Phases, antecedents, and outcomes. *Journal of Computer Information Systems*, *44*(3), 81–90.

Berchet, C., & Habchi, G. (2005). The implementation and deployment of an ERP system: An industrial case study. *Computers in Industry*, *56*(6), 588–605. doi:10.1016/j.compind.2005.02.009

Bernroider, E., & Koch, S. (2001). ERP selection process in midsized and large organisations. *Business Process Management Journal*, *7*(3), 251–257. doi:10.1108/14637150110392746

Bingi, P., & Godla, J. (1999). Critical issues affecting an ERP implementation. *Information Systems Management*, *16*(2), 7–14. doi:10.1201/1078/43197.16.3.19990601/31310.2

Bingi, P., & Godla, J. (1999). Critical issues affecting an ERP implementation. *Information Systems Management*, *16*(3), 7–14. doi:10.1201/1078/43197.16.3.19990601/31310.2

Boersma, K., & Kingma, S. (2005). From means to ends: The transformation of ERP in a manufacturing company. *The Journal of Strategic Information Systems*, *14*(2), 197–219. doi:10.1016/j.jsis.2005.04.003

Botta-Genoulaz, V., & Millet, P.-A. (2005). A classification for better use of ERP systems. *Computers in Industry*, *56*(6), 573–587. doi:10.1016/j.compind.2005.02.007

Bradley, J. (2008). Management based critical success factors in the implementation of enterprise resource planning systems. *International Journal of Accounting Information Systems*, *8*(3), 175–200. doi:10.1016/j.accinf.2008.04.001

Brehm, L., & Markus, M. L. (2001). Tailoring ERP Systems: A Spectrum of Choices and Their Implications. *Proceedings of the 34th Annual Hawaii International Conference*. 10.1109/HICSS.2001.927130

Brown, C., & Vessey, I. (2003). Managing the Next Wave of Enterprise Systems: Leveraging Lessons from ERP. *MIS Quarterly Executive*, *2*(1), 65–77.

Buckhout, S., & Nemec, J. (1999). Making ERP succeed: Turning fear into promise. *Journal of Strategy and Business*, *15*(1), 60–72.

Chen, R., & Jih, W. (2008). Role negotiation and interaction: An exploratory case study of the impact of management consultants on ERP system implementation in SMEs in Taiwan. *Information Systems Management*, *25*(2), 159–173. doi:10.1080/10580530801941371

Cotteleer, M., & Bendoly, E. (2006). Order Lead-Time Improvement Following Enterprise Information Technology Implementation: An Empirical Study. *Management Information Systems Quarterly*, *30*(3), 643–660. doi:10.2307/25148743

Dai, Z. (2008). Supply Chain Transformation By ERP For Enhancing Performance: An Empirical Investigation. *Advances in Competitiveness Research*, *16*(1&2), 87–98.

Deep, A., & Burns, N. (2008). Investigating factors affecting ERP selection in made-to-order SME sector. *Journal of Manufacturing Technology Management*, *19*(4), 430–446. doi:10.1108/17410380810869905

Dillard, J., & Yuthas, K. (2006). Enterprise resource planning systems and communicative action. *Critical Perspectives on Accounting*, *17*(2), 202–223. doi:10.1016/j.cpa.2005.08.003

Esteves, J. (2009). A Benefits Realisation Road-Map Framework for ERP Usage in Small and Medium-Sized Enterprises. *Journal of Enterprise Information*, *22*(1/2), 25–35. doi:10.1108/17410390910922804

Everdingen, Y., & Waarts, E. (2000, April). Enterprise resource planning: ERP adoption by European midsize companies. *Communications of the ACM*, *4*(43), 27–31. doi:10.1145/332051.332064

Federici, T. (2009). Factors Influencing ERP Outcomes in SMEs: A PostIntroduction Assessment. *Journal of Enterprise Information*, *22*(1/2), 81–98. doi:10.1108/17410390910922840

Finney, S., & Corbett, M. (2007). ERP implementation: A compilation and analysis of critical success factors. *Business Process Management Journal*, *13*(3), 329–347. doi:10.1108/14637150710752272

Finney, S., & Corbett, M. (2007). ERP implementation: A compilation and analysis of critical success factors. *Business Process Management Journal*, *13*(3), 329–347. doi:10.1108/14637150710752272

Fub, C., & Strahringer, S. (2007). ERP Usage in Banking: An Exploratory Survey of the World's Largest Banks. *Information Systems Management*, *24*(2), 155–171. doi:10.1080/10580530701221056

Fui-Hoon Nah, F., Lee-Shang Lau, J., & Kuang, J. (2001, August). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, *7*(3), 285–296. doi:10.1108/14637150110392782

Glover, S., & Romney, M. B. (1999). Implementing ERP: Internal auditing can help eliminate mistakes that commonly derail organisations' ERP initiatives. *Internal Auditor*, *56*, 40–47.

Grabski, S., & Leech, S. (2007). Complementary controls and ERP implementation success. *International Journal of Accounting Information Systems*, *8*(1), 17–39. doi:10.1016/j.accinf.2006.12.002

Granlund, M., & Malmi, T. (2002). Moderate impact of ERPS on management accounting: A lag or permanent outcome? *Management Accounting Research*, *13*(3), 299–321. doi:10.1006/mare.2002.0189

Hakkinen, L., & Hilmola, O. (2008). ERP Evaluation during the Shakedown Phase: Lessons from an After-Sales Division. *Information Systems Journal*, *18*(1), 73–100. doi:10.1111/j.1365-2575.2007.00261.x

Hitt, L., & Zhou, X. (2002). Investment in Enterprise Resource Planning: Business Impact and Productivity Measures. *Journal of Management Information Systems*, *19*(1), 71–98. doi:10.1080/07421222.2002.11045716

Holland, C., & Gibson, N. (1999). A critical success factors model for enterprise resource planning implementation. *Proceedings of the 7th European Conference on Information Systems, 1*, 273–297.

Hong, K., & Kim, Y. (2002). The critical success factors for ERP implementation: An organisational fit perspective. *Information & Management*, *40*(1), 25–40. doi:10.1016/S0378-7206(01)00134-3

https://www.business2community.com/business-intelligence/digital-transformation-starts-with-erp-02255484

Huang, S., & Lin, M. (2004). Assessing risk in ERP projects: Identify and prioritize the factors. *Industrial Management & Data Systems*, *104*(8), 681–688. doi:10.1108/02635570410561672

Huin, S. F. (2004). —Managing deployment of ERP systems in SMEs using multi-agents. *International Journal of Project Management*, *22*(6), 511–517. doi:10.1016/j.ijproman.2003.12.005

Hunton, J., & Reck, J. (2003, September). Enterprise resource planning systems: Comparing firm performance of adopters and non adopters. *International Journal of Accounting Information Systems*, *4*(3), 165–184. doi:10.1016/S1467-0895(03)00008-3

Jones, M., & Ryan, S. (2006). Exploring knowledge sharing in ERP implementation: An organisational culture framework. *Decision Support Systems*, *41*(2), 411–434. doi:10.1016/j.dss.2004.06.017

Kallunki, J., & Silvola, H. (2011). Impact of enterprise resource planning systems on management control systems and firm performance. *International Journal of Accounting Information Systems*, *12*(1), 20–39. doi:10.1016/j.accinf.2010.02.001

Kang, S., & Yang, H. (2008, Summer). ERP Alignment for Positive Business Performance: Evidence From Korea's ERP Market. *Journal of Computer Information Systems*, 25–38.

Langenwalter, G. (2000). *Enterprise Resources Planning and Beyond: Integrating Your Entire Organisation*. Boca Raton, FL: St. Lucie Press.

Mabert, V., & Venkataramanan, M. (2003, April 16). Enterprise resource planning: Managing the implementation process. *European Journal of Operational Research*, *146*(2), 302–314. doi:10.1016/S0377-2217(02)00551-9

Mabert, V., & Venkataramanan, M. A. (2003b). Enterprise resource planning: Managing the implementation process. *European Journal of Operational Research*, *146*(2), 302–314. doi:10.1016/S0377-2217(02)00551-9

Majed, A. (2000). Enterprise-Wide Information Systems: The Case of SAP R/3 Application. *Proceedings of the Second International Conference on Enterprise Information Systems*, 3-8.

Majed, A., & Mohamed, Z. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, (146), 352–364.

Mandal, P., & Gunasekaran, A. (2003). Issues in implementing ERP: A case study. *European Journal of Operational Research*, *146*(2), 274–283. doi:10.1016/S0377-2217(02)00549-0

Mason, C. (2019). Digital Transformation Starts With ERP. *Business (Atlanta, Ga.)*, 2.

Nah, F., & Kuang, J. (2001). *Critical factors for successful implementation of enterprise systems*. Academic Press.

Nicolaou, A., & Bajor, L. (2004). ERP systems implementation and firm performance. *The Review of Business Information Systems*, *8*(1), 53–60. doi:10.19030/rbis.v8i1.4504

Oliver, R. W. (1999). ERP is Dead, Long Live ERP. *Management Accounting*, 20-27.

Pairat, R., & Jungthirapanich, C. (2005). A chronological review of ERP research: an analysis of ERP inception, evolution, and direction. *Proceedings of the IEEE International Engineering Management Conference*, 1, 288-292. 10.1109/IEMC.2005.1559137

Quiescenti, M., & Perrone, G. (2006). Business process-oriented design of enterprise resource planning (ERP) systems for small and medium enterprises. *International Journal of Production Research*, *44*(18/19), 3797–3811. doi:10.1080/00207540600688499

Rom, A., & Rohde, C. (2007). Management accounting and integrated information systems: A literature review. *International Journal of Accounting Information Systems*, *8*(1), 40–68. doi:10.1016/j.accinf.2006.12.003

Rosario, J. G. (2000). On the leading edge: Critical success factors in ERP implementation projects. *Business World, 27*.

Roztocki, N., & Weistroffer, H. (2008). Information technology investments in emerging economies. *Information Technology for Development*, *14*(1), 1–10. doi:10.1002/itdj.20084

Scott, J., & Vessey, I. (2000). Implementing enterprise resource planning systems: The role of learning from failure. *Information Systems Frontiers*, *2*(2), 213–232. doi:10.1023/A:1026504325010

Shang, S., & Seddon, P. (2002). Assessing and managing the benefits of enterprise systems: The business manager's perspective. *Information Systems Journal*, *12*(4), 271–299. doi:10.1046/j.1365-2575.2002.00132.x

Shanks, G., & Seddon, P. (2000). Differences in critical success factors in ERP systems implementation in Australia and China: A cultural analysis. *Proceedings of the 8th European Conference on Information Systems*, 537–544.

Sheu, C., & Krumwiede, D. (2003). The Effect of National Differences on Multinational ERP Implementation: An Exploratory Study. *Total Quality Management & Business Excellence*, *14*(6), 641–651. doi:10.1080/1478336032000053807

Siriginidi, S. R. (2000). Enterprise Resource Planning in re-engineering business. *Business Process Management Journal*, *6*(5), 376–391. doi:10.1108/14637150010352390

Slimov, K. (2019). *ERP and Digital Transformation*. ERP News.

Soh, C., & Tay, J. (2000, April). Enterprise resource planning: cultural fits and misfits: is ERP a universal solution? *Communications of the ACM*, *4*(43), 47–51. doi:10.1145/332051.332070

Soh, C., & Tay, J. (2000). Cultural Fits and Misfits: Is ERP a Universal Solution. *Communications of the ACM*, *43*(4), 47–51. doi:10.1145/332051.332070

Soja, P., & Paliwoda-Pękosz, G. (2009). *What are real problems in enterprise system adoption?* Academic Press.

Soja, P., & Paliwoda-Pękosz, G. (2009, May 22). What are real problems in enterprise system adoption? *Industrial Management & Data Systems*, *109*(5), 610–627. doi:10.1108/02635570910957614

Somers, T., & Nelson, K. (2001). The Impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations. *34th Annual Hawaii International Conference on System Sciences (HICSS-34)*, 8, 8016. 10.1109/HICSS.2001.927129

Sumner, M. (2000). Risk Factors in Enterprise-wide/ERP Projects. *Journal of Information Technology*, *15*(4), 317–327. doi:10.1177/026839620001500407

Themistocleous, M., & Paul, R. (2001) ERP Problems and Application Integration Issues: An Empirical Survey. *Proceedings of the 34th Hawaii International Conference on System Sciences*, 9045-9054. 10.1109/HICSS.2001.927240

Umble, E., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, *146*(2), 241–257. doi:10.1016/S0377-2217(02)00547-7

Uwizeyemungu, S., & Raymond, L. (2010). Linking the effects of ERP to organisational performance: Development and initial validation of an evaluation method. *Information Systems Management*, *27*(1), 25–41. doi:10.1080/10580530903455122

Velcu, O. (2010). *Strategic alignment of ERP implementation stages: An empirical investigation*. Academic Press.

Velcu, O. (2010, April). Strategic alignment of ERP implementation stages: An empirical investigation. *Information & Management*, *47*(3), 158–166. doi:10.1016/j.im.2010.01.005

Wah, L. (2000, Mar.). Give ERP a chance. *Management Review*, 20–24.

Wee, S. (2000). *Juggling toward ERP success: Keepkey success factors high*. ERP News.

Wei, C. (2008). Evaluating the Performance of an ERP System Based on The Knowledge of ERP Implementation Objectives. *International Journal of Advanced Manufacturing Technology*, *39*(1-2), 168–181. doi:10.100700170-007-1189-3

Wieder, B., & Ossimitz, M. (2006). The Impact of ERP Systems on Firm and Business Process Performance. *Journal of Enterprise Information Management*, *19*(1), 13–29. doi:10.1108/17410390610636850

Yusuf, Y., & Abthorpe, M. (2004). Enterprise information systems project implementation: A case study of ERP in rolls-royce. *International Journal of Production Economics*, *87*(3), 251–266. doi:10.1016/j.ijpe.2003.10.004

Chapter 5
Unit of Analysis in Digitally-Enabled Electronic Procurement Research: A Literature Analysis

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ABSTRACT

E-procurement systems that have been in place for over a decade have begun incorporating digital tools like big data, cloud computing, internet of things, and data mining. Hence, there exists a rich literature on earlier e-procurement systems and advanced digitally-enabled e-procurement systems. Existing literature on these systems addresses many research issues (e.g., adoption) associated with e-procurement. However, one critical issue that has so far received no rigorous attention is about "unit of analysis," a methodological concern of importance, for e-procurement research context. Hence, the aim of this chapter is twofold: 1) to discuss how the notion of "unit of analysis" has been conceptualised in the e-procurement literature and 2) to discuss how its use has been justified by e-procurement scholars to address the research issues under investigation. Finally, the chapter provides several interesting findings and outlines future research directions.

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INTRODUCTION

Electronic procurement (E-procurement) represents a key area of e-commerce (EC) discipline (Barua et al., 2001; Gunasekaran et al., 2009). Although e-procurement systems emerged in early 2000 with the proliferation of the Internet, but in recent years these systems have begun incorporating more advanced digital tools (Srai & Lorentz, 2019). Hence, they are also known as digital procurement or digitally enabled e-procurement systems. The importance of such systems is highly recognised in the e-commerce literature due to two reasons. First, e-procurement is considered as the starting point for many organisations' overall e-commerce strategy (Chang et al., 2004). Second, e-procurement systems focus on automating and improving procurement process that is regarded as one of the most critical functions of supply chain (Novack & Simco, 1991). Given its importance, considerable research attention has been given by scholars to investigate various issues associated with e-procurement systems. Hence, there currently exists a rich body of literature on e-procurement as acknowledged by scholars like Rahim & As-Saber (2011).

Existing e-procurement literature typically addresses several key issues (e.g. cost savings, partner relationship, transparency, effectiveness of ordering process) associated with the stages (i.e. adoption, implementation, post-implementation) of e-procurement systems life cycle. However, one critical issue that has so far received scarce research attention is: "unit of analysis". This represents an important methodological concern for e-procurement research context that has largely been ignored by e-procurement researchers. In particular, it is not clearly known how the choice of an appropriate "unit of analysis" is justified by e-procurement researchers in order to address various research questions posed by them. Addressing this research gap is important because e-procurement involves multiple stakeholders having different motives (Rahim & Kurnia, 2014). This in turn requires attention to define a "unit of analysis" appropriate to address the research issues under investigation for e-procurement context. Hence, the purpose of this book chapter is to discuss how the notion of "unit of analysis" has been conceptualised in the e-procurement literature. This purpose is addressed in terms of the following two specific research questions:

1. What units of analysis are generally reported in the literature for e-procurement context?
2. What issues are generally considered by the researchers when choosing an appropriate unit of analysis for their e-procurement research context?

These research questions are addressed by undertaking a systematic literature analysis on e-procurement. A total of 116 articles, from peer-reviewed journals, addressing various aspects of e-procurement have been identified from multiple streams of literature (e.g. information systems, e-commerce, management, supply chain management), and then were subsequently analysed. Based on a critical analysis, this chapter reports two key findings concerning the use of "unit of analysis" for e-procurement research context. First, an overwhelming majority of studies (i.e. 84 out of 116 articles, representing 72%) make no explicit reference to "unit of analysis". Second, out of those 32 articles that explicitly report choosing a "unit of analysis" suitable for e-procurement research context, a slight majority (19 out of 32 articles representing 59%) have provided a clear explanation in support of choosing "unit of analysis" that merit discussion.

BACKGROUND LITERATURE

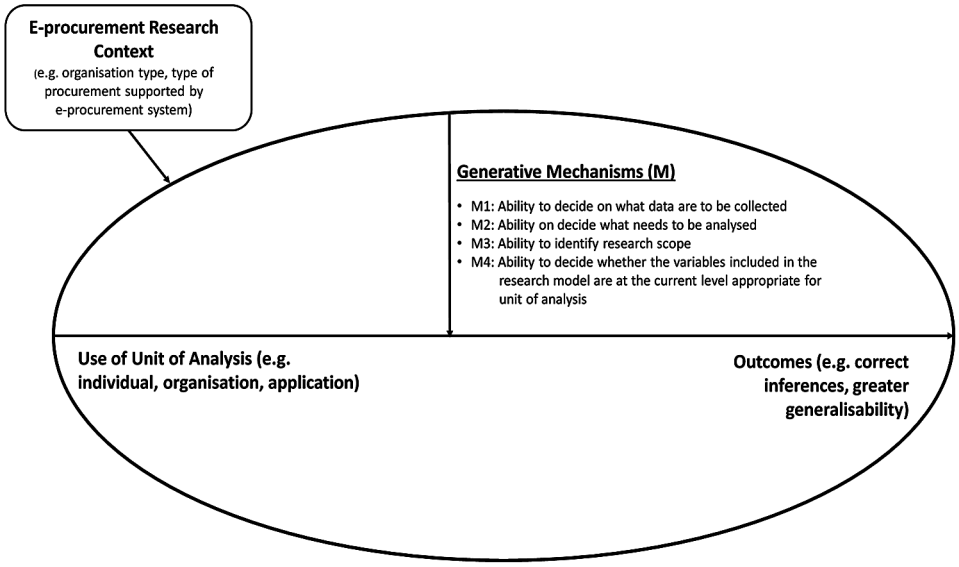
- **Definitions and Attributes of Unit of Analysis:** A review of literature on "unit of analysis" indicates the existence of multiple definitions (Table 1) that have commonly been cited in the EC and IS literature streams. These definitions are either proposed by some IS/EC scholars (Shanks et al., 2012), or borrowed by them from other disciplines (e.g. social science).

Table 1. List of commonly used definitions of "unit of analysis"

Literature Sources	Definition
Babbie (2013)	For social research context, the term "unit of analysis' represents what or whom can be studied in social research context,
Babbie (2013)	For social research context, the term "unit of analysis' represents the "thing" whose characteristics a researcher is seeking to describe or explain.
Shanks et al. (2012)	The unit of analysis represents a phenomenon that is being studied, and may be, for example, a group, organisation, project or supply chains.
Yin (2003)	The unit of analysis is the major entity that a researcher wants to describe and analyse in his/her study. It represents about 'who' or 'what' a researcher wants to draw inferences and generalisations.
Trochim (2006)	Unit of analysis is the "who" or the "what" that a researcher wants to analyse for his/her study. Your unit of analysis could be an individual student, a group, or even an entire program.
Lewis-Beck et al., (2003)	For social research context, "unit of analysis' refers to the subject (i.e. who or what) of study about which an analyst seeks to generalise.
Benbasat et al. (1987)	Unit of analysis can be an: IS group, individuals, decisions, entire organisation, decisions. It is even possible for a study to have multiple units of analysis.
Silverman & Solman (1998)	Unit of analysis represents the level at which data are used to represent one data point in an analysis.

Reviewing these definitions indicates the presence of five key attributes that collectively describe the concept of "unit of analysis": a) unit of analysis is treated as a "thing" or "phenomenon" or "subject of research interest" that is being discussed (Chambliss & Schutt, 2012; Yin, 2003), b) unit of analysis helps researchers to identify what is being included (thus establish research boundary) in a research study (Shanks et al., 2012), c) unit of analysis can influence researchers in determining the research context surrounding the research topic of interest (Benbasat et al.,1987), d) unit of analysis helps researchers to decide the level at which research data are to be collected and aggregated for subsequent analysis and explanation (Copeland & McKenney, 1988), and e) unit of analysis seeks to draw inferences (and thus enhancing generalisability) about a research issue that is being investigated (Babbie, 2013). These attributes are graphically shown in Figure 1 in terms of the notion of "concept" as articulated by (Daigneault & Jacob, 2012; Leigh Star, 2010; Daigneault & Jacob, 2012; Leigh Star, 2010), which is useful because it clearly helps EC researchers in identifying: a) the drivers (D) affecting choice of a unit of analysis, b) key components that make up unit of analysis (e.g. thing, phenomenon, subject of interest), c) key characteristics (e.g. must have a research interest), describing the concept of a "unit of analysis", and d), the expected outcomes (O) of using an appropriate unit of analysis for e-procurement research context.

Figure 1. Graphical representation showing components of "unit of analysis" as a concept



- **Importance of Unit of Analysis**: Unit of analysis is the first step in deciding how a research should study and analyse data (Trochim, 2006). Hence, unit of analysis needs to be identified before starting data collection and analysis (Benbasat et al., 1987). Furthermore, using an inappropriate unit of analysis may lead to erroneous results (Silverman & Solmon, 1998). As a result, it is important to address how unit of analysis has been dealt with in the e-procurement area of e-commerce discipline.
- **E-procurement: Definition and Organisational Value**: Like many other terminologies used in IS literature, there does not exist a single widely accepted definition of "e-procurement" (Bayazit, 2014). This is because e-procurement is a complex concept involving multiple ways of configuring workflow processes in organisational purchasing (Subramaniam, 2002). In this book chapter, a definition of "e-procurement" is adopted from buyer's own IT platform perspective. This definition includes the use of advanced digital tools like Internet of Things (IOT), data mining, cloud computing, and data marts for the context of automating procurement process and function, as components of e-procurement solutions. Such a perspective avoids confusion by eliminating e-procurement solutions operating by the third parties (e.g. e-marketplaces) or by suppliers (e.g. EDI or e-hubs developed by large suppliers). E-procurement thus represents a class of software systems that can automate the key tasks involved in procurement process. Therefore, a range of technologies qualify as e-procurement systems. Some examples include: Electronic Data Interchange (EDI), online auctions, procurement modules of Enterprise Resource Planning (ERP) systems like Ariba Buyer by Ariba, BuySite by CommerceOne, EBP by SAP, packaged e-procurement solutions and e-marketplaces. This book chapter however focuses on those e-procurement solutions that: a) automate ordering process, b) are initiated by the buying organisations, c) operate based on the IT infrastructure of buying organisations, and d) send procurement related documents to suppliers over the Internet. According to this definition, EDI, online auctions, and third-party marketplaces are outside the scope of e-procurement definition, because they do not generally support

the order requisition and ordering activities associated with purchasing. However, packaged e-procurement solutions (e.g. SAP EBP, Starightbuy, and Oracle iProcurement), procurement modules of Enterprise Resource Planning (ERP) systems, and e-Tendering from a buyer's platform are included within the scope of e-procurement considered relevant for the research reported in this book chapter.

The value arising from the use of e-procurement systems, that in recent years have begun incorporating advanced digital tools, among organisations is widely recognised (Ronchi et al., 2010). According to Piotrowicz and Irani (2010), three types of benefits are experienced by organisations upon successful implementation and continuous use of e-procurement systems. These include: operational, tactical, and strategic. At the operational level, benefits include categories related to procurement process efficiency and effectiveness, it also includes transaction process cost savings. Tactical benefits include improved faster payments, improved monitoring and control, and considerable procurement transformation. The pace of procurement transformation has specifically been advocated by digitally enabled e-procurement context (Platform, 2019). Strategic benefits include improvements in customer supplier relations, enhanced reputation.

- **E-procurement - unit of analysis:** By interpreting e-procurement definition in light with four key elements involved in IS definition (Piccoli, 2008), it is reasonable to expect multiple types of an appropriate "unit of analysis" for e-procurement context. This is shown in Table 2. Furthermore, as e-procurement represents an instance of inter-organisational systems (Tai et al., 2010) links a buying organisation with its network of suppliers, dyad represents another suitable "unit of analysis" as well for e-procurement context.

Table 2. Examples of various types of unit of analysis for e-procurement context

E-Procurement Components	Examples of Unit of Analysis for E-Procurement Context
Technology	An e-procurement system (e.g. packaged solution, module of an ERP)
People	Procurement managers, Head of procurement function, individual employees (i.e. users)
Process	Ordering process, requisition process, auction process
Structure	Procurement department, Dyad
IOS perspective	Dyad, collaboration between partners

RESEARCH APPROACH

A systematic literature review approach was adopted to answer the research questions as mentioned earlier. Such an approach synthesises prior theoretical as well as empirical evidence (Adjeu-Bamfo et al., 2019) on the use of "unit of analysis" gathered from e-procurement articles published in peer-review journals. The use of systematic literature review is not new and has been a well-established approach that is widely reported in many streams of literature including IS (Webster & Watson, 2002), Requirements Engineering (Mathiassen et al., 2004), and public procurement (Adjeu-Bamfo et al. 2019; Yevu

& Yu 2019). Drawing on the ideas expressed by these scholars, a systematic review of e-procurement has been conducted in four stages.

Stage 1(Literature Search): This stage involves searching for the relevant articles for inclusion in literature synthesis using academic databases. In particular, a set of three online academic databases (e.g. Monash library databases, ProQuest, and Google Scholar) have been used in the literature search process. These databases are considered relevant for this research because they are widely used by e-procurement scholars for literature search purpose as they cover business, management, and social science literature streams. The scope of the literature search process was set for the timeframe of 2005 to 2019 as e-procurement began receiving a growing attention from academics since 2005. A combination of such search terms like online procurement, e-procurement, electronic procurement, web-based procurement, and digital procurement have been used to identify journal articles on e-procurement. This is because journal articles are generally considered by scholars like Chan & Ngai (2011) as the primary representatives of state-of-the-art research deliverables. However, not all journal articles identified through search process were included within the scope of this literature analysis. Those journal articles were chosen that have meet five inclusion criteria mentioned in Table 3. As a result, a total of 116 articles chosen from a range of journal publication outlets representing various discipline areas (e.g. information systems, e-commerce, supply chain management, management) have been included for literature analysis.

Table 3. Inclusion criteria for e-procurement: A systematic literature review

Inclusion Criteria	Rationale
Articles published from 2005 to 2019	2005 was selected as e-procurement began receiving a growing attention from academics since 2005
Published in peer-reviewed journals	This is because they are of high quality than non-peer-reviewed articles. All book chapters or conference proceedings are excluded.
Publication in the English language	English language certainly dominates the field of e-commerce, of which e-procurement is a subset
Articles that discuss e-procurement in light with adopted definition	Only those articles that describe issues associated with E-procurement (including digital procurement) from the buyers' perspective
Article for which full text is available	Any article that has only abstract without the full contents of the paper were not include. Only articles with full contents including references list were included.

Stage 2 (Development of Coding Protocol): This stage is about developing a coding protocol consisting of three distinct sections by drawing on the suggestions of Arnott & Pervan (2005). The protocol addressed various issues of concern like research paradigm, research approach, research questions, and unit of analysis, which were the focus of an on-going research project.

Stage 3 (Application of Coding Protocol): Each article identified from Stage 1 was then carefully read and was subject to the application of coding protocol jointly by the authors.

Stage 4 (Verification of Coding): To improve the quality of coding process, coding of each article was done by the first author (i.e. lead researcher) of this book chapter, which was then verified by one of the remaining two co-authors (i.e. co-researchers) of this chapter. This in turn improved inter-

coder reliability. During verification process, a small number of changes (e.g. additional instances of unit of analysis for e-procurement context, relevant theoretical framework) were incorporated in the initial assessment of several coded articles, based on a discussion between the lead researcher and co-researchers. The time taken to code each article varied considerably, ranging from 30 minutes to 40 minutes.

FINDINGS

A list of 116 e-procurement articles has been identified in the literature review reported in this book chapter, out of which only 32 (representing 28%) explicitly acknowledge using a particular instance of "unit of analysis" for e-procurement context. The distribution of these 32 articles in terms of journal types, measured in terms of the Australian Business Deans Council's perspective (e.g. A*, A, B, C, Others), is shown in Table 4. The use of "unit of analysis" is found across all types of journals. No dominance of a particular type of journal is noted.

In addition, the distribution of these 32 articles in terms of discipline areas represented by those journals is shown in Table 5. A total of 8 discipline areas is noted from which journal articles have made an explicit reference to "unit of analysis" for e-procurement research context. A slight dominance of journals representing the "Business/Management" discipline is noted.

Further, the cumulative distribution of these articles over time since 2005 is shown in Figure 2. A gradual incremental growth in terms of published articles on e-procurement with a mention of "unit of analysis" is observed.

Unit of analysis (identified from those 32 articles) can be divided into 11 types as shown in Table 6. Individual adopter organisation is found to be the most popular unit of analysis for e-procurement research context. This is followed by the procurement department responsible for looking after procurement issues of the adopter organisation. In contrast, least popular types of "unit of analysis" include: country, transaction, e-procurement package-organisation misalignment, pairs of product categories and suppliers. However, e-procurement process of buyer firm has been considered as another "unit of analysis" in only two articles, and hence, has received some recognition as a "unit of analysis" in the e-procurement literature for post-implementation context.

Only 19 out of those 32 articles (59%), provide a justification expressed by scholars to choose a "unit of analysis" for e-procurement context. Those justifications however considerably vary. Authors of those 19 articles provide an explanation by taking into consideration of seven such issues as: a) methodological (e.g. nature of construct included in theoretical model), b) national policy formulation, c) key attributes of an adopter organisation (e.g. closeness of council to citizens, organisational size), d) perceptions of managers and employees (e.g. user satisfaction with e-procurement, e-procurement provision, efficiency improvement), e) improved organisational understanding on key issues (e.g. benefits, value-added, IT capability and system type, e-procurement package misalignment, responsibility of buyer organisations for multi-product category), f) concerns of work units (e.g. improvement in efficiency), and g) transaction issues in procurement process. For example, according to Vaidyanathan & Devaraj (2008) and Vaidyanathan et al. (2012), the ability of a survey method to capture the e-procurement experiences of managers is considered when choosing "e-procurement process of buyer organisations" as a unit of analysis.

Interestingly, an individual organisation is considered as a suitable "unit of analysis" for e-procurement context in over a dozen of articles. Multiple reasons were cited by e-procurement scholars: a) an adopter

Table 4. The distribution of 32 e-procurement articles with UOA in terms of journal type (Since 2005)

Journal Type	Journal	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	Total
A*	Decision Sciences								*								1
	European J. of Information Systems			*							*						2
	Information & Management	*															1
	Journal of Operations Management				*												1
A	International J. of Production Research						*				*						2
	International Journal of Operations & Production Management							*							*		2
	Journal of Organizational Computing and Electronic Commerce											*				*	2
	Supply Chain Management									*							1
B	e-Service Journal								*								1
	Environment and Planning C: Government							*									1
	Journal of Theoretical and Applied Electronic Commerce Research					*											1
C	International J. of Electronic Finance							*									1
	Journal of Information Systems and Technology Management							*									1
	International Journal of Supply Chain Management,															*	1

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organization usually uses a single e-procurement system, b) organization took part in a pilot project on e-procurement, c) continue to use an e-procurement system, d) enhanced business performance, and e) value creation at business level. In another study, public procurement at a national level is cited as a reason for choosing "country" as a unit of analysis (Somasundaram & Damsgaard, 2005).

Those 32 articles that explicitly specify a "unit of analysis" for e-procurement context, have used five empirical research methods: case study, survey, mixed method, qualitative interviews, and secondary data analysis, as shown in Table 7. It appears that both qualitative as well as quantitative researchers are

Table 4. Continued

Journal Type	Journal	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	Total
Others	Business & Management Quarterly Review									*							1
	Communications of the IBIMA				*												1
	Electronic Journal of E-government	*				*											2
	IEEE Transactions on Engineering Management			*	*												2
	International Journal of Business and Society											*					1
	Journal of Global Business and Technology	*															1
	J. of Public Procurement		*						*								2
	Journal of Service Science and Management							*									1
	Resources, Conservation and Recycling															*	1
	Journal of Business Management & Compliance														*		1
	European Journal of Management and Marketing Studies															*	1
	Total	3	1	2	3	2	1	5	3	2	2	2	0	0	2	4	32
	Cumulative Total	3	4	6	9	11	12	17	20	22	24	26	26	26	28	32	32

paying attention to diverse types of unit of analysis. In contrast, followers of other three approaches (e.g. mixed, interview, secondary sources) are focusing on a single type of "unit of analysis" (e.g. individual adopter organisation).

An attempt was made to explore the research questions mentioned in those 32 articles in which "unit of analysis" is clearly mentioned. Interestingly, research questions are clearly indicated in most of these articles. A close look at these articles indicate that those research questions are expressed containing variables of interest that are measured at an appropriate level of the unit of analysis. For example, in their study, Tai et al. (2010) explored research questions as "How do the operational and strategic impacts resulting from the implementation of Web-based e-procurement system influence the organisational performance?" and their unit of analysis is: "Purchasing department of buyer organisation". This unit of analysis is suitable in order to capture the views of the purchasing department for explaining how they perceive the influence of the e-procurement system use (i.e. variable of interest as perceived by the

Table 5. The distribution of 32 e-procurement articles with UOA in terms of journal disciplines (Since 2005)

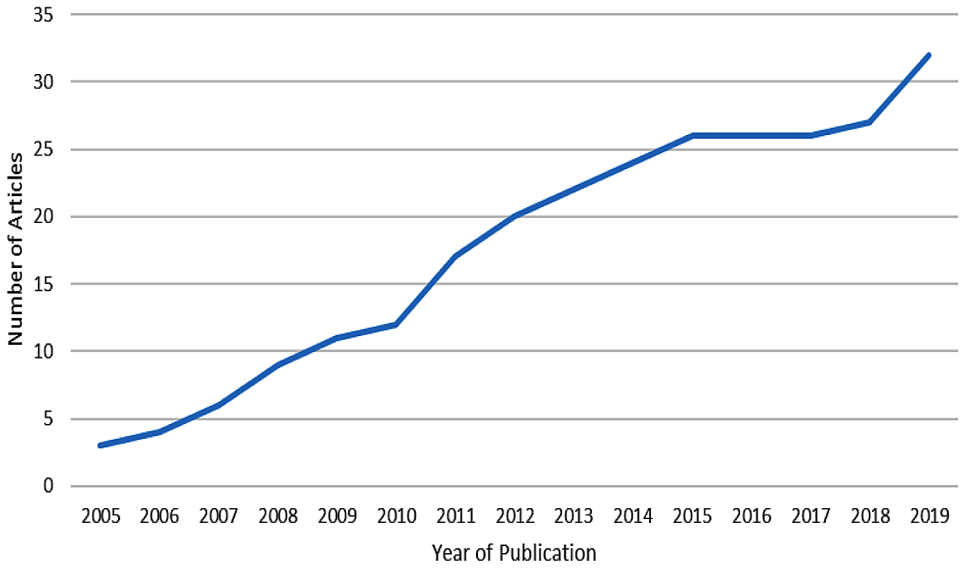
Discipline	Journal	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	Total
IS/IT	European J. of Information Systems			*							*						2
	Information & Management	*															1
	Journal of Information Systems and Technology Management							*									1
	Communications of the IBIMA				*												1
E-commerce	Journal of Organizational Computing and Electronic Commerce											*				*	2
	e-Service Journal								*								1
	Journal of Theoretical and Applied Electronic Commerce Research					*											1
Supply Chain Management	Supply Chain Management									*							1
	International Journal of Supply Chain Management															*	1
Operations/ Manufacturing	International J. of Production Research						*				*						2
	International Journal of Operations & Production Management							*							*		2
	Journal of Operations Management				*												1
	Resources, Conservation & Recycling															*	1
Business/ Management	Decision Sciences								*								1
	Journal of Service Science and Management							*									1
	International Journal of Business and Society											*					1
	Journal of Global Business and Technology	*															1
	Journal of Business Management & Compliance														*		1
	Business & Management Quarterly Review									*							1
	European Journal of Management and Marketing Studies															*	

continues on following page

Table 5. Continued

Discipline	Journal	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	Total
Finance	International J. of Electronic Finance							*									1
Engineering	IEEE Transactions on Engineering Management			*	*												2
Government	Environment and Planning C: Government							*									1
	J. of Public Procurement		*						*								2
	Electronic Journal of E-government	*				*											2
Total		3	1	2	3	2	1	5	3	2	2	2	0	0	2	4	27
Cumulative Total		3	4	6	9	11	12	17	20	22	24	26	26	26	28	32	32

Figure 2. The cumulative distribution of e-procurement articles with UOA since 2005



purchasing department) on their business performance. This finding supports the driving role of research questions in selecting a "unit of analysis."

DISCUSSION

Overall, a low trend among e-procurement scholars exist to indicate as well as justify their choice of "unit of analysis" for e-procurement research context. This is quite obvious as only in 32 out of 116 articles (i.e. 28%), included in the literature review, there exists a clear mention of a "unit of analysis". This finding suggests that e-procurement researchers are largely reluctant to position their "unit of analysis" in light

Table 6. Types of unit of analysis for e-procurement context cited in existing literature

Types of Unit of Analysis	Authors	Number	Percent
Country	Somasundaram & Damsgaard (2005)	1	3
E-procurement process of buyer firm	Vaidyanathan & Devaraj (2008); Vaidyanathan et al., (2012)	2	6
Individual adopter organisation	Chang et al., (2013); Huntgeburth et al., (2012); Mishra & Agarwal (2010); Picoto et al., (2014); Rahim & As-Saber (2011); Adjei-Bamfo et al. (2019); Ahmed et al (2019), Oliech and Mwangangi (2019); Li et al. (2015); Suliantoro et al. (2015); Murray et al. (2011); Pickernell et al., (2011); Tai et al. (2010); Soares-Aguiar & Palma-dos-Reis (2008); Vaidya & Callender (2006); Pires & Stanton (2005).	16	50
Work unit	Suliantoro & Wibowo (2015); Wu. & Ross (2007)	2	6
Pairs of product categories and suppliers	Kim & Umanath, (2005)	1	3
Individual employees	Brandon-Jones & Kauppi (2018); Daud et al. (2013); Mota & Filho (2011)	3	9
Procurement specialists and managers	Kim & Umanath, (2005)	1	3
Purchasing department of buyer organisation	Tai et al. (2010); Fiskhinindya & Sompa (2019); Mettler & Rohner (2009)	3	9
Transactions	Thomson (2009)	1	3
E-procurement package –organisation misalignment	Sia & Soh (2007)	1	3
Collaboration/relationships between business entities (e.g. councils, supply chain members)	Murray et al. (2011); Chang (2019)	2	6

with the rich discussion provided by research methodology authorities like (Patton, 1990; Yin, 2003). Due to paucity of literature on empirical findings on "unit of analysis", it is not clear whether such an observation applies across other areas of e-commerce in particular and Information Systems in general.

From the perspective of an information systems definition (Piccoli, 2008), various examples of potential "unit of analysis" representing all four components of e-procurement systems were indicated in Table 2. The findings of this systematic literature review empirically confirms the existence of "units of analysis" representing the four components of e-procurement systems. The positioning of "unit of analysis" in terms of these four components is shown in Figure 3. It can be noted that "unit of analysis" representing Technology component is least represented, which in turn is indicative of less attention given by e-procurement scholars to investigate the technological issues associated with e-procurement systems. This aspect too needs further investigation for the context of other type of B2B e-commerce applications.

In addition, several additional types of "units of analysis" were identified as well. This clearly indicates that research issues reflecting various aspects of e-procurement (within three stages of e-procurement systems life cycle) have received richer attention from the researchers, which in turn resulted in a wider choice of unit of analysis that were not identified in Table 2. In particular, the use of such "units of analysis" as country, suppliers, collaboration between councils, e-procurement package misalignment

Table 7. List of articles with unit of analysis across empirical research methodology used for e-procurement context

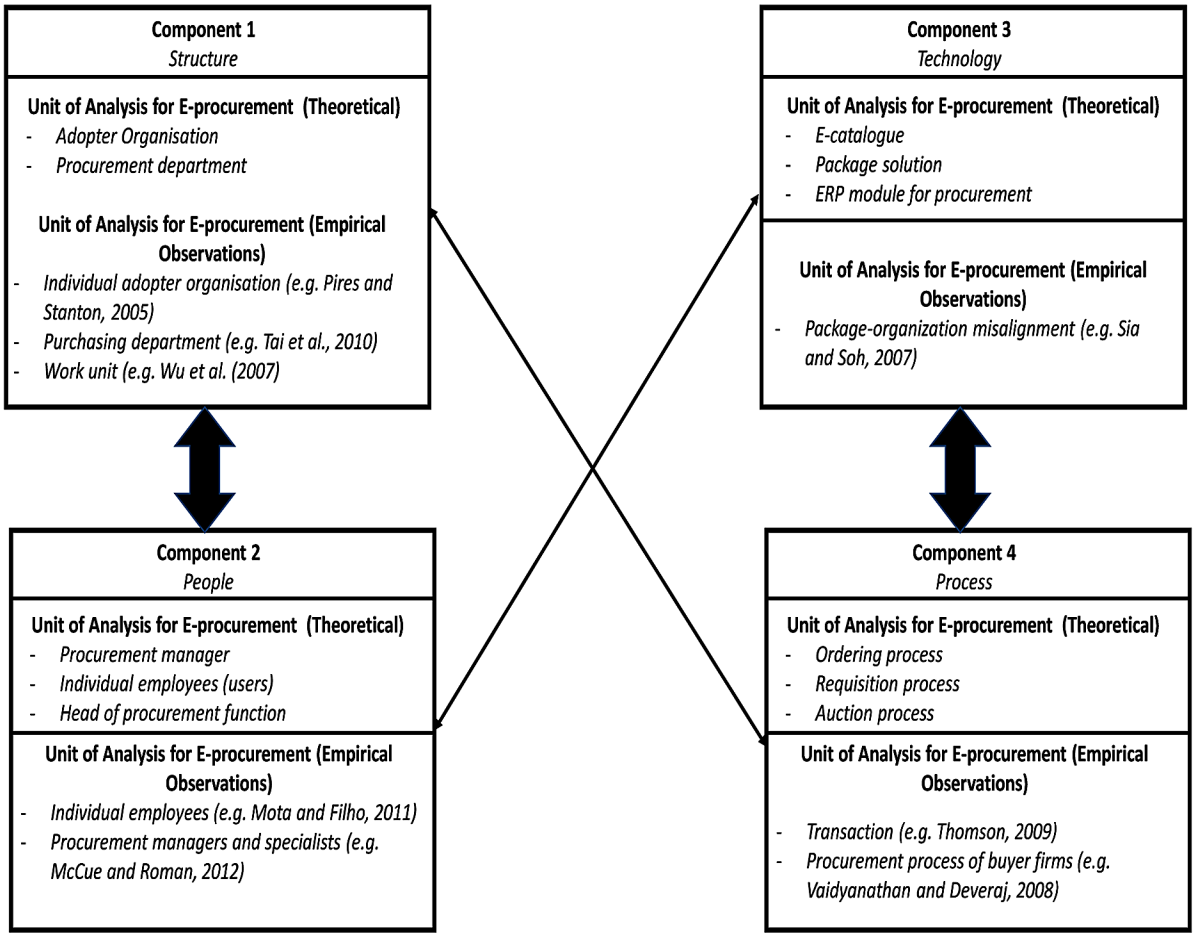
Unit of Analysis	Case Study	Survey	Mixed	Interview	Secondary Sources
Country	Somasundaram & Damsgaard (2005)				Adjei-Bamfo et al. (2019)
E-procurement process of buyer firm		Vaidyanathan & Devaraj (2008); Vaidyanathan et al., (2012)			
Individual adopter organisation	Rahim & As-Saber (2011); Huntgeburth et al. (2012); Rahim et al. (2008); Mota & Rodrigues Filho, (2011); Ahmed & Smith (2019)	Chang et al., (2013); Li et al., (2015); Mishra & Agarwal, (2010); Oh et al., (2014); Pickernell et al., (2011); Soares-Aguiar & Palma-dos-Reis (2008); Oliech & Mwangangi (2019).	Picoto et al. (2014)	Vaidya et al. (2006)	Pires & Stanton, (2005)
Work unit	Tai et al. (2010); Mettler & Rohner (2009),	Suliantoro et al. (2015); Tai et al., (2010); Wu et al., (2007)			
Pairs of product categories and suppliers		Kim & Umanath (2005)			
Individual employees		Brandon-Jones & Kauppi (2018); Daud et al., (2013); Tai et al., 2010)			
Procurement specialists and managers	Mota & Rodrigues Filho, (2011)	McCue & Roman (2012)			
Transactions	Thomson (2009)				
Eprocurement package – organisation misalignment	Sia & Soh (2007)				
Collaboration between councils	Murray et al. (2011); Chang (2019)				
Purchasing Department					Fiskhinindya, et al. (2019)

with organisation highlight the viewpoints of examining e-procurement usage issues that are rarely discussed in the e-procurement literature.

E-procurement, from an IOS perspective (last row of Table 2), provides another interesting insight. Drawing on Table 6, it is so obvious that only 2 out of 32 articles on e-procurement have considered collaboration as an instance of "unit of analysis" for e-procurement context. This is indicative of the existence of less attention given by the e-procurement scholars on the interactional aspects between client organisations and their suppliers. This aspect however needs further investigation for other types of e-commerce systems.

Another interesting observation is that out of 32 articles, only 2 involve multiple instances of "unit of analysis" for e-procurement context. For example, in their study Mota & Filho (2011) have used individual auctioneers as well as public institutions (federal and state) as two types of "unit of analysis".

Figure 3. Instance of "unit of analysis" representing four components of e-procurement system



In another study, Murray et al. (2011), reported two units of analysis: individual councils that adopted an e-procurement system, and interactions (collaborations) between the councils. More interesting is the use of case study approach adopted by these studies. Thus, the fining is indicative that qualitative approach like case studies are more suitable when more than one single "unit of analysis" is used for e-procurement context.

A total of 16 e-procurement articles, in which researchers have used "survey" as an appropriate empirical research method for data collection, have clearly acknowledged referring to various types of "unit of analysis" (e.g. business unit, adopter organisation, e-procurement process, individual employees) for their research context. This is surprising because the notion of "unit of observation" that refers to the level at which researchers collect data receives wide- attention from the quantitative researchers. Hence, the "unit of observation" and the "unit of analysis" can be the same but they need not be so in the quantitative research (Toshkov, 2016). In contrast, qualitative research experts generally emphasise more on the use of "unit of analysis". For example, (Yin 2003) discusses how "unit of analysis" relates to "case" for a case study research context. Likewise, Grünbaum (2007) also discusses relationship between "units of analysis" and "cases". Acknowledging "unit of analysis" by the quantitative researchers

for e-procurement context represents a good step towards wider acceptance of "unit of analysis" among a segment of the e-procurement researcher community.

Authors of only 19 articles (representing 59% of the articles in which "unit of analysis" was clearly mentioned) provided an explanation in support of choosing their unit of analysis. Overall, several specific issues (identified in previous section) were considered by them for choosing an appropriate "unit of analysis" regardless of their empirical methodology. The most astounding finding is that no articles have yet been found that: a) provide an explanation for ruling out an alternative "unit of analysis" for an e-procurement research context, b) justify selection of a "unit of analysis" based on type of research question (e.g. why, how, when), and c) specify "unit of analysis" relating to their unit of data collection (e.g. amalgamated). Hence, it is argued that in the existing e-procurement literature, inadequate attention has so far been given to acknowledge the research significance of considering a "unit of analysis".

SOLUTIONS AND RECOMMENDATIONS

Drawing on the findings and a reflection on them (as presented in earlier sections), it would be inappropriate to consider that this research is consciously challenging the research commitment and understanding of the e-procurement scholars who were not explicit about the "unit of analysis" for their research context. It is rather acknowledged that most e-procurement scholars have implicit recognition about the notion of "unit of analysis" in their work, and they might have felt it would be so obvious for the readers to recognise the "unit of analysis" implicit in their research. However, as a remedial solution to this problem, this research calls for a review of this mindset towards remaining silent on clearly expressing the choice of an appropriate "unit of analysis" deemed relevant for the e-procurement research context. Hence, a strong recommendation is offered to the e-procurement researchers to clearly demonstrate how their chosen "unit of analysis" is aligned with their research questions, the research models they choose, and their selected research methodology.

FUTURE RESEARCH DIRECTIONS

Drawing on the limitations of the research work reported in this book chapter (e.g. limited scope in terms of research topic, shorter selected time period for literature review), two directions for further research are recommended.

First, as this research focuses solely on e-procurement context, the findings cannot be generalised for the broader e-commerce landscape. Hence, further literature analysis is required to investigate how the use and importance of "unit of analysis" are actually perceived in other areas (e.g. e-marketplace, EDI, m-commerce, inter-organisational information systems) within e-commerce discipline in general to find out if the members of the broader e-commerce researcher community care less about strongly acknowledging the significance of "unit of analysis" for their research context.

Second, additional research is needed to examine how "unit of analysis" has been conceptualised in the wider IS discipline covering such important areas like Enterprise Resource Planning, Customer Relationship Management, Business Intelligence, among others.

CONCLUSION

Despite the significance "unit of analysis" bears for several important research issues (e.g. research questions, generalisability, research boundary) as highlighted by methodology authorities from multiple disciplines, it has so far received limited research attention in the e-procurement and digital procurement literature streams. Drawing on a systematic literature review on e-procurement systems (including digitally enabled e-procurement), reported in this book chapter, it appears that an overwhelming majority (72%) of e-procurement journal articles do not explicitly specify a "unit of analysis" appropriate for the e-procurement research context. However, those 32 articles on e-procurement that clearly articulate an instance of "unit of analysis" provide: a) an evidence of the existence of 11 specific types of "unit of analysis", out of which most popular is: individual organisation, and b) several explanations in support of choosing a "unit of analysis". Such explanations however vary because the research issue under investigation differs across three stages (i.e. adoption, implementation, post-implementation) of e-procurement life cycle.

In summary, the lack of considerable attention given by e-procurement scholars in explicitly articulating an instance of "unit of analysis" raises two key concerns. First, how the readers of the e-commerce journals interested in e-procurement phenomenon would perceive the appropriateness of research findings presented by various scholars when they (i.e. readers) are required to assume the "unit of analysis" that are implicit by those scholars. Second, the challenges the reviewers and journal editors would experience about the claims made by the e-procurement scholars on the generalisability of research findings, when they (scholars) make paper submission to e-commerce journals without explicitly clarifying and justifying an instance of "unit of analysis" relevant for the research issue under investigation.

A modest contribution of the research reported in this book chapter, involves a systematic literature analysis on the use of "unit of analysis" for e-procurement context. Such a research study has never been reported before, and hence it thus represents the first of its kind in the e-commerce literature. As a result, the findings of this research serve as a springboard for: a) motivating e-commerce researchers to pay greater attention to explicitly express an instance of an appropriate "unit of analysis" when their research project is formulated, and b) triggering further in-depth literature analysis initiatives on "unit of analysis" in other areas (e.g. B2C e-commerce, e-marketplaces, online auctions) of e-commerce discipline in order to determine if e-commerce scholars are indeed showing indifference with regard to taking into account of the importance of "unit of analysis" across all areas of e-commerce, or they are divided in perceiving the importance of the application of "unit of analysis" based on how they perceive the significance of different areas of e-commerce.

REFERENCES

Adjei-Bamfo, P., Maloreh-Nyamekye, T., & Ahenkan, A. (2019). The role of e-government in sustainable public procurement in developing countries: A systematic literature review. *Resources, Conservation and Recycling*, *142*, 189–203. doi:10.1016/j.resconrec.2018.12.001

Ahmed, F., As-Saber, S., Fry, S., & Smith, R. F. I. (2019). Bureaucracy and E-government: A study of e-procurement initiatives in Bangladesh. *Journal of Business Management & Compliance*, *I*(1), 35–51.

Arnott, D., & Pervan, G. (2005). A critical analysis of decision support systems research. *Journal of Information Technology*, *20*(2), 67–87. doi:10.1057/palgrave.jit.2000035

Babbie, E. R. (2013). *The basics of social research*. Cengage Learning.

Barua, A., Konana, P., Whinston, A. B., & Yin, F. (2001). Managing e-business transformation: Opportunities and value assessment. *Sloan Management Review*, *43*(1), 36–44.

Bayazit, O. (2014). Investigating adoption of e-procurement systems: An empirical study. *International Journal of Information Systems and Supply Chain Management*, *7*(2), 47–66. doi:10.4018/ijisscm.2014040103

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *Management Information Systems Quarterly*, *11*(1), 369–386. doi:10.2307/248684

Brandon-Jones, A., & Kauppi, K. (2018). Examining the antecedents of the technology acceptance model within e-procurement. *International Journal of Operations & Production Management*, *38*(1), 22–42. doi:10.1108/IJOPM-06-2015-0346

Chambliss, D. F., & Schutt, R. K. (2012). Making sense of the social world: Methods of investigation. *Sage (Atlanta, Ga.)*.

Chan, Y. Y., & Ngai, E. W. (2011). Conceptualising electronic word of mouth activity: An input-process-output perspective. *Marketing Intelligence & Planning*, *29*(5), 488–516. doi:10.1108/02634501111153692

Chandrasekar Subramaniam, M. J. S. (2002). A study of the value and impact of B2B e-commerce: The case of web-based procurement. *International Journal of Electronic Commerce*, *6*(4), 19–40. doi:10.1080/10864415.2002.11044245

Chang, H. L. (2019). Factors Affecting the Offshore Deployment of Interorganizational Systems in China: A Case Study Analysis. *Journal of Organizational Computing and Electronic Commerce*, *29*(3), 163–189. doi:10.1080/10919392.2019.1583811

Chang, Y., Markatsoris, H., & Richards, H. (2004). Design and implementation of an e-Procurement system. *Production Planning and Control*, *15*(7), 634–646. doi:10.1080/09537280412331298166

Copeland, D. G., & McKenney, J. L. (1988). Airline reservations systems: Lessons from history. *Management Information Systems Quarterly*, *12*(3), 353–370. doi:10.2307/249202

Daigneault, P.-M., & Jacob, S. (2012). Les concepts souffrent-ils de négligence bénigne en sciences sociales? Éléments d'analyse conceptuelle et examen exploratoire de la littérature francophone à caractère méthodologique. *Social Sciences Information. Information Sur les Sciences Sociales*, *51*(2), 188–204. doi:10.1177/0539018412437107

Fiskhinindya, A., Yunani, A., & Sompa, A. T. (2019). Implementation of good governance principles in procurement of regional government goods and services by the procurement service unit (ULP) Banjarbaru city Indonesia. *European Journal of Management and Marketing Studies*, *4*(1), 67–81.

Grünbaum, N. N. (2007). Identification of ambiguity in the case study research typology: What is a unit of analysis? *Qualitative Market Research*, *10*(1), 78–97. doi:10.1108/13522750710720413

Gunasekaran, A., McGaughey, R. E., Ngai, E. W., & Rai, B. K. (2009). E-Procurement adoption in the Southcoast SMEs. *International Journal of Production Economics*, *122*(1), 161–175. doi:10.1016/j.ijpe.2009.05.013

Hsin Chang, H., Tsai, Y.-C., & Hsu, C.-H. (2013). E-procurement and supply chain performance. *Supply Chain Management*, *18*(1), 34–51. doi:10.1108/13598541311293168

Huntgeburth, J., Parasie, N., Steininger, D., & Veit, D. (2012). Increasing the adoption of e-procurement services at the municipal level. *e-Service Journal: A Journal of Electronic Services in the Public and Private Sectors, 8*(3), 3-23.

Kim, K. K., & Umanath, N. S. (2005). Information transfer in B2B procurement: An empirical analysis and measurement. *Information & Management*, *42*(6), 813–828. doi:10.1016/j.im.2004.08.004

Leigh Star, S. (2010). This is not a boundary object: Reflections on the origin of a concept. *Science, Technology & Human Values*, *35*(5), 601–617. doi:10.1177/0162243910377624

Lewis-Beck, M., Bryman, A. E., & Liao, T. F. (2003). *The Sage encyclopedia of social science research methods*. Sage Publications.

Li, X., Pillutla, S., Zhou, H., & Yao, D.-Q. (2015). Drivers of Adoption and Continued Use of E-Procurement Systems: Empirical Evidence from China. *Journal of Organizational Computing and Electronic Commerce*.

Mathiassen, L., Saarinen, T., Tuunanen, T., & Rossi, M. (2004). *Managing requirements engineering risks: an analysis and synthesis of the literature*. Working paper 379, Helsinki School of Economics.

McCue, C., & Roman, A. V. (2012). E-procurement: Myth or reality. *Journal of Public Procurement*, *12*(2), 221–248. doi:10.1108/JOPP-12-02-2012-B003

Mettler, T., & Rohner, P. (2009). E-procurement in hospital pharmacies: An exploratory multi-case study from Switzerland. *Journal of Theoretical and Applied Electronic Commerce Research*, *4*(1), 23–38. doi:10.4067/S0718-18762009000100004

Mishra, A. N., & Agarwal, R. (2010). Technological frames, organizational capabilities, and IT use: An empirical investigation of electronic procurement. *Information Systems Research*, *21*(2), 249–270. doi:10.1287/isre.1080.0220

Mohd Daud, N., Mohammad, N., Azmi, A. E., & Mohamed, I. S. (2013). Factors influencing the usage of e-Procurement among contractor companies in Malaysia. *Business & Management Quaterly Review*, *4*(3&4), 62–80.

Mota, F. P. B., & Rodrigues Filho, J. (2011). Public e-procurement and the duality of technology: A comparative study in the context of Brazil and of the state of Paraíba. *JISTEM-Journal of Information Systems and Technology Management*, *8*(2), 315–330. doi:10.4301/S1807-17752011000200003

Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.

Murray, J. G., Rentell, P. G., Holland, T., & Locker, S. (2011). Why collaborate on local government procurement? The experience of UK councils. *Journal of Service Science and Management*, *4*(03), 325–333. doi:10.4236/jssm.2011.43038

Novack, R. A., & Simco, S. W. (1991). The industrial procurement process: A supply chain perspective. *Journal of Business Logistics*, *12*(1), 145.

Oh, S., Yang, H., & Kim, S. W. (2014). Managerial capabilities of information technology and firm performance: Role of e-procurement system type. *International Journal of Production Research*, *52*(15), 4488–4506. doi:10.1080/00207543.2013.867084

Oliech, C. O., & Mwangangi, P. (2019). Effect of strategic procurement management on performance of level five hospitals in Kenya. *International Journal of Supply Chain Management*, *4*(1), 39–62.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications, Inc.

Piccoli, G. (2008). *Information systems for managers: Text and cases*. John Wiley & Sons, Inc.

Pickernell, D., Kay, A., Packham, G., & Miller, C. (2011). Competing agendas in public procurement: An empirical analysis of opportunities and limits in the UK for SMEs. *Environment and Planning. C, Government & Policy*, *29*(4), 641–658. doi:10.1068/c10164b

Picoto, W. N., Bélanger, F., & Palma-dos-Reis, A. (2014). An organizational perspective on m-business: Usage factors and value determination. *European Journal of Information Systems*, *23*(5), 571–592. doi:10.1057/ejis.2014.15

Piotrowicz, W., & Irani, Z. (2010). Analysing B2B electronic procurement benefits: Information systems perspective. *Journal of Enterprise Information Management*, *23*(4), 559–579. doi:10.1108/17410391011061816

Pires, G. D., & Stanton, J. (2005). A research framework for the electronic procurement adoption process: Drawing from Australian evidence. *Journal of Global Business and Technology*, *1*(2), 12–20.

Platform, P. (2019). *Digital procurement and procurement transformation*. Retrieved from https://www.procuredesk.com/digital-procurement/

Rahim, M., Chen, X., & Kurnia, S. (2008). *Understanding benefits of electronic procurement systems adoption: experience of an Australian City Council*. Academic Press.

Rahim, M., & Kurnia, S. (2014). *Understanding E-Procurement System Benefits using organisational Adoption Motivation Lens: a Case Study*. PACIS.

Rahim, M., & Kurnia, S. (2014). *Understanding E-Procurement System Benefits using organisational Adoption Motivation Lens: a Case Study.* Paper presented at the PACIS.

Rahim, M. M., & As-Saber, S. N. (2011). E-procurement adoption process: An arduous journey for an Australian city council. *International Journal of Electronic Finance*, *5*(2), 150–168. doi:10.1504/IJEF.2011.040458

Ronchi, S., Brun, A., Golini, R., & Fan, X. (2010). What is the value of an IT e-procurement system? *Journal of Purchasing and Supply Management*, *16*(2), 131–140. doi:10.1016/j.pursup.2010.03.013

Shanks, G., Bekmamedova, N., & Johnston, R. (2012). *Exploring process theory in information systems research.* Paper presented at the Information Systems Foundations Workshop, Canberra, Australia.

Sia, S. K., & Soh, C. (2007). An assessment of package–organisation misalignment: Institutional and ontological structures. *European Journal of Information Systems*, *16*(5), 568–583. doi:10.1057/palgrave.ejis.3000700

Silverman, S., & Solmon, M. (1998). The unit of analysis in field research: Issues and approaches to design and data analysis. *Journal of Teaching in Physical Education*, *17*(3), 270–284. doi:10.1123/jtpe.17.3.270

Soares-Aguiar, A., & Palma-dos-Reis, A. (2008). Why do firms adopt e-procurement systems? Using logistic regression to empirically test a conceptual model. *IEEE Transactions on Engineering Management*, *55*(1), 120–133. doi:10.1109/TEM.2007.912806

Somasundaram, R., & Damsgaard, J. (2005). Policy recommendations for electronic public procurement. *The Electronic*. *Journal of E-Government*, *3*(3), 147–156.

Srai, J. S., & Lorentz, H. (2019). Developing design principles for the digitalisation of purchasing and supply management. *Journal of Purchasing and Supply Management*, *25*(1), 78–98. doi:10.1016/j.pursup.2018.07.001

Suliantoro, H., Ghozali, I., & Wibowo, M. A. (2015). E-Procurement Adoption in Government Institution: Predicting Social Values Effect on Intention and Usage Behavior of E-Procurement. *International Journal of Business and Society*, *16*(2). doi:10.33736/ijbs.562.2015

Tai, Y.-M., Ho, C.-F., & Wu, W.-H. (2010). The performance impact of implementing web-based e-procurement systems. *International Journal of Production Research*, *48*(18), 5397–5414. doi:10.1080/00207540903117915

Thomson, J. D. (2009). Remodelled and Restyled e-Procurement-New Power Relationships Down Under. *Electronic*. *Journal of E-Government*, *7*(2).

Toshkov, D. (2016). *Research design in political science*. Macmillan International Higher Education. doi:10.1007/978-1-137-34284-3

Trochim, W. M. (2006). Qualitative measures. *Research Measures Knowledge Base, 361*, 2-16.

Vaidya, K., Sajeev, A., & Callender, G. (2006). Critical factors that influence e-procurement implementation success in the public sector. *Journal of Public Procurement*, *6*(1/2), 70–99. doi:10.1108/JOPP-06-01-02-2006-B004

Vaidyanathan, G., & Devaraj, S. (2008). The role of quality in e-procurement performance: An empirical analysis. *Journal of Operations Management*, *26*(3), 407–425. doi:10.1016/j.jom.2007.08.004

Vaidyanathan, G., Devaraj, S., & D'Arcy, J. (2012). Does Security Impact E-procurement Performance? Testing a Model of Direct and Moderated Effects. *Decision Sciences*, *43*(3), 437–458. doi:10.1111/j.1540-5915.2012.00354.x

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *Management Information Systems Quarterly*, xiii–xxiii.

Wu, F., Zsidisin, G., & Ross, A. (2007). Antecedents and outcomes of e-procurement adoption: An integrative model. *IEEE Transactions on Engineering Management*, *54*(3), 576–587. doi:10.1109/TEM.2007.900786

Yin, R. K. (2003). *Case Study Research: Design and Methods*. Thousand Oaks, CA: Sage Publications, Inc.

KEY TERMS AND DEFINITIONS

Digital Procurement: An e-procurement system that includes advanced digital tools like Internet of Things, data mining, and cloud computing to automate and further streamline procurement process.

E-Procurement: Represents a class of software systems that can automate the key tasks involved in procurement process.

Generalisability: The applicability of research findings from one context to another.

Methodology: A research approach (qualitative, quantitative, hybrid) that is adopted to empirically evaluate a research model to find answers.

Research Boundary: Represents the scope that is outside a research investigation.

Systematic Literature Review: An approach that synthesises prior theoretical as well as empirical evidence on a research issue.

Unit of Analysis: Treated as a "thing" or "phenomenon" or "subject of research interest" that is being discussed.

Value: Represents a positive outcome that emerges as a result of e-procurement implementation.

Chapter 6
A Systematic Study for Digital Innovation in Management Education:
An Integrated Approach Towards Problem-Based Learning in Vietnam

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ABSTRACT

The past two decades have witnessed an unrelenting expansion of management education around the world. At the same time, however, influential scholars—Mintzberg, Bennis, Pfeffer, and others—have leveled pointed critiques at these programs questioning their quality and relevance, as well as their approach to teaching and learning. In the present era of globalization, information technology is really an opportunity for the management education system in Vietnam to convert it to be globally competitive through world-class quality. The present management education model in Vietnam drags the features of the British model designed by the British to train the natives as "OGA," enabling them to run the administration of the country at that time. Now the management or business education system has changed. Many modern business schools introduced several features in the management education system as replacing the traditional model of curriculum-teacher-student by problem-coach-problem solver, moral education, competence-based techniques approach, etc. This chapter explores and integrated approach to problem-based learning in Vietnam.

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INTRODUCTION

The previous two decades there have seen a tenacious extension of the executives training as the global markets have expanded exponentially. In that context of globalisation, prominent researchers such as Zavalkoff A. (2016) Savery, John R. (2019) and others have pointed at instruction projects for scrutinizing the quality and importance, as ways to dealing with educating and learning students.

A Problem-based Approach for Management Education" is an opportune commitment for the executives schools just as other advanced education organizations looking for the way to build the importance and nature of their expert training programs. This study depicts the utilization of Problem based learning (PBL) in the executive's instruction. PBL is a functioning learning approach which was first spearheaded in restorative training, however whose utilization has developed relentlessly in an assortment of expert fields in the course of recent decades. Problem based learning(PBL) is a significant teaching method to talk about particularly in the board instruction. It at first came in restorative training and has quickly spread to other expert teaches in advanced education, for example, the sciences, building, nursing, social work, and human sciences. There appears to be for all intents and purposes no disciplinary cutoff points to what PBL brings to the table. Further, it isn't astounding that administration training which has been over and over censured lately has likewise been, where PBL and other instructive developments have started to develop. This extraordinary issue is attempted to advertise and quicken the development of PBL in the executives training. Undisputedly, the historical backdrop of humankind saw the learning based mechanical society which demonstrates to be an aggressive society, creating welfare, prosperity and thriving. Mechanised society is the result of the instructive framework followed by human development & modernisation. There could be multitudinous models of instruction framework. The next section explains real models which are:

- **Asian Gurukul Model:** This is an ancient Asian model, which can still be perceived in Asian Countries. This model is normally based on duty, service, renunciation and spiritual. It is a proven model converting youths mainly through learning and experience of the Guru and individual. It offers individuals potential making him/her useful to the society. In addition the peak of scientific temper leads to spirituality. Students stay with the guru's family away from the cities, going back to nature and learn through it. This system was quiet flexible.
- **Western Model:** The model is being used by most of the western developed countries, like, USA, UK, France, Germany, Japan, Singapore, etc. It is right, materialistic and scientific tempered based. Mainly, it deals with the promotion of economic prosperity, sometimes at the cost of social moral and ethics.
- **British Model:** This model was designed by the British for the Indian (mainly privileged class of) natives enabling the British to administer and control this vast country with the help of a few natives. This model still exists after 70years of independence in India. Essentially, it represents a lecture-based method of learning.

The management education system all over the world has been rapidly changing. Factors, such as, market demands and forces in wider society, increasing demands for accountability to the public and State with greater vocational relevance, ever increasing links between higher education and industry, rapid education expansion towards mass rather than an elite system, declining unit of resources in higher education (e.g., UK universities has witnessed a fall over 30% in public funding per student since 1980

and the cuts still continue in accelerated way), etc., has compelled worldwide exploration of new but appropriate innovative model. Many models like lecture-based, rote, learning by doing, etc., have been proposed. Problem-based learning (PBL) is one of the latest models introduced in 1970s. But this model has not implemented in various curriculum of universities and school.

LITERATURE REVIEW

Diverse hypothetical points of view – data preparing, social constructivism, and sociocultural viewpoints – that underlie and give a helpful focal point to investigating learning in issue based settings. Data preparing centers around the job and structure of earlier information, with an exceptional accentuation on how master information actuates certain beneficial critical thinking systems that can be adjusted for learning general critical thinking methodologies. Social constructivism centers around the advancement of information as individuals participate in institutional, relational, and verbose procedures in which students build their own insight through social associations. connection between sociocultural hypothesis and issue based figuring out how to see how social apparatuses are utilized and changed in explicit settings to encourage co-development of information for future autonomous critical thinking (Eberbach, C., 2012). Problem-based learning as a social wonder which is socially, separately and institutionally built and, subsequently, is a co-delivered marvel. Problem based learning in Health and Social Care offers a down to earth understanding into the chances, advantages and difficulties of utilizing Problem based learning(PBL) in wellbeing and social consideration instruction and furthermore understudy coordinated learning (SDL) as a learning and educating device. It exhibits an assortment of reasonable and rising ideas as far as how to do PBL and SDL and thinks about the pragmatic obstructions and arrangements, difficulties to mindfulness lastly future possibilities and bearings for learning (Clouston, T. J., 2010). PBL is viewed with idea of status, andogogy and PBL. Andogogy is something which is gradually supplanting instructional method to decrease psychological discord.

An establishment for understanding the development of Problem based learning(PBL) from its starting to current deduction on the equivalent. It starts with a meaning of PBL and thinks about why this is a suitable methodology for the training of wellbeing and social consideration experts. It looks to interface the points and goals of PBL programs with the advancement of abilities important to work in a cutting edge wellbeing and social consideration condition. Models of different models of PBL have been given the genuinely necessary lift to the change (Haas, B., 2010). It has been proposed that Problem based learning(PBL) positively affects the group working aptitudes of therapeutic, wellbeing and social consideration understudies. These abilities are significant for graduates to ace to empower successful shared working in the present differing wellbeing and social consideration settings. What isn't obvious from the writing is the means by which understudies build up these aptitudes through the PBL experience (Seymour, A., 2013). The Problem based learning(PBL) writing presents the move from instructor guided transmission models of guidance to help as a test for PBL mentors.

Dispositions, aptitudes and information speak to three particular elements of help distinguished by understudies (Pourshafie, T., 2013). It offers a meaning of reflection, illustrating the embodiment of reflection as empowering the secret to be made clear. It contends that the motivation behind reflection is to urge experts to go past negligible assessment of their training. The section additionally interfaces the procedure of Problem based learning(PBL) to reflection and the other way around, with the goal of talking about how the significant part of clinical thinking in a calling can be supported by means of

reflection and the manners by which 'how to reflect 'is scholarly (Boniface, 2010). The data time has started to make significant moves in instructive frameworks, incorporating those in undergrad medicinal and graduate mental preparing programs. Regardless of these changes, instructing and learning in formal instructive settings remains predominately the result of the crossing point between teacher, students, appraisal and setting (Azzam, A., 2013). Contemporary true issues require inventive arrangements, requiring the planning of another age of innovative specialists equipped for discovering unique answers for not well-organized issues.

Albeit much school-put together preparing in innovativeness centers with respect to discrete abilities, certifiable inventiveness results from a multidimensional association between and among individual qualities, explicit procedures, inner or outer Press for creation, and an esteemed Product (Gallagher, S. A., 2015). Accentuation on transferable abilities and aptitudes of 'long lasting discovering 'that compares to human capital (Whitcombe, S. W., 2012). The setting of deep rooted learning and the effect it has on the instruction of experts in wellbeing and social consideration. It analyzes the job that Problem based learning(PBL) has in the advancement of self-coordinated students and considers an assortment of potential techniques that can be utilized to set them up for compelling long lasting learning (Scott-Roberts, S., 2010). There are three of summative evaluation in UBC's TELL through PBL Bachelor of Education accomplice: two organized as "Triple Jumps" and one as an e-folio. Every one of the three measure and bolster the advancement of our preservice instructors' expert abilities by re-enacting the expert settings wherein educators work. In accordance with these standards of good evaluation, the structure of Triple Jumps and e-folios has moved after some time toward progressively reasonable and attainable assessments that closer view the comprehension and application complex cross-curricular proficiencies. This incorporated, capacity based way to deal with appraisal organizes reflexivity, critical thinking, and reason-giving over data maintenance and recitation. It additionally better mirrors the expert abilities developed by issue based learning, looked for by our request based partner and essential for good instructing (Zavalkoff A., 2016).

Two issues that are essential to PBL programs: surveying and assessing PBL. Since the terms 'appraisal' and 'assessment' mean various things to various individuals. At the point when we discuss appraisal, we are alluding to realizing that our understudies have learned. Appraisal quantifies the learning sway on the individual understudy. Assessment then again, is about the general quality and estimation of the program from the point of view of the considerable number of partners. The two ideas of appraisal and assessment are inseparably connected (Thomas, 2000). Problem-based learning (PBL) has progressively been utilized as an instructing and learning approach in advanced education, especially in medication and dentistry. In multilingual and multicultural settings, for example, English Medium of Instruction (EMI) colleges in Asia, quiet has been distinguished as one trademark to depict Asian understudies. Be that as it may, no inside and out subjective work has been led to date on understudies' quietness in PBL instructional exercises in this unique situation. This part looks at understudies' quietness in communicated in English connection in PBL instructional exercises in an EMI college in Asia.

An assortment of means, including post-study interviews, perceptions, varying media recording, and invigorated review interviews are utilized to research one gathering of PBL understudies' quietness in cooperation. Discoveries demonstrate understudies' quiet in communicated in English association isn't just a methods for verbal withdrawal inside the gathering learning process yet additionally a profitable asset, a collective practice, a foundation of taking care of clashing understandings, and a sign of moving force relations. It might give advanced education showing staff and training approach creators with valuable data about little gathering association among differing students in an EMI setting (Jin J., 2012).

The Problem-Based Learning (PBL) model of guidance grew at first for teaching therapeutic specialists has been adjusted to a scope of expert schools and trains. There are a few learner-centred educational models that offer a portion of the attributes of PBL yet are diverse as far as crowd (students) and the job of the educator. The most differentiation is the distinction between the mentor in PBL who fills in as a procedure facilitator and mentor for metacognitive reasoning and the educator who serves similar jobs however likewise furnishes the students with layers of help and direct guidance.

The level of possession for learning for a creating proficient is basic – in this manner the job of the guide which encourages the advancement of the metacognitive aptitudes and capacities required for proficient practice (John R, 2019). Instructor instructors frequently experience obstruction when assisting preservice educators with investigating what various originations of social equity and against persecution training mean for their instructing and characters. What basic originations are there? For what reason would they say they are significant? By what means may they be sought after? What are our own encounters with and duties toward them? This part is composed from the viewpoint of a branch of knowledge asset authority answerable for helping preservice instructors thoroughly consider these inquiries. It shows the qualities of Problem based learning(PBL) instructional method in supporting preservice educators' investigation into the institutional and social elements of benefit and abuse both in schools and past. In it, I initially investigate the job of the branch of knowledge asset master inside the Teaching English Language Learners through Problem Based Learning (TELL through PBL) companion structure (Zavalkoff A., 2016).

Some new researches are presented and a summary of important findings are shown as follows;

RESEARCH METHODOLOGY

Important researches from 2010-2019 on the problem based learning are considered and their application is studied for developing a model for management education study in Vietnam universities. They are categorized by the application based study conducted with different sectors and what are the results they gave. It is a cross sectional study in different sectors across the globe which is also exploratory in nature that provides deeper insights into multifaceted areas of management education globally. As the global markets have expanded exponentially in the last two decades and continues to do the same in the future, there is a high demand for increased focus on management education from a global perspective, as many businesses are now operating online globally 24/7. To explore the key characteristics for a high-quality management education program at universities business schools have become paramount.

BACKGROUND OF NEW MODEL REQUIREMENT

The Vietnamese colleges, State and Union scarcely characterize the objectives of advanced education and expert instruction. The objectives of advanced education in our nation, as characterized under the code of Professional Ethics for University and College Teachers, can scarcely be viewed as similar with the call of the 21st century of privatization, progression and globalization. Globalization is the key manta since the most recent two decades. Countries should be focused at the two dimensions: the worldwide and nearby. This has changed the prerequisites of instruction framework everywhere throughout the world. Market powers and requests have added by and large another measurement to the training framework.

Table 1. A summary of some untold stories

Sr. No.	University	Summary of Important Findings
1	Hadeel, A., & Sandhu., K. (2020)	The study presents PLS model performance for factors influencing students acceptance of E-Learning Analytics Recommender system at universities business school. The authors adopt e-learning analytics principles to provide a new model to explain the acceptance behaviour of recommender systems adoption with e-learning and reflects the increasing focus on delivering online educational services. This has come at the necessity to improve overall access to the education system, and higher education at universities business school and has been driven with evidence of improving learning outcomes with electronic learning (e-learning) information and instructional technology with the use of e-learning analytics recommender systems. New discoveries show that the extension of technology acceptance model as a theoretical framework to generate a set of interlocked hypotheses that go to explaining student behaviors towards technological acceptance and continued usage intention of a recommender systems.
2	Kartono, K., Arumsasi, P. D., & Mariani, S. (2019).	The outcomes appeared (1) PBL was successful in accomplishing understudies' intelligent scientific reasoning capacity; (2) numerical intelligent considering capacity visual subject was not able draw the relationship of the issues and the visual subject was not able distinguish important information. The sound-related subject was not able clarify effectively the idea utilized in attracting representations and unfit to comprehend and distinguish the ideas. Moreover, the sound-related subject was less ready to recognize significant information. Regardless of whether the sensation subject committed an error in drawing the similarity however he was not able notice the issues that existed and couldn't recognize the important information. Likewise, the sensation subject was less capable in doing evidence by utilizing the idea associated with the confirmation of contention.
3	Fidan, M., & Tuncel, M. (2019	Introduction of studio based degrees. Skills, knowledge and general characteristics of designer defined. Eighteen students: working and middle class, matured students 18 years old. Distributed rational, objectives and contents of the course. Studio opens from 9.00 a.m. to 9.00 p.m. Continuous assessment. Self-assessment and peer assessment for identifying individual and group skills and attitudes. Log book and learning journal kept by students.
4	Ugwu, E. O. (2019).	Moving away from the apprenticeship model of learning. Three years course in two components: foundation and branch program, 18 months each, spend total 72 weeks on clinical practice (including 20 weeks in foundation program). Staff/student contact 20 hours/week. Thirty students for course. One staff for overall responsibility and two as facilitator to groups of 6/7 students. Students design problem sheet, and let free for library or allocated room rest of the day, at the end of day present findings to the tutor. The problem-based component not assessed summatively.
5	Maggio, L. A. (2019).	PBL introduced to overcome the problems as curricular overload, effective use of prior experience, students perceived valid knowledge held exclusively by staff. Goals are: learn strategies for problem analysis and intervention motivate to continue to learn, acquire further skills to work effectively in a constantly changing society. Statement of requirements set. Before acceptance of course display video of PBL in action, then discussed. 75 students first year, 45 in second year of social work course. Eight staff. Group size ten, ten week block. Video, library facilities, departmental information and consultation with experts used. Staff designing and planning study units, facilitating group, acting as consultant for particular topic, and personal tutor to students. For student autonomy and course economy, facilitator does not attend all meetings but presents in the beginning and end of each unit.
6	Yew, E. H., & Goh, K. (2016).	BE (Mechanical) final year undergraduate program. Subjects: CAD/CAM, Production Technology, and Industrial Engineering, 3 theory hours/week and 2 laboratory hours/week/ subject. Class strength 60 divided into four groups. Course material, teaching (theory and laboratory) weekly plan, industrial visits and expert lectures program given to students immediately after registration. Intra-group and inter group deliberation in the passive presence of a teacher, teacher comes forth in the last 15 minutes of 60 minutes class duration, continuous assessment through unit tests and quizzes, no weighage for this in the university semester written examination. Results improved to a great extent, placement in industry enhanced double. Independent thinking, critical analysis of a problem, interpersonal skills, etc., achieved.

Market needs information based, adaptable, self-guided/represented, versatile/, deep rooted students, and employable alumni. Other than this, proficient instruction is accounted for to be savvy. Maybe one can envision this new measurement in Milgrom's contention. Milgrom has contended that the shortfall in alleged 'delicate aptitudes" in the alumni needs quick consideration. Delicate aptitudes are simply the abilities, similar to, correspondence, administration, capacity to (self) sort out, capacity to determine human clashes, ability to effectively oversee clashing limitations, business enterprise, and so forth. Milgrom has suggested that administration approach be connected to plan of instruction framework, destinations, prerequisites and requirements be characterized, and arrangement of socio-constructivism approach in relationship with arranged figuring out how to structure of new educational modules. He has proposed an instructional model that is dynamic, self-guided, self-evaluated, little gathering, incompletely coached task and issue based picking up including the standard of "learning by doing in little gatherings".

Dynamic learning is the focal guideline of this model permitting a student getting new information and skills. He has additionally expressed that addresses are somewhat intends to either present the real purposes of new subject or to put point of view and structure on learning obtained during gathering or individual work. Seven days of understudy presently contains somewhere in the range of 15 and 18 hours of planned contact hours including 4 to 6 hours of addresses and on a solitary day an understudy faces most extreme two subjects. On use of this model, understudies remain in dynamic mode, they have changed their frame of mind, to be specific, to assume responsibility and propose arrangement when airing complaints, generally speaking uplifted soul of participation created among the odd 100 staff individuals, and so on. At last, Milgrom broadcasts "the way that our first year understudy enlistment has developed by 15% since a year ago surely adds to cause us to trust that some of what we are doing must be ideal!" On this back ground, an endeavor is made to show a few parts of PBL in the accompanying areas.

As expressed before, the issues in higher and proficient training are dynamic and flighty as a result of the complexities emerging out of firmly interrelated components, similar to, individual translation, open speculations, proficient domains and scholarly limits (Feletti, G., 1997). (see Figure. 1). This requests look for proper instruction model. Morgan calls the appropriation of PBL model, as Project-and-Problem-based Learning (Boud, D., 1985)., maybe can be a correct decision. Be that as it may, PBL contrasts from that of critical thinking approach. PBL centers in sorting out the educational modules content around issue situation as opposed to subjects or teaches, though critical thinking approach centers after giving understudies an address or an article to peruse and afterward a lot of inquiries dependent on the data given. PBL approach can grasp both liberal instruction and operational educational program by offering understudies open doors for undertaking discovering that holds genuine importance for them in conditions where information is esteemed for the wellbeing of its own just as with regards to responsibility and market related qualities. Hence PBL is relied upon to manage such and comparative issues, such as, learning setting, student personality and learning in connection (Feletti, G., 1997). It advances adaptability, versatility, critical thinking and evaluate and can help instill such aptitudes as exchange, bunch work, collaboration, introduction aptitudes, thinking expertise, self-coordinated learning capacity inside a setting sensitive to the universe of work and market abilities. Boud traces eight attributes of PBL courses as given beneath (Wijnen, W. H., 2001).:

1. An acknowledgment of the base of experience of learners.
2. An emphasis on students taking responsibility for their own learning.
3. A crossing of boundaries between disciplines.
4. An intertwining of theory and practice.

5. A focus on the process of knowledge acquisition rather than the products of such processes.
6. A change in staff role from that of instructor to that of facilitator.
7. A change of focus from staff assessment of outcomes of learning to student self-and peer assessment.
8. A focus on communication and interpersonal skills.

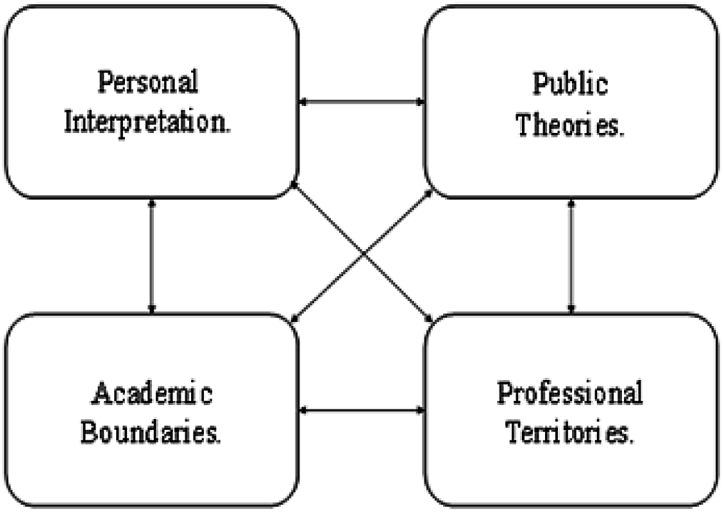
Barrows in his taxonomy highlights the educational objectives that are possible to address through PBL, and it has included the following combination of varieties in use Tuncel, M. (2019).:

1. Lecture-based cases.
2. Case-based lectures.
3. Case method.
4. Modified case method.
5. Problem based.
6. Close-loop-problem-based

Maggi considers PBL as a general education strategy rather than merely a teaching approach, and he identifies three broad areas of differentiation of PBL from other models as given below (Feletti, G., 1997).:

1. It comprises of curricula organization around problems rather than disciplines, an integrated curriculum and an emphasis on cognitive skills.
2. Conditions such as small groups, tutorial instructions, and active learning facilitate PBL.
3. PBL facilitates outcome as development of skills and motivation associated with the ability to be lifelong learners.

Figure 1. Dynamic issues in professional higher education



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THE IMPORTANT ELEMENTS OF PBL

The ways which faculty is been taught is greatly influenced by the manners of which they teach their students. This gives more stress on knowledge acquisition than knowledge creation. This gives rise to surface learning and does not portray deep learning characterized by "making sense". PBL accounts for learner identity, learning context and learning in relation. This equips students to learn with complexity, i.e., an ability to engage with coherence and incoherence, consensus and dissensus as well as vicissitudes of an uncertain and globalized world. These elements are presented below:

1. **Learner Identity:** It represents interaction of learner and learning framing a particular kind of identity. The framework yields learning styles, namely, converger, diverger, assimilator and accommodator.
2. **Learning Context:** Students' perception of the learning context is an integral part of learning. Learning context is created through such means as teaching methods, assessment mechanisms, and the overall design of the curriculum. It is not obviously a static environment. In fact, students' perception of formal learning context significantly influences the learning itself. This makes one to distinguish between transferable skills and the ability of transferring skills. Therefore, there appears to be a complex interface between the formal learning contexts of university, field work education and industrial placement.
3. **Learning in Relation:** It points out that students learn not only through formal training but also through their relation and interactions with tutors, peers, and others means of informal learning. This gives students not only empowerment, self-realization, or emancipation but also construct 'their own voice'.

The above elements put together, acknowledges the value of inner world. As a result, knower and what is known will be inseparable. The importance of these elements is felt more in context with the concepts like collective learning, massification of education (wherein dissatisfaction through unrealized expectations occur), and students as consumers.

3D LEARNER EXPERIENCE

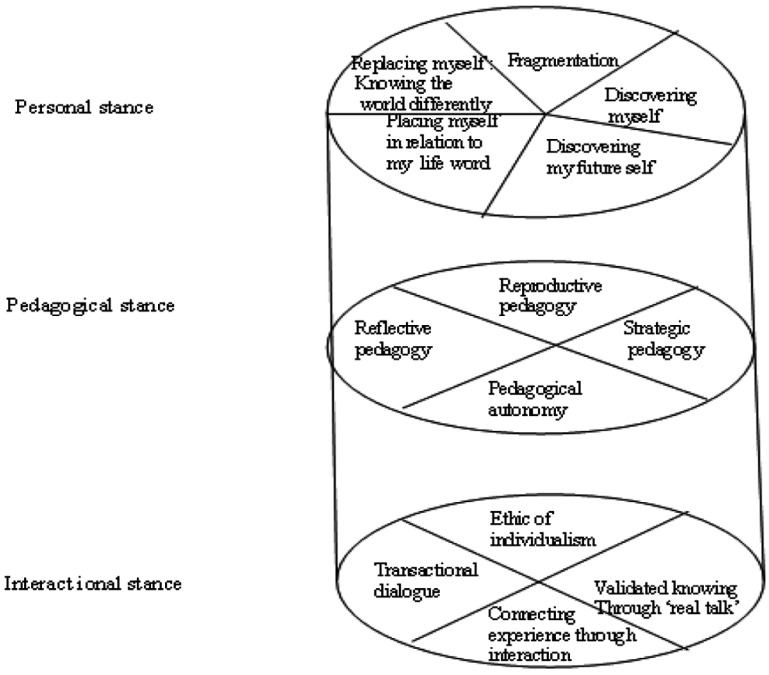
Teaching methods, like, didactic, rote, etc., curb out development of students in such areas as value their prior learning experience, independence in enquiry, etc. PBL on the other hand permits transitional learning, a result of students' critical reflection upon shifts (transitional). Transition denotes shift in learner experience caused by a challenge to the

1. **Personal Stance:** This is the way staff and students see them in relation in learning context and perceive meaning to their experience of that context. The domains of personal stance are:
    a. Fragmentation (i.e., disjunction leading to frustration and confusion).
    b. Discovering myself.
    c. Defining my future self.
    d. Placing myself in relation to my life-world.
    e. Replacing myself: knowing the world differently.
2. **Pedagogical Stance:** This presents the way people see themselves as learner's in particular educational environment. The domains of pedagogical stance are:
    a. Reproductive pedagogy.
    b. Strategic pedagogy.
    c. Pedagogical autonomy.
    d. Reflective pedagogy: students see learning and knowledge as flexible entities.
3. **Interactional Stance:** This stands for the way learners work and learn in groups and construct meaning in relation to one another Wijnen, W. H. (2001). Through dialogue, a central process of people's life, values are deconstructed and reconstructed, and experience relieved and explored. The domains of interactional stance are:
    a. Ethic of individualism.
    b. Validated knowing through 'real-talk'.
    c. Connecting experience through interaction.
    d. Transactional dialogue.

IMPORTANT PARAMETERS OF PBL MODELS

Few prominent PBL Models are given below.

Figure 2. The stances and domains of dimensions of learner experience



SOLUTIONS AND RECOMMENDATIONS

Problem based learning(PBL) is an understudy focused instructional method in which understudies find out about a subject through the experience of taking care of an open-finished issue found in trigger material. It is centered around the understudy's appearance and thinking to build their very own learning. Problem based learning(PBL) is both a showing technique and a way to deal with the educational program. It comprises of painstakingly planned issues that challenge understudies to utilize critical thinking methods, self-coordinated learning systems, group investment abilities, and disciplinary information. Problem based learning(PBL) is an instructional methodology that uses issues or cases as a setting for understudies to obtain critical thinking abilities. It advances relational abilities, dynamic learning, and basic reasoning aptitudes. It energizes peer educating and dynamic cooperation in a gathering. Problem-based learning (PBL), being used to facilitate students' critical thinking, self-directed learning, collaboration, and communication skills, has been considered effective on ethics education, especially when incorporated with experiential experience. Unlike lecturing that mainly disseminates knowledge and activates the left brain, PBL encourages "whole-brain" learning. However, PBL has several disadvantages, such as its inefficiency, lack of adequately trained preceptors, and the in-depth, silo learning within a relatively small number of cases. Because each school tends to utilize PBL in different ways, either the curriculum designer or the learning strategy, it is important to maximize the advantages of a PBL session, PBL then becomes an ideal format for refining students' ethical decisions and behaviours.

Teaching through PBLs can greatly improve the problem solving and critical reasoning skills with most of students year agreeing that the acquisition of knowledge and its application in solving multiple choice questions (MCQs) was greatly improved by these sessions. It is observed that their self-directed

Table 2. Models of problem-based learning

Parameters	Model: I Epistemological Competence	Model: II Professional Action	Model: III Interdisciplinary Understanding	Model: IV Tran Disciplinary Learning	Model: V Critical Contest Ability
Knowledge	Propositional	Practical and Performative.	Propositional performative and practical.	Examining & testing given knowledge & frameworks.	Contingent, contextual & constructed.
Learning	Use & management of a propositional knowledge body to solve a problem.	The outcome-focused acquisition of knowledge & skills for the work place.	The synthesis of knowledge with skills across discipline boundaries.	Critical thought & decent ring oneself from disciplines to under- stand them.	A flexible entity that involves interrogation of frameworks
Problem Scenario	Limited-solutions already known & are designed to promote cognitive understanding.	Focused on a real-life situation that requires an effective practical resolution.	Acquiring knowledge to be able to do, center around knowledge with action.	Characterized by resolving & managing dilemmas.	Multidimensional, offering students options for alternative ways of knowing, being.
Students	Receivers of knowledge, acquire, understand propositional knowledge by problem solving.	Pragmatists inducted into professional who can undertake practical action.	Integrators across boundaries.	Independent thinkers who take up a critical stance towards learning.	Explorers of underlying structures & belief systems.
Facilitator	Guide, to obtain solution, to under stand correct propositional knowledge.	Demonstrator of skills & a guide to 'best practice'.	Coordinator of knowledge, skill acquisition across boundaries of both.	Orchestrator of opportunities for learning (widest sense).	Commentator, a challenger & decoder of cultures, disciplines & traditions.
Assessment	Testing of a body of knowledge to ensure students have developed epistemological competence.	Testing of skills & competencies for the work place supported by a body of knowledge.	Examination of skills & knowledge in a context that may have been learned out of context.	Opportunity to demonstrate an integrated understanding of skills & personal and propositional knowledge across disciplines.	Open-ended & flexible.

learning, intrinsic motivation and skills to relate basic concepts with clinical reasoning which involves higher order thinking have greatly enhanced. Students found PBLs as an effective strategy to promote teamwork and critical thinking skills.

PBL is an effective method to improve critical thinking and problem solving skills among medical students. Problem-based learning (PBL) is an instructional method in which students learn through facilitated problem solving. The goals of PBL include helping students develop 1) flexible knowledge, 2) effective problem-solving skills, 3) SDL skills, 4) effective collaboration skills, and 5) intrinsic motivation. Improved teamwork and interpersonal skills. Successful completion of PBL challenges hinges firmly on communication and interaction. Meaning, instead of memorizing facts on their own, students get a chance to present them in front of a group, defending and revising them when required. Problem-based learning (PBL) is an instructional method in which students learn through facilitated problem solving. In PBL,

student learning centers on a complex problem that does not have a single correct answer. Students work in collaborative groups to identify what they need to learn in order to solve a problem. Project Based Learning is about exploring an answer. The aim here is that students gain and develop their knowledge and skills through working extensively to investigate and respond in detail to an issue that's engaging and complex, rather than clear-cut. Project-based learning focuses on developing critical thinking and problem solving skills in the students. Its inquiry-based method of learning to solve the problems given as projects to the students is a style of active learning. The difference is significant. Better learning effects are achieved by those students who have experienced PBL. Specifically, students who have experienced PBL have shown higher learning enthusiasm and analyzing ability. What's more, their writing skills and presentation skills are also well cultivated. Studies have proven that when implemented well, project-based learning (PBL) can increase retention of content and improve students' attitudes toward learning, among other benefits.

Every action is sorted out into five segments:

1. Time: Time length for the movement (as per mentors and coordinators) .
2. Objectives: Th e in general target of the action and the information, aptitudes and frame of mind students must accomplish toward the back er the movement.
3. Materials: Essential encouraging guides expected to help students, in view of the substance of every action (worksheets, asset data, and so on.) and preparing gear.
4. Steps:
    a. A definite provisional arrangement of the preparation procedure and yield of every action. Th e number of errands in every action may differ as indicated by the goal and substance, as managed in the "preparation content".
    b. Each action incorporates at least one undertakings; each assignment has a demonstrate innocence, preparing association, process and is introduced in the coach's action, students' movement and showing helps (concentrating on sharing genuine encounters).
    c. The exercises frequently incorporate asset/supporting data which furnish brief data in accordance with the action's goal (for example the substance that students must accomplish subsequent to taking an interest). Th is data is introduced in the Appendices.
5. Assessment: Focuses on whether the destinations were accomplished.

Before implementing PBL these things can be taken care of in Universities

1. Review, break down and orchestrate the training educational program and substance dependent on methodical intuition from the point of view of students, to make it significant and near their reallife encounters.
2. Relate information and aptitudes of diff erent subjects and instructive exercises to students' genuine encounters to take care of mind boggling and handy learning issues as per the learning targets of the evaluation and level.
3. PBL isn't exclusively a showing technique, yet in addition requires adjustment of the learning substance, instruments and association just as changing evaluation of the learning results in a comprehensive manner.

4. As a showing technique, PBL can be coordinated in most other showing strategies (for example issue raising introductions, issue raising discoursed, and research test showing) to make them increasingly dynamic.

Various wordings are utilized in Vietnam (and previous Socialist nations) to depict critical thinking abilities. Th ese incorporate issues, circumstances, issue based circumstances, issue raising instructing, issue based educating and learning, and so forth and as of late wording, for example, issue based learning (PBL), circumstance based learning, and so on. Much research on issue based learning has likewise been directed. Numerous individuals accept that to execute issue based learning, we should discover an issue and form it into an "issue based circumstance". Th is causes troubles in application in light of the fact that there are barely any issues in instructing that meet the criteria of an "issue based circumstance" (for example contain clashes, are suitable to the understudies' degree of learning and so on). Henceforth, issue bringing is fascinating up in principle however not generally pertinent practically speaking and at low levels. PBL infers a learning procedure where results are achieved from the way toward tackling issues. Along these lines, issues are both in setting and an inspiration for learning; the critical thinking process is the instrument for acquiring the learning result. In PBL, information and abilities are not for the most part introduced in an unbending organization, yet installed in the "issues". At the point when they are tackled, these issues will be uncovered; through taking care of issues, students will accomplish information and aptitudes. In this manner, the key issue in PBL is finding and creating issues and leading critical thinking exercises. 8 In PBL, the customary instructing strategies of repetition learning and retaining information are supplanted by methods in which students are effectively associated with investigating, discovering issues, circumstances and settings, proposing presumptions and expectations of future wonders and clarifying their causes and standards through perception, trials and talks. Th e fundamental nature of PBL includes gaining new information and abilities through innovative reasoning exercises. Its principle point is to assemble significant abilities for people, families and networks, for example the skill to rapidly and appropriately distinguish and take care of issues they experience. This methodology assists students with adjusting and coordinate into the general public and network, an issue of extraordinary worry in instruction these days.

FUTURE RESEARCH DIRECTIONS

- Make higher education nation making and national minded.
- Define national, regional and institutional strategies commensurate with the market forces and societal requirements.
- Grant full autonomy to all institutions.
- Reorient the curriculum towards PBL, reduce drastically lecture/practical hours, staff-student ratio be between 1:10 to 1:15, planned work/assessment, minimum 50 hours work load/week for staff, no vacation, introduce proportionate earned leave, in-house assessment by a teacher in charge of a student's-group of size 10-15, no traditional examinations but continuous planned assessment, one tutor (teacher) in charge of a group for the entire semester for all the subjects, staff more involved in research/consultancy work generating 20% of his salary, deploy need-based faculty training, etc.
- Tuition and living free for all students (residential institutions).

- No student be allowed to leave the country for any purpose after his graduation at least for two years, deploy unemployed graduates on social, educational, health, or any other task at the expense of local authorities meeting student's bare necessities only, confer degrees only after putting this national service.
- And above all, treat institutions as corporate (service industry).

CONCLUSION

This chapter presents briefly some models of education system and how they can be successful in Vietnam management education in universities. PBL has been internationally accepted by the developed countries which takes care of market forces and demands, and offers professional skills to the graduates improving their employability. Some features of PBL, like, learner identity, learning context and learning in relation have been presented. Domains of personal, pedagogical and interactional stance are also presented. Five PBL models and five untold stories are briefly presented. The sole objective of PBL seems to make student as an independent thinker/learner who can create knowledge based on his prior experience, his interaction with one or more persons, with nature, and with the life above all. A balanced blending of PBL, Gurukul model, and Yoga can be the right model to this soil. The leaders, educators, and faculty all need to strive in this direction to turn out useful graduates to society.

REFERENCES

Azzam, A. (2013). As technology and generations in medical education change, what remains is the intersection between educator, learners, assessment and context. *International Review of Psychiatry (Abingdon, England)*, *25*(3), 347–356. doi:10.3109/09540261.2013.787048 PMID:23859098

Barrows, H. S. (1986). A taxonomy of problem-based learning methods. *Medical Education*, *20*(6), 481–486. doi:10.1111/j.1365-2923.1986.tb01386.x PMID:3796328

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education*. Springer Publishing Company.

Boniface, G. (2010). Reflection and the Problem-Based Learning Curriculum. *Problem-Based Learning in Health and Social Care*, 97-113.

Boud, D. (1985). *Problem-based learning in education for the professions*. Higher Education Research and Development Society of Australasia.

Boud, D., & Feletti, G. (1997). *The challenge of problem-based learning* (2nd ed.). Kogan Page.

Clouston, T. J. (2010). 16: Interweaving the strands of thinking in problem-based learning. *Problem Based Learning in Health and Social Care*, 203.

Dolmans, D. H., Wolfhagen, I. H., Van Der Vleuten, C. P., & Wijnen, W. H. (2001). Solving problems with group work in problem-based learning: Hold on to the philosophy. *Medical Education*, *35*(9), 884–889. doi:10.1046/j.1365-2923.2001.00915.x PMID:11555227

Fidan, M., & Tuncel, M. (2019). Integrating augmented reality into problem based learning: The effects on learning achievement and attitude in physics education. *Computers & Education*, *142*, 103635. doi:10.1016/j.compedu.2019.103635

Gallagher, S. A. (2015). The role of problem-based learning in developing creative expertise. *Asia Pacific Education Review*, *16*(2), 225–235. doi:10.100712564-015-9367-8

Hadeel, A., & Sandhu, K. (2021). PLS Model Performance for Factors Influencing Students Acceptance of Elearning Analytics Recommender. *International Journal of Virtual and Personal Learning Environments*.

Hmelo-Silver, C. E., & Eberbach, C. (2012). Learning theories and problem-based learning. In *Problem-based learning in clinical education* (pp. 3–17). Dordrecht: Springer. doi:10.1007/978-94-007-2515-7_1

Jin, J. (2012). Sounds of Silence: Examining Silence in Problem-Based Learning (PBL) in Asia. In S. Bridges, C. McGrath, & T. Whitehill (Eds.), *Problem-Based Learning in Clinical Education. Innovation and Change in Professional Education* (Vol. 8). Dordrecht: Springer. doi:10.1007/978-94-007-2515-7_11

Kartono, K., Arumsasi, P. D., & Mariani, S. (2019). Analysis of students' mathematical reflective thinking on problem based learning (PBL) based from learning styles. *Unnes Journal of Mathematics Education*, *8*(1), 34–41.

Marks-Maran, D., & Thomas, B. G. (2000). Assessment and Evaluation in Problem-based Learning. In S. Glen & K. Wilkie (Eds.), *Problem-based Learning in Nursing*. London: Nurse Education in Practice. Palgrave. doi:10.1007/978-0-333-98240-2_8

Matheson, R., & Haas, B. (2010). Exploring the foundations for problem-based learning. *Problem-based learning in health and social care*, 9-24.

Mennin, S., Schwartz, P., & Webb, G. (Eds.). (2001). *Problem-based Learning: Case Studies, Experience and Practice*. Kogan Page.

Milgrom, E. (2001). The new engineering curriculum at the University Catholic of Louvain. *SEFI News Winter, 2002*, 9-11.

Murray, H., Walker, M., Dawson, J., Simper, N., & Maggio, L. A. (2019). Teaching Evidence-Based Medicine to Medical Students Using Wikipedia as a Platform. *Academic Medicine*. PMID:31725466

Okoye, H. C., Meka, I. A., Ugwu, A. O., Yahaya, I. A., Otokunefor, O., Ojo, O. O., & Ugwu, E. O. (2019). Perception of problem based learning versus conventional teaching methods by clinical medical students in Nigeria. *The Pan African Medical Journal*, *33*, 33. doi:10.11604/pamj.2019.33.311.19169 PMID:31692835

Pourshafie, T., & Murray-Harvey, R. (2013). Facilitating problem-based learning in teacher education: Getting the challenge right. *Journal of Education for Teaching*, *39*(2), 169–180. doi:10.1080/02607476.2013.765190

Savery, J. R. (2019). *The Wiley Handbook of Problem-Based Learning*. Wiley.

Savin-Baden, M. (2000). Problem-Based Learning. In *Higher Education: Untold Stories: Untold Stories*. McGraw-Hill Education.

Seymour, A. (2013). A qualitative investigation into how problem-based learning impacts on the development of team-working skills in occupational therapy students. *Journal of Further and Higher Education*, *37*(1), 1–20. doi:10.1080/0309877X.2011.643774

Stead, P., Morgan, G., & Scott-Roberts, S. (2010). 14: Becoming lifelong learners in health and social care. *Problem Based Learning in Health and Social Care*, 173.

Vernon, D. T., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine*, *68*(7), 550–563. doi:10.1097/00001888-199307000-00015 PMID:8323649

Waghodekar, P. H. (1989). Choice-Centered Class Room-A Case Study. *Journal of Engineering Education Transformations*, *3*(2), 6–15.

Whitcombe, S. W. (2012). *Problem-based Learning and the Development of Capital*. Academic Press.

Yew, E. H., & Goh, K. (2016). Problem-based learning: An overview of its process and impact on learning. *Health Profession Education*, *2*(2), 75–79. doi:10.1016/j.hpe.2016.01.004

Zavalkoff, A. (2016). Investigating Social Justice Education Through Problem Based Learning: A Subject Area Resource Specialist's Perspective. In M. Filipenko & J. A. Naslund (Eds.), *Problem-Based Learning in Teacher Education*. Cham: Springer. doi:10.1007/978-3-319-02003-7_11

Zavalkoff, A. (2016). Measures of Success in Problem Based Learning: Triple Jump Assessments and E-Folios. In M. Filipenko & J. A. Naslund (Eds.), *Problem-Based Learning in Teacher Education*. Cham: Springer. doi:10.1007/978-3-319-02003-7_13

Chapter 7
Digital Innovation for Transformation of Learning Management Systems at Universities

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ABSTRACT

Digital learning technologies have changed the face of the higher education sector and will continue to do so. The universities are using the digital LMS innovation (DLMS) tools that are unique to their environment. Different universities have different DLMS tools that are software driven and allow the users (management, instructors, and students) to use them for regular tasks. This study aims to investigate the acceptance and use of a DLMS at Jordanian universities. It also aims to examine the relationships among users (students and instructors), IT infrastructure, Jordanian culture, perceived usefulness (PU), perceived ease of use (PEOU), and acceptance of a DLMS. The study focuses on conviction of the users to use the digital system in a way to simplify their regular tasks. Findings are reported from data that were collected from 326 DLMS users.

INTRODUCTION

Digital Learning Management Systems (DLMSs) are widely used at universities for streamlining teaching and learning tasks, as they effectively manage learning tools and resources for user participants (students and teachers) (Kats, 2010; Rogers, 1995; Unwin et al., 2010). A phenomenal revolution has occurred in the university education over the past decade as a result of digital learning management systems, as

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they have been found to significantly benefit students' understanding and academic progress (Alnsour, Muhsen, Dababnah, Eljinini, & Barhoum, 2011; Rogers, 1995). DLMS applications are multifunctional, enabling students to have ubiquitous access to systems, watch lectures, download course materials and upload assignments online (AlQudah, 2014).

The latter provides convenience to students as never before and is conducive to study. To have efficient functioning of a DLMS, it is necessary to enable well-established links between data that is indexed by search engines, and web bots that connect and bind information together (Babić, 2012). DLMS empowers users and offers a greatly enhanced user experience overall (J. McIntosh & Torres, 2014; Phillipo & Krongard, 2012).

A DLMS greatly simplifies learning and deliverables, such as tests, assignments and other forms of assessment, with the use of multimedia applications that incorporate team learning through dynamic, real time, documented collaboration. Some examples include the use of chat, file transfer and assessment applications. A DLMS creates new platforms for the active learner and results in greatly expanding the learning curve. To fully understand the nature and implications of different DLMSs, it is vital to explore exactly what the DLMS context is (Ahmad, Chinade, Gambaki, Ibrahim, & Ala, 2012). This study is based on the most recent and related literature explaining various scenarios where DLMSs address learning issues in the digital environment in a way that was not possible in the previous confines of print logics.

This research study aims to identify the factors that impact on the acceptance of the DLMS at Jordanian universities. This research also investigate the acceptance and use of DLMS at Jordanian universities. It also focuses on the factors influencing acceptance of the DLMS at these Jordanian universities. However, the university management seeks, through related parties, to achieve the following goals:

- Provide all possible means of modern machine technologies (servers- information center-operation center-computer workshops-television digital learning management system such as Blackboard or Moodle) and necessary operating systems.
- Guarantee the application of information systems.
- Automate (machines of procedures and models) all information tasks.
- Take advantage of networks affiliated with the university, such as email services, banner system and television transmission of lectures and activities.
- Provide an environment suitable for spreading digital learning management system and applications and related training.
- Achieve high levels of information security from the source to the users.
- Safety of procedures and policies that guarantee the provision of electronic services.

BACKGROUND

Insight Into the Digital Learning Management System (DLMS)

Iskander (2008) and Whelan and Bhartu (2007) identify DLMS as a macro level term that refers to facilitating and managing the online learning process for all user profiles. These user types are students, administrators or instructors. The services facilitated by the DLMS include interactive strategies, and organising and monitoring control among learning groups. According to Kats (2010, p. 163), there are six tasks that are involved in an active DLMS. These six tasks include:

Creation *"refers to the production of learning and teaching materials by instructors"*. **Organization** *"refers to the arrangement of the materials for educational purpose (e.g., combining them into modules or courses)"*. **Delivery** *"refers to the publication and presentation of the materials, so that they can be accessed by students"*. **Communication** *"refers to the computer mediated communication between students and instructors and among students"*. **Collaboration** *"refers to students jointly working on files or projects; it also includes collaboration between instructors"*. **Assessment** *"refers to the formative and summative evaluation of learning process and outcomes, including feedback"*.

DLMSs are software that has been created to improve operations in the higher education sector. They can be used to monitor and control the learning and training conducted in any organization (Babić, 2012). It affects societies such as Jordan especially the people that are involved in DLMS and also the people around these learners attain a number of benefits in many ways such as increasing the performance and speed up data retrieval. Commonly used DLMSs are Moodle, Edmodo, Blackboard, Sumtotal System and Skillsoft (Gautreau, 2011). Among these mentioned systems, Moodle is the most commonly used learning system (S. Kim, Youn, & Kim, 2012). Moodle provides an open atmosphere for the learner to nourish and build upon their current knowledge base (Cole & Foster, 2007). Every year there is a significant increase in the number of users of these top five DLMSs. The number of users continues to increase exponentially (D. McIntosh, 2014).

DLMSs in Higher Education

Digital learning management systems are widely used in fields such as computer science and the arts (M. Kim, 2008). Various courses offered by engineering universities are through DLMS software (Whelan & Bhartu, 2007). The digital LMS model has largely advanced as a response to the new digital way of interacting with others as part of everyday life (Reilly, Vandenhouten, Gallagher-Lepak, & Ralston-Berg, 2012). A DLMS enables students to manage and manipulate large amounts of data that would otherwise require excessive effort if sorted by someone manually (J. McIntosh & Torres, 2014). A DLMS is applicable for all types of study and those who benefit most are students of computer science and engineering. The new trend is to obtain and share knowledge online. In computer science, it facilitates teachers and allows instructors to easily explain and demonstrate concepts and techniques using screen sharing functionality and other tools provided by DLMSs (Khafajeh, 2014; Majdalawi, Almarabeh, & Mohammad, 2014).

Learning through learning systems is more fruitful than other teaching mechanisms (McLeod Jr & Schell, 2001). According to Garrote Jurado (2012), there was a survey undertaken in engineering schools that studied the utilisation of a DLMS in the teaching process. The results stated that the instructors could not use the DLMS due to the risk there might be an adverse result on their teaching and, ultimately, learning. Proper results could be derived only if proper utilisation is carried out. To eliminate any threat to the educational process, instructors adopting the learning system should be subject to mandatory training to ensure they implement it as intended. Work performed by computer science students is mostly of a practical nature.

The theory and originating discussions leading to the inception of ideas and breakthroughs are not as effective if they are not incorporated as part of a learning system and integrated as part of its functionality. Video calls and online chat through the DLMS can remove this hindrance. As a result computer science learning takes places effectively, and efficiently which is of great practical importance (M. Kim, 2008).

STUDY OF FACTORS FOR THE ACCEPTANCE OF DLMS AT JORDANIAN UNIVERSITIES

The Technology Acceptance Model (TAM) (Davis, 1989; Venkatesh, 1999) has usually been used to examine the acceptance of a new technology. In this study, a research model is based on the TAM to investigate the acceptance of using DLMSs at Jordanian universities. The component of technical support will be incorporated through the TAM model, and serves as an extension to TAM. This is conducted in order to measure the acceptance of using DLMSs at Jordanian universities. The research model explains the system usage of applying DLMSs innovation at Jordanian universities. It consists of concepts that will be refined in relation to the Digital Learning Management System (DLMS) and include technical support, perceived usefulness (PU) and perceived ease of use (PEOU) (Venkatesh & Davis, 2000).

Information technology infrastructure (IT infrastructure) and the Jordanian culture, which are the main element factors that directly affect the acceptance of DLMS innovation in Jordan universities, followed by perceived usefulness and perceived ease of use of the DLMS. After that will be tested and discussed the acceptance of using DLMS and make sure it will continue use of DLMS in Jordanian universities.

Information Technology (IT) Infrastructure for DLMSs at Jordanian Universities

IT infrastructure for DLMSs in Jordan refers to the availability of technology in the country in general, and in universities in particular, such Internet connections, computers and DLMS tools (AlQudah, 2014). Many developing countries are still struggling with lack of IT infrastructure, and this research will highlight this factor as being one of the main factors influencing the acceptance of the DLMS in Jordan universities. According to Samak and Tawfik (2017), the Jordanian Ministry of Education made a five-year plan to establish IT infrastructure for public schools. This plan will be useful to identify the amount, methods and types of infrastructure used in the schools.

According to Khwaldeh, Al-Hadid, and Masa'deh (2017), the infrastructure for DLMS in Jordanian universities needs to improve and suit the demands of users (students, instructors and administration users). The study highlighted some users' infrastructure needs, such as deaf and the blind users, which means there is a gap in the IT infrastructure that needs to be identified and improved to be usable for all users (students and staff).

According to (Wimpenny, Adefila, & DeWinter, 2018), Jordanian academic staff plan around the existing technology. As some interviewers stated, "access to technology appears to be limited in certain organizations, and there is also evidence of unequal provision around the country. This could therefore justifiably explain why relatively few respondents (10.8%) feel that they can draw from a range of activities to meet their learner needs" (Wimpenny et al., 2018).

Donation from developed countries and organizations are being used to help upgrade the IT infrastructure for DLMSs in Jordanian universities from the old infrastructure to a new platform infrastructure; however, because of other obstacles like refugees from the border country and Jordan's lack of financial resources, the improvement is slow, which means that there is a lack of infrastructure, especially in the education sectors.

IT infrastructure for DLMSs in Jordanian universities positively affects the acceptance of DLMS through perceived use and perceived ease of use. Two hypotheses (H) were formulated regarding IT infrastructure for DLMSs as follows:

H1: IT infrastructure for DLMSs has a positive effect on perceived usefulness for the DLMS; and
H3: IT infrastructure for DLMSs has a positive effect on perceived ease of use for the DLMS.

Culture in Jordan

Cultural factors affect the use of DLMS tools in Jordanian universities. The unique culture in Jordan is a very important factor that influences the use of DLMSs in different ways, and this research will focus on this factor through perceived use and perceived ease of use. According to Cho and Berge (2002), the most influential factors regarding the adoption and deployment of a DLMS are the culture and norms of those working in higher education faculties. Therefore, pedagogical issues and the lack of technology professional training are affecting the acceptance of a DLMS.

Many researchers highlight culture as one of the most significant factors affecting the acceptance of using DLMSs in Jordanian universities. A limitation in the studies done in Jordan universities is that they do not reflect the real number of users, and to be accurate, the sample size should represent all types of users (Abdullateef, Elias, Mohamed, Zaidan, & Zaidan, 2016; M. Al-Shboul, 2013; Al Musawi, Ambusaidi, Al-Balushi, & Al-Balushi, 2015; Atoum, Otoom, & Ali, 2017; Bryan & Clegg, 2019; Khwaldeh et al., 2017). On the other hand, "emotions play a significant part in students' learning experiences within complex educational environments" (Arguel, Lockyer, Kennedy, Lodge, & Pachman, 2019; Misseyanni, Lytras, Papadopoulou, & Marouli, 2018).

According to M. Al-Shboul (2013), "We need to spread the culture of using e-Learning technology to enhance the quality of learning". The university management advised that more focus on user training is needed and the university culture needs to be more open to new technology to improve the quality of teaching and learning. With reference to Abbad, Morris, and De Nahlik (2009, p. 19) "Cultures that are more focused on oral traditions may be less engaged with e-learning". Management should work more on user training so the users can accept and enjoy the new technology and look forward to new updates. According to Varis and Al-Agtash (2008, p. 74) "As a relevant factor in the dissemination of values and in the formation of society's thinking, the media are responsible for disseminating local culture and the events that occur in the world". The media today is a very important player in local social life and improving the use of any new technology. It's the key player in changing user culture and improving positively any new technology.

In this research, a significant relationship exists between the influence of culture and the perceived usefulness and perceived ease of use of adopting a DLMS in Jordanian universities. There is a need to confirm this prediction with respect to the location (Jordanian universities) through this research. The relationship between cultural influence and the use of a DLMS is hypothesized in this research as follows:

H2: Culture has a positive effect on perceived ease of use for the DLMS; and
H4: Culture has a positive effect on perceived usefulness for the DLMS.

Perceived Usefulness of a DLMS

The perceived usefulness of a DLMS is defined as the degree to which the user believes that using the DLMS would improve their learning performance (Davis, 1989). It is "the degree to which a person believes that using a particular system could enhance their job performance" and "it is the extent to which an individual believes that using the system enhances his/her performance" (Saadé & Bahli, 2005, pp.

217-240). According to Davis (1989, p. 320) "People tend to use or not use an application to the extent they believe it will help them perform their job better. We refer to this first variable as perceived usefulness".

In the TAM, Davis (1989) suggests two determinants of computer usage: PU (perceived usefulness) and PEOU (perceived ease of use). Later, other investigators and researchers extended the TAM model to combine additional variables that could account for extra variance in computer usage technology (Gefen & Straub, 1997; Venkatesh & Davis, 2000). The advantage paradigm from behavioural decision theory is relevant to perceived usefulness and perceived ease of use (Beach & Mitchell, 1978).

The benefits of the hypotheses of IT infrastructure and culture are to encourage users (students, instructors and management) to accept any new technology and work on it to gain all the advantages and improve the quality of learning. The IT infrastructure and culture in Jordan are very important factors affecting the acceptance of any new technology to accept, including the use of DLMSs in Jordanian universities (M. Al-Shboul, 2011; M. A. Al-Shboul & Alsmadi, 2010; Alnsour et al., 2011; AlQudah, 2014).

This research will highlight the perceived usefulness on DLMS tools from the IT infrastructure and the culture in Jordan context to show the attention of acceptance using DLMS in Jordan universities. The relationship between perceived usefulness and the acceptance of DLMS to adopt DLMS is hypothesized as follows:

H5: Perceived usefulness in accepting a DLMS has a positive effect on acceptance of the DLMS.

Perceived Ease of Use of a DLMS

The perceived ease of use of a DLMS is defined as the degree to which the user believes that using the DLMS will be free of effort (Davis, 1989). It can be described as "the degree to which a person believes that using a particular system is free of effort. Previous research has demonstrated that individuals are more likely to use a new technology if they perceive that it is easy to use" (Saadé & Bahli, 2005, pp. 101-132).

Davis (1989) shows that ease of use had a direct effect on perceived usefulness. Many studies on the TAM also provided strong experimental support for a positive relationship between perceived usefulness and perceived ease of use. The TAM shows that perceived ease of use and perceived usefulness have a direct effect on acceptance of using a new technology (Adams, Nelson, & Todd, 1992; Szajna, 1996; Venkatesh & Davis, 2000). Venkatesh (1999) discovered that "facilitating conditions and external control served as anchors that users employ to inform perceived ease of use about information technology" as cited in (Abbad et al., 2009, p. 167). According to Williams (2002), an important factor in determining the acceptance of technology such as a DLMS is the availability of "technical support".

Both IT infrastructure and culture are very important factors that affect ease of use of a DLMS. According to M. Al-Shboul (2013) IT infrastructure and culture are key players in enhancing the quality of learning. IT infrastructure should be able to support and accept any technology and software tools without obstacles. Poor infrastructure will cost any organization money and time in activating the new tools or new technology software.

It is hypothesized that IT infrastructure and culture affect the perceived ease of use a DLMS positively and negatively. Good infrastructure makes any new software easy to apply and use. With regard to culture, knowledge of the culture where a new software will be applied will allow the new technology to be easy for the uses to use for the users to use (students, instructors and managements) (Al-Dmour, 2014; AlQudah, 2014).

Perceived ease of use of a DLMS shows the intention a user has to make use of a technology under a given behaviour. It was predicted that users' behavioural intention to adopt DLMS has an encouraging influence on acceptance of the DLMS.

H6: Perceived ease of use of a DLMS has a positive effect on acceptance for the DLMS.

Acceptance and Continued Use of DLMS

The Technology Acceptance Model (TAM) "has become well-established as a robust, powerful, and parsimonious model for predicting user acceptance" (Venkatesh & Davis, 2000, p. 19). A large number of researchers have adopted the TAM to test and examine the acceptance of new technologies like personal computers (Igbaria, Zinatelli, Cragg, & Cavaye, 1997).

Davis (1989, p. 335) indicates that: "the possibility of dysfunctional impacts generated by information technology emphasizes that user acceptance is not a universal goal and is actually undesirable in cases where systems fail to provide true performance gains. Although there has been a growing pessimism in the field about the ability to identify measures that are robustly linked to user acceptance, the view taken here is much more optimistic. User reactions to computers are complex and multifaceted. But if the field continues to systematically investigate fundamental mechanisms driving user behaviour, cultivating better and well measures and critically examining alternative theoretical models, sustainable progress is within reach".

To accept a new system, hypotheses for both perceived usefulness and perceived ease of use should be examined (Davis, 1989). The model reflects these hypotheses to measure the acceptance of new software for any organization, especially Jordanian universities, and it will then be possible to see if it is appropriate to use this new software in these universities. The model can then be used for all universities in Jordan. The outcome will influence the continued use of DLMS software in Jordanian universities in general (Almarabeh, 2014).

Acceptance of a DLMS shows the perceived usefulness and perceived ease of use of a DLMS under a given behaviour for continued use of DLMSs in Jordanian universities.

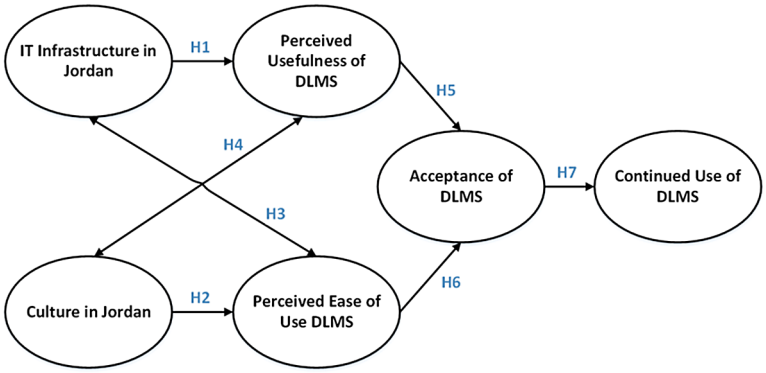
H7: Acceptance of a DLMS has a positive effect on continued use of the DLMS.

CONCEPTUAL CONSTRUCTS AND THE RESEARCH MODEL

The research utilises the Technology Acceptance Model (TAM) as a framework to address all the relevant issues around the DLMS context. In this research, the proposed model based on the extension of the Technology Acceptance Model (TAM) (Davis, 1989) that has been applied, tested and examined for the discovery of new information and understanding of the Digital Learning Management System model (DLMS). The following is a review and definition of this framework with critical perspectives (Ellis & Goodyear, 2018).

A number of issues can affect users' decision to accept DLMS tools of choice, and Jordan is one of the developing countries that experience problems such as lack of network connectivity, slow system response and social cultural issues. In this research, the many factors that affect acceptance and rate of adoption are used to understand how they influence the diffusion rate of DLMS tools as innovative in-

Figure 1 Conceptual framework for Digital Learning Management System Model at Jordan universities (DLMS)



structional delivery tools. Therefore, we investigate behavioural intent to use DLMS tools by employees, based on attitude, relative advantage, complexity and compatibility (Mkhize, Mtsweni, & Buthelezi, 2016). Table 1 below shows definition of the latent variable for this study.

Table 1. Definition of the Latent Variable

Latent Variable	Definitions
IT infrastructure	The availability of technology in the country in general, and in universities in particular, such Internet connections, computers and DLMS tools (AlQudah, 2014).
Jordanian Culture	The unique culture in Jordan is a very important factor that influences the use of DLMSs in different ways, and this research will focus on this factor through perceived use and perceived ease of use.
Perceived ease of use (PEOU)	Perceived ease of use refers to *the degree to which a person believes that using a particular system would be free of effort* (Davis, 1989, p. 320).
Perceived usefulness (PU)	the degree to which the user believes that using the DLMS would improve their learning performance (Davis, 1989).
Acceptance of an DLMS	The perceived usefulness and perceived ease of use of a DLMS under a given behaviour for continued use of DLMSs in Jordanian universities.

In the TAM, Davis (1989) suggests two determinants of computer usage: PU (perceived usefulness) and PEOU (perceived ease of use). Later, other investigators and researchers extended the TAM model to combine additional variables that could account for extra variance in computer usage technology (Gefen & Straub, 1997; Venkatesh & Davis, 2000). The advantage paradigm from behavioural decision theory is relevant to perceived usefulness and perceived ease of use (Beach & Mitchell, 1978).

The literature review proposed the hypotheses that suggests the acceptance of a DLMS may be due to complex relationship between the variables. The following hypotheses are proposed:

Summary of Hypotheses

H1: IT infrastructure characteristics positively affect perceived usefulness of a DLMS
H2: Cultural characteristics positively affect perceived ease of use of a DLMS
H3: IT infrastructure characteristics positively affect perceived ease of use of a DLMS
H4: Cultural characteristics positively affect perceived usefulness of a DLMS
H5: Perceived usefulness of DLMS characteristics positively affect acceptance of a DLMS
H6: Perceived ease of use of DLMS characteristics positively affect acceptance of the DLMS
H7: Acceptance of a DLMS characteristics positively affects continued use of the DLMS

A number of issues can affect users' decision to accept DLMS tools of choice, and Jordan is one of the developing countries that experience problems such as lack of network connectivity, slow system response and social cultural issues. In this research, the many factors that affect acceptance and rate of adoption are used to understand how they influence the diffusion rate of DLMS tools as innovative instructional delivery tools. Therefore, we investigate behavioural intent to use DLMS tools by employees, based on attitude, relative advantage, complexity and compatibility (Mkhize et al., 2016).

RESEARCH METHODOLOGY

A web-based survey instrument based on specific themes has been administered to organise and collect quantitative data in this research. A positivist research paradigm has been accepted for this web-based survey research for many reasons. Firstly, the researcher has been used a theoretical framework for DLMS based on a set of hypotheses derived from both quantitative positions and the literature review examined in this research and from the ontological view (Osterwalder, 2004).

According to epistemological view (Cannon, 1994), and in to deliver the reality data, the researcher was independent from any influence. Finally, this research expresses clearly the quantitative approach used to check the factors influencing for the acceptance of a DLMS in order to develop and improve a generalisation for the relationships affecting the model.

The research used quantitative methods, typically starting with a theoretical foundation and directed by hypotheses or explicit research enquiries (Cooksey & McDonald, 2009; Onwuegbuzie & Leech, 2005). It also utilized a predetermined and auditable group of stages to accept or reject a hypothesis (Macoun & Miller, 2014). Positivism is connected with many specific social theories (Straub, Boudreau, & Gefen, 2004). Positivist researchers prefer to conduct quantitative social research relying on surveys, statistics and experiments (Schrag, 1992; Straub et al., 2004). Positivist researchers try to examine and test the theory in order to increase the phenomena understanding (Creswell, 2013; Schrag, 1992).

Research Context: Jordanian Universities

The research conducted in the context of Jordanian universities. It was particularly focused on six main universities in Jordan: the University of Jordan (UJ) (www.ju.edu.jo), which is the oldest government university in Jordan, Princess Sumaya University for Technology (PSUT) (www.psut.edu.jo), which is a mixed university system (government and private), and Philadelphia University (PU) (www.philadelphia.edu.jo), which is one of the private universities in Jordan. Jordan University of Science and Technology

(JUST) (www.just.edu.jo), which is one of the public universities in Jordan. The last university is The Applied Science Private University (ASU) (www.asu.edu.jo), which is one of the private universities in Jordan. These six different types of universities represent the major universities in Jordan. According to (Rank, 2019), table 2 below shows some important details of these universities from which the research data was collected.

Table 2. Research context: Jordanian universities

University	World Rank	Country Rank	Type	Enrollment Range Students	Location
UJ	1643	1	non-profit public	35,000-39,999	Large city Amman
PSUT	6452	11	non-profit private	3,000-3,999	Amman
JUST	2315	2	non-profit public	20,000-24,999	Irbid
PU	2528	3	profit private	5,000-5,999	North Amman
ASU	7342	16	profit private	8,000-8,999	Amman
AABU	5362	9	non-profit public	15,000-19,999	Mafraq

Note. UJ = University of Jordan; PSUT = Princess Sumaya University of Technology; JUST = Jordan University of Science and Technology; PU = Philadelphia University; ASU = Applied Science Private University; AABU = Al al-Bayt University (Rank, 2019).

Sampling and Data Collection

Data collected from 326 respondents based on a convenience sampling technique between the period of July 2018 and Nov 2018. The respondents who preferably use DLMS software within the domain of Jordanian universities. (See Table 3). Initially, the anticipated respondents were 500, and the surveys were circulated. However, we finalized 326 valid responses after deleting improperly filled or doubted questionnaire indicating 65.2% response rate.

Questionnaires were distributed through an online approach based on the 34-item scale, including 4 demographic items. There were more in level four respondents (124 responses, 38%) than other levels (1, 2 and 3) respondents (202 responses, 61.9%). Although the age of a person depends on study levels, less than 17 years old, 17 to 19 years old, 20 to 22 years old and more than 22 years old. The age 20 to 22 years old (215 responses, 65.9%). In addition, Table 2 shows the detail descriptions of participant's ages attributes.

Table 3. The detail descriptions of participant's ages attributes

#	Age	Count	%
1	Less than 17 years old	1	0.31%
2	17 to 19 years old	33	10.12%
3	20 to 22 years old	215	65.95%
4	More than 22 years old	77	23.62%
	Total	**326**	**100%**

Instruments and Selection

Six constructs are used such as IT infrastructure, Culture, PEOU, PU, Acceptance of DLMS and User continuance. The questionnaire was developed in English and translated into Arabic with the help of the professor and lab fellows. Both languages have been used in the questionnaire during the data collection procedure for a better and clear understanding of each statement. The construct for IT infrastructure, Culture, PEOU, PU, acceptance of DLMS and user continuance formed based on a 5-point Likert-type scale (ranged, 1 = strongly disagree to 5 = strongly agree). Cronbach's alpha values of all constructs were above 0.088 (Table 3).

Table 4. Construct Reliability Statistical Data

Construct	α
IT	0.798
JC	0.833
PU	0.881
PEOU	0.838
UA	0.859
UC	0.706

Note. α = Cronbach's alpha; IT = Information Technology; JC = Jordanian Culture; PU = perceived usefulness; PEOU = perceived ease of use; UA = User Acceptance; UC = User Continuance.

To test the internal consistency and reliability of the measures, Cronbach's alpha test was conducted and the values for the multiple items of each construct were calculated. All variables that were merged from the factor analysis presented high Cronbach values, and thus the reliability of the instrument was established. As (Hair, Black, Babin, Anderson, & Tatham, 2006) recommended that the reliability of the scale is generally accepted if the value of Cronbach's alpha for each construct is equal to or greater than 0.70, the reliability of the constructs is established (see Table 3). IT infrastructure had a value of 0.798, Jordanian culture, 0.833, perceived usefulness, 0.881, perceived ease of use, 0.838, user acceptance, 0.859, and continuance usage intention, 0.706. Indeed, table 3 supports the enhancement of the reliability and validity of the scales.

Data Analysis

The quantitative data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) statistics software, version 17.0 and SmartPLS 3 (Ringle, Wende, & Becker, 2015). This will include the use of group means, frequencies, Rach Analysis, ANOVA and T-test. The Partial Least Square (PLS) modelling technique - developed by Professor Wynne Chin (Chin, 1995) - were adopted in this research. The qualitative data collected analyzed using thematic analysis of codes, categories and themes. This were brought together with the quantitative for interpretation and discussion.

In each step of the construct, validity and reliability process were analyzed using SPSS Version 17.0 because it enables data to be transferred easily from one format to another and because it is accessible in the University of New England (UNE) website as free of charge.

SPSS statistics software provides tools to transfer organise and analyse raw data. The data structure and format can be changed to test the data in this research study. For instance, SPSS was used to estimate the inter-construct correlation and descriptive statistics and to find the effects of dependent variables on independent variables and vice versa, whereas SmartPLS software was used to evaluate and interpret the PLS-SEM model. The inter-construct correlation among the variables was evaluated along with the mean and SDs of the variables. Finally, SEM was performed to investigate the relationships among IT infrastructure, Culture, PEOU, PU and Acceptance of DLMS at Jordanian universities.

Hypothesis Testing Measurement ModelHypothesis testing is a statistical technique that is used to investigate the truth value of a claim about a subject matter. Hypothesis testing process involves the statement of both alternative and null hypotheses have to be stated. A null hypothesis is stated negatively while an alternative hypothesis is stated positively (Williamson & Kirsty, 2018). Therefore, an alternative hypothesis represents the researcher's view point about the subject matter. A null hypothesis is a stated that is being tested. A null hypothesis is denoted by H0 while an alternative hypothesis is denoted by H1 (Iskandar, Ismed, Mohd, & Noraini, 2014). The following hypothesis were tested:

H0: IT infrastructure characteristics does not positively affect perceived usefulness of a DLMS
H1: IT infrastructure characteristics positively affect perceived usefulness of a DLMS
H0: Cultural characteristics does not positively affect perceived ease of use of a DLMS
H1: Cultural characteristics positively affect perceived ease of use of a DLMS
H0: IT infrastructure characteristics does not positively affect perceived ease of use of a DLMS
H1: IT infrastructure characteristics positively affect perceived ease of use of a DLMS
H0: Cultural characteristics does not positively affect perceived usefulness of a DLMS
H1: Cultural characteristics positively affect perceived usefulness of a DLMS
H0: Perceived usefulness of DLMS characteristics does not positively affect acceptance of a DLMS
H1: Perceived usefulness of DLMS characteristics positively affect acceptance of a DLMS
H0: Perceived ease of use of DLMS characteristics does not positively affect acceptance of the DLMS
H1: Perceived ease of use of DLMS characteristics positively affect acceptance of the DLMS
H0: Acceptance of a DLMS characteristics does not positively affects continued use of the DLMS
H1: Acceptance of a DLMS characteristics positively affects continued use of the DLMS.

The above hypothesis were tested by running correlation analysis. A correlation analysis is a statistical technique that is used to investigate the relationship between the variables. A correlation analysis presents the nature and the strength of the relationship through the coefficient of correlation. A perfect positive correlation has a value of 1 while a perfect negative correlation has a value of -1. Variables that are not correlated have a correlation coefficient of 0. A correlation coefficient that lies between 0 and 0.5 is a weak positive correlation while a correlation coefficient that lies between 0.5 and 1 is a strong positive correlation. On the other hand, a correlation coefficient that lies between 0 and -0.5 is a weak negative correlation while a correlation that lies between -0.5 and -1 is a strong negative correlation.

The table below represents the output of the latent variable correlation analysis. From the table below. The correlation coefficient between IT infrastructure characteristics and the perceived usefulness of a DLMS is 0.574. The correlation coefficient is a strong positive correlation coefficient. The correlation

is significant at 0.05 level of significance with a significance value of 0.00. Therefore, it is statistically accurate to conclude that indeed IT infrastructure characteristics positively affect perceived usefulness of a DLMS.

The correlation coefficient between Cultural characteristics and the perceived ease of use of a DLMS is 0.396. The correlation coefficient is a strong positive correlation which is significant at 0.05 level of significance. Therefore, it is statistically accurate to conclude that indeed cultural characteristics positively affect perceived ease of use of a DLMS.

The correlation coefficient between IT infrastructure characteristics and perceived ease of use of a DLMS is 0.413. The correlation coefficient is a weak positive correlation. Therefore, it is statistically correct to conclude that IT infrastructure characteristics positively affect perceived ease of use of a DLMS.

The correlation coefficient between cultural characteristics and perceived usefulness of a DLMS is 0.638. The correlation coefficient is a weak positive correlation Therefore, we conclude that Cultural characteristics positively affect perceived usefulness of a DLMS.

The correlation coefficient between perceived usefulness of DLMS characteristics and acceptance of a DLMS is 0.494. The correlation coefficient is a weak positive correlation. Therefore, perceived usefulness of DLMS characteristics positively affect acceptance of a DLMS.

The correlation coefficient between perceived ease of use of DLMS and affect acceptance of the DLMS is 0.634. The correlation coefficient is a strong positive correlation. Therefore, perceived ease of use of DLMS characteristics positively affect acceptance of the DLMS.

The correlation coefficient between acceptance of the DLMS characteristics and continued use of the DLMS is 0.418. The correlation coefficient signifies a strong positive correlation. Therefore, perceived ease of use of DLMS characteristics positively affect acceptance of the DLMS.

The T- Test

A t test was used to investigate whether there was any significant differences in the average values. The output below demonstrates that there was no significant difference in the average values of the parameters.

Confirmatory Factor Analysis (CFA)

The Confirmatory Factor Analysis (CFA) was performed in STATA 14.2. CFA were used to create factorial validity through discriminant and convergent validities as shown in Table 4 (Chin, 1998; Gefen & Straub, 2005; Martínez-López, Gázquez-Abad, & Sousa, 2013). Convergent validity indicates to the degree to which measures two diverse of the same variable or concept agree (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014). CFA presents once each measurement item has a strong correlation with its assumed theoretical variable. This can be completed by pointing the loading value with a significant t-value on its latent variable.

From the results, we can see that all the questions are significant in the model with the exception of JC4 which has a p-value greater than 0.05. This means that the grouping used with regard to the 36 questions was appropriate with the exception of question JC4.

Table 5. Latent Variable Correlations

Construct		IT	JC	PU	PEOU	UA	UC
IT	**Pearson Correlation**	1	.611**	.574**	.413**	.395**	.408**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	326	326	326	326	326	326
JC	**Pearson Correlation**	.611**	1	.638**	.396**	.338**	.383**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	326	326	326	326	326	326
PU	**Pearson Correlation**	.574**	.638**	1	.436**	.494**	.423**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	326	326	326	326	326	326
PEOU	**Pearson Correlation**	.413**	.396**	.436**	1	.634**	.304**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	326	326	326	326	326	326
UA	**Pearson Correlation**	.395**	.338**	.494**	.634**	1	.418**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	326	326	326	326	326	326
UC	**Pearson Correlation**	.408**	.383**	.423**	.304**	.418**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	326	326	326	326	326	326

Note. **. Correlation is significant at the 0.01 level (2-tailed); IT = Information Technology; JC = Jordanian Culture; PU = perceived usefulness; PEOU = perceived ease of use; UA = User Acceptance; UC = User Continuance.

Table 6. One-Sample Test

Construct	Test Value = 0					
	t	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
IT	82.011	325	.000	3.883	3.79	3.98
JC	58.280	325	.000	3.282	3.17	3.39
PU	82.622	325	.000	3.871	3.78	3.96
PEOU	78.145	324	.000	3.803	3.71	3.90
UA	70.346	324	.000	3.791	3.68	3.90
UC	71.900	323	.000	3.744	3.64	3.85

Note. t = t test; df = Degrees of Freedom; IT = Information Technology; JC = Jordanian Culture; PU = perceived usefulness; PEOU = perceived ease of use; UA = User Acceptance; UC = User Continuance.

Table 7. Confirmatory factor analysis (CFA)

Construct	Item Code	IT Infrastructure	Jordanian Culture	Perceived Usefulness	Perceived Ease of Use	User Acceptance	Continuance Usage
IT	IT1	0.709	0.607	0.707	0.667	0.679	0.601
	IT2	0.791	0.781	0.761	0.790	0.787	0.782
	IT3	0.772	0.711	0.718	0.770	0.701	0.714
	IT4	0.627	0.612	0.602	0.620	0.622	0.616
	IT5	0.782	0.770	0.754	0.788	0.710	0.777
	IT6	0.771	0.701	0.708	0.772	0.701	0.715
JC	JC1	0.737	0.747	0.737	0.707	0.719	0.711
	JC2	0.801	0.804	0.819	0.790	0.787	0.782
	JC3	0.711	0.848	0.718	0.770	0.701	0.714
	JC4	0.612	0.890	0.602	0.620	0.622	0.616
	JC5	0.870	0.871	0.799	0.788	0.719	0.797
	JC6	0.870	0.881	0.789	0.798	0.789	0.787
PU	PU1	0.807	0.819	0.834	0.737	0.809	0.801
	PU2	0.790	0.700	0.734	0.720	0.717	0.702
	PU3	0.800	0.801	0.864	0.770	0.801	0.814
	PU4	0.720	0.722	0.752	0.772	0.722	0.716
	PU5	0.728	0.719	0.784	0.748	0.710	0.777
	PU6	0.778	0.710	0.774	0.770	0.711	0.787
PEOU	PEOU1	0.507	0.519	0.601	0.604	0.607	0.609
	PEOU2	0.790	0.800	0.782	0.801	0.790	0.787
	PEOU3	0.600	0.601	0.598	0.604	0.560	0.601
	PEOU4	0.720	0.722	0.716	0.793	0.720	0.722
	PEOU5	0.728	0.719	0.707	0.734	0.711	0.710
	PEOU6	0.778	0.789	0.747	0.764	0.733	0.714
UA	UA1	0.739	0.700	0.789	0.718	0.800	0.737
	UA2	0.719	0.780	0.786	0.782	0.787	0.701
	UA3	0.718	0.705	0.701	0.714	0.755	0.711
	UA4	0.702	0.720	0.722	0.716	0.748	0.744
	UA5	0.649	0.668	0.619	0.607	0.676	0.670
	UA6	0.665	0.687	0.643	0.634	0.678	0.698
UC	UC1	0.705	0.710	0.667	0.679	0.701	0.706
	UC2	0.681	0.661	0.690	0.687	0.682	0.693
	UC3	0.711	0.728	0.750	0.721	0.714	0.751
	UC4	0.712	0.702	0.720	0.722	0.716	0.745
	UC5	0.730	0.754	0.758	0.710	0.755	0.762
	UC6	0.735	0.787	0.756	0.787	0.721	0.787

IT = Information Technology; JC = Jordanian Culture; PU = perceived usefulness; PEOU = perceived ease of use; UA = User Acceptance; UC = User Continuance

PLS Structural Model

Additionally to PLS algorithm, the bootstrapping procedure was used and 326 cases were selected, with the 'no sign changes' option to evaluate the significance of the path coefficients (Hair et al., 2012). The results of the PLS–SEM analysis show the structural model estimation and evaluation of the formulated hypotheses indicate they are sound according to obtained t-values and p-values (see Table 7) below. It found that IT infrastructure (IT) positively and directly influences perceived usefulness (PU) ($\beta = 0.456$, $p \leq 0.001$) and that Jordanian culture (JU) positively and directly affects perceived ease of use (PEOU) ($\beta = 0.420$, $p \leq 0.001$). Furthermore, IT infrastructure (IT) positively and directly influences perceived ease of use (PEOU) ($\beta = 0.486$, $p \leq 0.001$). Besides, Jordanian culture (JU) positively and directly affects perceived usefulness (PU) ($\beta = 0.417$, $p \leq 0.001$). Further, both perceived usefulness (PU) and perceived ease of use (PEOU) were found to positively and directly influence user acceptance (UA) ($\beta = 0.535$, $p \leq 0.001$; $\beta = 0.344$, $p \leq 0.001$; respectively). Finally, it was found that user acceptance (UA) positively and directly influences continuance usage intention (UC) ($\beta = 0.654$, $p \leq 0.001$).

Table 8. Hypotheses testing results

Hypotheses	Path Coefficient	*t*-Statistics	*p*-Values	Result
H1: IT → PU	0.456	6.338	0	Accepted
H2: JC → PEOU	0.420	6.362	0	Accepted
H3: IT → PEOU	0.486	6.378	0	Accepted
H4: JC → PU	0.417	6.322	0	Accepted
H5: PU → UA	0.535	9.295	0	Accepted
H6: PEOU → UA	0.344	6.947	0	Accepted
H7: UA → UC	0.654	10.652	0	Accepted

Note. H = Hypotheses; IT = Information Technology; PU = perceived usefulness; JC = Jordanian Culture; PEOU = perceived ease of use; UA = User Acceptance; UC = User Continuance.

SOLUTIONS AND RECOMMENDATIONS

DLMS's are managed by the administrators to restrict access to some or all documents stored (depends on the permissions for each user). However, in some cases the administrators can override the safeguard to access information in order to provide the best services. It is particularly important that Jordanian universities use one learning system for culturally and linguistically diverse. This also requires everyone to have access to smart phones, laptop and internet connections. On the other hand, it is essential for the users (instructors, administrators and students) to also embrace, access and manage the privacy of their profile's to enhance their practice and provide positive outcome to the daily works.

The challenge is to strike a balance between the qualities of using and managing the online digital learning management system by the users is very important in partnership with each other's. Following recommendations can be taken to improve using of digital learning management system as well as e-learning so that users can use 'DLMS' to empower them for their goal benefit in best and professional way;

- Promoting using digital learning management system is essential, as DLMS facilitates and motivates users to self-manage and empower themselves that determine their daily processes with other users or with themselves.
- It is essential for users to not just have access, know how to use their digital learning system records, but foremost how to use the basics computer skills, as a minimum requirement. In each university at Jordan has a specialized computer center can be run one semester digital/computer literacy units to teach how to use the computer and internet search engine skills to users with low-computer literacy and non-English speaking background.
- All key stakeholders such as the Ministry of Higher Education at Jordan, Jordanian university management (public and private) must work together for the adoption, safety, security, privacy of the digital learning management system, for beneficial usage of electronic educational system to empower the users to manage themselves and to improve using DLMS.
- It's obvious that DLMS must be improved and changed to suit users. Many users have complained about the complexity of use the digital learning management system due to the difficulty of accessing the information. Further, they propose improving the DLMS system through improving the notifications system, so they can access and know any updates on the DLMS instead of using unprofessional tools such as social media between each other.

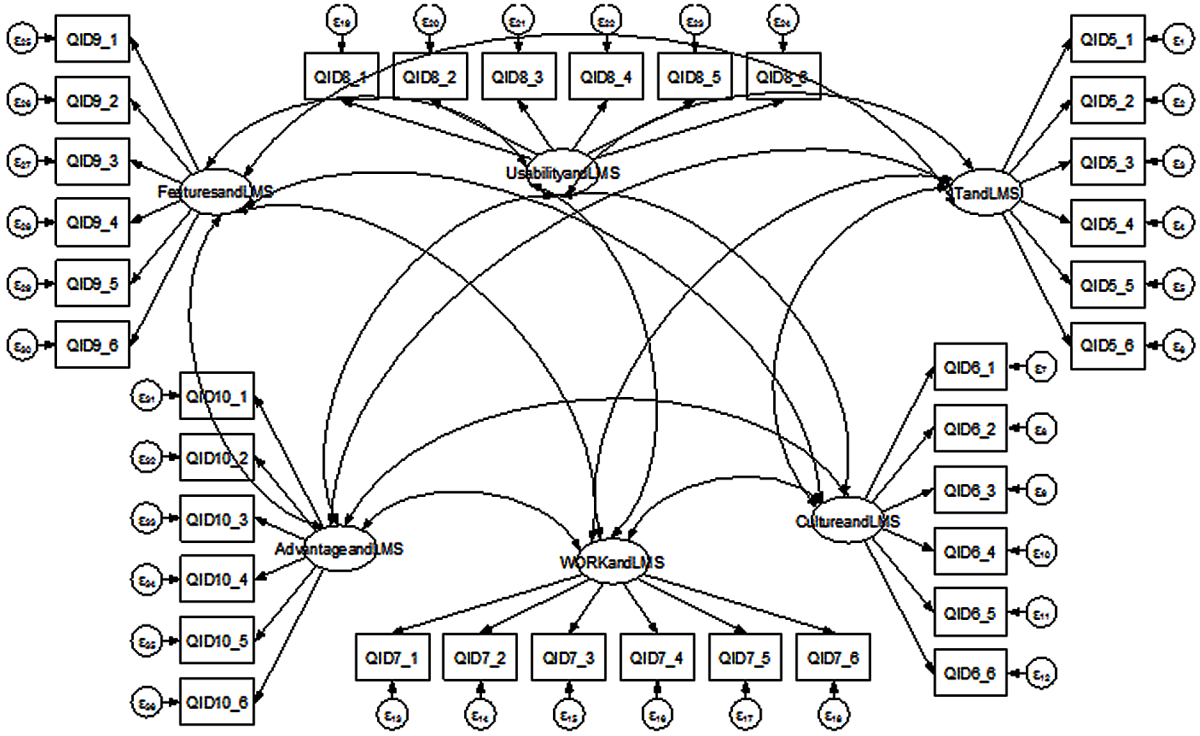
FUTURE RESEARCH DIRECTIONS

Future research could collect interview data with the instructors and the administrators to test the validity of the qualitative findings, followed by quantitative survey with the users' (instructors', students' and administrators'). Studies can also survey users satisfaction with the use of 'DLMS' by purposeful sampling of diverse population belonging to different demographic groups, education, gender characteristics and rural urban setting, due to digital divide. Such as youth, middle age. The hypothesized relationship between digital literacy, improves communication and enhances using DLMA can be explored and empirically tested with different groups of people in developed countries such as Australia, USA, UK...

CONCLUSION

Research indicates that Blackboard was previously one of the most popular learning systems, but its use has decreased recently, while the use of open source LMSs continues to increase on a global scale (J. McIntosh & Torres, 2014). Its place in the market grows as the ability for technology to connect users around the world proliferates (Machajewski, 2014). Its usage increased 33% from 2005 to 2009 (Kats, 2010). Moodle rates as the preferred learning system by all, as it is open source, free and gives the learner a broader platform on which to work (Cole & Foster, 2007). According to The Campus Computing Project, (2008), 13.8% of participating students identified Moodle or Sakai as the campus LMS, while the number were 10.3% in 2007 and only 7.2% in 2006. All the learning organizations prefer either Sakai or Moodle, but the majority have adopted Moodle, and the number of users is also increasing every year (Phillipo & Krongard, 2012). Both public and private sector both universities, especially those offering engineering and computer sciences, use Moodle (28%), Sakai (32%) and Blackboard (40%) (McDaniel, Fanfarelli, & Lindgren, 2017). In conclusion, the latest developments in the e-learning and DLMSs

Figure 2. Partial Least Squares Regression (PLS)



has broadened their capabilities, and they have been adopted by all universities in developed countries (Mwalumbwe & Mtebe, 2017).

Assuming that there are six distinct groups that are represented in question 5 to 10. Each group relates to a different factor associated with DLMS model; Nevertheless all the groups are correlated because they all answer questions linked to DLMS model. Each group is made up of six sub-questions investigating different aspects of using DLMS with regard to: IT, Culture, Work (PU), Usability (PEOU), Features (Acceptance), and Advantages (continued use of the DLMS).

The covariance vary between different groups with some having very high and others having relatively low covariance (Creswell, 2013). All in all, we can conclude there is sizable positive correlation between all the groups. The Root Mean Square Error of Approximation (RMSEA) for this model with a sample size of 326 is given as 0.065. This is an acceptable fit to the overall population; it indicates less than 25% misfit to the population data. In conclusion, the model illustrated below is statistically significant but it can be improved by removing JC4.

REFERENCES

Abbad, M. M., Morris, D., & De Nahlik, C. (2009). Looking under the bonnet: Factors affecting student adoption of e-learning systems in Jordan. *The International Review of Research in Open and Distributed Learning*, *10*(2). doi:10.19173/irrodl.v10i2.596

Abdullateef, B. N., Elias, N. F., Mohamed, H., Zaidan, A., & Zaidan, B. (2016). An evaluation and selection problems of OSS-LMS packages. *SpringerPlus*, *5*(1), 1. doi:10.118640064-016-1828-y PMID:27064567

Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *Management Information Systems Quarterly*, *16*(2), 227–247. doi:10.2307/249577

Ahmad, S. A., Chinade, U. B., Gambaki, A. M., Ibrahim, S., & Ala, N. A. (2012). The need for MOODLE as a learning management system in Nigerian Universities: Digesting University Utara Malaysia Learning Zone as a case study. *Academic Research International*, *2*(3), 444.

Al-Dmour, R. (2014). *An integration model for identifying the determinants of the adoption and implementation level of HRIS applications and Its effectiveness in business organisations in Jordan* (Doctor of Philosophy). Brunel University. Retrieved from https://bura.brunel.ac.uk/handle/2438/9222

Al Musawi, A., Ambusaidi, A., Al-Balushi, S., & Al-Balushi, K. (2015). Effectiveness of E-Lab Use in Science Teaching at the Omani Schools. *The Turkish Online Journal of Educational Technology*, *14*(1).

Al-Shboul, M. (2011). Potential Use of Course Management Systems in Higher Education Institutions in Jordan. *Online Submission*, *8*(2), 220–232.

Al-Shboul, M. (2013). The Level of E-Learning Integration at the University of Jordan: Challenges and Opportunities. *International Education Studies*, *6*(4). doi:10.5539/ies.v6n4p93

Al-Shboul, M. A., & Alsmadi, I. (2010). Challenges of Utilizing E-Learning Systems in Public Universities in Jordan. *iJET, 5*(1), 4-10.

Almarabeh, T. (2014). Students' Perceptions of E-learning at the University of Jordan. *iJET, 9*(3), 31-35.

Alnsour, A., Muhsen, Z., Dababnah, M., Eljinini, M. A., & Barhoum, K. A. (2011). Implementing Moodle as a Tool to develop the Isra University e-learn system. *IJCSNS International Journal of Computer Science and Network Security*, *11*, 120–124.

AlQudah, A. A. (2014). Accepting Moodle by academic staff at the University of Jordan: Applying and extending TAM in technical support factors. *European Scientific Journal*, *10*(18).

Arguel, A., Lockyer, L., Kennedy, G., Lodge, J. M., & Pachman, M. (2019). Seeking optimal confusion: A review on epistemic emotion management in interactive digital learning environments. *Interactive Learning Environments*, *27*(2), 200–210. doi:10.1080/10494820.2018.1457544

Arnold, M. J., & Reynolds, K. E. (2003). Hedonic shopping motivations. *Journal of Retailing*, *79*(2), 77–95. doi:10.1016/S0022-4359(03)00007-1

Atoum, I., Otoom, A., & Ali, A. A. (2017). Holistic Cyber Security Implementation Frameworks: A Case Study of Jordan. *International Journal of Information, Business and Management*, *9*(1), 108.

Babić, S. (2012). Factors that influence academic teacher's acceptance of e-learning technology in blended learning environment. *E-Learning-Organizational Infrastructure and Tools for Specific Areas*, 3-18.

Beach, L. R., & Mitchell, T. R. (1978). A contingency model for the selection of decision strategies. *Academy of Management Review*, *3*(3), 439–449. doi:10.5465/amr.1978.4305717

Bryan, C., & Clegg, K. (2019). *Innovative Assessment in Higher Education: A Handbook for Academic Practitioners*. Routledge. doi:10.4324/9780429506857

Cannon, T. (1994). *Corporate Responsibility a Textbook on Business Ethics, Governance, Environment: Roles and Responsibilities*. Academic Press.

Chin, W. W. (1995). Partial least squares is to LISREL as principal components analysis is to common factor analysis. *Technology Studies*, *2*(2), 315–319.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research, 295*(2), 295-336.

Cho, S. K., & Berge, Z. L. (2002). Overcoming barriers to distance training and education. *USDLA Journal*, *16*(1), 16–34.

Cole, J., & Foster, H. (2007). *Using Moodle: Teaching with the popular open source course management system*. O'Reilly Media, Inc.

Cooksey, R. W., & McDonald, G. M. (2009). *Surviving and thriving in postgraduate research*. Tilde University Press.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly*, *13*(3), 319–340. doi:10.2307/249008

Ellis, R. A., & Goodyear, P. (2018). *Spaces of teaching and learning: Integrating perspectives on research and practice*. Springer. doi:10.1007/978-981-10-7155-3

Garrote Jurado, R. (2012). *Barriers to a wider Implementation of LMS in Higher Education: a Swedish case study, 2006-2011*. Academic Press.

Gautreau, C. (2011). Motivational Factors affecting the integration of a learning management system by faculty. The Journal of Educator Online, 8(1).

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. *Communications of the Association for Information Systems*, *16*(1), 5. doi:10.17705/1CAIS.01605

Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. *Management Information Systems Quarterly*, *21*(4), 389–400. doi:10.2307/249720

Hair, J., Jr., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review*, *26*(2), 106–121. doi:10.1108/EBR-10-2013-0128

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis.* Pearson Prentice Hall.

Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. L. (1997). Personal computing acceptance factors in small firms: A structural equation model. *Management Information Systems Quarterly*, *21*(3), 279–305. doi:10.2307/249498

Iskandar, Ismed, Mohd, R., & Noraini. (2014). Multi-Mode Failure Models for Attribute Test Data in Reliability Systems, A bayesian Analysis Approach Using Multi-Nomial Distribution Model. *Journal of Advanced Amterial Research*, 6.

Iskander, M. (2008). *Innovative techniques in instruction technology, e-learning, e-assessment and education*. Springer Science & Business Media. doi:10.1007/978-1-4020-8739-4

Kats, Y. (2010). *Learning Management System Technologies and Software Solutions for Online Teaching: Tools and Applications: Tools and Applications*. IGI Global.

Khafajeh, H. (2014). *Evaluation the Impact of Training and the Role on the Principals from their Point of View to Reinforcement Decision-Making Process through their Use of E-Learning System EDUWAVE) in the Jordanian Ministry of Education*. Academic Press.

Khwaldeh, S. M., Al-Hadid, I., Masa'deh, R. e., & Alrowwad, A. (2017). The Association between E-Services Web Portals Information Quality and ICT Competence in the Jordanian Universities. *Asian Social Science*, *13*(3), 156. doi:10.5539/ass.v13n3p156

Kim, M. (2008). Factors influencing the acceptance of e-learning courses for mainstream faculty in higher institutions. *International Journal of Instructional Technology and Distance Learning*, *5*(2), 29–44.

Kim, S., Youn, J., & Kim, Y. (2012). *Design of Expanded Assessment Management System for Open-Source Moodle LMS Module.* Paper presented at the 3rd International Conference on e-Education, e-Business, e-Management and e-Learning (IPEDR).

Machajewski, S. (2014). Open Source Analytics for Blackboard Learn BbStats–Activity Dashboard Conference paper. *2014 Big Data Conference*.

Macoun, A., & Miller, D. (2014). Surviving (thriving) in academia: Feminist support networks and women ECRs. *Journal of Gender Studies*, *23*(3), 287–301. doi:10.1080/09589236.2014.909718

Majdalawi, Y. K., Almarabeh, T., & Mohammad, H. (2014). *Factors Affecting Students' Usage of Learning Management System at the University of Jordan*. Academic Press.

Martínez-López, F. J., Gázquez-Abad, J. C., & Sousa, C. M. (2013). Structural equation modelling in marketing and business research: Critical issues and practical recommendations. *European Journal of Marketing*, *47*(1/2), 115–152. doi:10.1108/03090561311285484

McDaniel, R., Fanfarelli, J. R., & Lindgren, R. (2017). Creative Content Management: Importance, Novelty, and Affect as Design Heuristics for Learning Management Systems. *IEEE Transactions on Professional Communication*, *60*(2), 183–200. doi:10.1109/TPC.2017.2656578

McIntosh, D. (2014). Vendors of learning management and e-learning products. *Learning Manage. Vendors*, 88-96.

McIntosh, J., & Torres, M. I. (2014). *Learning Management Systems: Revisiting Learning Management Systems at the University Level*. The University of Tampa.

McLeod, R., Jr., & Schell, G. (2001). Management Information Systems 8/E. In *Marketing Information System*. Academic Press.

Misseyanni, A., Lytras, M. D., Papadopoulou, P., & Marouli, C. (2018). *Active Learning Strategies in Higher Education: Teaching for Leadership, Innovation, and Creativity*. Emerald Publishing Limited. doi:10.1108/9781787144873

Mkhize, P., Mtsweni, E. S., & Buthelezi, P. (2016). Diffusion of Innovations Approach to the Evaluation of Learning Management System Usage in an Open Distance Learning Institution. *The International Review of Research in Open and Distributed Learning*, *17*(3). doi:10.19173/irrodl.v17i3.2191

Mwalumbwe, I., & Mtebe, J. S. (2017). Using Learning Analytics to Predict Students' Performance in Moodle Learning Management Systems: A case of Mbeya University of Science and Technology. *The Electronic Journal on Information Systems in Developing Countries*, *79*(1), 1–13. doi:10.1002/j.1681-4835.2017.tb00577.x

Onwuegbuzie, A. J., & Leech, N. L. (2005). Taking the "Q" out of research: Teaching research methodology courses without the divide between quantitative and qualitative paradigms. *Quality & Quantity*, *39*(3), 267–295. doi:10.100711135-004-1670-0

Osterwalder, A. (2004). *The Business Model Ontology-a proposition in a design science approach*. Academic Press.

Phillipo, J., & Krongard, S. (2012). *Learning Management System*. LMS.

Project, T. C. C. (2008). *Campus Computing*. Encino.

Rank, u. U. (2019). *Jordanian University Ranking 2019*. Retrieved from https://www.4icu.org/jo/

Reilly, J. R., Vandenhouten, C., Gallagher-Lepak, S., & Ralston-Berg, P. (2012). Faculty Development for E-Learning: A Multi-Campus Community of Practice (COP) Approach. *Journal of Asynchronous Learning Networks*, *16*(2), 99–110. doi:10.24059/olj.v16i2.249

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3*. Boenningstedt: SmartPLS GmbH. http://www. smartpls. com

Rogers, E. (1995). *Diffusion of Innovations*. The Free Press.

Saadé, R., & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: An extension of the technology acceptance model. *Information & Management*, *42*(2), 317–327. doi:10.1016/j.im.2003.12.013

Samak, A., & Tawfik, Z. (2017). *Exploration of Jordanian English Language Teachers' Attitudes*. Skills, and Access as Indicator of Information and Communication Technology Integration in Jordan.

Schrag, F. (1992). In defense of positivist research paradigms. *Educational Researcher*, *21*(5), 5–8. doi:10.3102/0013189X021005005

Straub, D., Boudreau, M.-C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information Systems*, *13*(1), 63.

Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. *Management Science*, *42*(1), 85–92. doi:10.1287/mnsc.42.1.85

Unwin, T., Kleessen, B., Hollow, D., Williams, J. B., Oloo, L. M., Alwala, J., ... Muianga, X. (2010). Digital learning management systems in Africa: Myths and realities. *Open Learning*, *25*(1), 5–23. doi:10.1080/02680510903482033

Varis, T., & Al-Agtash, S. (2008). *Ubiquitous ICT for sustainable education and cultural literacy*. Citeseer.

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *Management Information Systems Quarterly*, *23*(2), 239–260. doi:10.2307/249753

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. doi:10.1287/mnsc.46.2.186.11926

Whelan, R., & Bhartu, D. (2007). Factors in the deployment of a learning management system at the University of the South Pacific. *Proceedings Ascilite Singapore*, 1053-1062.

Williams, P. (2002). The learning web: The development, implementation and evaluation of internet-based undergraduate materials for the teaching of key skills. *Active Learning in Higher Education*, *3*(1), 40–53. doi:10.1177/1469787402003001004

Williamson & Kirsty. (2018). Qualitative Data Analysis. *The Journal of Research Methods*, 2-9.

Wimpenny, K., Adefila, A., & DeWinter, A. (2018). *Jordan Opportunity for Virtual Innovative Teaching and Learning: A Needs Analysis Report Contextualising the State of the Art in International Online Teaching and Learning, with Particular Attention to the Jordanian Case*. Academic Press.

Chapter 8
Gamification in E-Commerce: Enhancing Digital Customer Engagement Through Game Elements

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ABSTRACT

The gamification term, derived from the game concept, is the use of game-design elements (e.g., points, badges, levels, and leaderboards) in non-game contexts, often with the purpose of motivating and directing individuals' certain behaviors to achieve specific goals and outcomes. The contexts in which gamification is being researched and implemented include education, health, marketing, human resources, social networks, digital platforms, etc. Many studies conducted in various domains tried to understand and explain how gamification can influence or foster individuals' motivation to conduct goal-directed behavior digitally. In most of these conducted studies, significant impact of gamification on human behavior has been observed and proved. By presenting academic findings from literature and discussing real-world implementation examples from the relevant domain, this study assesses the role of digital gamification in e-commerce domain. This chapter shows how various digital game design elements can influence consumer behavior in different e-commerce platforms.

GAMIFICATION CONCEPT

Humans have been playing games for thousands of years. Games are one of the oldest forms of human social interaction. The relevant literature includes various definitions of the game. Game is defined as a system in which players engage in an artificial conflict, defined by rules, which results in a quantifiable outcome (Salen and Zimmerman, 2004). All games have one or many of the following features: rules; structure, voluntary play, player effort, player investment, quantifiable outcomes, conflict, resolution, etc. (Juul, 2003; Seaborn and Fels, 2015). Two related but not exactly the same concepts game and play are being used interchangeable in many contexts. In game studies, the distinction between game and

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play is usually tied back to the concepts of paidia and ludus which have been put forward by Caillois (2001). Caillois (2001) placed the two complementary terms paidia and ludus at opposite ends of a play continuum. Paidia (i.e., playing) is the main power of improvisation, expressiveness, spontaneity, and joy which is usually present in children's free play. On the other hand, Ludus (i.e., gaming) consists of formal play including rules and arbitrary obstacles that defines winners and losers and commonly manifests itself in board games and video games. The play is broader than the game and encompasses it. While playing refers to a more free form, expressive, improvisational meanings and behaviors, gaming refers to playing which is structured by rules and competitive strife toward goals (Salen and Zimmerman, 2004).

The term gamification derived from the game concept. This term was used for the first time in 2002 by Nick Pelling, a British programmer and video game designer for digital products. However, gamification term did not become popular and mainstream until 2010. In the relevant literature, there is no universal definition of gamification. However, the gamification definition of Deterding, Dixon, Khaled, & Nacke (2011a) is the one that is widely accepted and used. According to Deterding et al. (2011a) gamification is the use of game design elements in non-game contexts. The central idea behind this innovative technique is to utilize game-design elements (e.g., points, badges, levels, achievements, and leaderboards) in real-world contexts (e.g., business, education, etc.), with the goal of directing and motivating certain behaviors of individuals digitally. That is, gamification utilizes game mechanics for non-entertainment purposes. This technique is more about motivating people and encouraging them to show the behavior you want. Gamification and game are different in terms of the purpose of play. Main focuses of gamification are changing players' behavior, digital engagement with their environment towards achieving meaningful interaction and engagement and potentially achieve rewards. However, games focus more on entertainment and pleasure (Xu, Buhalis, & Weber, 2017). Gamification applies elements of "gamefulness", "gameful interaction", and "gameful design" for a specific intention (Deterding et al., 2011a). Gamefulness refers to the experiential and behavioral quality of playing; gameful interaction refers to the objects, tools and contexts that bring about the experience of gamefulness, and gameful design refers to the designing for gamefulness by utilizing game design elements. Gamification is more related with games (ludus-type) than with play or playfulness (paidia-type) (Salen and Zimmerman, 2004).

Game design elements are the main building blocks of gamified applications. Game elements are being applied in diverse type of non-game contexts with varying degrees of success. There are various types of game design element and depending on the type and purpose of application, numerous game elements can be utilized in a single application. The most common type of game elements encountered in gamified platforms include points, badges, levels, leaderboards, performance graphs, meaningful stories, avatars, virtual currencies, customization (personalization), tasks, social network features, and teammates. Table 1 shows the descriptions of each game design element mentioned above.

In the related literature, it is possible to see various alternative terms which are being used to refer to gamification, such as 'serious games', "applied games" 'game based learning', 'games for a purpose', 'productivity games', 'behavioral games', etc. The most common interchangeable used term with gamification is the "serious games". Even though they are related, they refer to different things. Serious games which was introduced to the literature by Abt (1970) refer to the games designed for a purpose of educating rather than merely entertaining users. Whilst serious games do entertain up to certain extent, they go beyond and mainly focus on training and skill development, educating, and behavioral and attitudinal change process. The term game elements helps in distinguishing gamification from serious games (Deterding et al., 2011a). While gamification refers to the use of distinct game elements embedded in real-world contexts, serious games are fully-developed games serving a specific, non-entertainment

Table 1. Description of game design elements

Game Element	Description	Source
Points	Points are usually accumulated as a result of successful execution of certain activities in gamified environment. The main purpose of points is to numerically show user's progress on the given activity. Points can be classified as experience points, redeemable points, reputation points, etc. Points also play an important role in providing continous and immediate feedback about performance of the users.	Werbach and Hunter, 2012; Sailer, Hense, Mandl, & Klevers, 2013
Badges	Badges visually represents achievements of user. They can be earned and collected in the gamified applications. They are usually earned as a result of completion of particular activity or accumlation of certain amount of points. Similar to points they also provide feedback about user performance on the gamified platform.	Werbach and Hunter, 2012; Sailer et al., 2013
Levels	Levels represents user advancements in the gamified platform. Levels can be progressed by collecting points, conducting certain actions, completing specific tasks, etc. Levels can be utilized to stimulate the desire to go after the more challenging levels on the given platform.	Gatautis, Banyte, Piligrimiene, Vitkauskaite, & Tarute, 2016
Leaderboards	Leaderboards enable to rank users according to their relative success, measuring them against a certain success criterion. Leaderboards can foster competition and can create social pressure which will increase the users' level of engagement, participation and learning.	Burguillo, 2010; Costa, Wehbe, Robb, & Nacke, 2013
Performance graphs	Performance graphs provide information about the player's performance compared to their preceding performance during a game. In opposite to leaderboards, the users' performance is not compared to other users' performance in this kind of graphs. Instead, such kind of graphs evaluate the player's own performance over time.	Sailer et al., 2013
Meaningful stories	Meaningful stories are game design elements that do not relate to the player's performance. This kind of game design elements contextualizes activities and characters in the game, and gives them meaning. They can alter the meaning of real world activities by adding a narrative overlay. Narrative contexts can be oriented towards real, non-game contexts or they can act as analogies of real world settings.	Kapp, 2012;
Avatars	Avatars visually represents users within gamified platforms. Avatars are usually picked out or designed by the users. They are used to identify and differentiate users from others in a given platform.	Werbach & Hunter, 2012; Kapp, 2012
Virtual currency	Virtual currencies can be obtained by successfully completing activities and tasks on the gamified environment and these currencies can be used to purchase virtual items.	Liu, Alexandrova, & Nakajima, 2011
Customization/ Personalization	It refers to activities which enable users to modify certain aspects of the interface up to certain degree which brings personal relevance to the users.	Marathe and Sundar, 2011
Tasks	A quest or small mission is a task in that users complete in order to gain a certain rewards	Sailer et al., 2013
Social network features	They are social-related gamification features which include messaging, blogging, chatting and connecting to social networks	Aparicio, 2012
Teammates	This kind of features enable creation of team of players that cooperate towards achieving a shared objective.	Werbach and Hunter, 2012

purpose (Deterding et al., 2011a; Yongwen, Johnson, Moore, Brewer, & Takayama, 2013). It is possible to see serious games in action in various industries such as education, health care, aviation, military, engineering, etc. While gamification is the use of various game elements integrated in real-life contexts, serious games are standalone games which carry a specific, non-entertainment purpose (Deterding et al., 2011a; Yongwen et al., 2013). It is possible to see serious games in action in various industries such as education, health care, aviation, military, engineering, etc.

IMPLEMENTATION EXAMPLES OF GAMIFICATION IN E-COMMERCE

Electronic commerce (a.k.a. e-commerce) refers to commercial transactions conducted over electronic networks, primarily the internet. The most common type of e-commerce that we encounter on the Internet is online shopping. However, e-commerce is not just limited to online shopping. E-commerce is an umbrella term covering many different types of other electronic transactions such as online banking, online ticketing, online gambling, online taxing and various types of electronic government services. With the popularization of the social media and advancements in mobile digital platforms we also started to see new subsets of e-commerce such as social commerce and mobile commerce both of which provides new possibilities and opportunities to business owners and customers. Among many other business models on the Internet business-to-consumer (B2C) is the most common one. B2C e-commerce refers to a transaction conducted over the Internet between businesses and end consumers. According to eMarketer (2019), global B2C ecommerce sales will approach 5 trillion U.S. dollars by 2021. When it is thought about the number of global active internet users which were approximately 4.33 billion as of July 2019 (Statista, 2019), this large volume of global e-commerce sales is not surprising and expected to increase even more in the future.

It is now very easier and less costly than ever to start a new business online thanks to the advancements in the Internet, web and mobile technologies. On the other side, it is also very convenient and less costly for consumers to get product and services from many potential suppliers located in various locations around the globe. For the business owners, the first and foremost difficulty is how to attract to and keep customers at their online business platforms. Internet has considerably reduced the online consumers' switching costs which refer to the costs that consumers incur as a result of changing their brands, suppliers, or products. Online business owners are well aware of the fact that on the Internet their customers are just few clicks away from their direct competitors. Therefore, they continuously try to discover and impose new switching costs on their consumers by differentiating their products and services, introducing entirely new business models, etc. That is, they always try to find new means to make their customers to stay with them. Gamification is one of the technique that managers have started to utilize in their online businesses in order to increase customer experience, engagement and retention rate. In recent years, business owners started to leverage the gamification techniques in various types of online business platforms. By incorporating game elements to their online business platforms, business owners are trying to encourage and motivate customers to use their products and services more. Through gamification technique online business owners are trying to create a fun, challenging and persuasive environments which could possible encourage customers to engage with brand and offered services more and discourage them to switch to competitors' services.

Global companies from diverse sectors have started to incorporate gamification techniques into their marketing strategies. Among these companies are Starbucks, Amazon, eBay, Expedia, TripAdvisor, Airbnb, Delta Air Lines, etc. According to the estimations, the gamification market is expected to grow from 4.91 billion U.S. dollars in 2016 to approximately 12 billion in 2021 (Statista, 2018). One important thing to note is that gamified e-commerce does not mean transforming your online business (e.g. online store) into pure game. The main idea is to take game design elements such as points, badges, levels, leaderboards, avatars, virtual currencies, tasks and implement these elements in various e-commerce platforms, with the goal of motivating and encouraging the specific behavior you want. To put it in other words, gamification in e-commerce is the use of game design elements in an e-commerce context to drive

customer engagement and motivate the desired action which could be the purchase frequency, positive reviews, dissemination of positive word of mouth, increased retention and loyalty, etc.

One of the most commonly used game design element in various gamified platforms are points. Points are usually accumulated as a result of successful execution of given activity and they numerically show user's progress (Werbach and Hunter, 2012; Sailer et al., 2013). Points enable to measure users' in-game behavior, and they serve as continuous and immediate feedback and as a reward (Sailer et al., 2013). In e-commerce businesses, point-based rewarding systems is one of the commonly utilized technique under loyalty programs. Through point-based system, customers earn reward points for each purchase they make or for each activity they successfully complete. Later, customers are usually offered various options to redeem these collected points. Depending on the nature of the business and policies of the loyalty program collected points can be converted into money, used as a discount, or exchanged for other valuable things. In order to increase customers' engagement and motivate them to conduct certain behavior even more, online business owners implement another type of gamified feature which is a tier system. This tier system corresponds to the levels advanced in games. Levels shows user progress in the gamified environment and they are advanced by collecting certain amount of points or successfully completing certain tasks (Gatautis et al., 2016). Starbucks, a coffee company, with its Starbucks Rewards program successfully implements above mentioned gamification features. Members of the Starbucks Rewards program collect stars as points on almost everything they purchase. Every time customers pay using a mobile application, they collect two stars for every dollar. When customers collect enough stars they can redeem these collected stars for free drinks or food at Starbucks stores. For example, at 25 stars, customers can add one customization to their drink for free; at 50, they can get a free brewed hot coffee, bakery item, or hot tea; at 150, they can get a free handcrafted drink, hot breakfast item, or parfait; at 200, they can get a free lunch sandwich, protein box, or salad; and at 400, they can redeem them for select merchandise or at-home coffee. Another feature of gamification which is also successfully implemented by Starbucks in its loyalty program is tier system. When customers sign up for Starbucks Rewards they start at the Green level. To get to Gold level, they need to earn 300 points in a 12-month period. Gold Level is the top tier of Starbucks' loyalty program that offers some benefits to frequent customers. Those perks include monthly double star days where members can earn 4 stars per $1, a personalized gold card, and a free food or drink item for every 125 stars collected. Tier system is an excellent gamification feature that provides customers with a goal to shoot for, makes them addicted to the brand, and feel valued with additional benefits offered to them at different levels. Levels can be utilized to stimulate the desire to follow the more challenging levels on the given platform. This tier system also allows businesses to segment customers according to their behavioral characteristics (e.g., spending behavior) which will help to carry out customized marketing strategies according to given segments characteristics.

Points and tier system are also successfully applied in civil aviation sector. Many airline companies have frequent-flyer programs which enable enrolled customers to accumulate points, also known as miles, which can be redeemed for air travel or other rewards. Customers earn mile points every time they fly with that company. The number of mile points customers earn depends on several factors such as route, class, tier, etc. Customers can advance through the tiers and take advantage of exclusive membership benefits as they earn more mile points. The most common types of tiers which are encountered in airline companies are Silver, Gold and Platinum levels. Most airline companies have mobile app which enable customers to track their mile points. Some of these mobile apps even enable customers to set travel goals and earn miles towards them.

TripAdvisor, the world's largest online travel platform, is one of the companies that are effectively utilizing game design elements in its online platforms. Travelers around the world use the company's web site and mobile app to reach more than 760 million reviews and opinions of more than 8 million accommodations, restaurants, experiences, airlines and cruises. In order to increase number and quality of user contributions (e.g., review, photo, video, forum post, etc.), TripAdvisor is utilizing various game design elements such as points, levels and badges in their online platforms. Every time users contribute to TripAdvisor, they receive TripCollective points. For example, each review worth 100 points, each photo worth 30 points, each forum post worth 20 points, etc. There are six TripCollective levels and users advance levels by collecting points. While level one requires 300 points, level six corresponds to 10.000 points. Another game design element that TripAdvisor is effectively utilizing are the badges. Badges are one of the most commonly utilized game design element in many gamified platforms. They are among the most visible elements of gamification. Badges visually represents status, progress and achievements of user and they can be either earned or collected in the gamified platforms. This gamification feature provide feedback about user performance on the gamified platform (Werbach and Hunter, 2012; Sailer et al., 2013). Badges are a way of showing users' knowledge and expertise. In TripAdvsior platform, users collect badges as they contribute to the system by writing reviews or by adding other posts (e.g., photos, videos, etc.). Users also get badges in recognition of how helpful or useful their review or other posts have been. Some of the available badges in TripAdvisor are as follows. There is a New Reviewer badge which you collect by writing your first review. The more you write, the higher level badge you receive in this given category. There is a Passport Badge which recognizes the users for being world travelers. Once users add reviews for places in at least two destinations in the world, they get their Passport badge. There is also an Explorer badge which are given to the users for being one of the first to review a hotel, restaurant, or attraction in a given language. These various types of virtual badges act as incentives to encourage users for more reviews.

Gamification has also been utilized in online gambling platforms (e.g., online casino, online sports betting) in increasing player retention and creating loyalty. Most of these online platforms use various gamification techniques which can include special sign up bonus points or referral rewards for the purpose of increasing membership. In such platforms, players are usually rewarded with loyalty points if they stick around and use the given platform on a regular basis. These platforms are utilizing another well-known game design element which is leaderboards. Leaderboards rank players according to their relative success and they can stimulate competition and create a social pressure which will increase players' engagement and participation levels (Burguillo, 2010; Costa et al., 2013). Through leaderboards players can monitor their status and they can see where they rank on the specific event which will encourage them to return back to the given platform to improve their positions on the leaderboards. Most of these platforms also enable players share their position in leaderboards, their badges and other performance indicators on various social networking platforms, which in turn brings them additional bonus points and loyalty points. These game design elements on various type of online gambling platforms not only encourage customers to play more but also increase their motivation and loyalty levels towards the given platform.

Nike is one of the companies that successfully utilize gamification technology in sports domain. For many people, the lack of motivation is the main barrier for consistent training. Without a running partner, a personal trainer, or some other form of encouragement, it's difficult for people to acquire the habit. In order to address this issue Nike have introduced Nike Run Club app which is available for both android and iOS platforms. This mobile app includes necessary gamification and other tools that can motive someone to run better. These tools include, but not limited to GPS run tracking, audio guided runs,

distance challenges (weekly, monthly and custom), competition on leaderboards, trophies and badges for celebrating achievements, sharing activities and achievements with friends on various online platforms, customized coaching plans for user goals, and nonstop motivation from friends. This gamified mobile app is a very nice example of how a brand can use game elements to get connected with its customers. This gamified app not only motivates users to do sports and engage with brand, but also enables Nike to collect valuable data about individual users which can be used for marketing purposes.

Businesses continuously seek for creative marketing strategies to promote their business and attract more and more consumers to their brand. Gamification has become a popular strategy for managers to keep their existing customers and reach potential ones over online platforms. Above mentioned examples have showed how companies in various fields successfully implement game design elements in attracting more customers and giving them a reason to keep returning to the brand and purchase or use products and services more.

GAMIFICATION AND USER MOTIVATION

Gamification technique has attracted attention of both scholars and practitioners because of its very wide application in various areas. Gamification has been studied in many different areas including but not limited to the following: education (Landers & Landers, 2014, Toda, Carmo, Silva, Bittencourt, & Isotani, 2019), crowdsourcing (Liu et al, 2011; Mekler, Brühlmann, Tuch, & Opwis, 2015), data-collection (Downes-Le Guin, Baker, Mechling, & Ruyle, 2012), health (Jones, Madden, & Wengreen, 2014; Cechetti, Bellei, Biduski, Mazuco Rodriguez, Roman, & De Marchi, 2019), marketing (Hofacker, Ruyter, Lurie, Manchanda, & Donaldson, 2016; Hamari, 2015; Hwang and Choi, 2019), social networks (Thom, Millen, & Dimicco, 2012), environmental protection (Liu et al, 2011), order handling (Sailer, Hense, Mayr, & Mandl, 2017) and workplace management (Mitchell, Schuster, & Jin, 2018). All of the above studies conducted in various domains tried to understand and explain how gamification can influence or foster individuals' motivation to conduct goal-directed behavior.

One of the main theoretical framework adopted in gamification studies is the self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2002). Many studies in the relevant field tried to explain user motivation and behavior within the scope of self-determination theory. Self-determination theory is a psychological framework which helps to understand human motivation. According to self-determination theory, individuals' motivation to conduct a certain behavior can be explained through self-determined continuum. This continuum ranges from non-self-determined to self-determined. At the right end of the self-determined continuum, there is intrinsic motivation in which individuals engage in an activity for potential pleasure and satisfaction that may be derived from it. At the left end of this continuum there is amotivation, which is lack of motivation or intention to engage in a given behavior. In the middle of this continuum there is extrinsic motivation in which individuals' behavior is driven by external factors (e.g., rewards or punishments) which are unrelated to the activity itself (Deci & Ryan, 1985; Ryan & Deci, 2000b).

Intrinsic and extrinsic motivation play an important role in shaping who we are and how we behave (Deci & Ryan, 2008). Extrinsic motivation is a drive to behave in certain ways based on external sources and it results in external rewards (Deci & Ryan, 1985). Extrinsic motivation occurs when an individual is motivated to perform a particular behavior or engage in a particular activity to earn certain rewards or avoid possible punishments. In other words under extrinsic motivation individuals engage in a behavior

not because they find it pleasant and satisfying or because they enjoy it but in order to get something in return or escape from possible negative consequences. In a professional environment sources of extrinsic motivation can be money, awards, promotion, employee evaluations, etc. On the other side, in intrinsic motivation there are internal driving factors that inspire us to behave in a particular way, including our core values, our interests, and our personal sense of morality. That is, under intrinsic motivation individuals perform a behavior or an activity for its own sake rather than the desire for some external reward or fear of any punishment. The most productive force behind people's behavior is commonly considered as intrinsic motivation (Deci & Ryan, 2000; Ryan & Deci, 2000b). Therefore, when people are motivated intrinsically, they have a strong desire for the activity itself and enjoy it. Although intrinsic motivation is a stronger drive of behavior (Grant, 2008; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997), extrinsic motivation also has a behavioral impact (Cerasoli, Nicklin, & Ford, 2014). Gamification should combine intrinsic with extrinsic motivation to increase motivation and engagement (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011b). Using only extrinsic rewards may have negative behavioral impacts as study of Deci, Koestner, and Ryan (1999) suggested that extrinsic rewards can undermine intrinsic motivation to complete a task, especially if the task is engaging, interesting and beneficial to the user. This implies that if individuals find a given task enjoyable, interesting and engaging, that is, if they are already intrinsically motivated to the given task, the addition of specific reward structures could decrease already existing intrinsic motivation toward the given task.

Cognitive Evaluation Theory (CET) which is a sub-theory within self-determination theory further explains that individuals are driven by three fundamental psychological needs: autonomy, competence, and relatedness. Satisfaction of these three psychological needs is very important for an individual's intrinsic motivation (Ryan & Deci, 2000a). The need for competence refers to being capable and competent in controlling outcome of an activity and experience mastery of that given task. Need for autonomy refers to individuals' need to actively participate in determining their own behavior. The need for relatedness refers to need to be connected to and experience caring for others. Basic Psychological Needs Theory (BPNT) which is another sub-theory within self-determination theory states that satisfaction of autonomy, competence, and relatedness positively influences the psychological well-being of individuals (Ryan & Deci, 2000c). On the contrary, any situations or activities that impede these psychological needs would negatively impact wellness. In gamification literature, a number of studies showed the influence of various gamification features on individuals' intrinsic need satisfaction, motivation and engagement (Peng, Lin, Pfeiffer, & Winn, 2012; Thom, Millen, & Dimicco, 2012; Sailer et al., 2017; Xi and Hamari, 2019; Deterding et al., 2011a; Cechetti et al., 2019; Mekler et al., 2015; Sailer et al. 2013). The following paragraphs discusses the important findings of some of these selected studies.

In their study Xi and Hamari (2019) assessed the relationship between different gamification features (immersion, achievement and social-related features) and intrinsic need satisfaction (autonomy, competence and relatedness). Immersion-related gamification features mainly include avatars, role-play mechanics, storytellings, narrative structures, customization, etc. and they mainly try to immerse the player in a self-directed inquisitive activity. Achievement gamification features include points, virtual currency, badges, progress bars, leaderboards, etc. and they enable users to monitor their progress and performance. Social-relatedness features include groups, messages, blogs, connection to social networks and these features enable users to reinforce interpersonal relationships and strengthen social participation in gamified platforms. Xi and Hamari (2019) showed that immersion-related gamification features were only positively associated with autonomy need satisfaction. However, achievement and social-related features were found to be positively associated with all of the aspects of intrinsic need satisfaction (i.e.,

autonomy, competence and relatedness). Their findings showed that gamification features such as badges, leaderboards, levels, tasks, etc. offer not only immediate feedback (which can engage users and generate flow experience) and skill development, but also help users to understand others in a gamified environment. This research also showed that social-related features not only facilitate the low-cost information exchange where users can acquire more skills and knowledge to achieve a sense of accomplishment but also enable users to get relatedness need satisfaction by communicating, talk and connecting with others in the gamified environment.

In an experimental study conducted over enterprise social network system (SNS) Thom et al. (2012) assessed the influence of extrinsic rewards on intrinsic motivation to conduct a given task. The extrinsic rewards in this experimental study was point-based incentive system on SNS. The goal of the incentive system was to encourage content contribution on SNS, so points were awarded for the addition of lists, photos and comments. In this experimental study it was found that the removal of the points system had a significant negative impact on the user activity. This study finding showed that gamification based extrinsic rewards do actually influence a segment of the user population to participate more intensely in a given activity.

Peng et al. (2012) manipulated game features and tried to assess how these manipulated game features effect players' three basic psychological needs. The results showed that availability of several choices in the game (e.g., choice of avatar customization, choice of how to grow strength of avatars) supported players' need satisfaction of autonomy. Additionally, the game's ability to dynamically adjusted difficulty levels based on players' performance and indicators for the players to see their achievements (e.g., heroism meter, achievement badges) led to increased satisfaction of the need for competence.

In another study conducted in a health domain Cechetti et al. (2019) assessed the influence of gamified elements on user intrinsic motivation to engage in particular behavior. Within the scope of this study two versions of an m-Health application were developed, one with the gamified elements and one without these elements. It was found that the app without gamification features did not necessarily motivate participants to change their habits regarding the specific treatment. On the other hand, gamified app resulted in higher user motivation and engagement. For example, gamification promoted the monitoring of blood glucose by participants, letting the participants acquire this habit.

Finally, in their study Sailer et al. (2017) utilized self-determination theory to understand motivational power of various game design elements on the fulfilment of basic psychological needs (i.e., perceived competence, relatedness, and autonomy). Their results showed that badges, leaderboards, and performance graphs positively influence competence need satisfaction and perceived task meaningfulness. Avatars, meaningful stories, and teammates were found to have impact on social relatedness. Sailer et al. (2017) stressed that gamification can have many forms and can include game elements in many different ways; therefore, it is not appropriate to study the motivational effects of gamification as a uniform concept. They suggested that the relationship between different game design elements and human behavior should be the main focus point. The findings of the above mentioned studies confirms the suggestion of Sailer et al. (2017) on the potential motivational effects of various game design elements. Therefore, in order to get the desired results careful attention should be paid to potential influences of various game design elements while designing gamified environments.

Another commonly utilized theories in gamification studies is Technology Acceptance Model (TAM) (Davis, 1989). TAM is an information systems theory that models how individuals come to accept and use a technology. TAM proposes that the acceptability and adoption of an information systems and technologies is determined by two main factors which are perceived usefulness (PU) and perceived ease of use

(PEOU). PU refers to the degree to which an individual believes that the use of a system will improve his performance. On the other side, PEOU refers to the degree to which an individual believes that the use of a system will be easy and effortless. In TAM, perceived usefulness and perceived ease of use are the fundamental factors that determine users' attitude toward using a new technology. That is, when new technological innovation is perceived to be useful and ease to use, users develop positive attitudes towards it. Besides, perceived ease of use is a significant predictor of usefulness of a given technology. According to TAM, attitude toward a particular technological product significantly influences intention to use the given product. This model also suggests that perceptions about usefulness of a given technology directly influences users' intention to use it. Behavioral intention represents users' readiness to conduct a given behavior and it plays a significant role in influencing users' actual behavior. These proposed suggestions of TAM were examined and proved in various types of information system studies (Turner, Kitchenham, Brereton, Charters, & Budgen, 2010). Researchers also implemented TAM in gamification domain to analyze and understand the role of various gamification elements on users' behavioral intention to use the platforms in which such techniques are implemented. Significant positive influence of gamification elements on user behavior was observed in the studies that utilized TAM (Rodrigues, Oliveira, & Costa, 2016; Huang, Chen, & Liu, 2019; García-Jurado, Castro-González, Torres-Jiménez, & Leal-Rodríguez, 2019). Literature showed that gamification positively influences the users' perceptions about usefulness and ease of use of the platform in which gamified elements are implemented. Users' favorable perceptions about gamified platforms, in turn, plays an important role in forming favorable attitudes towards such platforms. Developing favorable attitude in the mind of consumers is very critical as it leads to behavioral intention to use platforms under question.

GAMIFICATION AND ONLINE CONSUMER BEHAVIOR

In the relevant literature, the influence of gamification on online consumer behavior has been assessed in numerous studies in various e-commerce contexts such as online retailing, online banking, online gambling, online travel, etc. Studies showed that gamification techniques do have a significant influence on online consumer behavior. Research findings showed that use of gamification e-commerce domain modify online consumer behaviors by increasing the level of interest, motivation, engagement, retention and loyalty. The following paragraphs discusses the findings of the selected studies from various e-commerce domains.

In their study, Hwang and Choi (2019) investigated whether and how gamified loyalty programs impact consumer loyalty toward loyalty programs and behavioral intentions to use them, along with the role of the type of rewards, namely self-oriented and altruistic rewards. Altruistic rewards refer to rewards that are designed to benefit someone other than the loyalty program participant (e.g., donation of rewards to others in need or to the communities), in contrast self-oriented rewards refer to rewards designed to benefit the participants themselves. Their study showed that gamified loyalty programs engender significantly greater consumer loyalty to LPs than do conventional LPs. The results confirmed that gamified loyalty programs (vs. conventional ones) increased consumer loyalty toward loyalty programs which in turn enhanced consumers' participation intention in loyalty programs and mobile app download intention. In this study it was also found that self-oriented rewards have a greater positive impact on consumer LP loyalty than do altruistic rewards.

Also, Hofacker et al. (2016) developed a conceptual framework of gamification in the mobile marketing context. This framework defined the elements of gamification as story, mechanics, aesthetics, and technology, all of which influence marketing outcomes, including engagement, attitude, purchase, repurchase, and retention. Their model posits that consumer-related factors (e.g., characteristics, goals, and usage context) and product-related factors (e.g., type and life cycle) moderate the impact of gamification elements on marketing outcomes.

Eisingerich (2019) demonstrated how gamification can raise customer engagement. They analyzed relationships among gamification principles, individuals' engagement behaviors, and digital sales. In their study, they identified several gamification principles - social interaction, sense of control, goals, progress tracking, rewards, and prompts – which believed to play an important role in inducing people to take action. In addition to these gamification principles, they identified two main mechanisms - hope and compulsion - that explain how these principles influence behaviors. Hope refers to individuals' desire for a goal-congruent possible outcome. It represents a feeling that a currently unsatisfying situation can be improved. On the other side compulsion refers to a response to uncontrollable, repetitive and sometimes senseless desire to engage in certain behaviors. They found that hope positively mediates the relationship between gamification principles and customer engagement. On the contrary, compulsion was found to reduce the possibility of customer engagement. Compulsion was reported to have only a slight impact on customer engagement. That is, at the beginning individuals may feel forced to use and check their apps, however this compulsion will tend to decline over time. On the other side, hope is a stronger driver of customer engagement. Hope motivates and encourages customers to change their behaviors and makes them to take decisive actions in reaching their goals. Gamified apps should include social interaction, a sense of control, goal setting, and progress tracking, because these features motivate customers to hope for desired goals and engage more with the apps. This study finding implies that, instead of designing gamified apps that focus on compulsive use, practitioners should utilize hope as an alternative way to motivate customers to change their behaviors and achieve their objectives.

By utilizing the online reviews written on TripAdvisor platform, in their study Moro, Ramos, Esmerado, & Jalali (2019) tried to understand how each of the twelve gamification features used in TripAdvisor contributed to explaining review length and its sentiment score. In this study, three badge features – total number of badges, the passport badges and the explorer badges - were considered the most relevant ones, providing evidence of a relation between gamification features and traveler's behavior while writing reviews. In this study, it was found that visually appealing gamification features such as badges have a stronger effect on the review's length than simpler interaction counters.

By conducting research on online bookstore customers, in their study Hsu and Chen (2018) assessed the relationship among the experience of gamified marketing activities, perceived value (i.e., hedonic and utilitarian), satisfaction, brand love and desirable consumer behaviors. It was found that the experience of gamified marketing activities has a significant and positive impact on perceived hedonic and utilitarian value, which are in turn significantly influence satisfaction and brand love. Satisfaction, in turn, was found to have significantly positive impact on desirable consumer behaviors such as brand loyalty, positive word-of-mouth, and resistance to negative information. These research findings suggest that online retailers should incorporate gamification features to their marketing strategies if they want to better manage desirable consumer behavior.

Interesting results were obtained from gamification studies that assessed user behavior through Technology Acceptance Model (TAM). It was found that the more user perceives gamified apps to be useful and ease to use, the more satisfied he or she will become, thereby decreasing the tendency to quit

using such kinds of apps in the future (Huang et al., 2019). García-Jurado et al. (2019) suggested different type of users respond differently to gamified environment. They suggested that marketers should provide a fun interface to Millennials and a platform easier to use to the Generation X, for gamification to be successful. Rodrigues et al. (2016) applied TAM to better understand the adoption of gamified business applications. They assessed the influence of gamification on consumer behavior in online banking context. They explored the relationship between gamification, socialness, ease-of-use, usefulness, enjoyment, and intention to use a gamified e-banking app, and the corresponding business impact. In this context, socialness describes the phenomenon of users treating technology or technology interfaces, such as websites, as social actors and perceive that the interfaces to exhibit lifelike attributes associated with personality or emotions. Results of their study showed that when applied to e-banking platform, game design elements and social cues provide several positive outcomes, particularly in terms of the users' perceptions about application's usefulness, its ease-of-use and users' intention to use the given e-business app. They suggested that for customers most financial products and services are complex to understand; however, the use of gamification in such apps can help to make a serious application more attractive and easy to use for customers.

All of the above mentioned studies assessed the role of gamification in different fields. Results of these studies showed that gamification is not a simply gameful design but it can be a very powerful marketing tool which can be used to encourage engagement with a company's products and services. It also worth to mention that users do not respond to gamification strategies in the same way. Literature showed that different gamification techniques may have different end results in different types of users. Therefore, in order to get the desired effect individual differences should be taken into consideration by practitioners while designing and implementing such techniques.

CONCLUSION

In order to stay competitive companies are constantly looking for new means to stay a step ahead of their competitors. Gamification, the use of game mechanics in non-gaming applications, has become one of the promising means for managers. Gamification are being applied in various fields to bring intended behavioral outcome. For many businesses gamification is one the powerful technique to create desirable consumer behaviors such as increased engagement, higher retention, brand loyalty, positive word-of-mouth, etc. Well-designed gamification strategy attracts the target audience's attention to the company's products and services. While interacting with gamified interface, customers are drawn closer to the company and associate their enjoyment with company's products and services. It is also worth to mention that there is no one-size-fits all in the implementation process of gamification in e-commerce domain. Managers should tailor their gamified environments in such a way that they get more positive customer responses. What gamification tools and strategies are best for your customers mainly depends your particular business, products and audience. Gamification is possible to be found in many forms and it can include main building blocks of game in many different ways (Sailer et al., 2017). For gamification strategies to be successful it is very important for managers to understand the motivational effects of different gamification features on consumer behavior. Therefore, it is important that online business owners customize gamification techniques by considering the nature of their business and psychographic and behavioral characteristics of their customers.

Maybe today gamification have not yet reached its full potential yet but more and more managers have started to realize that they can implement this technique to change behaviors of consumers to achieve specific business outcomes. Originally, gamification was mostly about points, badges, and leaderboards, but it has changed to include additional game elements such as meaningful stories, avatars, virtual currency, personalization, tasks, social network features and many others. As game technologies improve, we will see transition and implementation of new game design elements in different non-game contexts. In the future we will also see gamification strategies built on top of virtual reality (VR) and augmented reality (AR) technologies which are already being applied in e-commerce field.

While gamification has brought lots of opportunities for business world, it has also brought ethical concerns and issues with itself. Gamification can be considered as a type of stealth marketing which is an act of advertising something to specific audience, without them realizing they are being marketed to. Stealth marketing is considered to be an unethical business practice by many. Currently, gamification is not formally regulated as a marketing practice. Researchers in this field has initiated discussions whether gamification should be regulated or monitored in some way (Thorpe and Roper, 2017; Marczewski, 2017). Gamification turns out to be unethical when the designer uses the psychology of users to manipulate them to do things which are not in their best interest (Marczewski, 2017). The use of random rewards to create addictive, gambling-like experiences that eventually lead certain users to be unable to exercise free will. As research developments advance and become more integrated into practice, more effective gamification will emerge and ethical issues will intensify even more (Thorpe and Roper, 2017). That is, as companies become more informed about the deep psychological mechanisms that underpin user engagement, they will have the opportunity of designing increasingly persuasive systems.

To sum up, gamification itself is not an unethical practice; however, the main emphasis here is on intention of the person designing and implementing it. Managers should develop such a system that will benefit both business itself and users equally. Gamified system should help online business owners to create a fun and engaging experience for their audience, which will eventually lead to a long-lasting and strong customer relationship. On the other side, such systems should help users to carry out their intended activities in an effective, efficient and at the same time entertaining manner but without being influenced by the system adversely. That is, gamified systems should help users, rather than causing harms to them.

REFERENCES

Abt, C. C. (1970). *Serious games*. New York: Viking Press.

Aparicio, A. F., Vela, F. L. G., Sánchez, J. L. G., & Montes, J. L. I. (2012). Analysis and application of gamification. *Proceedings of the 13th International Conference on Interacción Persona-Ordenado*. 10.1145/2379636.2379653

Burguillo, J. C. (2010). Using game theory and Competition-based Learning to stimulate student motivation and performance. *Computers & Education*, *55*(2), 566–575. doi:10.1016/j.compedu.2010.02.018

Caillois, R. (2001). *Man, Play, and Games*. Chicago, IL: University of Illinois Press.

Cechetti, N. P., Bellei, E. A., Biduski, D., Mazuco Rodriguez, J. P., Roman, M. K., & De Marchi, A. B. (2019). Developing and implementing a gamification method to improve user engagement: A case study with an m-Health application for hypertension monitoring. *Telematics and Informatics*, *41*, 126–138. doi:10.1016/j.tele.2019.04.007

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic Motivation and Extrinsic Incentives: A 40-Year Meta-Analysis. *Psychological Bulletin*, *140*(4), 980–1008. doi:10.1037/a0035661 PMID:24491020

Costa, J. P., Wehbe, R. R., Robb, J., & Nacke, L. E. (2013, October). *Time's Up: Studying Leaderboards For Engaging Punctual Behaviour.* Paper presented at the Gamification 2013: 1st International Conference on Gameful Design, Research, and Applications, Toronto, Canada. 10.1145/2583008.2583012

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly*, *13*(3), 319–340. doi:10.2307/249008

Deci, E.L., Koestner, R., & Ryan, R.M. (1999). A meta analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*(6), 627.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Springer. doi:10.1007/978-1-4899-2271-7

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal Pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Self-Determination Theory: A macro theory of human motivation, development, and health. *Canadian Psychology*, *49*(3), 182–185. doi:10.1037/a0012801

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. E. (2011a). From game design elements to gamefulness: Defining "Gamification". In *Mindtrek 2011 proceedings*. Tampere, Finland: ACM Press. doi:10.1145/2181037.2181040

Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011b). Gamification. using game-design elements in non-gaming contexts. In *Proceedings of CHI Abstracts* (pp. 2425–2428). 10.1145/1979742.1979575

Downes-Le Guin, T., Baker, R., Mechling, J., & Ruyle, E. (2012). Myths and realities of respondent engagement in online surveys. *International Journal of Market Research*, *54*(5), 1–21. doi:10.2501/IJMR-54-5-613-633

Eisingerich, A. B., Marchand, A., Fritze, M. P., & Dong, L. (2019). Hook vs. hope: How to enhance customer engagement through gamification. *International Journal of Research in Marketing*, *36*(2), 200–215. doi:10.1016/j.ijresmar.2019.02.003

eMarketer. (2019). *Global Ecommerce 2019*. Retrieved from https://www.emarketer.com/content/global-ecommerce-2019

García-Jurado, A., Castro-González, P., Torres-Jiménez, M., & Leal-Rodríguez, A. L. (2019). Evaluating the role of gamification and flow in e-consumers: Millennials versus generation X. *Kybernetes*, *48*(6), 1278–1300. doi:10.1108/K-07-2018-0350

Gatautis, R., Banyte, J., Piligrimiene, Z., Vitkauskaite, E., & Tarute, A. (2016). The impart of gamification on consumer brand engagement. *Transformations in Business & Economics*, *15*(1), 173–191.

Hamari, J. (2015). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, *71*, 469–478. doi:10.1016/j.chb.2015.03.036

Hofacker, C., Ruyter, K. D., Lurie, N. H., Manchanda, P., & Donaldson, J. (2016). Gamification Design for Mobile Marketing Effectiveness. *Journal of Interactive Marketing*, *34*, 25–36. doi:10.1016/j.intmar.2016.03.001

Hsu, C., & Chen, M. (2018). How gamification marketing activities motivate desirable consumer behaviors: Focusing on the role of brand love. *Computers in Human Behavior*, *88*, 121–133. doi:10.1016/j.chb.2018.06.037

Huang, C.-K., Chen, C.-D., & Liu, Y.-T. (2019). To stay or not to stay? Discontinuance intention of gamification apps. *Information Technology & People*, *32*(6), 1423–1445. doi:10.1108/ITP-08-2017-0271

Hwang, J., & Choi, L. (2020, January). Having fun while receiving rewards?: Exploration of gamification in loyalty programs for consumer loyalty. *Journal of Business Research*, *106*, 365–376. doi:10.1016/j.jbusres.2019.01.031

Jones, B. A., Madden, G. J., & Wengreen, H. J. (2014). The FIT game: Preliminary evaluation of a gamification approach to increasing fruit and vegetable consumption in school. *Preventive Medicine*, *68*, 76–79. doi:10.1016/j.ypmed.2014.04.015 PMID:24768916

Juul, J. (2003). The game, the player, the world: Looking for a heart of gameness. In M. Copier & J. Raessens (Eds.), *Proceedings of Level-Up: Digital games research conference* (pp. 30–45). Utrecht, Netherland: University of Utrecht.

Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. San Francisco, CA: Pfeiffer.

Landers, R. N., & Landers, A. K. (2014). An Empirical Test of the Theory of Gamified Learning: The Effect of Leaderboards on Time-on-Task and Academic Performance. *Simulation & Gaming*, *45*(6), 769–785. doi:10.1177/1046878114563662

Liu, Y., Alexandrova, T., & Nakajima, T. (2011). Gamifying intelligent environments. In *Proceedings of the 2011 International ACM Workshop on Ubiquitous Meta User Interfaces* (pp. 7–12). Scottsdale, AZ: ACM Press 10.1145/2072652.2072655

Marathe, S., & Sundar, S. S. (2011). What drives customization?: Control or identity? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp.781–790). Vancouver, BC, Canada: ACM Press

Marczewski, A. (2017). The ethics of gamification. XRDS: Crossroads. *The ACM Magazine for Students*, *24*(1), 56–59. doi:10.1145/3123756

Mekler, E. D., Brühlmann, F., Tuch, A. N., & Opwis, K. (2015). Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior*, *71*, 525–534. doi:10.1016/j.chb.2015.08.048

Mitchell, R., Schuster, L., & Jin, H. S. (2020, January). Gamification and the impact of extrinsic motivation on needs satisfaction: Making work fun? *Journal of Business Research*, *106*, 323–330. doi:10.1016/j.jbusres.2018.11.022

Moro, S., Ramos, P., Esmerado, J., & Jalali, S. M. (2019). Can we trace back hotel online reviews' characteristics using gamification features? *International Journal of Information Management*, *44*, 88–95. doi:10.1016/j.ijinfomgt.2018.09.015

Peng, W., Lin, J., Pfeiffer, K. A., & Winn, B. (2012). Need Satisfaction Supportive Game Features as Motivational Determinants: An Experimental Study of a Self-Determination Theory Guided Exergame. *Media Psychology*, *15*(2), 175–196. doi:10.1080/15213269.2012.673850

Rodrigues, L. F., Oliveira, A., & Costa, C. J. (2016). Playing seriously – How gamification and social cues influence bank customers to use gamified e-business applications. *Computers in Human Behavior*, *63*, 392–407. doi:10.1016/j.chb.2016.05.063

Ryan, R. M., & Deci, E. L. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, *11*(4), 319–338. doi:10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67. doi:10.1006/ceps.1999.1020 PMID:10620381

Ryan, R. M., & Deci, E. L. (2000c). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*(1), 68–78. doi:10.1037/0003-066X.55.1.68 PMID:11392867

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic dialectial perspective. In R. M. Ryan & E. L. Deci (Eds.), *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Ryan, R. M., Frederick, C. M., Lepes, D., Rubio, N., & Sheldon, K. M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology*, *28*, 335–354.

Sailer, M., Hense, J., Mandl, H., & Klevers, M. (2013). Psychological perspectives on motivation through gamification. *Interaction Design and Architecture(s). Journal*, *19*, 28–37.

Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, *69*, 371–380. doi:10.1016/j.chb.2016.12.033

Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. Cambridge, MA: MIT Press.

Seaborn, K., & Fels, D. I. (2015). Gamification in thoery and action: A survey. *International Journal of Human-Computer Studies*, *74*, 14–31. doi:10.1016/j.ijhcs.2014.09.006

Statista. (2018). *Value of the gamification market worldwide in 2016 and 2021 (in billion U.S. dollars).* Retrieved from https://www.statista.com/statistics/608824/gamification-market-value-worldwide/

Statista. (2019). *Global digital population as of July 2019 (in millions).* Retrieved from https://www.statista.com/statistics/617136/digital-population-worldwide/

Thom, J., Millen, D., & Dimicco, J. (2012). Removing gamification from an enterprise SNS. In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work - CSCW 12* (pp. 1067-1070). Seattle, WA: ACM Press

Thorpe, A. S., & Roper, S. (2017). The Ethics of Gamification in a Marketing Context. *Journal of Business Ethics*, *155*(2), 597–609. doi:10.100710551-017-3501-y

Toda, A., Carmo, R. M., Silva, A. P., Bittencourt, I. I., & Isotani, S. (2019). An approach for planning and deploying gamification concepts with social networks within educational contexts. *International Journal of Information Management*, *46*, 294–303. doi:10.1016/j.ijinfomgt.2018.10.001

Turner, M., Kitchenham, B., Brereton, P., Charters, S., & Budgen, D. (2010). Does the technology acceptance model predict actual use? A systematic literature review. *Information and Software Technology*, *52*(5), 463–479. doi:10.1016/j.infsof.2009.11.005

Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Philadelphia, PA: Wharton Digital Press.

Xi, N., & Hamari, J. (2019). Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management*, *46*, 210–221. doi:10.1016/j.ijinfomgt.2018.12.002

Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, *60*, 244–256. doi:10.1016/j.tourman.2016.11.020

Yongwen, X., Johnson, P., Moore, C. A., Brewer, R. S., & Takayama, J. (2013). SGSEAM: Assessing Serious Game Frameworks from a Stakeholder Experience Perspective. In *Gamification 2013: 1st International Conference on Gameful Design, Research, and Applications* (pp.75-78). Toronto, Ontario, Canada: ACM Press.

ADDITIONAL READING

Alsawaier, R. S. (2018). The effect of gamification on motivation and engagement. *International Journal of Information and Learning Technology*, *35*(1), 56–79. doi:10.1108/IJILT-02-2017-0009

Baptista, G., & Oliveira, T. (2017). Why so serious? Gamification impact in the acceptance of mobile banking services. *Internet Research*, *27*(1), 118–139. doi:10.1108/IntR-10-2015-0295

Baptista, G., & Oliveira, T. (2019). Gamification and serious games: A literature meta-analysis and integrative model. *Computers in Human Behavior*, *92*, 306–315. doi:10.1016/j.chb.2018.11.030

Chou, Y. (2014). *Actionable Gamification: Beyond Points, Badges, and Leaderboards*. Milpitas, CA: Octalysis Media.

Duggan, K., & Shoup, K. (2013). *Business Gamification For Dummies* (1st ed.). Hoboken, NJ: John Wiley & Sons.

Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful Experience in Gamification: Construction and Validation of a Gameful Experience Scale. *Journal of Interactive Marketing*, *43*, 98–115. doi:10.1016/j.intmar.2018.03.002

Kapp, K. M. (2012). *The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education* (1st ed.). San Francisco, CA: Pfeiffer.

Noorbehbahani, F., Salehi, F., & Zadeh, R. J. (2019). A systematic mapping study on gamification applied to e-marketing. *Journal of Research in Interactive Marketing*, *13*(3), 392–410. doi:10.1108/JRIM-08-2018-0103

KEY TERMS AND DEFINITIONS

B2C E-Commerce: Exchange of goods or services over the internet between businesses and customers.

Gamification: Use of game-design elements and game principles in non-game contexts.

Self-Determination Theory (SDT): A theory of motivation and personality that addresses three universal, innate and psychological needs which are competence, autonomy, and psychological relatedness.

Technology Acceptance Model (TAM): An information systems theory that models how individuals come to accept and use a technology.

Chapter 9
The Role of Internet Banking in the Presentation and Marketing of Financial Services and Products in a Digital Environment

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ABSTRACT

This study aims to reveal the advantages and disadvantages offered by internet banking to financial institutions and their customers as well as the reasons why customers use/do not use internet banking. For this purpose, customers' perspectives on internet banking are presented to the reader in the past and present by statistics. This research points out that many customers of the bank around the world still do not use the internet. Hence, internet banking is not an option. Therefore, in this study, suggestions are made to enable the use of internet banking by the wider masses. In addition to internet banking, technological developments and digital innovations in the banking sector are mentioned in the chapter, and the evolution of internet banking is pointed out.

INTRODUCTION

In spite of many economic crises in the world for the last 20 years, the competition in the global banking sector is taking a different dimension with each passing day. With the use of information and communication technologies transferred from developed countries by developing countries, many banking transactions are now offered to customers through alternative distribution channels in addition to branches. As an alternative to branch banking, by the agency of ATMs, telephone banking and finally internet banking it possible to carry out almost all transactions without withdrawing money. Internet banking

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enables customers to perform their financial activities in virtual environments by using technological developments in the field of internet. In addition to providing services via internet banking, banks also carry out marketing activities for their new products.

Internet banking was first used in the USA in 1995 and started to be used in many countries in the following 5 years. The fact that the developments in technology coincided with the same period encouraged banks to carry the financial products and services offered through their branches and employees to alternative distribution channels that are much less costly for themselves and their customers. In the 2000s, with appropriate legal arrangements and economic environment the most important share, along with ATM and telephone banking, was taken over by internet banking in order to ensure customer satisfaction and loyalty consistently. Today, almost all banks operating in developed and developing countries offer internet banking services to their customers. Despite the advances in information technology, customers still hesitate towards internet banking. Although strong measures have been taken to ensure the security of personal data, customers' hesitation persist because of security gaps in the internet environment and negative media news about this issue.

Today, most of the banks that provide services offer most of their financial services and products to their customers via internet banking for free or at low fees. At this point, internet banking has become an important market for banks. Aware of the fact that the future cannot be sustained without technology, banks continue to carry out advertising campaigns on this issue in order to get a larger share of the cake. As the number of customers using internet banking increases, customer complaints and customer dissatisfaction in banks will decrease and transaction costs of banks will be reduced, and profitability will be positively contributed. Therefore, the use of internet banking to reach the desired level will result in win-win results for both customers and banks. Also, to earn extra time is quite valuable for the modern customer.

In this study, it is aimed to present the new developments and trends in the sector to the readers in comparison with the data in the world as well as the benefits provided by the use of internet banking to the banks and customers providing financial services. In addition, the reasons why customers do not prefer internet banking have been put forward and suggestions have been made to banks that enable customers' to use more of internet banking. For this purpose, the following questions are studied:

- What is the current state of internet banking using in the world? How is the customers' approach to internet banking?
- What are the advantages and disadvantages of using internet banking for customers and banks?
- What are the opportunities and threats offered by Internet banking to customers and banks?
- What is the contribution of internet banking to the satisfaction and loyalty of bank customers?
- How can internet banking usage rates of customers be increased in favor of both customers and banks?

ORGANIZATION BACKGROUND

Digitalization in the World and Banking Sector

With the introduction of the internet to almost every part of the world since the 2000s, the internet has become a part of daily life in every age group. While the world population was 6.9 billion people and the

number of internet users was 1.9 billion people in 2010, the world population reached 7.7 billion people (World Population Prospects: The 2019, Revision,2019) and the number of Internet users reached 4.3 billion in August 2019 (ITU International Telecommunications Union, 2019). Accepted that digitization is a tool that reaches individuals to knowledge, these figures are an important indicator of the rapid digitalization of the world population. When the number of Internet users in 2018 is examined in terms of regional usage worldwide, it is seen that North America and Western Europe have the highest usage rate with 95% penetration rate, but Central Africa has the lowest internet usage rate with 12% (The 2018 Global Digital Report, 2019). At this point, the economic, technological and cultural developments of the countries are the main determinants of internet use.

In our age, the human-internet relationship has gone a step further and has moved to a dimension that directs life. So much so that the telecommunication tools designed to speak have lost their initial function and have become more internet use tools by individuals. This intertwined experience with the Internet has become a means of transporting, selling, marketing and implementing products and services for many sectors. The banking sector is one of these areas. Digitalization in the banking sector means that customers can make banking transactions through technological devices without face-to-face contact with bank branches and employees. ''The advent of the Internet and sophisticated technologies not only stimulated the new industries, but it also changed the business model including the banking sector, as a result Internet banking'' (Aboobucker & Bao, 2019, s.109). The first example of digital banking in the world began in 1981 with home banking services in New York and internet banking application was first used in the USA by Wells Cargo Bank in 1995. Then NetBank application was presented to customers by Atlanta Internet Bank in the USA in 1996. Today, almost all banks offer the opportunity to carry out all transactions over the internet to their customers.

The term digital banking has been one of the most frequent and actual important subjects in the banking sector in the world, especially in the last decade. Although the growing number of young internet users suggests that internet banking is generally used by the young population, many studies around the world point to the fact that middle age groups also use internet banking frequently (Kwateng, Atiemo & Appiah, 2018; Yuan, Lai & Chu, 2019). The biggest share in this is that the ownership ratio of deposit or loan product is the highest in the middle age group worldwide.

All over the world, banks are in an ever-growing competition with each other. In the past, banks have only competed in the market share of loans or deposits, but today the number of internet banking and mobile banking users and penetration rates have been included in this assessment. At this point, digitalization is one of the important criteria that determine the success performance of banks. The fact that the bank which has positioned itself at the most different and inaccessible point in digitalization and technology, will win competetion. Therefore, this fact will make digitalization the focal point.

Alternative Distribution Channels in Banking

Today, the banking sector has placed individual customers at the center of its goals almost everywhere in the world. The most important reason for this is the excess supply and insufficient demand in the world. Globally, raw material prices have been decreasing in recent years and the world economy is facing a serious growth problem. At this point, the banking sector focused on increasing demand, and in particular, headed for marketing products and services to the highly profitable consumer segment thanks to its low risk and high profit margin. This change has led banks to seek alternative service points in order to provide solutions to the needs of individual customers.

With the application and availability of technology in every field, the banking sector has begun to benefit from the endless boons of technology. Today, the products and services offered to the banking sector are becoming more and more compatible with the digital age and even lead many sectors in digitalization. At this point, the service distribution channels used by banks are diversified in line with technological developments and offered to customers.

Nowadays, we can categorize alternative distribution channels except branch where the products and services provided by banks to their customers are as follows:

- **ATM (Automatic Teller Machine):** ATMs are technological tools that provide uninterrupted service to customers around the clock, enabling them to conduct their banking transactions outside the branch. ‘’As an important public technology device, since the first ATM was installed at Barclays in the USA in 1967, the design improvement and research of the ATMs have never stopped’’ (Huang, Yang, Yang & Lv, 2019, p.62). Customers can use the ATMs 24 hours a day, 7 days a week. However, in order to provide this service, customers must apply to the bank branches before requesting an ATM card and receiving the password of the card. Through ATMs, customers can carry out many transactions such as withdrawing money, depositing, paying credit card debts, paying bills without going to the branch without using debit card or debit card. In addition, in many countries, customers use the ATM of another bank to learn account balance, withdraw and deposit, perform credit card cash advance and credit card debt payment transactions.
- **Telephone Banking:** Telephone banking is a service distribution channel that provides 24/7 service on financial transactions of customers using telephone keys through personnel working in call centers and voice systems established within the banks. In order to provide this service, customers must apply to the bank branches before and have taken the necessary transactions for the telephone banking product and get their password/user name. Today, many banks can complete their telephone banking application procedures without having to apply from the branch, if the customer uses internet banking. Customers can make some banking transactions such as account transactions, money transfers, investment transactions, credit card transactions, password transactions, tax and invoice payments, internet banking technical support transactions, credit card applications and personal loans applications by telephone banking.
- **Internet Banking:** It is a kind of banking service distribution channel that enables many banking transactions to be performed 24 hours a day, 7 days a week, in a virtual environment, except for transactions that require face-to-face comparison such as withdrawal, deposit and withdrawal by using the websites of the customers via computers / tablets and the Internet. Customers can make almost all banking transactions through internet banking except for withdrawal, deposit or check delivery that requires face-to-face transactions via internet banking. Today, internet banking is one of the most commonly used distribution channels. A study on the internet users, conducted by Internet and Mobile Association of India (IAMAI), found that ‘’about 23% of the online users prefer internet banking as the banking channel in India, second to ATM which is preferred by 53% and out of the 6,365 Internet users sampled, 35% use online 22 Jayshree Chavan banking channels in India’’(Chavan, 2013, p.21-22).
- **Mobile Banking:** Mobile banking can be defined as “a mobile phone to access your bank or credit union account. This can be done either by accessing your bank or credit union’s web page through the web browser on your mobile phone, via text messaging, or by using an app downloaded to your mobile phone” (Consumers and Mobile Financial Services Report, 2016). Mobile banking is

the provision of internet banking services through specially developed applications by banks on the smartphones or tablets. In addition to the transactions via internet banking, transactions such as video-audio and live support and making appointments for the service from the branch are also offered by mobile banking.

- **Kiosk Banking:** Kiosk banking is a banking service channel that enables the customers to perform their banking transactions through touchmatic screens. Generally, This devices is placed in bank branches or at certain point. Transactions in kiosk banking are more limited than internet banking and as in ATMs, service is only available at certain points through debit cards. Banks serve with less kiosks than ATMs.

Internet Banking

With the developments in economic, social and cultural life, the number and type of transactions related to the banking sector is increasing day by day and accordingly, alternative transaction channels are undergoing change and development. Internet banking, eliminating the human encounter, offer customers with a wide range of financial services via an innovative way (Akhlaq & Ahmet, 2013). ''Internet banking is an alternative distribution channel for the provision of banking services over the internet with a computer without time and space limitation" (Karamustafa & Özoğlu, 2015). Thanks to internet banking, customers can benefit from the products and services of the bank when they are anywhere in the world every minute of the day. The three elements required for this are; internet, internet access tool (computer, tablet, smart phone) and password & user names received before. These are required by bank for the entry of internet banking.

Since the first use of internet banking in the United States in 1995, the internet world has developed at an unbelievable pace and has reach to wider audiences. In addition to the intense competition, the fact that banks have to use information and communication technology with the most advanced form in order to fulfill the current demands of customers are an important reason for this. Today, no matter where in the world, banks have to invest in internet banking in order to respond to customer demands and maintain their existence. However, the size of this investment may change in line with the countries / countries in which each bank operates, its level of development, capital and vision. It is determined the leading group of banks in digital transformation in the sector in global meaning. These are ''Banco Santander, Bank of America, Barclays, BBVA, BNP Paribas, Citi, DBS Bank, Deutsche Bank, HSBC, JP Morgan Chase, RBS, Societe Generale, UniCredit, Wells Farg'' (Juniper Research, 2018).

In the new world where the internet world is updated and developed every second, the number of internet users is increasing day by day and this has a positive effect on the number of potential internet banking users. The development of internet banking in these countries in the last 10 years has gained significant momentum due to the fact that financial markets are more developed in almost all developed countries and some of the developing countries, and the technological investments of the banks in these countries are directed to digital banking and security measures are more stringent. Table 1 shows the internet banking usage rates in Europe. According to Table 1, the number of Internet banking users who are between 16 and 74 ages has increased by 116% in 28 European Union countries since 2007.

Data on the number of Internet banking users in other developed and developing countries can be listed as follows:

Table 1. People Who Used Internet Banking (% od Individuals Aged 16-74)

Internet Banking User (%)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Belgium	35	39	46	51	54	56	58	61	62	64	67	69
Bulgaria	2	2	2	2	3	4	5	5	5	4	5	7
Czechia	12	14	18	23	30	35	41	46	48	51	57	62
Denmark	57	61	66	71	75	79	82	84	85	88	96	89
Germany	35	38	41	43	45	45	47	49	51	53	56	59
Estonia	53	55	62	65	68	68	72	77	81	79	79	80
Ireland	25	28	30	34	33	43	46	48	51	52	58	58
Greece	4	5	5	6	9	9	11	13	14	19	25	27
Spain	16	19	23	26	27	31	33	37	39	43	46	49
France	34	40	43	50	51	54	58	58	58	59	62	63
Crotia	9	13	16	20	20	21	23	19	33	38	33	41
Italy	12	13	16	18	20	21	22	26	28	29	31	34
Cyprus	12	11	15	17	20	21	23	24	20	28	28	33
Latvia	28	39	42	47	53	47	55	57	64	62	61	66
Lithuania	21	27	32	37	40	43	46	54	50	54	56	61
Luxembourg	46	48	54	56	59	63	63	67	65	71	76	68
Hungary	11	13	16	19	21	26	27	31	34	35	38	41
Malta	22	25	32	38	42	41	43	45	47	47	50	51
Netherlands	65	69	73	77	79	80	82	83	85	85	89	89
Austria	30	34	35	38	44	45	49	48	51	53	57	58
Poland	13	17	21	25	27	32	32	33	31	39	40	44
Portugal	12	14	17	19	22	25	23	25	28	29	31	39
Romania	2	2	2	3	4	3	4	4	5	5	7	7
Slovenia	19	21	24	29	31	28	32	32	34	35	39	42
Slovakia	15	24	26	33	34	40	39	41	37	45	51	50
Finland	66	72	72	76	79	82	84	86	86	86	87	89
Sweden	57	65	71	75	78	79	82	82	80	83	86	84
United Kingdom	32	38	45	45	48	52	54	57	58	64	68	74
European Union-28 Countries-Total (%)	**25**	**29**	**32**	**36**	**36**	**40**	**42**	**44**	**46**	**49**	**51**	**54**

Source: (Eurostat Report, 2019)

- In 2007, the number of Internet banking users in the USA was 47% of the population in the same age group, exceeding 60% at the end of 2018 (Statistica Report, 2019).
- The number of Internet banking users in China, which was 772 million in 2017, reached 800 million people at the end of 2018 and showed an annual growth rate of 3%. (CNNIC Report, 2019).

- Looking at the development between 2016 and 2018, the rate of use of the adult population is 30% to 42% in India, 59% to 65% in Brazil, 21% to 23% in Japan, and South Korea. at 42% from the 58% e, Canada at 52% from the 62% 'to (Banking and Finance 2018 Report, 2019) in Turkey and 43% from the 53% e (TBB Reports, 2019) increased

For banks serving in the financial services sector, the use of information and communication technology is an important element for reaching new customer. The use of communication and information technologies is indispensable for banks because of the adaptation of existing customers to the changing world, the protection of the number of existing customers and the reference to the new customers. In this era where economic, social and cultural changes in the world know no limits, internet banking is an excellent tool for banks to present their existing and new products and services to their existing or potential customers.

Today, the most important factor triggering competition between banks is the fact that customers have many bank options to evaluate their investments and to provide fund deficits. The fact that deposits and loan rates are very close to each other in banks in the same country where competition conditions are harsh. So banks are forced to create new service and service channels in order to attract new customers, to protect their existing customers and to constantly review their service quality. One of these service channels is internet banking. Customers intend to achieve certain goals by using internet banking. These purposes can be listed as follows:

- To have information about financial products and services
- Making transactions related to financial products and services
- To follow financial news and developments,
- To be able to make investment analysis
- Giving feedback to banks about their available products and services,
- To perform banking transactions at a lower cost
- Suggest new product and service development to banks
- If there is a transaction from the branch, start the process and make an appointment.

Transactions with Internet Banking

The profit margin of the banking sector contracted as the margins between the deposit and loan rates decreased. In order to overcome this disadvantage, banks are also seeking to increase their non-interest income by offering new products and services to their customers. Many of these new products are also offered to customers via internet banking. At this point, we can list the transactions made by customers via internet banking:

- **Loan Application:** Individual loan application, credit card application and their approvals were only products that were carried out from the branch in the past and had the longest process. Because customers had to go to the bank branch to apply for an individual loan and submit the necessary documents to the bank for the loan allocation process. However, thanks to technological advances such as the transfer of the individual score system to the web, these transactions are now offered to customers in digital environment by many banks. Today, almost all of the documents

required by banks can be accessed without the need for customer submissions and these documents can be used in the process.

- **Loan Payment:** Customers can pay for individual or commercial loans via internet banking. In addition, when necessary, credit collections for forward term can be made via internet banking.
- **Money Transfer:** For money transfers through the branch, customers are required to go to the branch and give a written instruction. However, thanks to internet banking, customers can make their own money transfer transactions without any procedure.
- **Insurance Transactions:** Customers can create pension contracts based on the figures that they have saved or planned, and can take out car, home and workplace insurance.
- **Investment Transactions:** Banks offer transactions such as fund trading, deposit, stock trading orders to their customers through internet banking. In addition, customers may make transactions for investment and derivative products through internet banking provided that they have already signed and delivered additional contracts.
- **Tools of Payment:** Transactions such as invoices, taxes, payment orders, tax penalties and promissory notes can be made via internet banking. In addition, customers may collect checks from this channel provided that they have physically delivered the check to the bank.
- **Foreign Currency and Precious Metals Transactions:** Customers can purchase / sell transactions and parity transactions in different currencies and follow exchange rates via internet banking. In addition, buying / selling transactions of precious metals such as gold and silver can be done through this channel.
- **Product View/Monitoring:** Through internet banking, customers can view all their accounts, credit card expenses, credit payment plans and collections, cash flows (income and expenses) for that period.

Thanks to this and many other similar features, banks are now directing their customers to their digital channels. Bank customers also prefer to use digital channels especially internet banking instead of branches due to their convenience such as fast money transfers and credit transactions.

As a result, many transactions (except that money deposit, money withdrawal, check delivery) that do not require a face-to-face encounter can be done through internet banking. As the banks become more involved individuals and companies' world every day, the product range offered by banks is also changing. Nowadays, the frequency and type of foreign trade transactions increase with the uncertainty of the borders between countries. Today, all transactions related to export and import can be made only through the branch channel due to the submission of required documents. However, in the near future, it is not a prophecy to predict that payment transactions related to import/export can be made by transferring the documents to digital media via internet banking.

Internet Banking's Advantages

As in all areas of the service sector, customers in the banking sector have a number of expectations both for the quality of the service and for the service provider. ''The Bank's customers have some expectations such as being able to carry out their transactions without having to go to the branch and waiting in line, getting detailed reports and information, and receiving fast and uninterrupted banking services from the banks where they carry out their bank transactions'' (Torun Nalbant & Tunca, 2019, p.215). In line with

Table 2. The Advantages of Online Banking

Advantages	
The bank	Improved market image- perceived as leaders in new technologies implementation
	Reduced transaction costs
	Better and quicker response to the market evolution
	Increased market penetration - the online banking service can be accessed all over the world
	The use of the internet site to advertise/sell new financial products
The individual client	Reduced costs in acessing and using the banking services
	Increased comfort and time saving- transactions can be made 24 hours a day, without requiring the physical interaction with tha bank
	Speed of transaction
	Better administration of funds- the history of a transaction is registered on digital support and can be analysed before a new transaction is initiated
The institutional client	Reduced costs in accessing and using the banking services
	Quick and continious access to information
	Increased comfort and time saving- transactions can be made 24 hours a day, without requiring the physical interaction with tha bank
	Speed of transaction
	Better administration of funds- the history of a transaction is registered on digital support and can be analysed before a new transaction is initiated

(Gurău, 2002, p.286)

these expectations, there are a number of benefits provided by internet banking to banks, customers and individual customers. Gurău (2002, p. 286) summarized these benefits as shown in Table 2:

At this point, the advantages that banks provide to their customers are ''to be able to make transactions without any time and place, to make transactions fast and cheap / free, to analyze customers' assets and debts, to reduce paper and documents and to be open to change''. Internet banking creates various opportunities and advantages for customers as well as for banks. These advantages can be listed as ''being able to establish two-way communication with customers, conduct marketing activities according to the target customer and analyze marketing activities, save time for staff, reduce costs and make innovations an element of development policy and differentiation''.

Internet Banking' s Disadvantages

In addition to the advantages provided to customers and banks by the use of internet banking, there are some disadvantages that it presents due to its structure. In fact, these disadvantages are barriers to the use of the product even if the product is owned. The most important indicator of this is the majority of the customers who have internet banking products but do not use them. Because ''the difference between the number of customers selling internet banking products and the number of customers using this product points out that there are some factors that keep customers from using internet banking '' (Keskin, 2019, p.101). These factors are the disadvantages of internet banking as follows:

- **Security & Privacy:** Although security in communication technologies has improved significantly, a significant number of customers are still far away from performing many transactions via the internet. One of these is the use of internet banking by bank customers. A significant number of bank customers still think that internet banking is not secure. The most important reason for this is the advanced use of technology by unsafe institutions or individuals. Because of the personal data used by unrelated persons and the bank customers exposed to fraud acts leads to a distance approach of the bank customers to internet banking. At this point, the most important issue that banks should focus on is securing the privacy and security of customer information and resources.
- **Being Uninterested/Untalented in Technology:** Technology has become accessible to every group of society today. Of course, economic, geographical or cultural differences affect the availability or frequency of use of technology. At this point, due to the individual's living conditions and some of the socio-cultural and individual differences from the past, bank customers may find it difficult to use internet banking in addition to using computers / tablets. For the same reasons, bank customers may face difficulties such as remembering, using, recognizing passwords / usernames and using the internet banking transaction menu.
- **Human Factor:** Although the service sector uses technology in marketing and presentation, labor intensity still continues. Some of the customers who receive service through manpower still wish to continue this habit. Similarly, many bank customers want to receive service delivery from a person, even from a long-known and trusted bank employee.
- **Not interested in the Advantages of Internet Banking:** We listed the advantages offered by internet banking to bank customers in terms of location, time, speed and cost. One or more of these advantages may not be considered as an advantage for the customer. Some customers already do very little banking. In such a case, the location, time factor will not be an issue in their lives for this group of customers. Similarly, for people who have a lot of free time and who do not work, the advantage of ''speed'' is not a difference for them. A group of customers also want to make transactions over the bank, regardless of the cost, and do not care about the advantage that internet banking will offer in terms of cost.

In line with these disadvantages, revealing the factors that determine the customers point of view towards internet banking will have a significant effect on banks' product sales and usage.

RESEARCH METHODOLOGY

The research conducted in this study is planned and organized on the basis of theoretical framework. In order to contribute to the related literature, internet banking practices and implications are structured in a manner which is figured out and developed from existing literature. So as to achieve this, descriptive research methodology has been chosen. The rationale behind this is; descriptive researches are generalized researches conducted to determine the qualifications of the research questions, to determine the variables that lead to the emergence of the research questions and to estimate the effects of these variables on the research question. The purpose of descriptive research is to make generalizations by establishing a causal relationship, to systematize and classify and to make predictions (Islamoğlu, 2009: 34).

The spread of internet banking is determined by the customer's point of view as well as the presentations of the banks. For this reason, the subject has been tried to be evaluated from the perspective of both

customers and banks, and in addition to the researches in the field literature, statistics have been included and comprehensive results have been tried to be put forward. This study will also unravel important factors towards internet banking which will have a significant effect on banks' product sales and usage.

Factors Determining the Use of Internet Banking

Research shows that a considerable proportion of customers around the world are still hesitant to conduct banking transactions via internet banking. When the data is analyzed, it will not be enough to evaluate the ownership ratios of the customers with the internet banking product. Because the frequency of customers using internet banking is a more important criterion in evaluating the actual data. Many studies have been conducted on the reasons why internet banking is preferred / not preferred by customers in many countries of the world without distinction between developed and developing countries. These studies show that the factors that determine the point of view of the use of internet banking are affected by both the bank and the personal characteristics of the customer. In the guidance of the studies, we can list the factors that affect the use of internet banking in terms of bank and customer in two different categories as follows:

Determinants of the banks:

- Design of the website: The design of the website, in which the banks provide internet banking services, has a direct impact on the customers' decision to use this service, especially its visual appeal, ease of use and the ability to perform fast transactions. Studies (Nasri & Charfeddine, 2012; Yoon & Steege, 2013; Montazemi & Qahri-Saremi, 2015; Alwan & Al-Zubi, 2016; Boateng & Narteh, 2016; Keskin, 2019) point out that the design and ease of operation of the website is important for customers to accept and use this product.
- Quality of the service provided: In the services provided over the web, consumers can receive one-to-one business support. Particularly, when customers encounter a problem while making transactions via internet banking, the solution is more difficult to reach. Since the customers will receive face-to-face support from any personnel in the transactions made at the branch, they can evaluate the service quality more positively. However, necessarity to reach the call center or branch staff again to solve the problems experienced in the internet banking or difficult processes may affect the evaluation of the service quality negatively. Previous studies (Montazemi & Qahri-Saremi, 2015; Yuan, Lai & Chu, 2018) point out that service quality is a limitation of the use of internet banking.
- Security: One of the most important obstacles to the use of internet banking is personal privacy and security. It will be possible customers' confidence in the internet banking service and their use increases, as the security of the websites increases. Researches (Chang, Wang, Chih & Tsai, 2006; Yoon & Stteege, 2013; Montazemi & Qahri-Saremi, 2015; Tran & Corner, 2016; Aboobucker & Bao, 2018; Jansen & Schaik, 2018; Yuan, Lai & Chu, 2018; Sharp, 2019; Normalini & Ramayah, 2019) point out that strengthening the use of methods such as password, biometric application, will reduce security concerns and customers will use the internet banking. The results of the research conducted by Thorton Consultancy with the banks in the USA in 1999 show that 67% of the banks think that main obstacle is ''security concerns'' for internet banking. (Sathye, 1999, p.325). However, security cannot be provided via banks and the technology alone. Customers are also required to fulfill their duties. Because ''banks cannot control customer behaviour nor the

devices customers use for online banking and customers them-selves have certain responsibilities regarding the safety and security of online banking'' (Jansen & Schaik, 2018, p.371). Jansen &Leukfeldt (2015) noticed that ''customers' behaviour is often the cause for internet banking fraud victimization''.

- Bank's recognition and reputation: The Bank's recognation and public' s trust to the bank are another factors that limits the use of internet banking. At this point, the reliability and creditworthiness of the bank, the size of its investments in technology and the technical possibilities will affect the customers' decision to use the internet banking. As a matter of fact, Peng, Moghavvemi & Teng' s (2019) studies prove this.

Determinants of the customers:

- Age: The most important characteristics of this age group, which is called the digital generation, which is capable of using technology very well today, are freedom, personalization, research, honesty, collaboration, entertainment, speed and innovation. (Karahasan, 2012, p. 77, cited from Don Tapscott). In addition to this group, customers in the adult age group are starting to adapt to the technology day by day. Statisca's research confirms this. In the Netherlands, 17% of the population aged 75 and over used internet banking in 2012, while this ratio reached 48.6% in 2018 (Centraal Bureau voor de Statistiek, 2019). In this research, the second highest increase over the years was between 65-75 age (from 53.5 to 73.1). The group who started to use the internet at an middle ages is considered as digital immigrants and although the individuals in the group do not dominate the digital world, these groups are also growing rapidly and they are trying to benefit from all the opportunities offered by internet life (Karahasan, 2012, p.77). Jansen & Schaik (2018) emphasizes that age is one of the determinants of internet use. In this study, contrary to the results of the previous research, it was concluded that over 50 years of age are at a distance from the use of internet banking.
- Education level: Education level can lead to variability in individuals' vision and technology acceptance. The fact that the use of internet banking is more widespread in developed countries and that it is more limited in developing countries can be considered as an indicator of the relationship between education level and internet banking use. Jansen & Schaik (2018) emphasizes that education level is one of the determinants of internet use. It is revealed that highly educated customers are more sensitive and conscious about perceiving the existence of threats and trust. Similarly, Jiménez & Díaz (2019) reached in their research that individuals with higher education are more likely to use Internet banking than individuals with lower educational levels.
- The habit of using computers: Regardless of education and age, customers may be in the habit of not using computers unless they are compulsory. This situation may also cause customers not to conduct their banking transactions with internet banking. In particular, studies conducted in developing countries (Keskin, 2019) point out that a group of customers do not use internet banking because they do not have the chance or access to the internet in addition to computers.
- Inability to socialize: Customers may wish to conduct banking transactions using one-to-one human interaction. Sociality is an important issue for many customers. Keskin (2019) reached conclusion in his research in Turkey that as one of the reasons for customers to not use internet banking is being customers' inability socialize. Another reason is that internet banking using is

not useful. Similarly, research was made in Lebanon (Tarhini, El-Masri, Ali, & Serrano, 2016) are reached similar results.

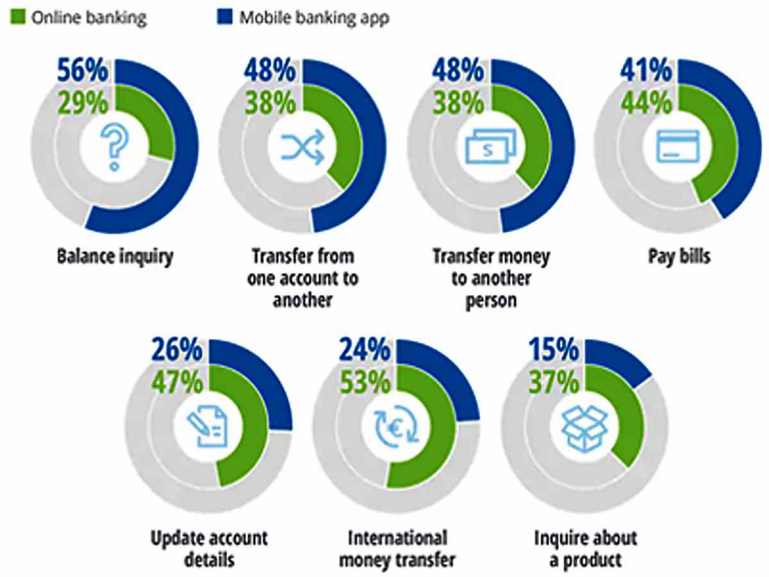
- Not being open to innovation: ''People who score low on openness are considered to be closed to experience and tend to be conventional and traditional in theiroutlook and behavior and they prefer familiar routines to new experi-ences, and generally have a narrower range of interests'' (Yoon & Steege, 2012, p. 1134). Part of the research (Yoon & Stteege, 2013; Montazemi & Qahri-Saremi, 2015) point out that one of the factors that affect customers' not to use internet banking and change their habits.
- Adoption of technology: The use of internet banking also depends on individuals' approach to technology. Internet banking can be a new technology for many customers. The adoption of a new technology and it's active using by customers will also take place in different customer expectations. At this point '' if the use of a new technology is easy for the consumer, and if the person thinks that he will get an additional benefit by using the technology, he will adopt the technology. So, emphasizing that the use of technology is easy and useful will affect the realization of that behavior'' (Torun Nalbant & Tunca, 2019, p.217).

Internet Banking or Mobile Banking?

Mobile options available to consumers have expanded considerably in only a few shortyears (Arcand, PromTep, Brun & Rajaobelina, 2017). The digital banking adventure, which first started with internet banking, is carried to the phone applications via smart phones and brought another distribution channel such as mobile banking application to the agenda. With the serving of mobile banking, mobile banking has become more comfortable for customers. Along with the ownership of smart phones by individuals at every budget and socio-cultural level, banking transactions have started to be conducted over mobile banking for the last 5 years. Today, depending on the type of transactions, customers' preferences in internet banking or mobile banking may also change. According to Deloitt's research results, internet banking and mobile banking preferences of individuals according to their banking transactions are shown in Figure 1 below.

Deloitt's report was made on 17,100 bank customers from 17 different countries. Accordingly, this report; it is seen that except for the update account deatils, international money transfer and inquire about and product, customers make their banking transactions via mobile banking. The survey findings reveal internet banking may remain a key channel of customer interactions in the forseeable future, even among mobile banking users. According to research survey found 73 percent of respondents globally use internet banking at least once a month, compared to 59 percent who use mobile banking apps. Moreover, it revealed no generational differences in how frequently internet banking is used—baby boomers use internet banking just as often as tech-savvy millennials. Overall, these findings suggest that as banks continue to invest in improving and enhancing mobile capabilities, there are potential challenges if banks allow mobile banking to fully eclipse internet banking. Instead, banks should continue to enhance the value proposition of the online channel, focusing on evolving the internet banking experience rather than seeing it as a phase-out to mobile. To do this, banks should aim to provide a more seamless experience between internet and mobile channels and purposefully measure internet customer engagement to meet evolving customer needs and preferences (Srinivas & Wadhwani 2018).

Figure 1. Use of internet banking and mobile banking apps in different banking activities
Source: (Deloitte Sights, 2019)



Today, 1.8 billion smart phones and 182 thousand tablets are sold every day in the world, while the sale of only 292 thousand computers (https://www.internetlivestats.com/) is an important indicator that internet banking can evolve into mobile banking.

Integration of Internet Banking with Fintech

Fintech (Financial Technology) is a new financial industry that uses technology to provide financial services to its customers in a more convenient way. All over the world, Fintech's motto is to make their customers' lives easier. In fact, internet banking has emerged with the use of Fintech applications of traditional banking. Today, with the spread of internet and mobile applications all over the world, the domain has widened. Especially due to the investment size and R&D studies required, it is more effective in the financial markets of developed countries. In 2017, Fintech ventures received $ 22.5 billion worldwide, resulting in an investment of $ 111.8 billion in 2018 (KPMG Annual Report 2018, 2019). These figures are also important indicators that Fintech will expand its application areas in the future.

At this point, it will be useful to talk about artificial intelligence and blockchain applications during the integration process of Fintech into internet banking.

Artificial Intelligence

Artificial intelligence characters that have forced our dreams in science fiction films until 40 years ago began to come to life in many everyday electronic goods that we use today. The artificial intelligence applications in the household goods or smart phones that we use make our lives easier with technological support in many respects. Artificial intellegence refers to ''computers' capability to acquire and apply knowledge without programmers' intervention'' (Kaya, 2019). One of the important uses of artificial

intelligence is the financial sector. In many developed and developing countries, mobile assistants used in the financial sector are the most widely used and known artificial intelligence applications. Advantages of artificial intelligence for banks can be listed as (FSB, 2017):

- ''Customer focused
  - Credit scoring
  - Insurance policies
  - Client facing chatbots
  - Know your customer
- Operations focused
  - Capital optimisation
  - Model risk management
  - Stress testing
  - Fraud detection
- Trading and portfolio management
  - Trade execution,
  - Portfolio management
- Regulatory compliance
  - Regulatory technology
  - Macroprudential surveillance
  - Data quality assurance
  - Supervisory technology''

Today, artificial intelligence has started to be used in internet banking applications, too. Especially thanks to the voice mobile assistant service in the internet banking web site or applications of the banks, customers can get support from artificial intelligence applications in many products such as account transactions, money transfers and foreign exchange purchase-sale. In many applications, artificial intelligence can communicate with customers by understanding customer conversations. Thanks to the two-way interaction, it is possible to design customer-specific products or learn customer needs with artificial intelligence applications. The fact that customers can establish two-way communication via internet banking through artificial intelligence products, in fact, provides more qualified service delivery than the peer-to-peer service provided to the customers at the branch.

Thanks to artificial intelligence products, it is seen that the costs in the financial sector decreased to 80% and time consumption decreased to 90% (Accenture 2016 Report, 2017). On the other hand, the transformation of the profits obtained by artificial intelligence into new business areas and investments may form the basis for even more important innovations. In addition, banks can prevent fraud attempts in internet banking more easily thanks to the ability of artificial intelligence to interpret data.

Blockchain Technology

Blockchain Technology entered the world with Bitcoin in 2009 through the process of digitalization of money. Blockchain is a continuously growing distributed database in which records are linked to each other by cryptographic elements (hash functions) (Technic Trends Report, 2017). Encrypted transaction tracking is performed with Blockchain. Collomb & Sok (2016) defined Blockchain as a digital or

distributed general ledger. In simpler terms, blockchain technology is a technology that enables the transfer of a value between two parties without any mediation or bank. With the Blockchain Technology, the exchange of crypto coins such as Bitcoin between individuals is carried out safely. The benefits of Blockchain Technology can be listed as accelerating the process, decreasing costs, increasing security and facilitating operational functioning (Dilek, 2018). Blockchain Technology is an important digital step. This is due to the fact that Blockchain Technology has a decentralized verification system, which makes it possible for the real estate, vehicles and valuables to be kept from evidence and registration, to hold birth, marriage and death certificates, to perform elections and to manage smart contracts, to the storage, processing and management of financial documents. It works as a digital record store in the field '' (Dilek, 2018, p.11).

Although Blockchgain was originally designed to deactivate the bank in transfer transactions, it is one of the most important areas of use in the financial sector today. Today, many important banks are investing in this technology. Today, blockchain Technology is also a new field of application for banks and is not fully integrated with internet banking. With this full integration in the future, banks aim to ensure simultaneous international money transfers and to ensure that all loan processes are extended without branches thanks to smart contract features, as well as digital authentication, and to ensure that all loan processes are extended without branches thanks to smart contract features.

SOLUTIONS AND RECOMMENDATIONS

Research shows that a group of customers still avoid to use of internet banking. What is important at this point is to increase the internet banking ownership and usage rates of different age, education, and socio-cultural customers. There is an important task for banks to discover the points of contact that will motivate this abstaining group. At this point, the importance of customer relationship management practices for banks is once again emerging. Thanks to the relationship management practices that the banks will strategically construct, they will make a significant contribution to the success rate when they frequently communicate to the customers who do not use internet banking but who own ownership by telephone or face to face through the employees. Because the general feature of this group is in fact a group that is prone to the use of internet banking. Only time on the persuasion side needs to be spent, which is only possible with a relational touch to the customers. At this point, the following suggestions can be given to the banks who want to increase the frequency of internet banking ownership and usage:

- Banks have a strategic structure in product design as well as business lines that plan, implement and monitor the marketing of these products. It is very important that these two units work synergistically to encourage the use of the internet banking product and to increase the frequency and number of transactions.
- A group of customers who have problems with the technological design of the product (for reasons such as the complexity of the menu) prefer not to use internet banking. At this point, banks can organize training activities by simulation method at regular intervals for customers who do not use internet banking to change this thought / behavior.
- One of the most frequent discomforts of bank customers is the collection of personal data by third parties or illegal organizations or persons. At this point, banks need to constantly move their technology and system internet fraudsters' beyond one or two steps. The fact that banks increase

their investments especially in blockchain applications will help them make significant progress in this regard.

- Most of the customers still do not trust internet banking and are still conducting money transfer transactions at the branch. By informing this customer segment, they may be encouraged to use internet banking more frequently by keeping transaction limits low or limited.
- Hedonic marketing is getting more and more on the agenda of the marketing activities of institutions. At this point, making the internet banking website more interesting and entertaining for customers can help them to adopt and develop the habit of using this product more easily.
- For customer who thinks that he will be left alone with the computer when he makes transactions through internet banking and experiences difficulties, banks should set the establishment of '' live assistance/mobile voice assistant'' application using artificial intelligence within the internet banking transaction menu.
- Customers who think internet banking is not attractive and resist the use of products can be directed to internet banking by keeping the costs high through the transactions made through the branch. Some customers may not pay fees for various transactions in branches. At this point, the opportunity offered to these customers can be terminated and the reason for the transition to internet banking applications can be created.
- Today, the question of how individuals around the world can improve the environment and nature and contribute to the ecosystem is sought. At this point, since internet banking makes the consumption of paper and other resources unnecessary, this advantage can be emphasized and customers can be encouraged to the product.
- Generation Z should be well known and banks should be worked on in accordance with the perspective of generation whn they develop new product. Because in the near future the most important customer segment will be the Z generation.

FUTURE RESEARCH DIRECTIONS

In this study, the role of internet banking in the marketing of financial services and products and the use of internet banking today and the advantages and disadvanteges it offers to both the bank and the customers are discussed. In future studies, it is important to contribute to the literature by using qualitative or quantitative methods to compare these issues in different countries or developed / developing countries. In addition, research can be conducted to determine the factors that affect the use of banks according to their target customer or users' demographic information.

Nowadays, mobile banking has become a part of internet banking and it is recommended that all these issues should be evaluated within the scope of mobile banking.

CONCLUSION

Today, banks are directing their customers to use internet banking more and more for both their own interests and customer interests. The most important reason behind this is operational efficiency and reduction of costs. For this purpose, banks need to listen to the feedback of their customers about internet

banking using, and to guide and convince them accordingly. In this way, in addition to internet banking product ownership, usage rate can be increased rapidly.

As a result, the basic condition of customers' using internet banking is to encourage and motivate them for this distribution channel. To the extent that banks are able to achieve this, they will not only increase the use of internet banking, but will also take an important step in weakening the negative perspectives of customers who are resistant to change for their new products and services. In addition, banks should keep up to date by following technological developments and integrating artificial intelligence and blockchain products into internet banking very quickly.

REFERENCES

Aboobucker, I., & Bao, Y. (2018). What Obstruct Customer Acceptance of Internet Banking? Security and Privacy, Risk, Trust and Website Usability and The Role of Moderators. *The Journal of High Technology Management Research*, *29*(1), 109–123. doi:10.1016/j.hitech.2018.04.010

Accenture. (2017). *2016 Report*. https://www.accenture.com/_acnmedia/pdf-35/accenture-2016-shareholder-letter10-k006.pdf#zoom=50

Akhlaq, A., & Ahmed, E. (2013). The Effect of Motivation on Trust in the Acceptance of Internet Banking in a Low-Income Country. *International Journal of Bank Marketing*, *31*(2), 115–125. doi:10.1108/02652321311298690

Alwan, H. A., & Al-Zubi, A. (2016). Determinants of Internet Banking Adoption Among Customers of Commercial Banks: An Empirical Study in the Jordanian Banking Sector. *International Journal of Business and Management*, *11*(3), 95–104. doi:10.5539/ijbm.v11n3p95

Arcand, M., PromTep, S., Brun, I., & Rajaobelina, L. (2017). Mobile Banking Service Quality and Customer Relationships. *International Journal of Bank Marketing*, *35*(7), 1068–1089. doi:10.1108/IJBM-10-2015-0150

Banking and Finance Report. (2019). https://www.appannie.com/en/insights/market-data/banking-finance-2019-shift-to-mobile/

Boateng, S. L., & Narteh, B. (2016). Online Relationship Marketing and Affective Customer Commitment the Mediating Role of Trust. *Journal of Financial Services Marketing*, *21*(2), 127–140. doi:10.1057/fsm.2016.5

Centraal Bureau voor de Statistiek. (2019). https://www.statista.com/statistics/575490/share-of-individuals-using-internet-banking-in-netherlands-by-age-group/

Chang, S. H., Wang, K. Y., Chih, W. H., & Tsai, W. H. (2012). Building Customer Commitment in Business-to-Business Markets. *Industrial Marketing Management*, *41*(6), 940–950. doi:10.1016/j.indmarman.2011.11.026

Chavan, J. (2013). Internet Banking- Benefits and Challenges in an Emerging Economy. *International Journal of Research in Business Management*, *1*(1), 19–26.

Collomb, A., & Sok, K. (2016). Blockchain/Distributed Ledger Technology (DLT): What Impact on the Financial Sector? *Digiworld Economic Journal*, *103*(3), 93–110.

Consumers and Mobile Financial Services Report. (2016). https://www.federalreserve.gov/econresdata/consumers-and-mobile-financial-services-report-201603.pdf

Dilek, S. (2018). *Blockchain Technology and Bitcoin*. https://setav.org/assets/uploads/2018/02/231.-Bitcoin.pdf

Europa Report. (2019). https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180115-1

FSB. (2017). *Deutsche Bank Research*. https://www.dbresearch.com/servlet/reweb2.ReWEB?rwnode=RPS_EN-PROD$RPSHOME&rwobj=DIGITAL.alias&rwsite=RPS_EN-PROD

Gurău, C. (2002). Online Banking in Transition Economies: The Implementation and Development of Online Banking Systems in Romania. *International Journal of Bank Marketing*, *20*(6), 285–296. doi:10.1108/02652320210446742

Huang, H., Yang, M., Yang, C., & Lv, T. (2019). User Performance Effects with Graphical Icons and Training for Elderly No Vice Users: A Case Study on Automatic Teller Machines. *Applied Ergonomics*, *78*, 62–69. doi:10.1016/j.apergo.2019.02.006 PMID:31046960

ITU International Telecommunications Union. (2019). http://stats.areppim.com/stats/stats_internetxf-cstx2017.htm

Jansen, J., & Leukfeldt, R. (2015). How People Help Fraudsters Steal Their Money: An Analysis of 600 Online Banking Fraud Cases. *Proceedings of 2015 Workshop on Socio-Technical Aspects in Security and Trust*, 24-31. 10.1109/STAST.2015.12

Jansen, J., & Schaik, P. V. (2018). Testing A Model of Precautionary Online Behaviour: The Case of Online Banking. *Computers in Human Behavior*, *87*, 371–383. doi:10.1016/j.chb.2018.05.010

Jiménez, J. R. Z., & Díaz, I. A. (2019). Educational Level and Internet Banking. *Journal of Behavioral and Experimental Finance*, *22*, 31–40. doi:10.1016/j.jbef.2019.01.004

Juniper Research. (2018). https://www.juniperresearch.com/press/press-releases/digital-banking-users-to-reach-2-billion

Karahasan, F. (2012). *Taşlar Yerinden Oynarken Dijital Pazarlamanın Kuralları*. İstanbul: Doğan Egmont.

Karamustafa, K., & Ozoğlu, B. (2015). Turkiye'de Internet Bankaciligi Hizmetlerinin Onem Basarım Analizi ile Degerlendirilmesi: Yozgat Ili Orneği. *Erciyes Universitesi Sosyal Bilimler Dergisi*, *39*, 108–131.

Kaya, O. (2019). Artificial Intelligence in Banking. *Artificial Intelligence, Deutche Bank Research*. https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD0000000000495172/Artificial_intelligence_in_banking%3A_A_lever_for_pr.pdf

Keskin, S. (2019). The Analysis of the Reasons Why Bank Customers Are Not Using Internet Banking. *Kırıkkale University Journal of Social Sciences*, *9*(1), 99–110.

KPMG Annual Report 2018. (2019). https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/the-pulse-of-fintech-2018.pdf

Kwateng, K. O., Atiemo, K. A., & Appiah, C. (2019). Acceptance and Use of Mobile Banking: An Application of UTAUT2. *Journal of Enterprise Information Management*, *32*(1), 118–151. doi:10.1108/JEIM-03-2018-0055

Montazemi, A. R., & Qahri-Saremi, H. (2013). Factors Affecting Adoption of Online Banking: A Meta-Analytic Structural Equation Modeling Study. *Information & Management*, *52*(2), 210–226. doi:10.1016/j.im.2014.11.002

Nasri, W., & Charfeddine, L. (2012). Factors Affecting the Adoption of Internet Banking in Tunisia: An Integration Theory of Acceptance Model and Theory of Planned Behavior. *The Journal of High Technology Management Research*, *23*(1), 1–14. doi:10.1016/j.hitech.2012.03.001

Normalini, M. K., & Ramayah, T. (2019). The Impact of Security Factors towards Internet Banking Usage Intention among Malaysians. *Global Business and Management Research*, *11*(2), 241–251.

Peng, L. S., Moghavvemi, S., & Teng, L. S. (2019). Trust and Loyalty among Islamic and Conventional Bank Customers in Malaysia. *Social Sciences & Humanities*, *27*(2), 1275–1295.

CNNICReport. (2019). https://cnnic.com.cn/IDR/ReportDownloads/

ReportT. T. (2017). https://www2.deloitte.com/us/en/insights/focus/tech-trends/2017.html

Sathye, M. (1999). Adoption of Internet Banking by Australian Consuners: An Empiricial Investigation. *International Journal of Bank Marketing*, *17*(7), 324–334. doi:10.1108/02652329910305689

SightsD. (2019). https://www2.deloitte.com/us/en/insights/industry/financial-services/online-banking-usage-in-mobile-centric-world.html

Srinivas, V., & Wadhwani, R. (2018). The value of online banking channels in a mobile-centric world. *Deloitte Consulting Report*. https://www2.deloitte.com/us/en/insights/industry/financial-services/online-banking-usage-in-mobile-centric-world.html

Statista Report. (2019). https://www.statista.com/statistics/455418/number-of-digital-banking-users-usa/

Tarhini, A., El-Masri, M., Ali, M., & Serrano, A. (2016). Extending the UTAUT Model to Understand the Customers' Acceptance and Use of Internet Banking in Lebanon: A Structural Equation Modeling Approach. *Information Technology & People*, *29*(4), 830–849. doi:10.1108/ITP-02-2014-0034

TBB Reports. (2019). https://www.tbb.org.tr/Content/Upload/istatistikiraporlar/ekler/965/Dijital-Internet-Mobil_Bankacilik_Istatistikleri-Mart_2018.pdf

The 2018 Global Digital Report. (2019). https://digitalreport.wearesocial.com/

Torun Nalbant, F., & Tunca, M. Z. (2019). Technology Acceptence Model Based Investigation of Internet Banking as an Alternative Channel. *Suleyman Demirel University the Journal of Faculty of Economics and Administrative Sciences*, *24*(2), 215–236.

Tran, H. T. T., & Corner, J. (2016). The Impact of Communication Channels on Mobile Banking Adoption. *International Journal of Bank Marketing*, *34*(1), 78–109. doi:10.1108/IJBM-06-2014-0073

World Population Prospects. (2019). *The 2019 Revision*. https://population.un.org/wpp/

Yoon, H. S., & Steege, L. M. B. (2013). Development of A Quantitative Model of the Impact of Customers' Personality and Perceptions on Internet Banking Use. *Computers in Human Behavior*, *29*(3), 1133–1141. doi:10.1016/j.chb.2012.10.005

Yuan, Y., Lai, F., & Chu, Z. (2018). Continuous Usage Intention of Internet Banking: A Commitment Trust Model. *Inforfmation Systems and E-Business Management*, *17*(1), 1–25.

ADDITIONAL READING

Alhassany, H., & Faisal, F. (2018). Factors Influencing the Internet Banking Adoption Decision in North Cyprus: An Evidence from the Partial Least Square Approach of the Structural Equation Modeling. *Financial Innovation*, *4*(29), 1–21. doi:10.118640854-018-0111-3

Bucur, L. E., Manea, N., & Goldbach, D. (2019). Opinions and Perceptions of Bank Managers on the Quality of Provision of Internet Banking Services. *Journal of Economic Development. Environment and People*, *8*(3), 53–59. doi:10.26458/jedep.v8i3.634

Marafon, D. L., Basso, K., Espartel, L. B., Barcellos, M. D., & Rech, E. (2018). Perceived Risk and Intention to Use Internet Banking: The Effects of Self-confidence and Risk Acceptance. *International Journal of Bank Marketing*, *36*(2), 277–289. doi:10.1108/IJBM-11-2016-0166

Matsuo, M., Minami, C., & Matsuyama, T. (2018). Social Influence on Innovation Resistance in Internet Banking Services. *Journal of Retailing and Consumer Services*, *45*, 42–51. doi:10.1016/j.jretconser.2018.08.005

Singh, S. (2019). Measuring E-Service Quality and Customer Satisfaction with Internet Banking in India. *Theoretical Economics Letters*, *9*(2), 308–326. doi:10.4236/tel.2019.92023

KEY TERMS AND DEFINITIONS

Alternative Distribution Channels: Platforms where banking products and services are offered outside the branch.

Banking Transactions: It is operational activities that banks do them for fulfilling their customers' demands.

Digital Innovation: These are new applications that banks shaped internet banking and mobile banking platforms according to today's technology.

Digitalization: It is the management of business processes by transferring them to digital environments.

Financial Services Marketing: These activities are the promotion, sale, after-sales support process and consultancy activities of financial products and services for the needs, expectations and desires of existing and potential customers.

Internet Banking: It is a product that offers many of the services offered by bank's branchs to its customers through the internet without any time and place limits.

Technological Developments: Technology-based applications that banks monitor and implement for increased productivity and profitability.

Chapter 10
Digital Learning Analytics Recommender System for Universities

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ABSTRACT

The aim of this chapter is to present the multivariate analyses results of the factors that influence students' acceptance and the continuance usage intention of digital learning analytics recommender systems at higher education institutions in Saudi Arabia. Data was collected from 353 Saudi Arabian university students via an online digital survey questionnaire. The research model was then used to examine the hypothesized relationships between user experiences of the digital learning analytics recommender system and their intentions for long-term adoption of the system. The research model was primarily based on the technology acceptance model (TAM) developed by Davis (1989)—the variables 'perceived usefulness', 'perceived ease of use', and 'acceptance', particularly—with 'continuance usage intention' added as an endogenous construct and with 'service quality' and 'user experience' added as external variables.

INTRODUCTION

Electronic and multimodal information communication technologies (ICT) are increasingly utilised in education service delivery in countries around the world (Al-Amoush, and Sandhu 2020; Alharbi, and Sandhu 2019; Al-Gahtani, 2016). Described as electronic learning (e-learning), not only is it increasingly perceived as an inclusive learning approach, it is acknowledged as a flexible and convenient learning pathway for students and a cost-effectiveness strategy for the management of learning spaces (Al-Gahtani,

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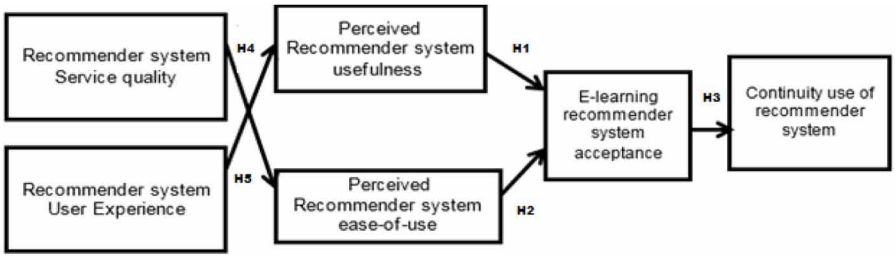
2016). Digital learning analytics recommender systems fall within the broad suite of e-learning technologies. Characterised as collaborative, content-based system, digital learning analytics recommender system assist students to access and evaluate learning materials and other information to make informed choices to meet their learning needs and interests (Okechi and Kepeghom, 2013). To facilitate this outcome, the analytics recommender system first predicts and then responds to the students' areas of interest.

Notwithstanding the potential benefits to student learning outcomes from using digital learning analytics recommender system, their adoption in Saudi Arabian higher education institutions remains limited (Al-Amoush, and Sandhu 2020; Alharbi, and Sandhu 2019; Al-Gahtani, 2016; Alenezi et al., 2012). In response, this study investigates the factors influencing Saudi students' acceptance of, and continuance usage intention for, digital learning analytics recommender systems in universities in Saudi Arabia. It is anticipated that the findings from the investigation can help to inform the strategies needed to promote the adoption of analytics recommender technologies in Saudi Arabia.

RESEARCH MODEL AND HYPOTHESES

The research model to investigate the factors affecting students' acceptance and the continuance usage intention of digital learning analytics recommender systems is primarily based on the TAM developed by Davis (1988). It incorporates 'service quality' and 'user experience' as external variables; and includes the TAM variables: 'perceived usefulness', 'perceived ease of use', and 'acceptance'. The research model also extended the TAM by adding 'continuance usage intention' as the ultimate endogenous construct in the developed model (see Figure1).

Figure 1. Research Model for digital learning analytics recommender system acceptance



Following analysis of the findings reported in previous studies (e.g. DeLone and McLean, 1992; Gorla et al., 2010; Rana et al., 2015) and in consideration of the key issues explored in the literature (e.g. Al-Amoush, and Sandhu 2020; Alharbi, and Sandhu 2019; Dağhan, and Akkoyunlu, 2016; Karapanos, 2013; Lin 2011; Lee, 2010), the following hypotheses were formulated:

H1: The perceived recommender system usefulness affects digital learning analytics recommender system acceptance.

H2: The perceived recommender system ease of use affects digital learning analytics recommender system acceptance.

H3: The digital learning analytics recommender system acceptance affects the continuity use of recommender system.
H4: The digital learning analytics recommender system service quality affects perceived recommender system ease of use.
H5: The digital learning analytics recommender system user experience affects perceived recommender system usefulness.

Service quality refers to both the quality of information delivered in terms of accuracy, currency and completeness (Huh et al., 1990), and to system quality in terms of performance and functionality; that is, correctly and performs the required tasks (Chatfield and AlAnazi, 2013). User experience relates to user confidence, skills, feelings of frustration, and navigation outcomes. Perceived usefulness relates to performance, productivity, efficiency, effectiveness, and timeliness. Lastly, perceived ease of use relates to the capacity of the system to meet user demands and to facilitate user learning of the system.

Digital Learning Analytics and Recommender Systems

Learning analytics refers to "the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (Long and Siemens, 2011, p. 32). Learning analytics tools such recommender systems enable educational institutions to provide learners with a more personalised educational materials (Dietz-Uhler and Hurn, 2013). In addition, these tools would enhance students' learning experience and increase their engagement, retention and success (Lockyer et al., 2013). Moreover, Learning analytics also offers educational institutions valuable insights and improved decision-making for better resources allocation to achieve educational excellence (Macfadyen and Dawson, 2012).

Recommender systems, or recommendation systems/engines, are digital learning analytics tools that assist users to select items relevant to their interest (Almeida, 2013). Recommender systems have been designed to cover the gap between information collection and analysis by improving the capacity and efficiency of the filtering of available data and presenting the most appropriate items to the user (Almeida, 2013). However, the major issue with recommender systems is obtaining the ideal match between those recommending and those receiving the recommendation; that is, indicating and discovering the relation between users' interests. Recommender systems are widely adopted in various fields for the recommendation of research papers, articles, music, objects, videos, movies and even people. Professional databases and portals, such as Facebook, LinkedIn, IBM, Cisco and Amazon, use recommender systems that suggest items (e.g., products and contacts) to their users (Cleomar & Oliveira, 2011).

The advent of e-learning environments has shifted course content from a traditional static model that treated all students similarly to a more fluid approach to content that responds to the individual needs of the student (Berharndi et al., 2016). Recommender systems are designed to facilitate rapid filtering to provide targeted information that matches the needs of the student (Berharndi et al., 2016). Targeted recommender systems avoid information overload that reduces learning time, often associated with unfiltered searches (Tarus, Niu, & Mustafa, 2017). This filtering process allows for the generation of a personalised learning environment, where students are freed from the task of searching for relevant information through browsing or self-filtering, enabling the student to spend more time on learning materials (Berharndi et al., 2016).

Recommender system innovations have seen the rise of systems, such as the new multi-personalised recommender system for e-learning (NPR-eL), that not only filter data, but through a historical examination of previous searches, are able to determine how much information the student is retaining (Berharndi et al., 2016). However, while these systems have benefits to regular users due to their intuitive learning mechanisms, they often have start issues (Bourkoukou & El Bachari, 2016). The avoidance of cold-start issues is critical to user experience and therefore long-term uptake of the recommender system. To avoid this, the use of initial filtering based on peer identification, where a learner profile is generated based on the collaborative filtering, and then use of this starting point to bring forward learning objects that engage the student and enable a more historically reliant guide of student needs to be developed (Bourkoukou & El Bachari, 2016). Further, understanding student learning styles, modelled using the Felder Silverman Learning Styles (FSLS), can generate scales that guide the recommender system algorithm (Bourkoukou & El Bachari, 2016; see Table 1). The FSLS generates a 44-question survey of potential recommender system users to find the learning style and create the correct scales to meet the needs of the student (Bourkoukou & El Bachari, 2016).

Table 1. The four scales of the Felder Silverman Learning Styles (FSLS) used to inform cold-search recommender systems.

Scale	Student Style	Characteristics
Information processing	Active (A)	Works in groups, prefers to try new material instantly, handles practical stuff.
	Reflective (R)	Works alone, preferring to take the time to think about a problem.
Information perception	Sensing (S)	Is patient with details, prefers senses, facts and experimentation.
	Intuitive (I)	Interested in the overview and broad-scale knowledge, interested in innovations and accepts complications, prefers principles and theories.
Information reception	Visual (L)	Prefers to perceive materials as images, diagrams and films.
	Verbal (B)	Prefers to perceive materials as text.
Information understanding	Global (G)	Prefers to get the big picture first, assimilates and understands information in a linear and incremental step.
	Sequential (Q)	Prefers to process information sequentially.

(Bourkoukou & El Bachari, 2016, p. 1568)

Once the student scale has been determined, the recommender system is able to formulate a strategy that data mines information to meet the identified student learning style (see Table 2-3). The role of recommender systems in e-learning is to maximise the time spent by the student learning and reduce the time spent searching. The understanding of the learning style of the student enables student engagement from a cold start, increasing the rates of user satisfaction. Once the hurdle of cold starts has been avoided, the style of recommender system chosen will be able to work most effectively.

Research Method

This study employed both web-based and personally administered questionnaires. During the twentieth century, technological advances, including the internet, revolutionised the way in which survey research

is conducted. In coming years, some experts expect that the majority of survey research will be conducted online (Evans & Mathur, 2005). Several researchers around the world have utilised internet-based surveys, for several reasons. One advantage of using the internet for conducting a survey is saving researchers' time. A web-based survey enables researchers to reach thousands of potential participants in a short time frame, even though possibly being separated by great geographic distances. In addition, this type of survey may save time by allowing researchers to work on other parts of their research while collecting data. Moreover, it reduces the time needed to manually enter the data into the data analysis software (Taylor, 2000; Llieva, Baron, & Healey, 2002; Wright, 2005). The second advantage of using online surveys is saving money. Researchers can save money by using an electronic medium to reach their sample instead of a paper format. The cost associated with printing paper-based questionnaires, mailing them to targeted participants or travelling to personally administer them can be enormous (Wright, 2005). However, if not properly addressed, electronic surveys suffer from potential limitations including low response rates, security and privacy concerns and sampling issues (Evans & Mathur, 2005). To overcome these weaknesses, there was a limited use of hard copies for the convenience of some respondents.

In this research, the survey was designed and organised to ensure the clarity and accuracy of the questions. The researcher used Qualtrics survey software to develop the web-based survey (Evans & Mathur, 2005). The questionnaire design was divided into two sections. The first section was designed to capture the respondents' profiles (i.e., demographic data) using multiple-choice questions. In this section, yes/no questions were also used at the beginning of the questionnaire for the purpose of filtering the participants (e.g., based on whether they are using e-learning recommender systems or not). The second section consisted of scale questions used to measure the independent and dependent variables related to the research model. Scale questions were close-ended questions using a five-point Likert scale with end points of 'strongly agree' and 'strongly disagree'. To achieve clarity, each type of question was separated from other types. Thus, the demographic questions and yes/no questions were placed first, followed by the scale questions, which were clustered based on the subject.

The survey utilised the previous literature survey to develop a series of measures suitable for measuring users' acceptance and continued use of e-learning recommender systems in Saudi Arabia using the TAM framework. The constructs of interest in this study were 'perceived usefulness', 'perceived ease of use', 'service quality', 'user experience', 'user acceptance' and 'continuance usage intention'. These constructs were described in Chapter 2. Survey items were operationalised using validated items drawn from prior research (see Table 1 and Table 2).

The scales of perceived usefulness and perceived ease of use were adopted from Davis (1989) and Davis et al. (1989). Service quality items were adopted from Chutimaskul, Papasratorn, and Wangpipatwong (2005). The measurements of users' experience were adopted from Koufaris (2002), Taylor and Todd (1995b) and Venkatesh et al. (2003). Users' acceptance items were adopted from Morris and Dillon (1997). Continuance usage intention items were adopted from Al-Debei, Al-Lozi and Papazafeiropoulou (2013). Table 3 shows the Measurement scales developed in this survey lists the items. There were six constructs and total of 29 items used to measure them: perceived usefulness has one dimension with five items, perceived ease of use includes one dimension and five items, service quality has one dimension and four items, user experience has one dimension and seven items, user acceptance has one dimension with five items and finally, continuance usage intention has one dimension and three items.

All items were measured using a five-point Likert-type scale on an interval level ranging from 'Strongly agree' to 'strongly disagree'. The Likert scale's invention was to explain this technique for the assessment of attitudes (Likert, 1931). The Likert scale was selected as an instrument to obtain a

Table 2. Operationalisation of constructs

Variable Code	Variable Name	Explanation	Number of Items
PU	Perceived usefulness	The degree to which a learner believes that using the digital learning recommender system would enhance his or her performance	5
PEOU	Perceived ease of use	The degree to which a learner believes that using the digital learning recommender system would be free of effort	5
SQ	Service quality	The quality of information that the digital learning recommender system delivers to its users as well as the system quality	4
UX	User's experience	Learners' knowledge and skills in interacting with the digital learning recommender system	7
UA	User's acceptance	Learners' initial behavioural intention to use the digital learning recommender system	5
CUI	Continuance usage intention	Learners' intentions to continue using the digital learning recommender system after the initial adoption	3

Table 3. Measurement scales developed in this survey

Construct	Item	Measure	Source
Perceived usefulness	PU1	I would find the digital learning recommender system useful to access educational services.	Davis (1989) and Davis et al. (1989)
	PU2	Using the digital learning recommender system will probably improve my academic performance.	
	PU3	Using the digital learning recommender system would probably increase the effectiveness of my learning.	
	PU4	Using the digital learning recommender system would probably help me to accomplish educational tasks more quickly.	
	PU5	Using the digital learning recommender system would increase my academic productivity (e.g., find information about educational services in shortest time frame)	
Perceived ease of use	PEOU1	Learning how to use the digital learning recommender system to access educational services is easy for me.	Davis (1989) and Davis et al. (1989)
	PEOU2	I find it easy to use the digital learning recommender system to find what I want.	
	PEOU3	My interaction with the digital learning recommender system to access educational services is clear and understandable.	
	PEOU4	The digital learning recommender system is flexible to interact with.	
	PEOU5	Overall, I find using the digital learning recommender system to access educational services easy to use.	
Service quality	SQ1	Information delivered from the digital learning recommender system is accurate.	Chutimaskul et al. (2005)
	SQ2	Information delivered from the digital learning recommender system is up-to-date.	
	SQ3	The digital learning recommender system always works properly without service disruption or downtime.	
	SQ4	The digital learning recommender system enables me to complete all necessary tasks electronically.	

continues on following page

Table 3. Continued

Construct	Item	Measure	Source
User experience	UE1	I have become very skilled at using the digital learning recommender system.	Koufaris (2002), Taylor and Todd (1995b) and Venkatesh et al. (2003)
	UE2	I know where to find what I want on the digital learning recommender system.	
	UE3	I know more about using the digital learning recommender system than most users.	
	UE4	Using the digital learning recommender system helps me to locate information easily.	
	UE5	It is easy for me to move between different sections on the digital learning recommender system.	
	UA6	I am less aware of other things around me when interacting with the digital learning recommender system.	
	UA7	When successful in a task on the digital learning recommender system, I feel confident in using it for other tasks.	
User acceptance	UA1	The digital learning recommender system is easy to navigate.	Morris and Dillon (1997)
	UA2	I intend to use the digital learning recommender system more for my study.	
	UA3	I find information quicker on the digital learning recommender system.	
	UA4	Using digital learning recommender system would probably save my money.	
	UA5	Using digital learning recommender system would probably help me in monitoring time.	
Continuance usage intention	CBI1	I intend to continue using the digital learning recommender system in the future.	Al-Debei et al. (2013)
	CBI2	I will continue using the digital learning recommender system in the future.	
	CBI3	I will regularly use the digital learning recommender system in the future.	

participant's preference and degree of agreement with statements (Hair, Black, Babin, Anderson, & Tatham, 2006). This scale can more conveniently show the responses from a strongly positive one to a strongly negative one with the mid-point indicating a neutral response. In addition, Hair et al. (2006) held the view that the Likert scale is one of the most useful devices available as it builds in a degree of sensitivity and differentiation of responses. Moreover, Likert scales are the most frequently used scales in information systems research (Sekaran, 2003).

Assessing the Validity and Reliability of the Constructs

Instrument validity is considered a critical stage to confirm that the instrument is accurate and measuring what it is intended to measure (Straub et al., 1989). According to Sekaran and Bougie (2010), different techniques can be used to ensure instrument validity, such as content, convergent and discriminant validity. Straub, Boudreau and Gefen (2004, p. 68) defined content validity as 'the degree to which items in an instrument reflect the content universe to which the instrument will be generalised. This validity

is generally established through literature reviews and experts' judges or plans'. The content validity of our survey instrument was established in two ways. First, the constructs along with the measures used in this study have already been validated in previous studies, as they were all adopted from the existing literature. Second, the results of the pre-test with subject-matter experts assured the content validity of the survey instrument. The questionnaire was sent to two academics and two PhD students in the field of management information systems. The process started by asking two PhD students from Saudi Arabia who are studying in Australia to fill in the questionnaire. Students were asked to provide their feedback on whether the items were worded in an accurate, clear and understandable manner. The comments and notes they provided were taken into consideration and some of the items re-worded and refined. Thereafter, the questionnaire was sent to two subject-matter experts working as faculty members to complete and advise on whether the items would measure the construct and check item ambiguity, simplicity and redundancy. Finally, the questionnaire items were modified to incorporate the experts' feedback and comments.

Convergent validity is the degree to which multiple measures of a construct are correlated. Discriminant validity is the opposite of convergent validity, and assesses the degree to which two conceptually similar concepts are different (Hair et al., 2006). Convergent validity is used to ensure that all the items measuring a construct are grouped in one single construct. In this study, validity and uni-dimensionality of the scales were assessed with exploratory factor analysis (EFA) and examination of the correlation coefficients. In addition, convergent and discriminant validity of the measurement scales was assessed using confirmatory factor analysis (CFA). Specifically, composite reliability (CR) and average variance extracted (AVE) tests were conducted to measure convergent validity. Fornell and Larcker (1981) suggested that the value of CR for each construct must exceed 0.70, while the value of the AVE must exceed 0.50 for convergent validity to be assured. As for discriminant validity, it is established when the square root of the AVE from the construct is greater than the correlation shared between the construct and other constructs in the model (Chin, 1998).

Reliability refers to 'the extent to which a variable or set of variables is consistent in what it is intended to measure' (Straub et al., 2004, p. 68). For reliability of the scale, Cronbach's alpha (Cronbach, 1970), which is a common method used to measure the reliability and internal consistency of scales, was used. Hair et al. (2006) suggested that the reliability of the scale is generally accepted if the value of Cronbach's alpha for each construct is equal to or greater than 0.70. Nunnally (1978) argued that to level of reliability (alpha value) is a determination made by the researcher in terms of energy, time and the potential impacts if a lower level of reliability is applied. Notwithstanding, that an alpha of 0.95 is the gold standard, a lower alpha reflects the nature of measurement arose when dealing with multiple variables which are combined within an instrument (Nunnally, 1978).

Sampling

This study employed the survey questionnaire as the main method for collecting data. Web-based and self-administered questionnaires were developed based on previous literature. As this research is studying the continuous use of digital learning recommender systems, it is vital that the targeted universities have this technology in place. A list of such universities and contact data were obtained from the Ministry of Higher Education. The researcher then identified a university that was convenient. The selection was based on the fact that the selected university had been using the digital learning recommender system

for a few years. In addition, the selected university has different branches across Saudi Arabia, which was thought likely to increase the response rate and the generalisability of the obtained results.

To obtain a list of students' emails, computer centre staff at this university were contacted face-to-face or online via emails and/or by phone calls. Their contact details were identified by personal connections and through the university website. The link to the web-based questionnaire was distributed via email to a total of 1,000 students, and participation was completely voluntary. It was available online and accessible to students for the period from the 5 February 2016 to the 15 May 2016.

In addition, there was a limited use of hard copies for the convenience of some students. A total of 350 questionnaires were randomly distributed by the researcher herself and by three professional survey collectors who were voluntarily recruited to distribute and collect the survey data from different locations.

A total of 406 surveys were returned from both the web-based and the self-administered questionnaires. Out of the 406 surveys collected, 54 were considered unusable, either because students indicated that they had never used the digital learning recommender system or because the collected self-administered surveys had many missing response items. The remaining 353 surveys were used in the analysis.

Data Analysis

Data analysis using Structural Equation Modelling (SEM) with Partial Least Square (PLS) was conducted using SmartPLS 2.0 M3 to test the structural model and hypotheses.

Results

To evaluate the significance of the path coefficients of the formulated hypotheses, 353 cases, 5000 samples, and the no sign changes option were used in a bootstrapping procedure (Hair et al., 2012). Results presented in Table 4 indicate all study hypotheses were accepted according to obtained t-values and p-values. For instance, user experience positively and directly influences perceived usefulness (β=0.456, $p \leq 0.001$) and service quality positively and directly affects perceived ease of use (β=0.420, $p \leq 0.001$). Furthermore, perceived ease of use and perceived usefulness positively and directly influence user acceptance (β=0.344, $p \leq 0.001$; β=0.535, $p \leq 0.001$; respectively). Finally, user acceptance positively and directly influences continuance usage intention (β=0.654, $p \leq 0.001$).

Table 4. Hypotheses Testing Result

Hypotheses	Path Coefficient	T Statistics	P Values	Results
PEOU -> UA	0.344	6.947	0.000	Accepted
PU -> UA	0.535	9.295	0.000	Accepted
SeQ -> PEOU	0.420	6.362	0.000	Accepted
UA -> CUI	0.654	10.823	0.000	Accepted
UX -> PU	0.456	6.338	0.000	Accepted

Correlation Coefficient of Latent Variables

The shared variance among the constructs was compared with the AVE from each construct to establish the discriminant validity among the constructs. The results provided in Table 5 show support for the discriminant validity among the latent variables in our model.

Table 5. Latent Variable Correlations

	CUI	PEOU	PU	SeQ	UA	UX
CUI	**1.000**					
PEOU	0.455	**1.000**				
PU	0.436	0.408	**1.000**			
SQ	0.473	0.420	0.372	**1.000**		
UA	0.654	0.563	0.676	0.497	**1.000**	
UX	0.289	0.193	0.456	0.223	0.268	**1.000**

Hence, the measurement instrument's content validity, reliability, convergent validity, and discriminant validity were all satisfactorily met in this study.

INNER MODEL

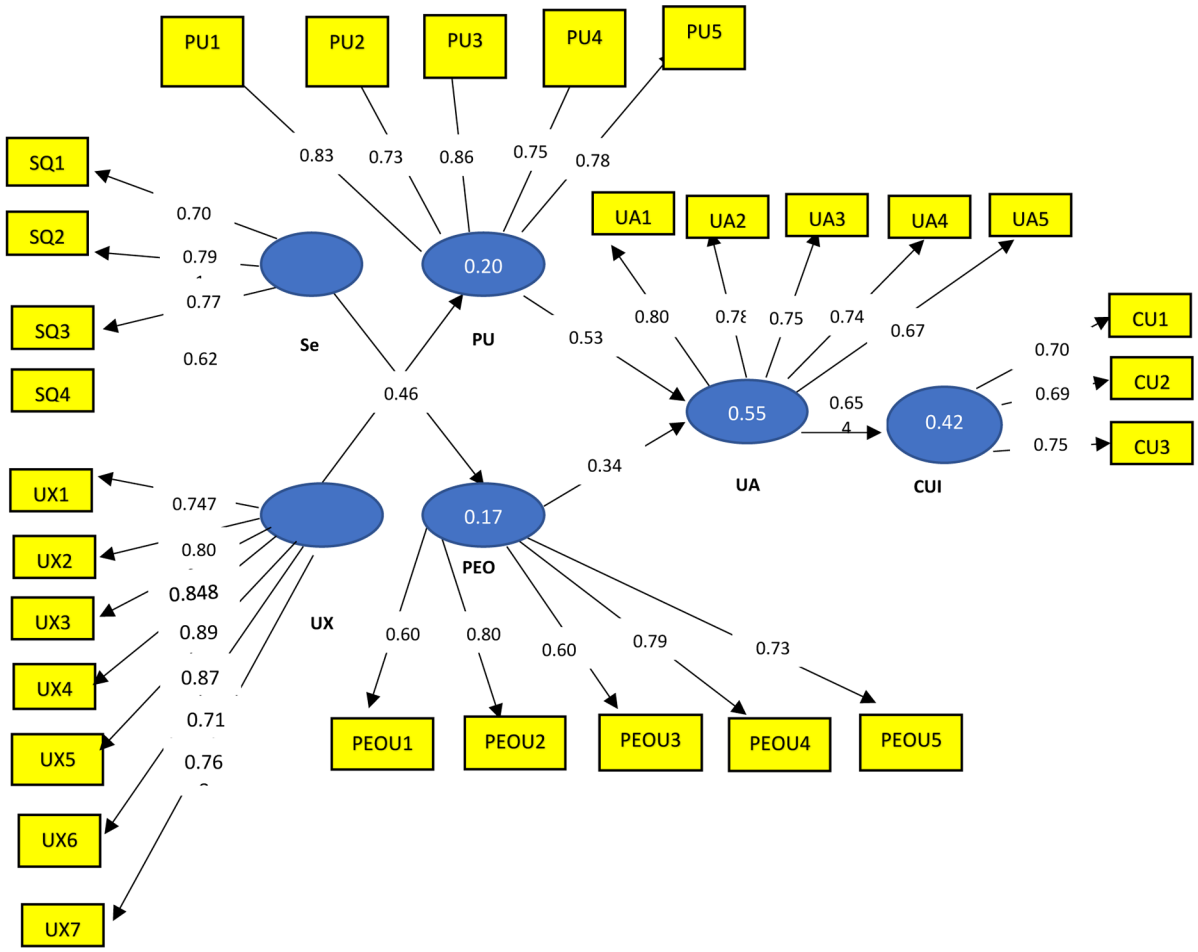
The R^2 and Q^2 values in this research were also measured. Table 6 and Figure 2 show that the R2 value for each endogenous latent construct in this study was above 25%, demonstrating an acceptable prediction level in empirical research (Gaur and Gaur, 2006; Griffith, 1996). Moreover, the coefficient of determination R^2, which is the central criterion for the structural model's assessment (Klarner et al., 2013), has a high value of 0.555 and 0.428 for the targeted constructs in this study.

Table 6. Results of R^2 and Q^2

Constructs	R2	Q^2	f^2
CUI	0.428	0.188	N/A
PEOU	0.176	0.070	0.222
PU	0.208	0.119	0.537
SQ	N/A	N/A	0.214
UA	0.555	0.285	0.749
UX	N/A	N/A	0.262

In addition, Q^2 predictive relevancy measures were used to support these finding through (Stone, 1974) by performing the blindfolding procedure (Chin, 1998) with omission distance D=9. All Q^2 values were well above zero for Continuance Usage Intention (0.188), perceived ease of use (0.07), perceived usefulness (0.119), and user acceptance (0.285).; indicating the predictive relevance of the PLS path model. Finally, the effect size (f^2 value) of perceived usefulness on user acceptance was large (53.7%); whereas, the effect size of perceived ease of use on user acceptance was moderate (22.2%). T effect sizes for service quality on perceived ease of use was moderate (21.4%), as was the effect size for user experience on perceived usefulness (26.2%). Finally, the effect size for user acceptance on continuance usage intention was large (74.9%).

Figure 2. SmartPLS-SEM Results



OUTER MODEL

Extraction communalities estimate the variance in each variable accounted for by the factors in the model (see Table 4). User experience rated the highest on the scale (0.624), followed by perceived usefulness (0.573), perceived ease of use (0.566), acceptance (0.510), service quality (0.453), and continuance usage intention (0.351). Use of the digital learning recommender system is strongly influenced by user experience (0.624), implying that the students' ability to locate information easily was a significant factor contributing to their user experience of the digital learning recommender system. Similarly, perceived usefulness and perceived ease of use strongly influence the use of digital learning analytics recommender systems (0.573, 0.566, respectively). The students' perceptions that the digital learning recommender system helped to improve productivity and was generally easy to use also significantly contributed to the students' use of the recommender systems.

The path coefficients results (Table 7) indicate perceived usefulness strongly influences user acceptance (0.535) and continuance usage intention is very much dependent on user acceptance (0.654). In addition, user experience has a relatively strong influence on perceived usefulness (0.456), as does service quality on perceived ease of use (0.420). However, the path analysis results also show a weak link between perceived ease of use and user acceptance of the digital learning recommender system compared to the influence of perceived usefulness. This suggests user acceptance and continued usage of the digital learning recommender system is more closely tied to perceived usefulness than perceived ease of use.

Clear and understandable interaction, the ability to complete all tasks electronically, and the help students receive to monitor time have the least impact on acceptance and continued usage of digital learning recommender system. In contrast, regular use has the greatest influence on user experience of the digital learning recommender system (0.751), and easy to use has the greatest influence on perceived ease of use of the system for locating information (0.801). Furthermore, easy to navigate has the greatest influence user acceptance of the digital learning recommender system (0.800), and information delivered has the greatest impact on perceived service quality of the digital learning recommender system (0.791); which indicates the importance of the timeliness factor to the students. Finally, locate information easily was found to have the greatest influence on user experience (0.890), whilst using the digital learning recommender system has the greatest impact on perceived usefulness of the system to improve learning (0.864).

SOLUTIONS AND RECOMMENDATIONS

Digital learner analytics recommender systems such as collaborative filtering systems aim to predict a student's interest in services/items including course information, grades, and references available via digital learning applications. Saudi universities do not demonstrate however the adoption of effective digital learning practices compared to Western universities such as those located in the United Kingdom (Al-Amoush, and Sandhu 2020; Alharbi, and Sandhu 2019; Elfaki et al., 2014). The factors contributing to the problems with digital learning adoption in Saudi Arabia may be related to culture, expectation around the use of technology in universities, regulations, and the availability of technical support. Moreover, service quality in Saudi universities is not determined by international standards and criteria and the digital learning analytics recommender systems available in Western universities through their digital learning systems have been adopted only to a limited extent in Saudi universities (Elfaki et al., 2014).

Table 7. Outer Model Results

	Weight	Loading	Communality	Redundancy
Continuance Usage Intention (CUI) Outward				
CUI1	0.399	0.706	0.331	0.181
CUI2	0.392	0.693	0.352	0.175
CUI3	0.425	0.751	0.351	0.209
Perceived Ease of Use (PEOU) Outward				
PEUO1	0.219	0.604	0.347	0.036
PEUO2	0.290	0.801	0.494	0.098
PEUO3	0.219	0.604	0.213	0.035
PEUO4	0.287	0.793	0.410	0.093
PEUO5	0.266	0.734	0.566	0.089
Service Quality (SeQ) Outward				
SeQ1	0.304	0.709	0.433	0.000
SeQ2	0.339	0.791	0.453	0.000
SeQ3	0.331	0.772	0.425	0.000
SeQ4	0.269	0.627	0.308	0.000
User Acceptance (UA) Outward				
UA1	0.262	0.800	0.419	0.268
UA2	0.258	0.787	0.619	0.342
UA3	0.247	0.755	0.403	0.281
UA4	0.245	0.748	0.439	0.266
UA5	0.221	0.676	0.514	0.266
User Experience (UX) Outward				
UX1	0.158	0.747	0.554	0.000
UX2	0.170	0.804	0.596	0.000
UX3	0.179	0.848	0.616	0.000
UX4	0.188	0.890	0.624	0.000
UX5	0.184	0.871	0.612	0.000
UX6	0.150	0.710	0.582	0.000
UX7	0.162	0.768	0.609	0.000
Perceived Usefulness (PU) Outward				
PU1	0.250	0.834	0.560	0.160
PU2	0.220	0.734	0.525	0.089
PU3	0.259	0.864	0.556	0.135
PU4	0.225	0.752	0.542	0.101
PU5	0.235	0.784	0.573	0.109

The user's experience of a technology system is strongly influences their technology adoption and usage success. However, few studies have investigated the implication of this for continued digital learning tool usage (Deng et al., 2010). To address this issue, this research adopted a model that integrates TAM with two additional constructs: user experience and service quality to explore the factors influencing the acceptance and continuance usage intention of digital learning analytics recommender systems in Saudi universities. This research model can serve as a foundation for future research on students' adoption and post-adoption of digital learning analytics recommender systems.

FUTURE RESEARCH DIRECTIONS

This study found that the TAM constructs combined with user experience and service quality constructs significantly impacted students' adoption and post-adoption of digital learning analytics recommender systems. All direct relationships between the core constructs of the original TAM exhibited strong positive effects, with perceived ease of use and perceived usefulness found to positively and directly influence user acceptance (β=0.344, $p \leq 0.001$; β=0.535, $p \leq 0.001$, respectively). Together, they accounted for 55.5% of the variance in user acceptance of digital learning analytics recommender systems ($R2 = 0.555$). Hence, H1 and H2 are supported. Our results align with the previous TAM research (e.g. Davis et al., 1989; Venkatesh and Davis, 2000) and suggest that educational institutions should ensure digital learning analytics recommender systems are ease to use and usable. Universities could achieve this by increasing student awareness of the usefulness of using digital learning services including digital learning analytics recommender systems, providing digital learning and ICT training workshops, and refining IT/IS systems departments to meet different students' needs. In addition, user acceptance was found to positively and directly influence continuance usage intention (β=0.654, $p \leq 0.001$). Therefore, H3 is supported.

Consistent with previous research, this study hypothesised a positive relationship between perceived service quality and perceived ease of use. It found service quality positively and directly affects perceived ease of use, validating H4. This finding aligns with previous research that validates the consistent relationships between service quality and perceived ease of use (Ahn et al., 2007; Cheong and Park, 2005; Rana et al., 2015). Based on this result, digital learning analytics recommender systems with higher service quality, that is, with more reliable, relevant, and current information will be perceived by students as an easy to use interface. This finding implies that designers of the digital learning analytics recommender systems need to pay more attention to the service quality issues including accuracy, relevance, reliability and timeliness of the content provided by such systems.

Finally, our findings confirmed that user experience positively and directly influences perceived usefulness (β=0.456, $p \leq 0.001$), which is consistent with extant literature (e.g. Al-alak and Alnawas, 2011). Several studies have reported a significant relationship between user experience and digital learning system usefulness (e.g. Lee et al., 2013; Martin, 2012; Purnomo and Lee, 2013). Users who are skilled in using computers, Internet and digital learning systems are more likely to have more favourable perceptions towards the usefulness of an digital learning system than poorly skilled users (Lee et al., 2013; Purnomo and Lee, 2013). Given that digital learning recommender system technology is newly adopted in Saudi universities, this finding suggests that universities need to provide students with adequate training on using the systems. Online tutorials, awareness programs and efficient technical support may also assist students to develop their skills in using these systems.

CONCLUSION

The adoption of digital learning technologies for education service delivery in countries around the world aim to provide an inclusive, flexible and convenient learning pathway for students and a cost-effectiveness use of the learning spaces for universities. Within the trending digital learning phenomenon is the emergence of digital learning analytics recommender systems to support students to access and evaluate learning materials to meet their learning needs. Adoption of such systems has been slow in universities in Saudi Arabia however. Given that students' perceived usefulness, service quality, and perceived ease of use of the analytics recommender system influences their acceptance of, and continuance usage intention for the system, higher education institutions in Saudi Arabia must be more proactive in ensuring digital learning analytics recommender systems are accessible to students and easy to use. This study found that the TAM constructs combined with user experience and service quality constructs significantly impacted students' adoption and post-adoption of digital learning analytics recommender systems. It can be concluded from our results that higher education institutions in Saudi Arabia should ensure digital learning analytics recommender systems are accessible to students and ease to use. To increase student awareness of the usefulness of using digital learning analytics recommender systems Saudi universities would be well served to provide e-learning and ICT training workshops to students, and to refine their technology systems to better meet the diversity of students' learning needs.

REFERENCES

Al-alak, B. A., & Alnawas, I. A. M. (2011). Measuring the acceptance and adoption of E-learning by academic staff. *Knowledge Management & E-Learning*, *3*(2), 201–221.

Al-Amoush, A., & Sandhu, K. (2020). Digital Transformation of Learning Management Systems at Universities: Case Analysis for Instructor Perspective. In Examining Social Change and Social Responsibility in Higher Education. Delaware Technical Community College.

Al-Amoush, A., & Sandhu, K. (2020). Digital Learning Analytics Management Systems Innovation: New Findings from A Study of major Jordanian Universities. *International Journal of Innovation in the Digital Economy, 11*(1).

Al-Gahtani, S. S. (2016). Empirical investigation of e-learning acceptance and assimilation: A structural equation model. *Applied Computing and Informatics*, *12*(1), 27–50. doi:10.1016/j.aci.2014.09.001

Alharbi, H., & Sandhu, K. (2019). New Discoveries for User Acceptance of E-Learning Analytics Recommender Systems in Saudi Arabia. *International Journal of Innovation in the Digital Economy*, *10*(1), 31–42. doi:10.4018/IJIDE.2019010103

Chatfield, A., & Alanazi, J. (2013). Service quality, citizen satisfaction, and loyalty with self-service delivery options: A strategic imperative for transforming e-government services. *24th Australasian Conference on Information Systems (ACIS)*, 1–12.

Dağhan, G., & Akkoyunlu, B. (2016). Modeling the continuance usage intention of online learning environments. *Computers in Human Behavior*, *60*, 198–211. doi:10.1016/j.chb.2016.02.066

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *Management Information Systems Quarterly*, *13*(3), 319–340. doi:10.2307/249008

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95. doi:10.1287/isre.3.1.60

Deng, L., Turner, D. E., Gehling, R., & Prince, B. (2010). User experience, satisfaction, and continual usage intention of IT. *European Journal of Information Systems*, *19*(1), 60–75. doi:10.1057/ejis.2009.50

Elfaki, A. O., Alhawiti, K. M., AlMurtadha, Y. M., Abdalla, O. A., & Elshiekh, A. A. (2014). *Rule-based recommendation for supporting student learning-pathway selection*. Recent Advances in Electrical Engineering and Educational Technologies.

Gaur, A. S., & Gaur, S. S. (2006). *Statistical methods for practice and research: A guide to data analysis using SPSS*. Thousand Oaks, CA: Sage.

Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *The Journal of Strategic Information Systems*, *19*(3), 207–228. doi:10.1016/j.jsis.2010.05.001

Griffith, D. A. (1996). Some guidelines for specifying the geographic weights matrix contained in spatial statistical models. Practical Handbook of Spatial Statistics, 65–82.

Huh, Y. U., Keller, F. R., Redman, T. C., & Watkins, A. R. (1990). Data quality. *Information and Software Technology*, *32*(8), 559–565. doi:10.1016/0950-5849(90)90146-I

Karapanos, E. (2013). User experience over time. In *Modeling users' experiences with interactive systems* (pp. 57–83). Heidelberg, Germany: Springer. doi:10.1007/978-3-642-31000-3_4

Klarner, P., Sarstedt, M., Hoeck, M., & Ringle, C. M. (2013). Disentangling the effects of team competences, team adaptability, and client communication on the performance of management consulting teams. *Long Range Planning*, *46*(3), 258–286. doi:10.1016/j.lrp.2013.03.001

Lee, M. C. (2010). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation–confirmation model. *Computers & Education*, *54*(2), 506–516. doi:10.1016/j.compedu.2009.09.002

Lin, H. F., & Lee, G. C. (2006). Determinants of success for online communities: An empirical study. *Behaviour & Information Technology*, *25*(6), 479–488. doi:10.1080/01449290500330422

Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2015). Investigating success of an e-government initiative: Validation of an integrated IS success model. *Information Systems Frontiers*, *17*(1), 127–142. doi:10.100710796-014-9504-7

Chapter 11
Dot.com Price Bubble for the Venture Capital Growth of Digital Companies

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ABSTRACT

Today, innovation performance is an important determinant of competition power and national progress. In the beginning of major innovation, new firms are created to benefit from new digital technologies, and investment and employment in the related industries is increasing. Venture capital (VC) plays an important role in financing venture businesses in the high digital technology sector. The VC market is now accessible at any point in history for ventures. Partly due to the rise of digital entrepreneur incubators, risk capitalists have spread throughout the spectrum. The new digital technology creates an almost constant balloon known as "tech bubble" or "dot com bubble," which caused economic turmoil in the American stock market in the late '90s. Venture capital companies will be informed about market activity, price bubble history, risk capital, and price bubbles that can have a major impact on their business.

INTRODUCTION

Ensuring global competitiveness and sustainable growth for the country, it depends on economic and digital transformation capabilities that dynamically adapt to changing conditions substantially. In the 1990s, investors have begun to realize the importance and potential of their online investment. During this period; mostly just completed the training, with new ideas and digital technological maintenance of the original but with many new ideas with a deficiency in terms of capital has led to the emergence

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of entrepreneurs. At the same time these ideas in some investment funds and shareholders who wish to realize, that period has been much mention of the name. Especially in the 2000s, one of the elements in accelerating economic development, venture capital financing models is revised to life with technology companies.

In recent years, entrepreneurship has gained importance in the debate on the quality of access to finance issues. Venture capital, classic intermediaries' (support agencies, banks) quality alternative financing model represents an intermediary that brings together companies and entrepreneurs.

The decisive factor in the development of venture capital industry is the existence of competent and willing investors. Venture capital, investors with surplus, can be described as long-term investments made by the company with the growth trend. Venture capital financing involve different types according to the needs of each investment. The aim of venture capital, which has a good business idea and entrepreneurial flair, but without adequate funding opportunities for entrepreneurs is to provide financing by making long-term investments.

In developing countries, the development of venture capital phenomenon that makes it mandatory financing model is that traditional financial institutions with relatively high interest rates on bank loans. The high costs of using these funds are not able to access long-term investment.

Technology-intensive industrialization strategy adopted by in countries such as the USA, Britain, France, Japan, the Netherlands and Germany; venture capital in general appeared especially after World War II, ; dynamic, creative but financially unstrengthen can be defined as a form of investment financing that allows entrepreneurs to achieve their investment ideas.

In the 2000s, with the internet and digital communication development dramatically, the place of digital companies both in daily life and business life has increased in time. One after another established growth rate of these companies happened so quickly that it began to emerge some unforeseen structural problems over time. One of these structural problems was the valuation of the companies. When you want to value a manufacturing operation, whereas determining the relationship between the cash flows of the investment really is possible, establishing a strong bond at levels well in the expected cash flows of the asset structure of and digital company is not always possible. Accordingly, 2000s, tulip bubble in the financial world (Tulpenmanie) and the starting price bubble have resulted in claiming that there are dot.com bubbles in digital companies.

In the light of the statement made above, the study will consist of three sections. In the first chapter, it will be given information about the market efficiency, causes of inefficiency in financial markets

In the second part of the study, price balloon history will be examined also it will be given information about the concept of price bubble and the dot.com bubble.

The last part of the study, the concept of venture capital, characteristics of the venture capital model, the functioning of venture capital model will focus on the types of venture capital the recent financing will be focused on fast-growing form of digital companies and financing needs. The added value provided by the venture capital finance is not limited to solve the access problems, brought about the efficiency and cost savings, the literature on the subject will be introduced by reference. In addition, this section will focus on venture capital backed by world examples.

RESEARCH METHODOLOGY

The study includes a qualitative research. Especially, a historical analysis of the price bubble has been conducted to evaluate the anomalies that may occur on the stock prices of digital companies with the idea of venture capital. In this context, this study is mostly aimed at determining the situation and aims to provide a basis for future exploratory studies. The research presented in this chapter shows that digital impact has been an important element for the venture capital growth of the companies.

Market Efficiency

Market efficiency emerges as the most controversial concept in finance theories. While it is important for the development of financial markets, the emergence of investment strategies is also important. In the case of market efficiency, efficient distribution of resources is ensured. (Demiral, 2013, p. 3). Market efficiency is seen as one of the basic concepts of finance as science. The concept of effectiveness is defined as a market where valid information can be transferred to prices of financial instruments (Dimson&Mussavian,1998, p. 91). It means that the securities in the market can be immediately adapted according to the updates in the current market or the market is dominated by the securities and the price is set accordingly (Weimer &Vining, 2017, p.15).

The fact that marketable securities values can be estimated with the available information in the market is considered as the criterion of market efficiency. In other words, market efficiency is directly proportional to the knowledge level of information technology and investors (Demireli et.al,. 2010).

As known that information is so important, the ease of accessing information on the market increases market efficiency as well (Abeysekara, 2001, p. 251).

An effective capital market is important for the current country and for businesses in that country's economy. If we explain the effective market as an example, in an economy where the capital market is effective, the prices of securities are determined accurately. The fact that the securities prices are determined correctly not only attracts investors but also gives important clues to firm managers. If the opposite happens, for example if the prices of the securities are wrong, the relationship between the current risk in the market and the return of the investors will not be safe.

The types of activities carried out in terms of the capital market are as follows (Fama, 1970, p. 383):

- Information activity; the prices of the securities reflect all the current information.
- Valuation activity; stock markets are in an active position within the scope of basic analysis.
- Full assurance activity; it means that the market of securities is complete. The structure of the new securities portfolio in the market is similar to the portfolio of existing securities due to the surplus of market securities.
- Functional activity; is that the markets of securities are organized markets and that the resources are efficiently transferred in the most efficient way possible for their efficient use.
- Distribution activity; the same level of return for investments that are at the same risk level of financial markets.
- Business activity; means that the purchase and sale of securities are carried out at low cost.

The effective market hypothesis put forward by Fama (1970) argues that information in the current situation is fully reflected in stock prices and that investors will not be able to earn any return on the market with any model on the market (Süngü, 1996, p. 115).

Effective Market Hypothesis

The effective market hypothesis put forward by Fama argues that the current information is fully reflected in stock prices and that investors will not be able to earn a return on any model with the normal return on the market(Brealey et al.,1995, p 18).

According to the efficient market hypothesis, the rapid adjustment of prices and the rational movement are the main characteristics of the prices of securities. When price adjustments are slower than the information available on the market, securities prices do not fully reflect the information on the market (Özçam, 1996, p.115).

Market efficiency occurs in three stages: active market in weak form, active market in semi-strong form and active market in strong form (Demireli et. al., 2010).

Effective Market Hypothesis in Weak Form

The hypothesis argues that past securities information affects the prices of the market today. In other words, the prices of past securities determine the prices of future securities (Tezcanli, 1996, p. 22). In the weak market effective market hypothesis, the data such as the prices of securities, transaction volumes are taken into consideration (Dağlı, 2004, p. 311). The weak form of market efficiency is measured using random walk hypothesis (Yücel, 2016).

Random Walk Hypothesis

The random walk hypothesis is becoming part of the effective market hypothesis because of the more understandable pricing of competitive markets (Dimson &Mussavian, 1998, p. 94). The prices in similar markets are known to reflect the entire information on the market. The reason for the price imbalance that occurs in such markets is that unexpected news emerges, that is, information that is not disclosed to the public is leaked to the public through the institution (Zerenet.al., 2013).

The random walk hypothesis states that stock prices cannot be analytically derived, and that any past period price cannot affect the future (Bildik, 2000, p. 9). The random walk hypothesis argues that the prices generated in the stock market are purely coincidental and independent from the past. In other words, it seems impossible to try to make profit by considering past information. The reason for the stock market to reach equilibrium over time is due to the interpretation of investors' similar information as different (Preda, 2004, p. 353).

Effective Market Hypothesis in Semi-Strong Form

It is argued that in the markets which are active in semi-strong form, all the information transferred to the public has a direct effect on the prices of the securities (Dağlı, 2004, p. 311). In semi-strong active markets, adding data such as economic data and financial statements will provide the opportunity to

earn profit (Yücel, 2016). If the market is efficient in semi-strong form, investors are consuming billions of dollars in technical and basic analyst fees for inconvenient advices (Boulton & Bacon, 2019,p. 94).

Effective Market Hypothesis in Strong Form

In active markets with strong form, past price information, open to the public and private information within the company are affecting stock prices. At these markets, the information in the hand, including the company's executives, is not profitable enough to be in the light. A market that is active in a strong form is considered active in the other two forms (Yücel, 2016, p. 4). The strong form is not considered separately in other forms. In other words, the market must be both weak and semi-powerful in order to be strong (Karan, 2001, p. 269)

To summarize, according to the efficient market hypothesis, investors, even if they struggle to get more profits, after a while all investors show the same behavior. The full competition approach of the markets means that investors will not be able to exploit any market for a long time (Zeren et al., 2013)

Causes of Inefficiency in Financial Markets

In financial markets, volatility, price bubbles, noisy processors in the markets, the effects of the behavior of the market participants, and the social dynamics that arise from the market itself also cause the ineffectiveness of the emerging technologies in the financial markets.

Volatility in Financial Markets

Volatility is defined as the unexpected price movements seen in the markets. The concept of volatility is also referred to as measuring the expected changes in the price of a financial asset over a specified period (Özhan, 2016, p. 67).

The fact that there is a lot of volatility in the market leads to problems from the activity and indirectly from the economical point of view about the macro dimension. The price movements in the market can be measured by specific tests. At the same time, price fluctuations in the market are creating additional costs. Changes in the prices of financial assets cause them not to fully reflect the real values of the securities. As a result, market prices face less information (Cuthbertson, 1999, p. 134).

Price Bubbles

The concept of economical balloon can be expressed as a rapid increase in price with speculative movements, without regard to the essence of any asset. Therefore, it is not possible to base sudden price increases and declines on the economic base (Akıncıet.al., 2014).

With the realization of the valuation of a certain security on its own, it also occurs as an extra valuation, also called "price bubbles". Price bubbles increase the price of securities. The reason is that those on the market believe that the price of the securities they will sell to other market participants in the future will be higher, and that the existing price reflects the real value of the security in question. As a result of the formation of price bubbles, massive collapses have occurred in the markets in historical perspective. Duch Tulip Bulp, the southern sea balloon in Britain and the collapse of the Mississippi Company in France and crises in capital markets in 1929 and 1987 are examples of price bubbles (Özhan, 2016, p. 67).

The beginning of the formation of the price balloon is overcome by the fact that the price increases are excessive and the underlying value of the securities that come after it is formed. These price movements are determined by market participants and expectations regarding the possible future price situation. However, the price movements that occur take a self-reinforcing process, independent of the other variables that exist, until they find the underlying value. Then, the securities prices that are formed contain balloons, and as the process continues, overvalued prices cause the market to collapse or the price balloon to explode (Youssefmir et al., 2002, p. 6).

PRICE BALLOON HISTORY

Despite the problems with balloon definitions, there are many studies that try to incorporate balloons into models. This can be exploited by Brunnermeier (2008). The main elements of this classification are the rationality of participants, the symmetry of existing knowledge and the arbitrage opportunities.

Rational participants and symmetric knowledge: Trying to explain the bubbles in these models is very difficult. The main reason for this is that when everyone has the same knowledge, nobody will want to get any asset at a price above the equilibrium price. In response to the difficulty of explaining the emergence of balloons, some ideas have been suggested about how a previously emerged balloon could go on, and it has been shown that it is possible to survive the existence of an existing balloon, but only to the extent of exploding (Blanchard and Watson, 1982). The growing need for growth of bubbles prevents the possibility of balloons in assets that are easy to substitute. In spite of all these difficulties, it has been observed that in many experiments carried out under symmetric information conditions, the balloons were able to come out easily (Rosenthal, 1981,p. 5).

Rational Participants and Asymmetric Information: In these models it is much easier to provide the appropriate conditions for the presence of the balloons. In such environments, even a particular subgroup is not required to be aware of the presence of balloons. In fact, even if everyone is aware of the presence of the balloon, balloons can form if some feel they do not know it. Also, at least for some people it is supposed to be profitable or supposed to be buying and selling assets. These models can be given as examples of creatively named “bigger fools” (Kindleberger, 2000, p. 13) and “churning fund managers” (Allen &Gorton, 1993, pp. 7-9).

Noise traders and arbitrage restrictions: Advocates of the active market hypothesis generally argue that all participants in the market do not have to be rational and have full knowledge. It is thought that a limited number of rational participants and their arbitrage movements will lead to the withdrawal of non-rational participants from the market by bankruptcy in the long run and to keep prices stable. On the other hand, as Long et al. (1991) shows, “noise traders” are not likely to rise even in the long run, and conditions that limit arbitrage may prevent prices from reaching the balance as quickly as expected. Arbitrage may be directly prohibited by law, and some risks for rational participants may prevent arbitrage, or at least limit it.

These risks can be summarized in 3 chapters. Fundamental risk is the reversal of the ending equilibrium price, with changes in the underlying factors at a time when prices are expected to return to equilibrium. Noise trader risk is further offset by price fluctuations due to the behaviour of noise traders (Long, 1990, p. 24). Synchronization risk is due to the need for rational investors to move together to correct the price offset. Since a single participant cannot influence the price, the price can be balanced by the participation of a sufficient number of rational investors. Up to this critical point, prices may

continue to move upwards and lead to a risk of synchronization (Abreu &Brunnermeier, 2002, pp. 17-19), and it may make sense to do bubble riding for rational participants. So, if you know it's a balloon, continue to stay on the market believing that the balloon will not pop up for a while, trying to get the right spot to make a sale.

Heterogeneous expectations and arbitrage limitations: In the simplest case, assuming that the market has optimists and pessimists, and that arbitrage restrictions also inhibit sales to open markets, the following is true: In this case, pessimists cannot trade while optimists can act in anticipation. Positive deviations in market prices lead to the formation of a balloon. Ofek and Richardson (2003) found the existence of such a structure behind the Internet balloon (Internet Bubble or DotCom Mania) in the 1990s. Owners of new publicly traded companies cannot legally sell their own shares for a period of time after these public offerings. This duration is called the lockup period.

The bubbles are the result of bitcoin's story, the purchase of pressure leading to significant price increases. The question that arises is what explains the desire to keep bitcoin apart from the belief that it will continue to rise (Moosa, 2019, p.5). Turanova (2017) believes that the interest in bitcoin may be justified because it resembles gold. Bariviera et al. (2017) argue that cryptocurrencies barely manage to perform exchange tool, account and values to refunctions. TomFort (2017) argues that a bubble can be sen as a deviation from thelong-term equilibrium state represented by cointegration regression.

Tulip Madness

The first and most bizarre balloon in history is the 'Tulip Madness' in Holland, which lived in 1636. The balloon, also known as the Tulip Balloon, Tulip Speculation, is known as the Golden Age of the tulip bulb that suddenly and extremely rises and collapses. The event, which lived in the Netherlands between 1634 and 1637 and was called Tulaneia (Tuligania), is important in that it shows destructive effects of price fluctuations created by tulip speculation.

Sent to his native Austria as the first tulips from Turkey, it has spread to Western Europe in the mid-16th century. The lilies, which are considered to be suitable for the most stylized gardens and in the position of a rare flower, soon began to be regarded as a mark of wealth. The lilacs, which have achieved a great popularity, have become a dominant plant species in Dutch gardens as well as in other markets. The tulip islands, also referred to as seeds because of what they provide, are being sold at higher prices compared to flowers because they are difficult to grow (Garber, 1989, p. 537). In the first quarter of the 1600's the arrival of the Netherlands as a centre of Europe in terms of planting methods and the creation of new species led to the passing of professionals and wealthy traders instead of non-qualified producers (Garber, 1990, p. 37). Especially with the start of the demand for tulips, the rapid changes in tulip trade have begun to occur and the production units triggered by the increasing demand have been gradually enlarged. This is a natural outcome, manifested itself in the form of the development of the market structure, and a large market volume has emerged (Fulcher, 2004).

John Law System - Mississippi Balloon

A similar kind of financial crisis, called the South Sea Balloon in England, was experienced by the Mississippi Balloon (The Mississippi Bubble) in 1720 (Murphy, 2017:36), due to speculative movements for companies founded by John Law in France.

In 1715, King XIV. due to the financial instability that has arisen in France along with Louis's death, the idea of establishing a kind of central bank, just like in England and Holland, has come to mind. The Scottish banker, John Law, who settled in Paris in 1714, suggested that the country could be saved only through the warnings of trade and industry, Law, which clearly outlines effective reformist views, The Duke of Orléans II, one of the rulers of the Louisian period France. He's succeeded in gaining Philippe's trust. On top of that, in 1716, the first private bank named BanqueGénérale, who had the power to issue notes and to collect deposits and deposits, was given by Law to the Law. Thinking that credit volume and paper money to be redirected to the market would revive the French economy, Law believed that the main element of the economy that would earn the commercial dynamism of the country was money circulation (Cesarano, 2004, p. 179).

1720 South Sea Balloon

The balloon, called the South Sea, which exploded in 1720, emphasizes the activities of the South Sea Company, which was founded in 1711 by George Caswall and John Blunt, trying to trade with a monopolistic structure in the South American territories, the majority of which belongs to Spain and Portugal. The main element behind the establishment of this company, which is actually a fairly small theme of trade and a product of the 1688- 1689 Glorious Revolution, is to help organize the national debt of the Tory government2 and to support the government. The glorious Revolution which is expressed is; the government's aim was to be able to steer future tax revenues to existing debts through the establishment of a parliamentary system and thus to permanently finance national debts. Moving towards this goal, the government has had to adopt practices related to high interest policies in order to get rid of the debt burden (Hoppit, 2002, pp. 141-142).

Real Estate Balloon With US Stock And 1929 Great Style

Prior to World War I, the United States, from the 1890s onward to becoming an industrialized country, played a very small role in world economy within its understanding of political economy. Until 1917, the United States was not officially involved in this war, although many European countries joined the war that began in 1914, but the American army helped England and France defeat Germany. Having entered the war after a certain period of time and taking part in the victorious states, the USA has become the world's most powerful force by the destruction of many countries of Europe. With the end of the war, most of the European countries that are aiming to rebuild economies, especially Britain, France and Germany, have begun to receive millions of dollars in loans from the United States (Sanders, 2008, p. 257).

Japan Real Estate Balloon

"Meiji Restoration" in Japan as a result of economic closeness between the aristocratic but poor samurai in the highest level of society in terms of moral virtues from the second half of the 1800s and the wealthy merchant class at the lowest level of social order according to the moral virtue level, It has been realized. The ruling samurai adopted the state-led industrialization strategy, and the state, itself, supported the sectors where the private capital was inadequate, and directed itself until it began to make profits. Later, small-scale privatized sectors and policy implementations resulting from these practices resulted in the existence of a state-owned new entrepreneur class in Japan (Harris, 2011, p. 570).

Sweden Real Estate Balloon

Sweden, which started its first deregulation process in the financial markets after World War II, realized the basic dynamics that changed the structure of the financial system in the early 1980s. In this framework, firstly the liquidity ratios for banks have been reduced7 and then restrictive regulations on interest and credit ceilings and foreign exchange transactions have been abolished to a great extent (Erdönmez, 2005, p. 63). Since the Swedish financial system in the pre-liberalization period was not very experienced in assessing and measuring the risk, various problems were encountered in the financial markets, but these problems were tried to be solved together with the structural arrangements realized. However, in spite of these developments, the expansion of the credit volume has not been optimally distributed among the sectors of the economy, and a significant portion of these loans have been directed towards the real estate sector and financial asset transactions (Pomerleano, 2005, p. 504). There was a deep crisis spreading to all Scandinavian countries, especially Finland (Hemmelgarn, 2012, p. 62).

Mortgage Crisis (2008 Global Financial Crisis)

In the 2000s, the central banks of Europe and Japan, especially the USA, have gone to a considerable degree of relaxation in their monetary policies and have reduced interest rates. On the one hand, loose monetary policies have encouraged swelling of asset prices while banks have borrowed with short-term and low interest rates to make long-term loan schemes, primarily housing loans. Banks' diversification of loans in order to increase demand for housing loans and the flexibility of credit conditions have led to a rapid increase in the credit utilization rate of consumers who are unlikely to repay. The securities have entered the finance system of many countries, from USA to Europe and Japan, the securities thus traded are also globalized (Earle 2009, p. 787). Increases in profits provided by both companies and investors have also led to a rise in the prices of the securities and a speculative movement has begun. In addition to the high profits achieved, the other major reason for the large increase in asset prices is the low interest rate policy implemented by the Federal Reserve (FED) since the mid-1990s. With this policy, many companies have obtained the initial capital required to make an investment at low cost, and thus the shareholders have started to become a virtual company with the help of digital networks (Wollscheid, 2013, p. 4).

Internet Balloon

The dot-com balloon, also known as the Internet stock market balloon, is defined as price swelling. In the late 1990s, with the development of the Internet and digitalization, it became a major stock market bubble in the 2000s. The balloon has gained momentum due to the increase in the internet users in general terms and investors have invested heavily in some digital companies traded on the stock market with overvaluation and the effects ended in 2011. Many digital based companies have entered into the stock market with too much value, not having too much physical presence in the physical sense. Investors have invested only in returning speculation for all industries, regardless of the profitability of the companies entering the stock market. This has also led to the launch of the dot-com balloon (Hawkins 2004, p. 70).

The Dotcom Bubble is used to describe speculative bubbles that explode in 2000 due to the fact that stocks in Nasdaq, the stock market index of tech companies, were not able to provide return on a return-based basis for investors in computer and digital technologies.

In the 1990s, in parallel with rapid developments in communication technologies, the number of personal computers has increased, the scope of software and program packages has been expanded, and all borders have been removed via digital networks. In parallel with these developments, business cycles and personal investments have begun to be transferred to virtual partnership, and business activities in real markets have accelerated in an increasingly electronic way (Kaizoji, 2006, p. 124). Irrational spending on stocks offered through digital networks, without regard to market conditions and possible risks, led investors to overvalue the related securities and exacerbate speculative movements. Irrational spending on stocks offered through digital networks, without taking into account market conditions and possible risks, led investors to overvalue the related securities and speculative movements exacerbated (Friedman, 2010, p. 31). In fact, these movements are clearly visible in the Nasdaq Securities Index. Thus, the index value of 600 in 1996 reached 5,000 by the year 2000. This positive conjuncture in the virtual environment disappeared in the beginning of 2000 as the FED raised market interest rates six times over, and the heated economy started to lose speed. Because of this process investors are overvalued stocks traded on the internet and in fact they are aware that a speculative balloon has spread to the entire market. Along with the sudden panic, the massive share sales wave showed itself and the speculative bubble burst in March. This led to a sharp decline in share prices and in a few months the Nasdaq Index fell from 5,000 to 2,000. The conjuncture was reversed and the market reaching a trillion dollars level and many investors disappeared into the system (Valliere&Peterson, 2004), when the speculative balloon peak reached its peak in 1999 and early 2000, when a new millionaire emerged in Silicon Valley every sixty seconds.

In the second half of the 1990s, the economy of the United States, where the dot-com balloon burst with the burst of 2001, was dragged into the recession (Ünal & Kaya, 2009: 3). Dot-com companies have focused on growing their brand and market share and have not offered any enduring products to the market. In 2000, NASDAQ (National Association of Securities Dealers Automated Quotations), a technology exchange traded by these companies, saw a high value that did not happen before and then dropped slightly. The decline is perceived as a correction, but as the declines continue, it quickly becomes a panic. NASDAQ lost about 9% in 1 week. At the beginning of 2001, he lost almost half of the index value, falling below the levels in 2000. In this case, between the first quarter of the year 2000 and the last quarter of 2002, dot-com companies lost value in the market up to $ 5 trillion(Gollotto& Kim, 2003, p. 65).

VENTURE CAPITAL

Interest in the concept of venture capital is increasing in the press and academic literature. Innovation in the US economy is defined as the fuel of the engine (Gompers, 2007, p. 483). Venture capital is generally a financing model for the implementation of profitable new investment proposals (Erkan & Topal, 2001, p. 71).

The venture capital industry is shaped by its own institutional context in every country. The level of economic development is influenced by the existence of innovations in the national system, working practices, institutional arrangements, educational success, legal system and work culture in the formation of the venture capital industry (Ahlstrom et al., 2007, p. 248).

Developing countries and venture capital financing model cases mandating the development in Turkey, is highly traditional financial institutions that banks' lending rates. It is not possible to enter long-term investments by using these high-cost funds (Akkaya, 2004, p. 23).

Especially in countries like USA, UK, France, Japan, Netherlands and Germany, where technology-oriented industrialization strategy is adopted, The venture capital that emerged after World War II is generally; can be defined as a form of investment financing that allows dynamic, creative, but insufficient financial power to realize the investment ideas of entrepreneurs (Jeng&Wells, 2000, p.245).

The scope of venture capital is not limited to investments. The entrepreneur also uses managerial knowledge and experience; actively participates in the company's feasibility studies, establishment and management. One of the reasons is that the management has less managerial experience than the venture capital company, and the other is that it does not want to keep the firm under control in order to reduce the risk that the venture capital company has to undertake (Uçkun, 2009, p. 127).

Venture capital companies are financial intermediaries as a fund management company. These financing companies have a very important expertise in assessing investment proposals, such as the ability to distinguish between growth and consequently non-profit projects (Bulut & Er, 2008, p. 275). In addition to these, they conduct preliminary interviews, sign contracts, check and determine the timing and shape of the investment (Berger & Udell, 1998, p. 17). The venture capital company evaluates each investment with its own risk and expected result. The reason for this is that alternative projects have affordability (Akkaya & İçerli, 2001, p. 68). Without venture capital, most of the companies that made the digital revolution with technical innovations would not exist. Risk investments have enabled these firms to transform their business into commercial products that create new business (Kressel&Lento, p.15).

CHARACTERISTICS OF INITIATIVE CAPITAL MODEL

The assets of the venture capital investment trusts will include the projects related to the SMEs and will transfer resources to be collected from the capital market to the SMEs as this investment partnership is traded in the stock exchange (Erkan & Topal, 2001, p. 71). Initiatives supported by venture capital are usually start-up, risk and profit likely, as well as small and medium-sized enterprises. Considering this situation, it is not enough that the stock market of the country is developed. There is a need for subsidiary markets that are appropriately organized for the sale of stocks in entrepreneurially financed ventures, with entry and quotation conditions and characteristics of small and medium sized enterprises. Over the Counter Market in the United States is regulated in the capital market laws of the markets called "Unlisted Securities Market" in the UK, taking into account the needs and characteristics of small businesses (Kortum &Lerner, 2001, p. 23).

The basic characteristics of the venture capital model can be expressed as follows (Çoban & Saban, 2006, p. 135):

- In the model, the venture capitalist has the right not to invest or financial support.
- Financing with this model is made against stocks or stock-like instruments,
- The financing support provided is long term,
- Venture capital assumes a significant risk
- The parties have an active partnership and participate in management decisions,
- The profit of the venture capital is the positive difference between the market value of the stocks it has obtained with the capital invested,
- The model has a longer term and lower cost than traditional financing models,

- The investment project should include the production of new technology and goods that show potential for development in small and medium-sized enterprises.

The first company established for venture capital activities in Turkey was Venture Capital Investment Trust Inc, the Foundation established in 1996 with registered capital of 2 trillion TL by Bank Vakıflar. Teknoplazma A.Ş., which operates in the METU-KOSGEB Technology Center in its portfolio., Inova Biotechnology Inc. which operates in Aegean Free Zone. Turkey's first service provider T-net of establishing the Middle East Software Services Inc., including three companies with Vakıf Risk, as listed on the stock exchange in 2000, the initial public offering of common shares (Sönmez & Toksoy, 2014, p. 47).

FUNCTION OF VENTURE FUND MODEL

The function of the venture capital financing model is explained below. Venture capital companies do not undertake any return commitment for the funds they provide from the sources as they can be seen in the model. The transaction basically depends on a fund usage contract. In general practice, 80% of the profits are in the form of funds and 20% of the profits are in the company (Yenidünya, 2006, p. 10). In the venture capital model, there are three stages: creation of funds, investment and exit.

Fund Creation

Before the venture capital fund can be established, the amount of this fund must be determined. For this, factors such as the nature of the businesses to which the venture capital will invest, management costs and other costs are important (Chambers, 1999, p. 77).

Investing

The venture capital company collects funding requests from entrepreneurs who want to complete their half-finished investment and who want to expand their existing business, or who have a new investment idea. It evaluates these requests and gives the decision to invest when it feels appropriate. The stage of making the investment is the longest and complicated phase (Kuğu, 2004, p. 150).

Exit from Investment

At this stage, the investor is the stage in which he / In other words, it may be a company merger, a company buy, a new investor, liquidation or another person or a group sale (Dilmaç, 2006, p. 23).

There are different types of financing in the venture capital depending on the needs of each investment.

- Seed Capital: The stage of building ideas for a product or company. But it is still the phase in which the basic research and development is possible, and the idea is valid. At this stage, there is no business plan and management team (Hill &Power, 2001, pp. 40-41). At this stage, the amount of funds is usually limited, but the duration of the investment is long, the likelihood of failure is high, and the need for further financing in terms of production and marketing is important.

- Start-up Capital: the company has a business plan, defined product, basic structure, but with little or no revenue. The product can still be a prototype. There may be gaps in the management team (Hill &Power, 2001, pp. 40-41).
- Early Stage and Gate Financing: The stage in which the enterprise has a product to market, but the financing company provides financing in case the firm does not have market funding to obtain market share or branding (Ertuğrul, 2011, p. 53). This type of financing is also referred to as second-stage financing. At this stage, the previously acquired capital is exhausted. However, additional capital is needed to continue production and service (Acar, 2001, p. 43).
- Bridge Financing: The business is now tied up with the product in the market and has reached a certain market share. This process results in the provision of funds in the form of capital by opening the shares to the public within six months or one year. Bridge financing is used to provide the funding needed by the operator in the process of public offering (Kuğu, 2004, p. 148).
- Management Buy Outs or Buy-Ins: This includes the financing of acquisitions and control of existing businesses by a new management team either inside or outside the company. The buyers of company shares / assets may be the following (Kilimlioğlu, 2006, p. 67):
  - Management buy-out (MBO)
  - Third persons, (Leveraged buy-out: LBO)
  - Management buy-in (MBI)
  - a combination of MBO and MBI, (buy-in management buy-out:BIMBO)
  - Company employees (Employee Stock Ownership Plan: ESOP).

PRICE BUBBLE IN VENTURE CAPITAL COMPANIES

It has been recognized that the start-up companies play an important role as the driving force of the technological and economic growth of any country. These companies create a favorable environment by offering new products or services that can make a significant contribution to the competitiveness of the country (Hellmann &Puri, 2002, p. 172). In addition, as they tend to be more labor-intensive, they can increase employment more effectively than larger firms. In this respect, state intervention is needed for subsidies for the initiation of the state and for the promotion of transformation for such employment creation (Pena, 2002, p. 183).

In the early days of major innovation, new firms tend to be created to take advantage of new technologies, and investment and employment in related industries tend to expand. The demand for digital technology, which is driven by private and public institutions from the enormous potential of commercial Internet applications, has strengthened the favorable investment climate for newly created digital companies financed by venture capital in the late 1990s and claimed that Internet provider technologies will change rapidly stock market structure and institutional landscape (Chang, 2004, p. 722).

Venture capital (VC) plays a dominant role in financing ventures in high-tech sectors (Sahlman, 1990; Kaplan &Stromberg, 2003). The literature shows that financing, as well as risk capitalists (VCs), are heavily involved in many values-an activities. For example, they sit in board of directors, hire senior executives, formulate strategies and modernize firms.

However, the value-added role of VCs depends on market conditions (Cumming&MacIntosh, 2001). It has also been shown that VCs are opportunistic during periods of asset bubbles. In addition, during the boom years, VCs are investing in more advanced stages at an early stage, offering less patronage,

engaging in inappropriate contracts, offering less monitoring and strategic advice, and achieving less and less effective phased financing (Wang et al, 2013, p. 284).

During the 1998-2001 periods (the internet balloon) capital markets saw rapid increases in valuations and capital volumes throughout the life cycle, and then there was a rapid collapse at the same rate. In this period, the market value of publicly traded digital companies has risen and has dropped significantly. Leading e-commerce retailer logged in at $ 18 on the Amazon.com 1997 IPO, increased to $ 106 by December 1999, and then dropped below $ 15 by December 2001 (US $ amounts). The first public offer market in the US displayed similar behavior and peaked at 446 bids before falling to only 79 in 1999 (Ritter 2001). At pre-IPO markets, venture capital investors experienced corresponding fluctuations in business volumes. The US National Venture Capital Association (NVCA), in 1998, had $ 31.1 billion in investment capital and 288 VC funds, and VC companies were aggressively receiving additional funds from their own investors, so this figure was $ 107.7 billion 635 dollars. By the end of 2001, it had fallen to 94 for only $ 5.7 billion.

Finding sources of investment to create or expand a start is a major obstacle for many entrepreneurs. Generally, the project builders at the beginning have no financial resources of their own and therefore need external investments. There are several traditional funding sources, such as bank loans, business angels, risk capital, and structured funds that can be used.

Risk capital investments can come from individuals, companies or funds investing in individual companies to help their development. Risk capital is not affected by the company's cash flow (Džupka et. al., 2016).

In the last few decades, there has been a massive market collapse in stock markets. Increasing market accidents have attracted academics, historians and policy makers. Numerous reports, reviews, academic papers and books reveal various reasons for stock market collapse (Kaizoji, 2006, p. 123).

In the 1990s, personal computers, software, telecommunications and the Internet quickly became accepted for business and personal use. Computer-related technology continued to be the strong bullish market trend of global markets. Many economists have even suggested that we are in the New Economy, where inflation does not exist and stock markets have become old. Investors from all over the world believed that the euphoric and constant bull market was wrong. Large-scale stock speculation, which caused a worldwide ban, has come to fruition. At the end of the 1990s, many technology companies were selling shares in IPOs (IMOs). Most start up shareholders, including employees, were millionaires at night. In early 2000, reality began to sink. Investors soon realized that spot-dream was really a balloon. In months, Nasdaq fell from 5000 to 2000. Billions of high-tech stocks in Japan's stock exchanges were not as fast as they could be seen from the map. Panic sales were realized with the loss of trillions of dollars by investors. Yahoo Japan is a typical example. The price per share of Yahoo Japan was around $ 25,000 on January 5, 1998. Two years later, the stock price increased by 5450 percent and on February 23, 2000 it rose to about US $ 1.5 million. In 2002, the price dropped to US $ 15,000, a decrease of about 99.1 percent (Lowenstein, 2004: 12).

SOLUTIONS AND RECOMMENDATIONS

Price balloons can be seen in any period of history. Price bubbles are a financial anomaly and result from supply and demand imbalances. Price bubbles can cause many problems such as wrong decision by economic agents, loss of efficiency in markets, increase in volatility of real activity, and so on. It also plays

a role in the emergence of many crises. In digital companies, price bubbles may arise if intangible asset valuation and future cash flows are not realized. As market activity increases, price bubbles decrease. Ensuring market effectiveness prevents price bubbles.

FUTURE RESEARCH DIRECTIONS

Today, it is observed that the share of intangible assets in the market value is increasing gradually. With the spread of new information technologies, intangible assets have become one of the most important determinants of business value.

In the statements of financial position; particularly intangible or unreported assets such as internally generated brands and goodwill should be reported in the financial statements. The financial reporting will be reorganized in terms of internally generated brands and intangible assets and it will be possible to present the financial statements in a fair manner. This will enable stakeholders to make decisions that will be most beneficial to them. Intangible assets are especially important for digital companies. For these companies, it is important that the intangible assets are valued and reported in the balance sheet. In this context, new methodologies can be developed for valuation of digital companies.

CONCLUSION

Venture capital companies are in case of a fund management company as a financial tool. These finance companies, assessing their investment proposals, have a significant expertise such as growth and profit potential due to distinguish transport projects.

There are two sides to go against the concept of venture capital: investors and entrepreneurs. Venture capital in terms of investors are good and generally different idea of business and has a rapid growth potential, competitive advantages and long-term investments that are available to entrepreneurs in need of financing higher expected earnings in the sector. Here investors, sometimes people who have more money, sometimes it can be professionally persons and institutions. The capital risk for enterprising, innovative business ideas and often high-tech and cost-effective investment is to obtain financial resources in the form of capital required to implement the partnership and long-term basis.

The functioning of the venture capital institutions can be summarized as follows: Investors, who does not want to invest in areas with low risk and return, transfer their savings to the pools, which are built by venture capital organizations. These organizations pooled resources; it is promising and newly established company in providing them with common use of external financing. Venture capital organizations, companies emerge from the partnership through a public offering or sale when they reach a certain size. The resulting income or damage is shared with investors having shares in the pool.

The capital factor lies behind many problems that the digital companies are facing today. This determination continues in the same way today. Initiative started with little capital; it continues with an ever-growing problem. Entrepreneurs to create businesses with little capital at their disposal, the share capital is not sufficient for marketing work to do to take part in both investment and markets. These companies are faced with the equity issue began in the foundation stage.

Sometimes the question of financing cooperation is possible with incentives and grants. In this sense, grants and benefit from the incentives also be hosts of different circumstances, cooperation and the dif-

ferent types of financing has increased the need for the concept accordingly venture capital has become crucial for digital companies.

However, during the establishment of digital companies provide financing through venture capital is not easy. Digital companies in the financing process, businesses are under various risks. During the emergence of a technological idea of the risk borne by the structure of the research process and illustrates the negative effects on business operations. Risk factors are often in the form of research and development costs of going against the firm, as a result of this technological field are losing its attraction for this idea emerged, and even can cause investors to abandon the investment idea.

The implementation of a project-based technology in many areas of the economy from production to employ multi-dimensional effects to create, and therefore carries much more value than just financing may be different needs of each investment support provided in this area.

In this sense, venture capital, digital companies are exactly the characteristics peculiar to the structure of the sector in the solution of financial problems and that it is a financing method that overlaps. In addition, the financing model is a method capable of adapting to changes in the world economic trend.

When the venture capital practice in the world, of all the developed countries where government support seems to be very significant. In every country, venture capital initiatives primarily been a pioneer in the state's interest in the subject is provided in the private sector with incentives applied continuously. After reaching a certain size venture capital investment, the state is also easier to load, investors are aware of the fact that they now contribute to the development of higher earnings this model itself.

REFERENCES

Abeysekara, S. (2001). Efficient Market Hypothesis and Emerging Capital Market in Sri Lanka: Evidence From the Colombo Stock Exchange – A Note. *Journal of Business Finance & Accounting*, *28*(1-2), 249–261. doi:10.1111/1468-5957.00373

Abreu, D., & Brunnermeier, M. K. (2002). Synchronization risk and delayed arbitrage. *Journal of Financial Economics*, *66*(2-3), 341–360. doi:10.1016/S0304-405X(02)00227-1

Acar, H. (2001). *Dericilik Sektörüne Risk Sermayesi Modelinin Uygulanabilirliği*. Isparta: Süleyman Demirel Üniversitesi, İşletme Anabilim Dalı, Yüksek LisansTezi.

Ahlstrom, D., Bruton, G. D., & Yeh, K. S. (2007). Venture Capital in China: Past, present, and future. *Asia Pacific Journal of Management*, *24*(3), 247–268. doi:10.100710490-006-9032-1

Akıncı, G. Y., Akıncı, M., & Yılmaz, Ö. (2014). Finansal Gelişmişliğin Makro ekonomik Belirleyicileri: Türkiye İçin Bir VAR Modeli. *Journal of Alanya Faculty of Business/Alanya Işletme Fakültesi Dergisi, 6*(1), 1-15.

Akkaya, G. C. (2004). Risk Sermayesi Yatırımından Beklenen Karlılığın Analizi, *Dokuz Eylül Üniversitesi*. *Sosyal Bilimler Enstitüsü Dergisi*, *6*(4), 22–28.

Akkaya, G. C., & İçerli, M. Y. (2001). Kobi'lerin Finansal Problemlerinin Çözümünde Risk Sermayesi Finansman Modeli. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *3*(3), 61–70.

Allen, F., & Gorton, G. (1993). 10).Churning Bubbles. *The Review of Economic Studies*, *60*(4), 813–836. doi:10.2307/2298101

Atilla, O. (2006). Girişimciliğin Finansmanında Risk Sermayesi. Gazi Üniversitesi.

Bacon, F., & Cannon, C. (2018). Brexit Announcement: A Test of Market Efficiency. *Journal of Applied Business and Economics*, *20*(8). doi:10.33423/jabe.v20i8.208

Bariviera, A. F., Basgall, M. J., Hasperué, W., & Naiouf, M. (2017). Some stylizedfacts of the bitcoin market. *Physica A*, *484*, 82–90. doi:10.1016/j.physa.2017.04.159

Berger, A. N., & Udell, G. F. (1998). The Economics of Small Business Finance: The Roles of Private equity and Dept Markets in The Financial Growth Cycle. *Journal of Banking & Finance*, *22*, 1–69. doi:10.1016/S0378-4266(98)00038-7

Bildik, R. (2000). *Hisse senedi piyasalarında dönemsellikler ve İMKB üzerine ampirik bir çalışma*. İstanbul: İMKB.

Blanchard, O., & Watson, M. (1982). *Bubbles, Rational Expectations and Financial Markets*. NBER Working Papers 0945, National Bureau of Economic Research, Inc. doi:10.3386/w0945

Brealey, R., Myers, S. C., & Marcus, A. J. (1995). *Fundamentals of Corporate Finance*. New York: McGraw-Hill.

Brunnermeier, M. K. (2008). Bubbles. In S. N. Durlauf & L. E. Blume (Eds.), *The new Palgrave dictionary of economics*. New York: Palgrave Macmillan. doi:10.1057/978-1-349-95121-5_44-2

Bulut, H. İ., & Er, B. (2008). Risk Sermayesi Destekli Girişimlerin Fiyatlandırılması ve Fiyatlandırmada Kullanılan İskonto Oranı. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *11*(1), 275–297.

Çamoğlu, S. M., Yüce, G., & Akıncı, M. (2010). 2008 Küresel Finansal Kriz ve Türkiye: Makro Ekonomik Göstergelerin Kümeleme Yöntemi İle Analizi. *Finans Politik&Ekonomik Yorumlar*, *47*(546), 75–88.

Cesarano, F. (2014). The Puzzle of Metallism: Searchingfor the Nature of Money. *History of Political Economy*, *46*(2), 177–210. doi:10.1215/00182702-2647468

Chambers, R. N. (1999). Risk Sermayesi ve İşleyişi. *Muhasebe FinansmanDergisi*, *8*(11), 75–88.

Chang, S. J. (2004). Venture capital financing, strategic alliances, and the initial public offerings of Internet startups. *Journal of Business Venturing*, *19*(5), 721–741. doi:10.1016/j.jbusvent.2003.03.002

Çoban, M., & Saban, M. (2006). Türkiye'de Risk Sermayesi Uygulaması ve Sorunları. *Muhasebe ve Finansman Dergisi*, *31*, 131–140.

Cumming, D., & MacIntosh, J. (2001). Venture capital investment duration in Canada and the United States. *Journal of Multinational Financial Management*, *11*(4–5), 445–463. doi:10.1016/S1042-444X(01)00034-2

Cuthbertson, K., & Nitzsche, D. (2010). *Quantitative financial economics: Stocks, bonds and foreign exchange*. Chichester: Wiley.

Dağlı, H. (2004). *Sermaye Piyasası ve Portföy Analizi*. Trabzon: Derya Kitabevi.

Demiral, R. Ş. (2013). *Piyasa Etkinliği Analizi: İMKB'de Haftanın Günüve Yılın Ayı Etkisi*. İzmir: Yüksek Lisans Tezi.

Demireli, E., Akkaya, G. C., & Elif, İ. B. (2010). Finansal piyasa etkinliği: S&P 500 üzerine bir uygulama. *CÜ İktisadi ve İdari Bilimler Dergisi*, *11*(2), 53–67.

Dilmaç, M. (2006). *Risk Sermayesi'nde Yatırım Kararı ve Muhasebesi*. Erzurum: Yüksek Lisans Tezi.

Dimson, E., & Mussavian, M. (1998). 03).A brief history of market efficiency. *European Financial Management*, *4*(1), 91–103. doi:10.1111/1468-036X.00056

Džupka, P., Klasová, S., & Kováč, V. (2016). Analysis of Innovative Start-Up Companies–Case of Košice Region. *Quality Innovation Prosperity*, *20*(1), 40–56. doi:10.12776/qip.v20i1.641

Earle, T. C. (2009). Trust, confidence, and the 2008 global financial crisis. *Risk Analysis: An International Journal*, *29*(6), 785–792. doi:10.1111/j.1539-6924.2009.01230.x PMID:19392679

Erdönmez, P. A. (2005). Seçilmiş ülkelerde gayrimenkul fiyatları ve bankacılık sektöründeki gelişmeler. *BankacılarDergisi*, *54*, 59–73.

Erkan, M., & Topal Y. (2001). *Kobilerin Sermaye Piyasası Yoluyla Finansmanı ve IMKB deki Kobilerle İlgili Ampirik Bir Çalışma*. 1. Orta Anadolu Kongresi, "KOBİ'lerin Finansman ve PazarlamaSorunları", Erciyes Üniversitesi.

Ertuğrul, A. (2011),. YenilikçiKüçükİşletmelerinFinansmanı. Kadir Has Üniversitesi, Sbe, FinansveBankacılıkAnabilimdalı, YüksekLisansTezi, İstanbul.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383. doi:10.2307/2325486

Friedman, B. M. (2010). Reconstructing economics in light of the 2007–? financial crisis. *The Journal of Economic Education*, *41*(4), 391–397. doi:10.1080/00220485.2010.510397

Fulcher, G. (2004). Deluded by Artifices? The Common European Framework and Harmonization. *Language Assessment Quarterly*, *1*(4), 253–266. doi:10.120715434311laq0104_4

Garber, P. M. (1989). Tulipmania. *Journal of Political Economy*, *97*(3), 535–560. doi:10.1086/261615

Garber, P. M. (1990). Famous First Bubbles. *The Journal of Economic Perspectives*, *4*(2), 35–54. doi:10.1257/jep.4.2.35

Gollotto, J. C., & Kim, S. (2003). Market valuation of Dot Com companies; R&D versushype. *Managerial Finance*, *29*(11), 61–72. doi:10.1108/03074350310768562

Gompers, P. (2006). Venture Capital. In B. EspenEckbo (Ed.), Handbook of Empirical Corporate Finance (pp. 481-509). Elsevier.

Harris, L. (2011). *Trading and Exchanges: Market microstructures for practitioners*. New Delhi: Oxford University Press.

Hawkins, R. (2004). Looking beyond the dot com bubble: exploring the form and function of business models in the electronic marketplace. In *E-life after the dot com bust* (pp. 65–81). Heidelberg: Physica. doi:10.1007/978-3-662-11659-3_4

Hayırsever, Baştürk, & Feride. (2004). F/K oranı ve Firma Büyüklüğü Anomalilerinin Bir Arada Ele Alınarak Portföy Oluşturulması ve Bir Uygulama Örneği. Anadolu Üniversitesi Yayınları.

Hellmann, T., & Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. *The Journal of Finance*, *57*(1), 169–197. doi:10.1111/1540-6261.00419

Hemmelgarn, T., Nicodeme, G., &Zangari, E. (2012). The Role of Housing Tax Provisions. *Taxation and the Financial Crisis*, 61-87. doi:10.1093/acprof:oso/9780199698165.003.0003

Hill, B. E., & Power, D. (2001). *Inside Secrets to venture capital*. New York: John Wiley.

Hoppit, J. (2002). The Myths Of The South Sea Bubble. *Transactions of the Royal Historical Society*, *12*, 141–165. doi:10.1017/S0080440102000051

İpekten, O. B. (2006). Risk Sermayesi FinansmanModeli. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *7*(1), 385–408.

Jeng, L. A., & Wells, P. C. (2000). The determinants of venture capital funding: Evidence acrosscountries. *Journal of Corporate Finance*, *6*(3), 241–289. doi:10.1016/S0929-1199(00)00003-1

Kaizoji, T. (2006). A precursor of market crashes: Empirical laws of Japan's internet bubble. *The European Physical Journal B*, *50*(1-2), 123–127. doi:10.1140/epjb/e2006-00142-9

Kaplan, S. N., & Lerner, J. (2010). It ain't broke: The past, present, and future of venture capital. *Journal of Applied Corporate Finance*, *22*(2), 36–47. doi:10.1111/j.1745-6622.2010.00272.x

Kaplan, S. N., & Stromberg, P. (2003). 04). Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts. *The Review of Economic Studies*, *70*(2), 281–315. doi:10.1111/1467-937X.00245

Karan, M. B. (2001). *Yatırım Analizi ve Portföy Yönetimi*. Ankara: Gazi Kitabevi.

Kilimlioğlu, S. (2006). *Kobi'lerin Risk Sermayesi Finansman Modelinden Yararlanma Olanakları ve Beklenen Faydalar (Eskişehir İl Merkezindeki KOBİ'ler Örneği)*. Eskişehir: Osmangazi Üniversitesi.

Kindleberger, C. P., & Aliber, R. Z. (2001). *Manias*. Panics and Crashes; doi:10.1057/9780230536753

Kortum, S., & Lerner, J. (2001). Does venture capital spur innovation? In *Entrepreneurial inputs and outcomes: New studies of entrepreneurship in the United States* (pp. 1–44). EmeraldGroup Publishing Limited. doi:10.1016/S1048-4736(01)13003-1

Kressel, H., & Lento, T. V. (2010). *Investing in Dynamic Markets : Venture Capital in the Digital Age*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511730061

Kuğu, T. D. (2004). Finansman Yöntemi Olarak Risk Sermayesi. *Yönetim ve Ekonomi Dergisi*, *11*(2), 141–153.

Long, J. B., &Summers, L. (1990). *Equipment Investment and Economic Growth*. doi:10.3386/w3515

Long, J. B., & Summers, L. H. (1991). 05). Equipment Investment and Economic Growth. *The Quarterly Journal of Economics*, *106*(2), 445. doi:10.2307/2937944

Lowenstein, R. (2004). *Origins of the crash: The great bubble and its undoing*. New York: Penguin Books.

Mermertaş, Ş. (2010). *Rhea Girişim Sermayesi Yatırım Ortaklığı Analist Toplantısı Notları*. TSKB Araştırma.

Moosa, I. (2019). The Bitcoin: A Sparkling Bubble or Price Discovery? *Economia e Politica Industriale*. doi:10.100740812-019-00135-9

Murphy, A. E. (2017). The first financial market bubble. *The Foundations of Political Economy and Social Reform: Economy and Society in Eighteenth Century France*.

Ofek, E., & Richardson, M. (2003). Dot Com Mania: The Rise and Fall of Internet Stock Prices. *The Journal of Finance*, *58*(3), 1113–1137. doi:10.1111/1540-6261.00560

Özçam, F. (1996). *Teknik analiz ve İstanbul Menkul Kıymetler Borsası*. Ankara: Sermaye Piyasası Kurulu.

Özhan, T. (2016). *Finansal Krizler ve Etkileri: Açıklamalı ve Diyagramlarla*. eKitap Projesi via Publish Drive.

Pena, I. (2002). Intellectual capital and business start-up success. *Journal of Intellectual Capital*, *3*(2), 180–198. doi:10.1108/14691930210424761

Pomerleano, M. (2005). *The morning after: Restructuring in the aftermath of an asset bubble. Asset Price Bubbles: The Implications for Monetary*. Regulatory, and International Policies.

Preda, A. (2004). Informative Prices, Rational Investors: The Emergence of the Random Walk Hypothesis and the Nineteenth-Century" Science of Financial Investments. *History of Political Economy*, *36*(2), 351–386. doi:10.1215/00182702-36-2-351

Rosenthal, R. W. (1981). Games of perfect information, predatory pricing and the chain-store paradox. *Journal of Economic Theory*, *25*(1), 92–100. doi:10.1016/0022-0531(81)90018-1

Sahlman, W. A. (1990). The structure and governance of venture-capital organizations. *Journal of Financial Economics*, *27*(2), 473–521. doi:10.1016/0304-405X(90)90065-8

Sanders, A. (2008). The subprime crisis and its role in the financial crisis. *Journal of Housing Economics*, *17*(4), 254–261. doi:10.1016/j.jhe.2008.10.001

Söğüt, M. A. (2001). *Küçük ve Orta Boy İşletmelerin Finansman Sorunlarının Çözümünde Alternatif Finansman Yöntemleri*. Orta Anadolu Kongresi "KOBİ'lerin Finansman ve Pazarlama Sorunları", Erciyes Üniversitesi Nevşehir İ.İ.B.F.

Sönmez, A., & Toksoy, A. (2014). Türkiye'de Girişimcilik ve Türk Girişici Profili Üzerine Bir Analiz. *Yönetim ve Ekonomi*, *21*(2), 41–58.

Soydemir, S. (1993). Risk Sermayesi. *Ekonomik Yaklasim*, *4*(11), 77. doi:10.5455/ey.10170

Süngü, S. (1994). *Etkin Sermaye Piyasası Teorisi ve Menkul Kıymetler Piyasalarının Düzenlenmesi*. Sermaye Piyasası Kurulu Araştırma Raporu.

Tezcanlı, M. V. (1996). *İçeriden öğrenenlerin ticareti ve manipülasyonlar*. İstanbul: İstanbul Menkul Kıymetler Borsası.

Tomfort, A. (2017). Detecting asset price bubbles: A multi factor approach. *International Journal of Economics and Financial Issues*, *7*, 46–55.

TuranovaG. (2017). *Is bitcoin a bubble?* https://www.nasdaq.com/article/is-bitcoin-a-bubble-cm898150

Uçkun, N. (2009). KOBİ'lerin Finansal Sorunlarına Melek Sermaye Çare Olabilir mi? *Muhasebe ve Finansman Dergisi*, *41*, 121–131.

Ünal, A., & Kaya, H. (2009). *Küresel Kriz ve Türkiye*. İstanbul: Ekonomi ve Politika Araştırmaları Merkezi.

Valliere, D., & Peterson, R. (2004). Inflating the bubble: Examining dot-com investor behaviour. *Venture Capital*, *6*(1), 1–22. doi:10.1080/1369106032000152452

Wang, L., Wang, S., & Zhang, J. (2013). 04). Venture Capital Backing and Overvaluation: Evidence from the High-Tech Bubble. *Financial Review*, *48*(2), 283–310. doi:10.1111/fire.12004

Weimer, D. L., & Vining, A. R. (2017). *Policy analysis: Concepts and practice*. Routledge. doi:10.4324/9781315442129

Wollscheid, C. (2013). *Rise and burst of the dotcom bubble.* Academic Press.

Yenidünya, S. T. (2006). Risk Sermayesinin Türkiye'de Uygulama Olanakları. Marmara Üniversitesi.

Youssefmir, M., Huberman, B. A., & Hogg, T. (2002). *Bubbles and Market Crashes.* Academic Press.

Yücel, Ö. (2016). Finansal Piyasa Etkinliği: Borsa Istanbul Üzerine Bir Uygulama. *International Review of Economics and Management*, *4*(3). doi:10.18825/irem.16916

Zeren, F., Kara, H., & Arı, A. (2013). Piyasa etkinliği hipotezi: İMKB için ampirik bir analiz. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi,* (36), 141-148.

Chapter 12
Innovative Method of Lifelong Learning in the Digital Environment

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ABSTRACT

When the term lifelong learning (LLL) is the matter of discussion, its features, benefits, and limitations are also to be derived. In the era of digitization, digital learning is a buzz word for educating people irrespective of age. The concepts of digital learning must be clearly understood before embedding LLL in a digital environment. The contribution of web technology for the fusion of digital learning with LLL cannot be overlooked. To look deeper into it, a methodology is to be derived for LLL to best focus on the features. A framework for knowledge management (KM) has been proposed to create virtual learning communities (VLCs), which in turn will foster collaborative learning. Also, it is to be observed that by inducting the principles and practice of LLL in the digital environment, a blooming educational concept has erupted for the creation of knowledge society (KS). The chapter gives a clear discussion of LLL embedded in a digital learning environment.

INTRODUCTION

Lifelong learning (LLL) is the "continuous, willful, and self-motivated" pursuit of knowledge either for personal or professional uses. Therefore, it enhances social inclusion, active citizenship, and personal development, along with self-sustainability, competitiveness and employability. Thus, LLL is the learning activity undertaken throughout life, for the improvement of knowledge, skills and competences within a personal, civic, social and/or employment-related paradigm. It is often considered learning that occurs after the formal education years of childhood (where learning is instructor-driven—pedagogical) and into adulthood (where the learning is individually-driven—andragogical). In today's fast-growing world filled with continuous changes, formal education seems to be insufficient and inappropriate for the needs

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of modern society. These shortcomings can be removed by introducing LLL through formal, non-formal, and informal education. LLL enables individuals of all ages to access knowledge and development of competency (Pureta, 2015). LLL allows acquisition of knowledge to persons whose have crossed the age of formal learning and informal learning is not close at hand. The term LLL stands for a consistency in learning over one's life in and beyond educational settings that means there are many common ways in which learning takes place (Laal et al., 2013). With the rapid change of technology, individuals must adapt and learn to meet day-to-day demands. The concept of LLL has become more significant with the emergence of new technologies such as Internet, which change the way of receiving and gathering information, collaboration among people, and communicate. Digital technology has a strong influence on all aspects of learning that make the world of knowledge accessible at any places and at any times to suit students' requirement. The incredible growth of Information & Communication Technology (ICT) brought a significant change in learning by allowing people to learn at any time and anywhere such as sitting at home. It is the new form of learning characterized by e-learning (EL). LLL, with the help of digital technology, has the ability to give each individual the knowledge that they need if andragogy principles and the needs of students have an advantage over the technology (Pureta, 2015). But learning should not be lifelong only but should be present in different forms to attract learners of all age groups. The various aspects of LLL in this regard can be described as follows:

- *Formal learning* refers to the official education and training system of a country. It is structured and organized by Government/Private organization/Institution and provides formal level of qualification which as a whole recognized by certification. Formal education is offered inside classroom in full-time mode and supervised by a teacher. It includes primary, secondary, post-secondary, higher, professional, technical as well as adult education.
- *Informal learning* takes place at any place in our daily activity either in the performance of a person or interactions within work, family and leisure time. It is non-institutional without having any external support. The teacher is someone with more experience such as parents, grandparents, friends or anybody else. It is achieved through conversation, and exploration and enlargement of experience (Knowles, 2016). It is developed through sharing time with people by listening and talking. Since knowledge is used to achieve informal learning, it is fostered through knowledge management.
- *Non-formal learning* takes place outside the formal curriculum may be offered separately or as a part of large activity. Though, it does not provide any certification. It is highly enriching and has a significant role in improving individual's skills and capacities. People of all age groups can participate in non-formal learning. It may be taught by experienced teacher or by any experience person. LLL is also a part of non-formal learning.

The inclusion of young learners and adult learners will definitely foster the literacy rate all around the globe. There is a paradigm shift from classroom learning to virtual learning and from print-based content to digitized content. Assistive Technologies are also important considerations under the umbrella of emerging technology and LLL. Collaboration in digital environment is performed through virtual mode. Web 2.0 technologies have the potentiality to support LLL by allowing informal learning. Developing methodology for LLL is really challenging. Collaboration enhances student-centered learning by encouraging knowledge construction and critical thinking.

BENEFITS OF LIFELONG LEARNING

The benefits of LLL are the following (Hildebrand, 2008):

- Sharpens the mind
  As getting older, continuous learning helps to keep the mind sharp and improve memory. It is a known fact that learning in general has beneficial effects on the brain. Research has shown that people with more education are less likely to have dementia in old age.

- Sharpens the confidence
  Sometimes, when someone has not stepped out of their routine for a while, they haven't taken on a new challenge or really applied themselves to learning something new, they may find the experience a bit daunting. With LLL this fear is more easily overcome. LLL helps to gain confidence in ability to learn and to share the information with others; gain confidence in who we are and what we have to offer.

- Sharpens the interpersonal skills
  Opportunity to socialize can help to greatly improve our interpersonal skills. When we are learning, we are engaged in life; we are engaged in those around us. And when we share what we know, we help others learn and further enhance our relationships.

- Sharpens the career opportunities
  For anyone who has aspirations of moving their career to the next level, LLL will very much need to be part of the package. Not only can learning enhance the skills we already have, it provides the opportunity to learn a new skill or trade and improve chances of career growth.

- Sharpens the ability to communicate
  Learning generally employs the skills of reading, listening and writing; skills essential to the ability to communicate. Enhancing these skills, improves our ability to write a business letter, compile a marketing report, give a department presentation or even speak one-on-one to the company president. It is observed that LLL enhances collaboration among people through the incorporation of technology. Individual learner is connected with number of learners in a digitized collaborative environment forming learning communities. Knowledge is created continuously in the collaborative environment. This gathering of knowledge gradually increases to form knowledge society (KS).

Assumptions of Lifelong Learning

As stated earlier lifelong learning occurs after formal education, it is considered as adult learning or andragogy. Malcom Knowles the inventor of andragogy developed the concept into a theory of education defined it as "the art and science of helping adults to learn" (Knowles, 1980). The assumptions are stated as follows:

- **Self-Directed:** Self-directed refers to an adult becoming more independent as he/she matures. They can choose their learning objective, when they want to learn it, and how they want to learn

without the help of the teacher/supervisor. Teachers generally provide more choices for learners, such as allowing them to design their own tests, and/or providing a collaborative learning environment that foster mutual respect. This allows them to take part in directing their own learning. Within an andragogical environment, the course author can guide the student and they are provided with plenty of resources while the learners are free to 'discover' much of the information and incorporate it as they need to, within their learning requirements.

- **Experience:** Adult learners are rich of experiences that they can use for enhancing learning experiences. They are able to contribute their experience through discussions and are considered valuable resources for learning. Though some of the experiences may cause misinformation or biased related to the new learning those must be sort out so as not to cause a barrier of learning.
- **Readiness to learn:** Adult learners are more willing and able to learn problem-specific contents related to their social and professional development. If the learners see any social benefit to the learning, they are likely to engage. Goal specific learning isn't just about learning a new task but can also incorporate things like social networking, group learning, peer reviews and more. Adults are situation-oriented and their readiness to learn can be initiated by any of the situations such as a sudden change in their lives, a requirement to deal with any task in life such as care for a child who has been diagnosed with a disease, or learning to cook healthy meals to prevent health risks or the desire for self-improvement and self-development.
- **Orientation to learn:** The adult perspective towards learning is different as it is focused on the immediate need for the knowledge, versus a more long-term application. An adult's learning needs more problem-oriented rather than subject-oriented. Adult learners want knowledge that is useful either for their personal life or professional life. They always expect the learning must be relevant to their real-life problems and will foster their performance for a better life.
- **Motivation:** Adult learners are intrinsic motivators. Their motivation is initiated spontaneously to achieve a better lifestyle, curiosity, self-improvement, recognition, etc. Thus, they are quickly satisfied with the learning process, more persistent and are interested to apply their knowledge more frequently. It is clear that andragogy is very much motivational since the learners are target-oriented.

LIFELONG LEARNING A CRITICAL ANALYSIS

Most commonly adults (above 25 years of age) are considered as lifelong learners who have gained experience & knowledge by the go of life and desire to learn more for societal growth as well as growth of self. Lifelong learning (LLL) most significantly takes place after the formal education. Acquiring new knowledge and learning new skills is surrounded in the boundary of formal learning. Effective learning must be integrated into the work process. Current teaching programs train people to use what is effectively a snapshot of an evolving technology. Training is often considered as a variable plugged into an economic model. This short-sighted cycle of training and retraining cannot be broken unless we recognize that learning is a lifelong process that cannot be separated from working (Sachs, 1995). LLL is more than continuous education and training. Table 1 summarizes the different emphases of training and lifelong learning along a number of dimensions (Fischer,2000).

Table 1. Emphasis on training versus emphasis on lifelong learning

	Emphasis Training	Emphasis on Lifelong Learning
Perceived role of new media	Economical, productivity	Quality
Epistemologies of knowledge	Explicate and transfer existing knowledge	Understand existing knowledge and create new knowledge
New media	Learn about computers	Learn with computers
Impact of new media	Make delivery method more efficient	Allow new things to be sent
Teaching	Add-on to current teaching methods	Change what we teach and how we teach
assessments	Number of facts known	Articulate knowledge, reflective practitioner
Mindset	Passive consumer	Active designer, co-developer
setting	Schools, separate, formal, forced	Workplace, families, museums; integrated, informal, discreationary
New knowledge	Assigned-to-learn, decontextualized	Need-to-know, on demand, contextualized
learning	Rote learning	Learning with understanding

Source: (Fischer, G., 1998)

For the economic and social growth of mankind higher study and non-formal education is very much essential that motivates people to continue learning throughout their lives by which knowledge can always be acquired. With the increase of age, people can learn best in different ways than they learnt during formal education period. The ability of understanding theory and implementing it in practice leads into lifelong education of people. LLL has its importance in professional development and adoption of environmental changes. For example, many adults need higher degree in their profession for career growth. Other adults require non-formal education to lead a better lifestyle. In today's technical world acquiring knowledge in digitized environment is an essential factor in day-to-day life which motivates the learners to become computer savvy irrespective of age. If some new technology is introduced, then it will enhance the benefits for society. Thus, the role of web here is important for the transformation of new instructional technologies of teaching. The term web has not the similar meaning as internet however that is the most significant part of the internet that is outlined as a socio-technological environment allowing humans to interact within the technological networks. The concept socio-technological is a system that improves human thinking i.e., cognition, communication, and co-operation; cognition forces people to communicate and communication forces to co-operate. Thus, it a backtracking method where co-operation is originated communication and communication is originated from cognition. These three together forms a social and collaborative learning environment which in turn leads the mankind to form a knowledge society (KS). Thus, the role of web here is important for the transformation of new instructional technologies of teaching. If the new technology such as web service is introduced, then it will enhance the benefits for the society.

Use of Web Services in Learning

With the incorporation of web services learning becomes 24 x 7 hours flexible learning in the digitized environment. Thus, any person can learn at any time and anywhere. This significantly increases the rate of continuous education or lifelong learning (LLL). With the development of technology, web services have gone through different generations:

Web 1.0

Web 1.0 was introduced by Berners-Lee is the 1st generation of web and is known as read-only web which allowed the user to only read the content from the web not create content. Most commonly, it is the static web and is unidirectional. The contents were available in the form of static HTML pages updated very rarely. Web 1.0 contents are not interactive. Users can only see these sites; but can't contribute their ideas online. In fact, the technology of web 1.0 leads the society into e-learning 1.0 (EL 1.0). The "anytime, anywhere and anybody" concept provided easy and convenient access to educational contents and expressed characteristics of EL 1.0 (Ebner, 2007). The characteristics of web 1.0 are the following:

1. The content is read only.
2. Web 1.0 built-up an on-line presence and create information accessible to anyone at any time. It provides static sites only and uses basic Hypertext Mark-up Language (HTML) text.

Web 2.0

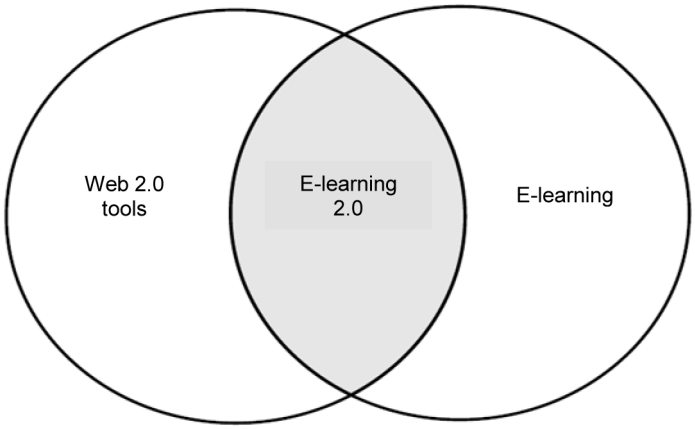
Web 2.0 is named as the read/write web. Users can read the content as well as they are allowed to create their own content. The components of web 2.0 are analyzed as follows: *Learners*, which use the system to achieve goals, *instructors*, which use the system to monitor guide and assist learners in their learning process, *e-content* which provides the important pieces of information (including multimedia and interactive elements) and the possibility of self-evaluation, and *technology*, which allows access over Internet or Intranet, through web browsers (Dietinger, 2003). Integration of web 2.0 tools and technologies and the virtual learning environment (VLE) has created a new pedagogy in teaching/learning during the last decade. This new pedagogy has created a new era in teaching/learning methodology moves e-learning (EL) into e-learning 2.0 (EL 2.0) environments. Now, it is EL 2.0 based on web 2.0. The origin of EL 2.0 is given in figure 1.

Learning takes place in the virtual environment through various tools of web services.

Tools of Web 2.0

- **Wikis:** used for collaborative publication i.e., collective intelligence.
- **Blogs:** used for publication of content and allows the participant to post comments.
- **Microblog:** It is a weblog which is restricted to 140 characters and used for transferring short messages, thoughts and ideas by using instant messaging software or mobile phone.
- **Social network:** used for creating communication like, face book, twitter are in order to provide collaborative learning.

Figure 1. The Origin of E-learning 2.0



- **Discussion forums:** used to focus discussion on a particular topic and to support frequently asked questions (FAQs).
- **RSS feeds:** used for regular monitoring of information.
- **M-learning:** enhances EL to a greater extent by using wireless devices such as laptop, mobile phones.
- **Tags:** used to improve and personalize the search.
- **Podcasts and videocasts:** used for sharing of audio and video files such as video conferencing.

Web 3.0

If web 2.0 is said to be the current generation of web, then web 3.0 is outlined as the next generation of web service which is based on Artificial Intelligence (AI) techniques. It will allow linking of data from different sources and of different types or formats such as word, excel sheet, .pdf, etc. The Knowledge Society (KS) will become the knowledge ocean. The society is now already on the horizon of the next generation of web i.e., web 3.0 known as transcendent web. Web 3.0 will also facilitate ubiquitous learning which is not supported by web 2.0. The ubiquitous version of the web supports teaching/learning on mobile devices such as mobile phones, laptop, palmtop, etc. Learning based on web 3.0 leads the society into e-learning 3.0 (EL 3.0) environments. The potentiality of Artificial Intelligence (AI) in web 3.0 services aggregates and analyses all the data in the Internet to provide more powerful search and more specific content filtering. Web 3.0 is defined as the idea of next evolution of www which will facilitate linking, grouping, and analyzing information from numerous sources of information to create new information streams (Suphakorntanakit, 2008). Web 3.0 next tools are based on Artificial Intelligence (AI) technique which can facilitate 24x7 hours online help from the teachers to the learners. The umbrella of web 3.0 contains all the tools of web 2.0 along with number of additional tools.

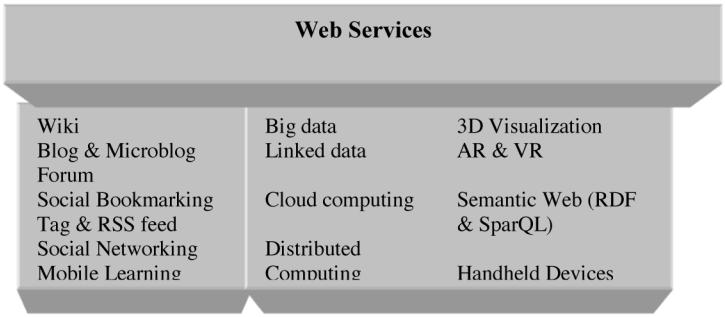
Tools of Web 3.0

- **Big-Data:** AI has the ability to make the computer understands the relationship between different datasets and can integrate them to form a large central dataset known as big data.

- **Linked Data:** The objective is to standardize the data structures in the internet. All the contents will be standardized into a common format through the RDF language. The idea of *"Linked Data"* has been recently developed in order to broaden the linking objectives (Fischetti, 2010). Consequently, this globalization phenomenon enhances the innovation and creativity of the users and there will be a significant development in Research & Development (R & D) activity.
- **Distributed and Cloud Computing**: It is the delivery of computing as a service in stead of a product.
- **3D Visualization:** It is used to simulate the physical classroom as the virtual classroom.
- **Socio-Semantic Web:** It permits the users to share information.
- **Intelligent/semantic Web:** Semantic web often refers to the W3C's vision on the web of linked information that enables users to create knowledge and construct. In simply way, semantic web is the concept of describing things in a type which is understandable by computers.
- **Openness and Interoperability:** this often refers to openness in terms of application programming interfaces, data formats, protocol etc and skill among devices and platforms.
- **Global Repository of Data:** Information are often accessed across programs and across on-line.
- **3D Visualization:** Wide use of 3D modeling and 3D spaces for which services like second life and customized avatars connected to user's devices are used.
- **Control of Information:** Web 2.0 is about information management, while Web 3.0 is about bringing order back thereto.
- **Socio-Semantic Web** permits the users to share information.
- **Distributed and Cloud Computing:** The delivery of computing as a service in stead of a product.

The hierarchy of web services is given in figure 2.

Figure 2. Hierarchy of web services.

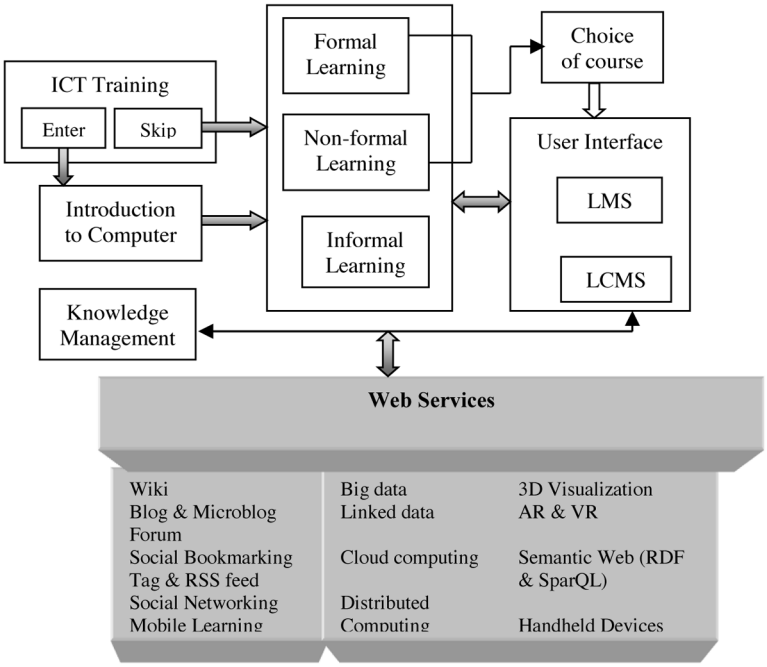


LIFELONG LEARNING FRAMEWORK

Lifelong learning (LLL) is now the most eye-catching learning process which empowers learners to learn for social as well economic development. Since the economic growth of the country depends upon the literacy rate of the country, only continuous education can increase the literacy rate. People are allowed to learn within work context and also beyond work context. People within work learn for their career growth and other people learn to acquire new knowledge in order to adapt environmental

changes to lead a smooth life. LLL attracts the adult learners during the learning process. It seeks to remove the authority from the learning process and as such may prove useful in a range of community settings (O'Beirne & Garnett 2006). In digital environment virtual learning communities (VLCs) can be formed which enables the learners to share, transfer their existing knowledge and also acquire new knowledge from their peers. With the integration of knowledge management (KM) learning becomes globalized. The globalization of learning will be a basis of knowledge society (KS) which facilitates knowledge economy; since existing knowledge is reused to create new knowledge. With the support of KM the framework of LLL is given in figure 3.

Figure 3. Framework of Lifelong Learning methodology



ICT training course is introduced for the novice users, large number of learners will be attracted towards the course. It would seem that e-learners should be provided with relevant training prior to enrollment to avoid any difficulties, especially for individuals without much ICT background (Wong, 2007). This module will give idea about computer system such as its components, its uses and benefits in learning. The features of the unit are the following:

- Introduction to computer system
  - What is computer
  - Hardware/Software
  - Input/Output devices
  - Central processing unit (CPU)
  - Installing program and exit program

- Managing files and folders: create, move, copy, save, etc.
- Data security & protection from virus, backup, etc.
- Applications and Software
- Operating system
- Multimedia
- Computer architecture
- Memory, Buses, Ports
- Communication and Networking
- The Internet & Browsing and E-Mail
- Virtual learning environment (VLE)

A Virtual Learning Environment (VLE) is a system for delivering learning materials to learners via the web. These systems include assessment, learner tracking, and collaboration and communication tools. The various instruction modes are audio/video-based course, animation, e-Books/e-Texts, etc. VLE consists of a set of teaching and learning tools designed to enhance a learner's learning experience by including computers and the Internet in the learning process.

If the user wants to skip the training module, he/she can directly opt for type of learning. For each type of learning number of courses are available and the user can choose the course as per his/her desire.

As already discussed, formal learning has its own curriculum. Non-formal learning is provided with formal learning, but it is outside the curriculum is not included in the credit system. But for non-formal learning the learners get certification which can help them in future for higher study or job prospect. Informal learning on the other hand, can be availed at any time and at ant place. It's purpose, is to cultivate communities, associations and relationships that make for human flourishing. There is no certification for informal learning. But it increases human value to a greater extent.

After choice of course, the learner will enter into the enrollment procedure which is a part of the user interface i.e., the Learning Management System (LMS). The architecture of LMS is given in the next part.

Learning Management System (LMS)

The different components of LMS with their functionalities are described as follows:

Enrollment

Enrollment form is designed for the learners. After enrollment each user will be assigned a unique ID, the enrollment procedure provides the confirmation about the users of online learning system. Accordingly, the institution/organization can plan their learning schedule.

Learner Tracking

Learner tracking system can be used to check and record learner's overall performance such as attendance, progress. Examination results, etc. The main functions of learner tracking system include record the attendance of the learner in case of synchronous learning. Timely submission of assignments, progress during course will also be included in learner tracking. A grade book can be maintained which can be

accessed by the learner, teacher and parents. As the overall performance can be kept in recorded form, this will help to improve the performance of learner.

Curriculum Management

Curriculum management will include the entire learning plan. It includes curriculum mapping, content and structure analysis, assessment and evaluation, research, review and revise to know that whether any changes in curriculum will be required or not. Curriculum mapping is a template of the curriculum which includes phases, duration, courses, sessions, etc. of the course. Content and structure analysis will find out if there is any gap in the content, the correctness of teaching methodology, the sequencing of topics. Assessment and evaluation will identify the learners' progress as well as course satisfaction level. Research, review and revise will identify whether any changes will require in the curriculum or not. Through curriculum management all the users can get a clear picture about the entire course. Accordingly, they can prepare their schedule. The learner can prepare himself to compete in the market.

Assessment and Evaluation (AE)

Assessment and evaluation is one of the most important factors in any learning modality. Assessment and evaluation is the measuring factor of learner as well as teacher. Assessment refers to measuring the learner's performance and evaluation refers to measuring the quality of course. The term evaluation is used relevant to evaluation of course and programmes, and assessment is used relevant to evaluation of learner learning (Rekkedal. 2001). The two types of assessments are: (1) Formative assessment and (2) Summative assessment. Formative assessment is done phase-wise and summative assessment is the collective assessment done after completion of the course. Evaluation is performed by taking learner feedback about the course. But it is a difficult task in distance learning courses. To make it easier AI technique can be used.

The learner has to log in at the specified time and will be provided with assessment question. She/he has to complete the answers within the time specified after which the session expires. The answers of the learner will be checked and evaluated by expert system (ES) technology through robot tutor immediately and the learner can get the result. For evaluation purpose each learner will be supplied by a set of questionnaires to give the feedback about the course as well as about the teaching of the teacher. A scale of evaluation is fixed and accordingly will be performed by ES will perform the evaluation. The evaluation result will only be available to authorized persons. Accordingly, the standard of content or instruction method may be improved if necessary.

Collaborative Learning

Collaborative learning is referred to as group learning. A group of people learn together with a common objective. Hence learning takes place as a teamwork. As number of users can participate in a parallel manner, this will lead into community learning. With this community learning activity, interaction will take place in between learner-learner and learner-teacher. As a result, users can acquire new knowledge and can share their knowledge for the benefit of others during the learning process. Gradually the size of knowledge pool increases. Number of participants will be increased through the community learning process. The knowledge of all the participants can be collected in a societal way to form a KS.

Course Calendar

Course calendar is the time keeping system of creation and publication of course schedules, deadlines of course completion and date of examination, etc. The function of course calendar will include the timely creation and publication of course schedules. The date of commencement of course and date of closing of instruction will also be mentioned in the course calendar. It will also include the deadline of enrollment of course, deadline of submission of periodical assignments, etc. The date of monthly tests and final examination will also be mentioned in the course calendar. For the teachers the dates of lesson plan preparation, date of uploading assignments, etc., and for the authors' date of learning content preparation will be mentioned in the course calendar. Following the course calendar, the learners, teachers, authors and other users can be aware of their responsibilities. Accordingly, they will perform their duties in time. *The learning content management system (LCMS) side will consist of the following components:*

Content Upload and Content Delivery

Content upload is the process of storing the learning content in the content repository. After the content is prepared by the author it is the responsibility of the administrator to load the content into the digital repository. Content delivery is the process of making the content available to the learner. The learner can access the content and can download the content as per his/her requirement.

Metadata

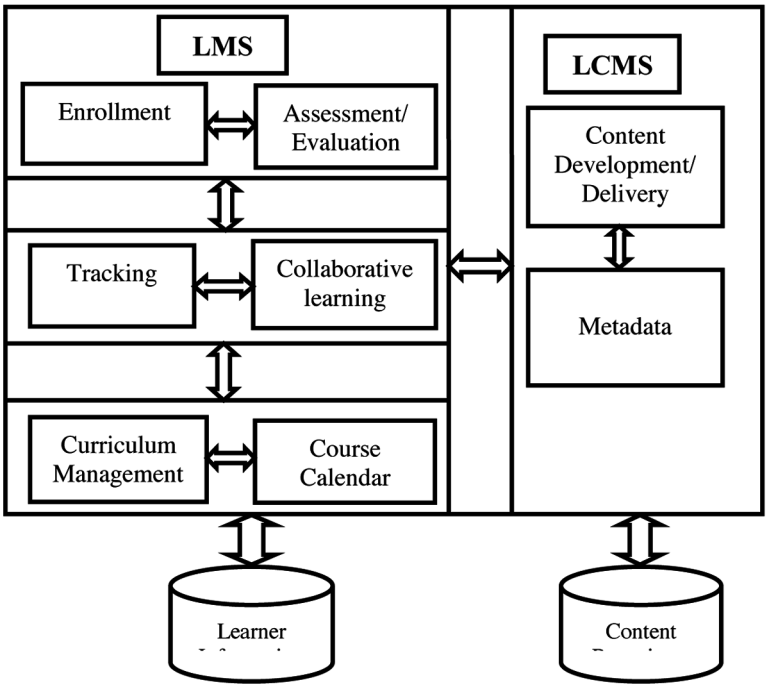
Metadata gives information about all other data of a particular content. For example, metadata of a text document contains the size of the document, author, date the text created and a short summary.

KNOWLEDGE MANAGEMENT FOR THE CREATION OF COLLABORATION

Digital learning simply focuses on individual learning where Knowledge Management (KM) focuses on group learning. KM is the software environment plays a vital role in fostering lifelong learning (LLL). The 6 phases of KM cycle facilitate the exploitation of knowledge by which new knowledge can be created form the existing knowledge. The individual knowledge of participants is extracted in the learning environment and the knowledge passes through the 6 phases in order to create knowledge repository.

It uses communication and collaboration to improve how people apply knowledge in their job within an overall process.KM can only be invoked with the application of appropriate tools and technologies. These technologies involve e-learning (EL), Collaboration, expert system (ES) and tools involve web services. EL delivers knowledge by assigning instructionally designed learning resources to individuals while in KM systems capturing and conveying knowledge is driven by individual skills, competencies and needs of users (Ponce, 2003). Collaboration will initiate the formation of knowledge society (KS), ES facilitates knowledge codification, and web service tools will be incorporated to achieve various learning modalities. On the other hand, the functionalities of EL if uses more techniques of web services such as mobile learning, big data, linked data, cloud computing, semantic web, 3d-visualization, etc. then the functional power of EL shall be boosted up exponentially and it will add more flavor for bigger KS. The proposed KM framework is given in figure 4 is designed with the incorporation of the above

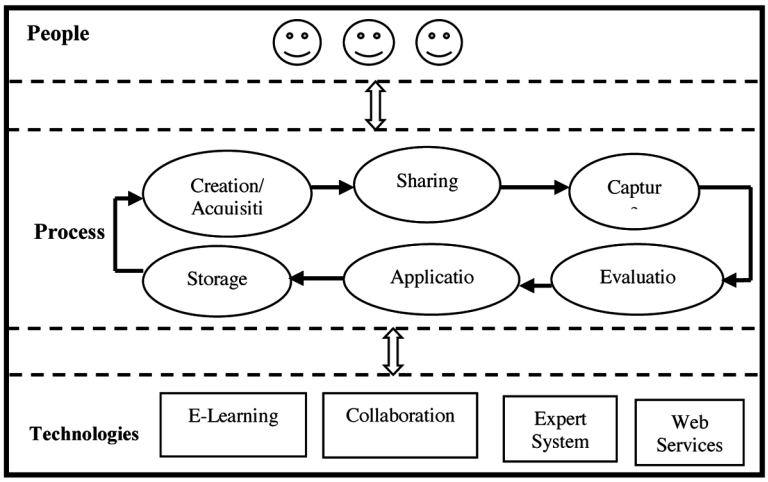
Figure 4. Architecture of LMS



tools and technologies. To make the KM environment functional appropriate tools and technologies are to be incorporated in the environment. These tools and technologies are the web services which are described in the next section.

The derived methodologies with the help of web services certainly bring a new era in education for both adult as well as child learners. This innovating practice of andragogy and pedagogy must be a valuable tool for creation of knowledge society.

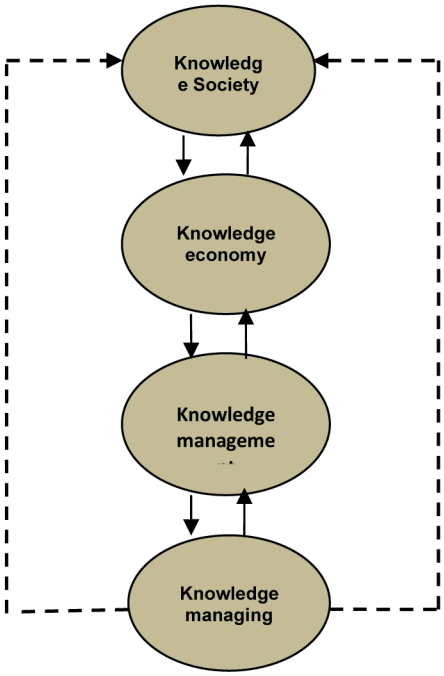
Figure 5. Framework of Knowledge Management (KM)



CREATION OF KNOWLEDGE SOCIETY

Lifelong learning (LLL) system provides opportunities for continuous learning as well as people all around the globe become the member of learning community. Traditional learning takes place in a squeezed manner in a specific boundary. LLL diversifies learning and a greater number of learners can be involved in the process. The suggested LLL framework is the combination of (1) technology standards such as web 3.0 (semantic web, ontology, cloud computing, etc.,) and web 2.0 (wikis, chats, social networks, etc.) and (2) adaptive learning such as learner profile, instructional design, technology enhanced learning, learning communities, etc. The processes are suggested to take place through knowledge management (KM) to create collaborative learning environment where number of learners participate to achieve a common goal. The web services technologies used here enable the KM processes such as knowledge creation/acquisition, sharing, capture, etc. Expert system (ES) is used for knowledge codification. During the entire process large amount of individual knowledge is supposed to be gathered. With the participation of number of learners, a learning society is formed where creation of knowledge is a continuous process. This continuous process of learning is supposed to create lifelong learning (LLL). Now, it can be argued that in the proposed learning environment there is an exponential growth of number of learners and a learning society is formed. The gathering of individual knowledge in the learning society is termed as collective intelligence. Te collective intelligence is now named as knowledge society (KS). The hierarchy of KS is shown in figure 6.

Figure 6. Hierarchy of Knowledge Society



FUTURE SCOPE

Certain points listed below can be included for empowering lifelong learning (LLL) in digital environment. In this context it will boost LLL in future. Incorporation next generation of web services i.e., web 4.0 are left for future work of this research.

1. One important future scope is to increase in digital Literacy & development of Infrastructure such as internet connectivity to a significant level in developing and underdeveloped countries.
2. Multilingual instruction should be developed and provided in future.
3. Sufficient funds should be provided by the Government to avail latest technologies in learning In developing countries digital technology implementation into education systems is a difficult task as it requires huge funds and infrastructure.
4. Last but not the least. web 4.0 is if included it will create a man-machine interaction. Web 4.0 known as symbiotic web. The idea behind of the symbiotic web is interaction between humans and machines in symbiosis. More powerful interfaces such as mind controlled interfaces can be possible by using web 4.0. Machines would more intelligent to read contents of the web and react in the form of executing and have deciding authority for order of execution and more authoritative interfaces. Web 4.0 will be the read-write-execution-concurrency web.

CONCLUSION

The chapter enumerates the concepts of lifelong learning (LLL) with its benefits. When these two concepts are linked with the education of adult and younger people respectively, then in this era of digital environment the fusion of LLL with digital learning must create a knowledge society (KS). In this regard, a clear description of digital learning related to LLL has been given in the chapter. Also, the different aspects of LLL have been descried clearly. How LLL is helpful to achieve communication skill, career opportunities is also presented. The difference between traditional training and LLL is summarized in a simple way. Also, the tools and technologies such as web 2.0 and web 3.0 are used to enable knowledge management (KM) functional are described. A framework for LLL is also given. It is believed that this method of inducting the digital environment in LLL certainly will give an innovating practice to create a knowledge society.

REFERENCES

Dientinger, T. (2003). *Aspects of E-Learning environments*. Graz University of Technology.

Ebner, M. (2007). *E-Learning 2.0 = e-elarning 1.0 + web 2.0?‖ Availability, Reliability and Security.* Paper presented in International Conference on availability, reliability and security (ARES'07).

Fischer, G. (2000). Lifelong learning – More than training. *Journal of Interactive Learning Research, 11*(3/4), 265-294.

Fischetti, M. (2010). The web turns 20: Linked data gives people power. *Scientific American*, 12.

Hildebrand, D. S. (2008). *The powerful benefits of lifelong learning*. Winnetka. Retrieved 2011Nov. 15, Retrieved from: https://www.officearrow.com/training/the-powerful-benefits-of-lifelong-learning-oaiur-861/view.html

Knowles, M. S. (1980). *The Modern Practice of Adult Education*. Chicago: Association Press.

Knowles, M. S. (2016). *What does Malcom Knowles know about adult learning theory*. Retrieved from: https://www.ispringersolutions.com/blog/hat-does-malcom-knowles-knows-about-adultlearning-theory

Laal, M., Laal, A., & Aliramaei, A. (2013). Continuing education; Lifelong learning. *Procedia Behavioral Sciences*, 4052-4056.

O'Berine, R. & Garnett, F. (2005). E-literacy and andragogy- a view through the Community content lens. *Journal of Eliteracy, 2*.

Ponce, D. (2003). *What can e-Learning Learn from Knowledge Management*. Paper presented in 3rd European Knowledge Management Summer School.

Pureta, I. (2015). *Lifelong learning process using digital technology*. Paper presented at the conference of Interdisciplinary Management Research, Opatija.

Rekkedal, T. (2001). *Assessment and Evaluation Techniques in SESAM/NKI ELearning courses*. Article prepared for the EL Socrates Minerva Project —Student support series in elearning.

Sachs, P. (1995). Transforming Work: Collaboration, Learning and Design. *Communications of the ACM*, *38*(9), 36–44. doi:10.1145/223248.223258

SuphakorntanakitN. (2008). *Web 3.0*. Retrieved from http://www.webuser.hs-furtwangen.de/~heindl/ebte-08ss-web-20-suphakorntanakit.pdf

Wong, D. (2007). A Critical Literature Review on e-Learning Limitations. *JASA, 2*, 55-62. Retrieved from www.en.wikipedia.org/wiki/Lifelong_learning

Compilation of References

Abbad, M. M., Morris, D., & De Nahlik, C. (2009). Looking under the bonnet: Factors affecting student adoption of e-learning systems in Jordan. *The International Review of Research in Open and Distributed Learning*, *10*(2). doi:10.19173/irrodl.v10i2.596

Abbosh, O., Savic, V. & Moore, M. (2019, August 3). What Sets the Most Effective Innovators. *Harvard Business Review.*

Abdullateef, B. N., Elias, N. F., Mohamed, H., Zaidan, A., & Zaidan, B. (2016). An evaluation and selection problems of OSS-LMS packages. *SpringerPlus*, *5*(1), 1. doi:10.118640064-016-1828-y PMID:27064567

Abeysekara, S. (2001). Efficient Market Hypothesis and Emerging Capital Market in Sri Lanka: Evidence From the Colombo Stock Exchange – A Note. *Journal of Business Finance & Accounting*, *28*(1-2), 249–261. doi:10.1111/1468-5957.00373

Aboobucker, I., & Bao, Y. (2018). What Obstruct Customer Acceptance of Internet Banking? Security and Privacy, Risk, Trust and Website Usability and The Role of Moderators. *The Journal of High Technology Management Research*, *29*(1), 109–123. doi:10.1016/j.hitech.2018.04.010

Abreu, B. R. A., & Oliveira, L. K. (2014). The potential of response rate in online transportation surveys. *Procedia: Social and Behavioral Sciences*, *162*, 34–41. doi:10.1016/j.sbspro.2014.12.183

Abreu, D., & Brunnermeier, M. K. (2002). Synchronization risk and delayed arbitrage. *Journal of Financial Economics*, *66*(2-3), 341–360. doi:10.1016/S0304-405X(02)00227-1

Abt, C. C. (1970). *Serious games*. New York: Viking Press.

Acar, H. (2001). *Dericilik Sektörüne Risk Sermayesi Modelinin Uygulanabilirliği*. Isparta: Süleyman Demirel Üniversitesi, İşletme Anabilim Dalı, Yüksek LisansTezi.

Accenture. (2017). *2016 Report*. https://www.accenture.com/_acnmedia/pdf-35/accenture-2016-shareholder-letter10-k006.pdf#zoom=50

Adam, F., & O'Doherty, P. (2000). Lessons from enterprise resource planning implementations in Ireland – towards smaller and shorter ERP projects. *Journal of Information Technology*, *15*(4), 305–316. doi:10.1177/026839620001500406

Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *Management Information Systems Quarterly*, *16*(2), 227–247. doi:10.2307/249577

Adams, R., Bessant, J., & Phelps, R. (2006). Innovation Management Measurement: A Review. *International Journal of Management Reviews*, *8*(1), 21–47. doi:10.1111/j.1468-2370.2006.00119.x

Adjei-Bamfo, P., Maloreh-Nyamekye, T., & Ahenkan, A. (2019). The role of e-government in sustainable public procurement in developing countries: A systematic literature review. *Resources, Conservation and Recycling*, *142*, 189–203. doi:10.1016/j.resconrec.2018.12.001

Adjei, D. (2013). Innovation leadership management. *International Journal of ICT and Management*, *1*(2), 103–106.

Aernoudt, R. (2004). Incubators: Tool for Entrepreneurship. *Small Business Economics*, *23*(2), 127–135. doi:10.1023/B:SBEJ.0000027665.54173.23

Aerts, K., Matthyssens, P., & Vandenbempt, K. (2007). Critical role and screening practices of European business incubators. *Technovation*, *27*(5), 254–267. doi:10.1016/j.technovation.2006.12.002

Ahlstrom, D., Bruton, G. D., & Yeh, K. S. (2007). Venture Capital in China: Past, present, and future. *Asia Pacific Journal of Management*, *24*(3), 247–268. doi:10.100710490-006-9032-1

Ahmad, S. A., Chinade, U. B., Gambaki, A. M., Ibrahim, S., & Ala, N. A. (2012). The need for MOODLE as a learning management system in Nigerian Universities: Digesting University Utara Malaysia Learning Zone as a case study. *Academic Research International*, *2*(3), 444.

Ahmed, F., As-Saber, S., Fry, S., & Smith, R. F. I. (2019). Bureaucracy and E-government: A study of e-procurement initiatives in Bangladesh. *Journal of Business Management & Compliance*, *I*(1), 35–51.

Aiken, P. (2002). *Enterprise resource planning (ERP) considerations*. VCU/Institute for Data Research.

Ailin, M., & Lindgren, P. (2008). Conceptualizing Strategic Innovation Leadership for Competitive Survival and Excellence. *Journal of Knowledge Globalization*, *1*, 87–107.

Akhlaq, A., & Ahmed, E. (2013). The Effect of Motivation on Trust in the Acceptance of Internet Banking in a Low-Income Country. *International Journal of Bank Marketing*, *31*(2), 115–125. doi:10.1108/02652321311298690

Akıncı, G. Y., Akıncı, M., & Yılmaz, Ö. (2014). Finansal Gelişmişliğin Makro ekonomik Belirleyicileri: Türkiye İçin Bir VAR Modeli. *Journal of Alanya Faculty of Business/Alanya Işletme Fakültesi Dergisi, 6*(1), 1-15.

Akkaya, G. C. (2004). Risk Sermayesi Yatırımından Beklenen Karlılığın Analizi, *Dokuz Eylül Üniversitesi*. *Sosyal Bilimler Enstitüsü Dergisi*, *6*(4), 22–28.

Akkaya, G. C., & İçerli, M. Y. (2001). Kobi'lerin Finansal Problemlerinin Çözümünde Risk Sermayesi Finansman Modeli. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *3*(3), 61–70.

Akkermans, H., & Van Helden, K. (2002). Vicious and Virtuous Cycles in ERP implementation: A Case Study of Interrelations between Critical Success Factors. *European Journal of Information Systems*, *11*(1), 35–46. doi:10.1057/palgrave.ejis.3000418

Al Musawi, A., Ambusaidi, A., Al-Balushi, S., & Al-Balushi, K. (2015). Effectiveness of E-Lab Use in Science Teaching at the Omani Schools. *The Turkish Online Journal of Educational Technology*, *14*(1).

Al-alak, B. A., & Alnawas, I. A. M. (2011). Measuring the acceptance and adoption of E-learning by academic staff. *Knowledge Management & E-Learning*, *3*(2), 201–221.

Al-Amoush, A., & Sandhu, K. (2020). Digital Learning Analytics Management Systems Innovation: New Findings from A Study of major Jordanian Universities. *International Journal of Innovation in the Digital Economy, 11*(1).

Al-Amoush, A., & Sandhu, K. (2020). Digital Transformation of Learning Management Systems at Universities: Case Analysis for Instructor Perspective. In Examining Social Change and Social Responsibility in Higher Education. Delaware Technical Community College.

Alawadhi, S., & Morris, A. (2008). The Use of the UTAUT Model in the Adoption of E-government Services in Kuwait. *Proceedings of the 41st Hawaii International Conference on System Sciences*. 10.1109/HICSS.2008.452

Alawneh, A., Al-Refai, H., & Batiha, K. (2013). Measuring user satisfaction from e-Government services: Lessons from Jordan. *Government Information Quarterly*, *30*(3), 277–288. doi:10.1016/j.giq.2013.03.001

Al-Dmour, R. (2014). *An integration model for identifying the determinants of the adoption and implementation level of HRIS applications and Its effectiveness in business organisations in Jordan* (Doctor of Philosophy). Brunel University. Retrieved from https://bura.brunel.ac.uk/handle/2438/9222

Al-Gahtani, S. S. (2016). Empirical investigation of e-learning acceptance and assimilation: A structural equation model. *Applied Computing and Informatics*, *12*(1), 27–50. doi:10.1016/j.aci.2014.09.001

Alharbi, H., & Sandhu, K. (2019). New Discoveries for User Acceptance of E-Learning Analytics Recommender Systems in Saudi Arabia. *International Journal of Innovation in the Digital Economy*, *10*(1), 31–42. doi:10.4018/IJIDE.2019010103

Al-Kasasbeh, M. M., Dasgupta, S., & Al-Faouri, A. H. (2011). Factors Affecting E-Service Satisfaction. *Communications of the IBIMA, 2011*, 12.

Allen, D., & Havenhand, M. (2002). ERP critical success factors: An exploration of the contextual factors in public sector institutions. System Sciences, 2002. HICSS. *Proceedings of the 35th Annual Hawaii International Conference on*, 3062-3071.

Allen, D., & Rahman, S. (1985). Small Business Incubators: A Positive Environment for Entrepreneurship. *Journal of Small Business Management*, 1–22.

Allen, F., & Gorton, G. (1993). 10). Churning Bubbles. *The Review of Economic Studies*, *60*(4), 813–836. doi:10.2307/2298101

Almarabeh, T. (2014). Students' Perceptions of E-learning at the University of Jordan. *iJET, 9*(3), 31-35.

Al-Mashari, M., & Okazawa, K. (2006). Enterprise resource planning (ERP) implementation: A useful road map. *International Journal of Management and Enterprise Development*, *3*(1/2), 169–180. doi:10.1504/IJMED.2006.008248

Al-Mashari, M., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, *146*(2), 352–364. doi:10.1016/S0377-2217(02)00554-4

Al-Mashari, M., & Zairi, M. (2003). Enterprise Resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, *146*, 352–364.

Al-Mubaraki, H. M., & Busler, M. (2013). Business Incubation as an Economic Development Strategy: A Literature Review. *International Journal of Management*, *30*(1), 362–372.

Alnsour, A., Muhsen, Z., Dababnah, M., Eljinini, M. A., & Barhoum, K. A. (2011). Implementing Moodle as a Tool to develop the Isra University e-learn system. *IJCSNS International Journal of Computer Science and Network Security*, *11*, 120–124.

AlQudah, A. A. (2014). Accepting Moodle by academic staff at the University of Jordan: Applying and extending TAM in technical support factors. *European Scientific Journal*, *10*(18).

Al-Shboul, M. A., & Alsmadi, I. (2010). Challenges of Utilizing E-Learning Systems in Public Universities in Jordan. *iJET, 5*(1), 4-10.

Al-Shboul, M. (2011). Potential Use of Course Management Systems in Higher Education Institutions in Jordan. *Online Submission*, *8*(2), 220–232.

Al-Shboul, M. (2013). The Level of E-Learning Integration at the University of Jordan: Challenges and Opportunities. *International Education Studies*, *6*(4). doi:10.5539/ies.v6n4p93

Alsolami, H. A., Cheng, K. T. G., & Twalh, A. A. M. I. (2016). Revisiting Innovation Leadership. *Open Journal of Leadership*, *5*, 31–38. doi:10.4236/ojl.2016.52004

Alwan, H. A., & Al-Zubi, A. (2016). Determinants of Internet Banking Adoption Among Customers of Commercial Banks: An Empirical Study in the Jordanian Banking Sector. *International Journal of Business and Management*, *11*(3), 95–104. doi:10.5539/ijbm.v11n3p95

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*(2), 357–377. doi:10.1037/0022-3514.45.2.357

Aparicio, A. F., Vela, F. L. G., Sánchez, J. L. G., & Montes, J. L. I. (2012). Analysis and application of gamification. *Proceedings of the 13th International Conference on Interacción Persona-Ordenado*. 10.1145/2379636.2379653

Arcand, M., PromTep, S., Brun, I., & Rajaobelina, L. (2017). Mobile Banking Service Quality and Customer Relationships. *International Journal of Bank Marketing*, *35*(7), 1068–1089. doi:10.1108/IJBM-10-2015-0150

Arguel, A., Lockyer, L., Kennedy, G., Lodge, J. M., & Pachman, M. (2019). Seeking optimal confusion: A review on epistemic emotion management in interactive digital learning environments. *Interactive Learning Environments*, *27*(2), 200–210. doi:10.1080/10494820.2018.1457544

Arnold, M. J., & Reynolds, K. E. (2003). Hedonic shopping motivations. *Journal of Retailing*, *79*(2), 77–95. doi:10.1016/S0022-4359(03)00007-1

Arnott, D., & Pervan, G. (2005). A critical analysis of decision support systems research. *Journal of Information Technology*, *20*(2), 67–87. doi:10.1057/palgrave.jit.2000035

Ash, C., & Burn, J. (2003). A strategic framework for the management of ERP enabled e-business change. *European Journal of Operational Research*, *146*(2), 374–387. doi:10.1016/S0377-2217(02)00556-8

Atilla, O. (2006). Girişimciliğin Finansmanında Risk Sermayesi. Gazi Üniversitesi.

Atoum, I., Otoom, A., & Ali, A. A. (2017). Holistic Cyber Security Implementation Frameworks: A Case Study of Jordan. *International Journal of Information, Business and Management*, *9*(1), 108.

Ayatse, F., Kwahar, N., & Iyortsuun, A. S. (2017). Business incubation process and firm performance: An empirical review. *Journal of Global Entrepreneurship Research*, *7*(2), 1–17. doi:10.118640497-016-0059-6

Azzam, A. (2013). As technology and generations in medical education change, what remains is the intersection between educator, learners, assessment and context. *International Review of Psychiatry (Abingdon, England)*, *25*(3), 347–356. doi:10.3109/09540261.2013.787048 PMID:23859098

Babbie, E. R. (2013). *The basics of social research*. Cengage Learning.

Babić, S. (2012). Factors that influence academic teacher's acceptance of e-learning technology in blended learning environment. *E-Learning-Organizational Infrastructure and Tools for Specific Areas*, 3-18.

Bacon, F., & Cannon, C. (2018). Brexit Announcement: A Test of Market Efficiency. *Journal of Applied Business and Economics*, *20*(8). doi:10.33423/jabe.v20i8.208

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94. doi:10.1007/BF02723327

Bailey, J. E., & Pearson, S. W. (1983). Development of a tool for measuring and analyzing computer user satisfaction. *Management Science*, *29*(5), 530–544. doi:10.1287/mnsc.29.5.530

Bajwa, D., & Mooney, T. (2004). An integrative framework for the assimilation of enterprise resource planning systems: Phases, antecedents, and outcomes. *Journal of Computer Information Systems*, *44*(3), 81–90.

Bakker, R., & Shepherd, D. (2017). Pull the Plug or take the Plunge: Multiple opportunities and the speed of venturing decisions in the Australian Mining Industry. *Academy of Management Journal*, *60*(1), 130–155. doi:10.5465/amj.2013.1165

Banking and Finance Report. (2019). https://www.appannie.com/en/insights/market-data/banking-finance-2019-shift-to-mobile/

Barbero, J., Casillas, J., Ramos, A., & Guitar, S. (2012). Revisiting incubation performance. How incubation typology affects results. *Technological Forecasting and Social Change*, *79*(5), 888–902. doi:10.1016/j.techfore.2011.12.003

Bariviera, A. F., Basgall, M. J., Hasperué, W., & Naiouf, M. (2017). Some stylizedfacts of the bitcoin market. *Physica A*, *484*, 82–90. doi:10.1016/j.physa.2017.04.159

Barkley, D. L. (2006). *The value of case study research on rural entrepreneurship: Useful method.* Paper presented at the Joint ERS-RUPRI Conference, Exploring Rural Entrepreneurship: Imperatives Opportunities Res., Washington, DC.

Baroudi, J., & Orlikowski, W. (1988). A short-form measure of user information satisfaction: A psychometric evaluation and notes on use. *Journal of Management Information Systems*, *4*(4), 44–59. doi:10.1080/07421222.1988.11517807

Barrows, H. S. (1986). A taxonomy of problem-based learning methods. *Medical Education*, *20*(6), 481–486. doi:10.1111/j.1365-2923.1986.tb01386.x PMID:3796328

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education*. Springer Publishing Company.

Barua, A., Konana, P., Whinston, A. B., & Yin, F. (2001). Managing e-business transformation: Opportunities and value assessment. *Sloan Management Review*, *43*(1), 36–44.

Bayazit, O. (2014). Investigating adoption of e-procurement systems: An empirical study. *International Journal of Information Systems and Supply Chain Management*, *7*(2), 47–66. doi:10.4018/ijisscm.2014040103

Beach, L. R., & Mitchell, T. R. (1978). A contingency model for the selection of decision strategies. *Academy of Management Review*, *3*(3), 439–449. doi:10.5465/amr.1978.4305717

Bearse, P. (1998). A Question of Evaluation: NBIA's Impact Assessment of Business Incubators. *Economic Development Quarterly*, *12*(4), 322–333. doi:10.1177/089124249801200404

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *Management Information Systems Quarterly*, *11*(1), 369–386. doi:10.2307/248684

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238–246. doi:10.1037/0033-2909.107.2.238 PMID:2320703

Bentler, P. M., & Bonet, D. G. (1980). Significant tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588–606. doi:10.1037/0033-2909.88.3.588

Berchet, C., & Habchi, G. (2005). The implementation and deployment of an ERP system: An industrial case study. *Computers in Industry*, *56*(6), 588–605. doi:10.1016/j.compind.2005.02.009

Berger, A. N., & Udell, G. F. (1998). The Economics of Small Business Finance: The Roles of Private equity and Dept Markets in The Financial Growth Cycle. *Journal of Banking & Finance*, *22*, 1–69. doi:10.1016/S0378-4266(98)00038-7

Bernroider, E., & Koch, S. (2001). ERP selection process in midsized and large organisations. *Business Process Management Journal*, *7*(3), 251–257. doi:10.1108/14637150110392746

Bildik, R. (2000). *Hisse senedi piyasalarında dönemsellikler ve İMKB üzerine ampirik bir çalışma*. İstanbul: İMKB.

Bingi, P., & Godla, J. (1999). Critical issues affecting an ERP implementation. *Information Systems Management*, *16*(2), 7–14. doi:10.1201/1078/43197.16.3.19990601/31310.2

Bitner, M. J. (1990). Evaluating Service Encounters: The Effects of Physical Sur-roundings and Employee Responses. *Journal of Marketing*, *54*(2), 69–82. doi:10.1177/002224299005400206

Blanchard, O., & Watson, M. (1982). *Bubbles, Rational Expectations and Financial Markets*. NBER Working Papers 0945, National Bureau of Economic Research, Inc. doi:10.3386/w0945

Boateng, S. L., & Narteh, B. (2016). Online Relationship Marketing and Affective Customer Commitment the Mediating Role of Trust. *Journal of Financial Services Marketing*, *21*(2), 127–140. doi:10.1057/fsm.2016.5

Boersma, K., & Kingma, S. (2005). From means to ends: The transformation of ERP in a manufacturing company. *The Journal of Strategic Information Systems*, *14*(2), 197–219. doi:10.1016/j.jsis.2005.04.003

Boniface, G. (2010). Reflection and the Problem-Based Learning Curriculum. *Problem-Based Learning in Health and Social Care*, 97-113.

Bossink, B. A. (2004). Effectiveness of innovation leadership styles: A manager's influence on ecological innovation in construction projects. *Construction Innovation*, *4*(4), 211–228.

Botta-Genoulaz, V., & Millet, P.-A. (2005). A classification for better use of ERP systems. *Computers in Industry*, *56*(6), 573–587. doi:10.1016/j.compind.2005.02.007

Boud, D. (1985). *Problem-based learning in education for the professions*. Higher Education Research and Development Society of Australasia.

Boud, D., & Feletti, G. (1997). *The challenge of problem-based learning* (2nd ed.). Kogan Page.

Boulter, J. (2014). *How to build profitable customer relationships*. Retrieved 7 Nov 2014 http://www.businessexpert-webinars.com/content/view/1033/29/

Bradley, J. (2008). Management based critical success factors in the implementation of enterprise resource planning systems. *International Journal of Accounting Information Systems*, *8*(3), 175–200. doi:10.1016/j.accinf.2008.04.001

Brandon-Jones, A., & Kauppi, K. (2018). Examining the antecedents of the technology acceptance model within e-procurement. *International Journal of Operations & Production Management*, *38*(1), 22–42. doi:10.1108/IJOPM-06-2015-0346

Brealey, R., Myers, S. C., & Marcus, A. J. (1995). *Fundamentals of Corporate Finance*. New York: McGraw-Hill.

Brehm, L., & Markus, M. L. (2001). Tailoring ERP Systems: A Spectrum of Choices and Their Implications. *Proceedings of the 34th Annual Hawaii International Conference*. 10.1109/HICSS.2001.927130

Brown, C., & Vessey, I. (2003). Managing the Next Wave of Enterprise Systems: Leveraging Lessons from ERP. *MIS Quarterly Executive*, *2*(1), 65–77.

Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations. *Technovation*, *32*(2), 110–121. doi:10.1016/j.technovation.2011.11.003

Brunnermeier, M. K. (2008). Bubbles. In S. N. Durlauf & L. E. Blume (Eds.), *The new Palgrave dictionary of economics*. New York: Palgrave Macmillan. doi:10.1057/978-1-349-95121-5_44-2

Bryan, C., & Clegg, K. (2019). *Innovative Assessment in Higher Education: A Handbook for Academic Practitioners*. Routledge. doi:10.4324/9780429506857

Buckhout, S., & Nemec, J. (1999). Making ERP succeed: Turning fear into promise. *Journal of Strategy and Business*, *15*(1), 60–72.

Buckingham, M., & Clifton, D. O. (2001). *Now, discover your strengths*. New York: Simon and Schuster.

Bulut, H. İ., & Er, B. (2008). Risk Sermayesi Destekli Girişimlerin Fiyatlandırılması ve Fiyatlandırmada Kullanılan İskonto Oranı. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *11*(1), 275–297.

Bundesregierung. (2019). *Digitalisierungs-Index 2019: So digital ist Deutschland.* Retrieved from https://www.bundesregierung.de/breg-de/themen/digitalisierung/so-digital-ist-deutschland-1588792

Bundesverband der Deutschen Industrie e.V. (2015). *Faktencheck: Mittelstand und Familienunternehmen*. Retrieved from file:///C:/Users/e01132/Desktop/Faktencheck_Mittelstand_Familienunternehmen_230915.pdf

Burgelman, R. A., Christensen, C. M., & Wheelwright, S. C. (2004). *Strategic Management of Technology and Innovation* (4th ed.). New York: McGraw Hill/Irwin.

Burguillo, J. C. (2010). Using game theory and Competition-based Learning to stimulate student motivation and performance. *Computers & Education*, *55*(2), 566–575. doi:10.1016/j.compedu.2010.02.018

Caillois, R. (2001). *Man, Play, and Games*. Chicago, IL: University of Illinois Press.

Çamoğlu, S. M., Yüce, G., & Akıncı, M. (2010). 2008 Küresel Finansal Kriz ve Türkiye: Makro Ekonomik Göstergelerin Kümeleme Yöntemi İle Analizi. *Finans Politik&Ekonomik Yorumlar*, *47*(546), 75–88.

Cannon, T. (1994). *Corporate Responsibility a Textbook on Business Ethics, Governance, Environment: Roles and Responsibilities*. Academic Press.

Carmeli, A., Gelbard, R., & Gefen, D. (2010). The importance of innovation leadership in cultivating strategic fit and enhancing firm performance. *The Leadership Quarterly*, *21*(3), 339–349. doi:10.1016/j.leaqua.2010.03.001

Cechetti, N. P., Bellei, E. A., Biduski, D., Mazuco Rodriguez, J. P., Roman, M. K., & De Marchi, A. B. (2019). Developing and implementing a gamification method to improve user engagement: A case study with an m-Health application for hypertension monitoring. *Telematics and Informatics*, *41*, 126–138. doi:10.1016/j.tele.2019.04.007

Centraal Bureau voor de Statistiek. (2019). https://www.statista.com/statistics/575490/share-of-individuals-using-internet-banking-in-netherlands-by-age-group/

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic Motivation and Extrinsic Incentives: A 40-Year Meta-Analysis. *Psychological Bulletin*, *140*(4), 980–1008. doi:10.1037/a0035661 PMID:24491020

Cesarano, F. (2014). The Puzzle of Metallism: Searchingfor the Nature of Money. *History of Political Economy*, *46*(2), 177–210. doi:10.1215/00182702-2647468

Chambers, R. N. (1999). Risk Sermayesi ve İşleyişi. *Muhasebe FinansmanDergisi*, *8*(11), 75–88.

Chambliss, D. F., & Schutt, R. K. (2012). Making sense of the social world: Methods of investigation. *Sage (Atlanta, Ga.)*.

Chandrasekar Subramaniam, M. J. S. (2002). A study of the value and impact of B2B e-commerce: The case of web-based procurement. *International Journal of Electronic Commerce*, *6*(4), 19–40. doi:10.1080/10864415.2002.11044245

Chang, H. H., & Chen, S. W. (2008). The impact of customer interface quality, satisfaction and switching costs on e-loyalty: Internet experience as a moderator. *Computers in Human Behavior*, *24*(6), 2927–2944. doi:10.1016/j.chb.2008.04.014

Chang, H. L. (2019). Factors Affecting the Offshore Deployment of Interorganizational Systems in China: A Case Study Analysis. *Journal of Organizational Computing and Electronic Commerce*, *29*(3), 163–189. doi:10.1080/10919392.2019.1583811

Chang, S. H., Wang, K. Y., Chih, W. H., & Tsai, W. H. (2012). Building Customer Commitment in Business-to-Business Markets. *Industrial Marketing Management*, *41*(6), 940–950. doi:10.1016/j.indmarman.2011.11.026

Chang, S. J. (2004). Venture capital financing, strategic alliances, and the initial public offerings of Internet startups. *Journal of Business Venturing*, *19*(5), 721–741. doi:10.1016/j.jbusvent.2003.03.002

Chang, Y., Markatsoris, H., & Richards, H. (2004). Design and implementation of an e-Procurement system. *Production Planning and Control*, *15*(7), 634–646. doi:10.1080/09537280412331298166

Chan, Y. Y., & Ngai, E. W. (2011). Conceptualising electronic word of mouth activity: An input-process-output perspective. *Marketing Intelligence & Planning*, *29*(5), 488–516. doi:10.1108/02634501111153692

Chatfield, A., & Alanazi, J. (2013). Service quality, citizen satisfaction, and loyalty with self-service delivery options: A strategic imperative for transforming e-government services. *24th Australasian Conference on Information Systems (ACIS)*, 1–12.

Chavan, J. (2013). Internet Banking- Benefits and Challenges in an Emerging Economy. *International Journal of Research in Business Management*, *1*(1), 19–26.

Chen, S.-C. (2012). The customersatisfaction–loyaltyrelationinaninteractivee-servicesetting: The mediators. *Journal of Retailing and Consumer Services, 19*, 202-210.

Chen, L. D., Soliman, K. S., Mao, E., & Frolick, M. N. (2000). Measuring user satisfaction with data warehouses: An exploratory study. *Information & Management*, *37*(3), 103–110. doi:10.1016/S0378-7206(99)00042-7

Chen, R., & Jih, W. (2008). Role negotiation and interaction: An exploratory case study of the impact of management consultants on ERP system implementation in SMEs in Taiwan. *Information Systems Management*, *25*(2), 159–173. doi:10.1080/10580530801941371

Chiesa, V., Coughlan, P., & Voss, A. (1996). Development of a technical innovation audit. *Journal of Product Innovation Management*, *13*(2), 105–136. doi:10.1111/1540-5885.1320105

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research, 295*(2), 295-336.

Chin, W. W. (1995). Partial least squares is to LISREL as principal components analysis is to common factor analysis. *Technology Studies*, *2*(2), 315–319.

Chin, W. W. (1998). Issues and opinions on structural equation modeling. *Management Information Systems Quarterly*, *22*(1), 7–16.

Cho, N., & Park, S. (2001). Development of Electronic Commerce User-Consumer Satisfaction Index (ECUSI) for Internet Shopping. *Industrial Management & Data Systems*, *101*(8), 400–405. doi:10.1108/EUM0000000006170

Cho, S. K., & Berge, Z. L. (2002). Overcoming barriers to distance training and education. *USDLA Journal*, *16*(1), 16–34.

Clouston, T. J. (2010). 16: Interweaving the strands of thinking in problem-based learning. *Problem Based Learning in Health and Social Care*, 203.

CNNICReport. (2019). https://cnnic.com.cn/IDR/ReportDownloads/

Çoban, M., & Saban, M. (2006). Türkiye'de Risk Sermayesi Uygulaması ve Sorunları. *Muhasebe ve Finansman Dergisi*, *31*, 131–140.

Cole, J., & Foster, H. (2007). *Using Moodle: Teaching with the popular open source course management system*. O'Reilly Media, Inc.

Collomb, A., & Sok, K. (2016). Blockchain/Distributed Ledger Technology (DLT): What Impact on the Financial Sector? *Digiworld Economic Journal*, *103*(3), 93–110.

Consumers and Mobile Financial Services Report. (2016). https://www.federalreserve.gov/econresdata/consumers-and-mobile-financial-services-report-201603.pdf

Cooksey, R. W., & McDonald, G. M. (2009). *Surviving and thriving in postgraduate research*. Tilde University Press.

Cooper, R. G., & Kleinschmidt, E. J. (1995). Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management*, *12*(5), 374–391. doi:10.1111/1540-5885.1250374

Copeland, D. G., & McKenney, J. L. (1988). Airline reservations systems: Lessons from history. *Management Information Systems Quarterly*, *12*(3), 353–370. doi:10.2307/249202

Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. London: Sage Publications.

Cormican, K., & O'Sullivan, D. (2004). Auditing best practice for effective product innovation. *Technovation*, *24*(10), 819–829. doi:10.1016/S0166-4972(03)00013-0

Costa, J. P., Wehbe, R. R., Robb, J., & Nacke, L. E. (2013, October). *Time's Up: Studying Leaderboards For Engaging Punctual Behaviour.* Paper presented at the Gamification 2013: 1st International Conference on Gameful Design, Research, and Applications, Toronto, Canada. 10.1145/2583008.2583012

Cotteleer, M., & Bendoly, E. (2006). Order Lead-Time Improvement Following Enterprise Information Technology Implementation: An Empirical Study. *Management Information Systems Quarterly*, *30*(3), 643–660. doi:10.2307/25148743

Crawford, J. A., & Kelder, J.-A. (2019). Do we measure leadership effectively? Articulating and evaluating scale development psychometrics for best practice. *The Leadership Quarterly*, *30*(1), 133–144. doi:10.1016/j.leaqua.2018.07.001

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, *47*(6), 1154–1191. doi:10.1111/j.1467-6486.2009.00880.x

Csíkszentmihályi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention*. New York: HarperCollins.

Cumming, D., & MacIntosh, J. (2001). Venture capital investment duration in Canada and the United States. *Journal of Multinational Financial Management*, *11*(4–5), 445–463. doi:10.1016/S1042-444X(01)00034-2

Cuthbertson, K., & Nitzsche, D. (2010). *Quantitative financial economics: Stocks, bonds and foreign exchange*. Chichester: Wiley.

Dağhan, G., & Akkoyunlu, B. (2016). Modeling the continuance usage intention of online learning environments. *Computers in Human Behavior*, *60*, 198–211. doi:10.1016/j.chb.2016.02.066

Dağlı, H. (2004). *Sermaye Piyasası ve Portföy Analizi*. Trabzon: Derya Kitabevi.

Daigneault, P.-M., & Jacob, S. (2012). Les concepts souffrent-ils de négligence bénigne en sciences sociales? Éléments d'analyse conceptuelle et examen exploratoire de la littérature francophone à caractère méthodologique. *Social Sciences Information. Information Sur les Sciences Sociales*, *51*(2), 188–204. doi:10.1177/0539018412437107

Dai, Z. (2008). Supply Chain Transformation By ERP For Enhancing Performance: An Empirical Investigation. *Advances in Competitiveness Research*, *16*(1&2), 87–98.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly*, *13*(3), 319–340. doi:10.2307/249008

Deci, E.L., Koestner, R., & Ryan, R.M. (1999). A meta analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*(6), 627.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Springer. doi:10.1007/978-1-4899-2271-7

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal Pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Self-Determination Theory: A macro theory of human motivation, development, and health. *Canadian Psychology*, *49*(3), 182–185. doi:10.1037/a0012801

Deep, A., & Burns, N. (2008). Investigating factors affecting ERP selection in made-to-order SME sector. *Journal of Manufacturing Technology Management*, *19*(4), 430–446. doi:10.1108/17410380810869905

Dejgaard, S. (1998). Complexities of virtual organisation: Towards a framework. In W. Baets (Ed.), *A Collection of Essays on Complexity and Management* (pp. 53–73). London: World Scientific Publishing.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95. doi:10.1287/isre.3.1.60

Demiral, R. Ş. (2013). *Piyasa Etkinliği Analizi: İMKB'de Haftanın Günüve Yılın Ayı Etkisi*. İzmir: Yüksek Lisans Tezi.

Demireli, E., Akkaya, G. C., & Elif, İ. B. (2010). Finansal piyasa etkinliği: S&P 500 üzerine bir uygulama. *CÜ İktisadi ve İdari Bilimler Dergisi*, *11*(2), 53–67.

Deng, L., Turner, D. E., Gehling, R., & Prince, B. (2010). User experience, satisfaction, and continual usage intention of IT. *European Journal of Information Systems*, *19*(1), 60–75. doi:10.1057/ejis.2009.50

Deschamps, J. P. (2003). Innovation and leadership. In The international handbook on innovation. Oxford: Pergamom. doi:10.1016/B978-008044198-6/50056-5

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. E. (2011a). From game design elements to gamefulness: Defining "Gamification". In *Mindtrek 2011 proceedings*. Tampere, Finland: ACM Press. doi:10.1145/2181037.2181040

Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011b). Gamification. using game-design elements in non-gaming contexts. In *Proceedings of CHI Abstracts* (pp. 2425–2428). 10.1145/1979742.1979575

Dientinger, T. (2003). *Aspects of E-Learning environments*. Graz University of Technology.

Dilek, S. (2018). *Blockchain Technology and Bitcoin*. https://setav.org/assets/uploads/2018/02/231.-Bitcoin.pdf

Dillard, J., & Yuthas, K. (2006). Enterprise resource planning systems and communicative action. *Critical Perspectives on Accounting*, *17*(2), 202–223. doi:10.1016/j.cpa.2005.08.003

Dilmaç, M. (2006). *Risk Sermayesi'nde Yatırım Kararı ve Muhasebesi*. Erzurum: Yüksek Lisans Tezi.

Dimson, E., & Mussavian, M. (1998). 03).A brief history of market efficiency. *European Financial Management*, *4*(1), 91–103. doi:10.1111/1468-036X.00056

Dodgson, M. (2018). Innovation Leadership. In K. Wiltshire, A. Malhotra, & M. Axelsen (Eds.), *Transformational Leadership and Not for Profits and Social Enterprises, United Kingdom/Abingdon-on-Thames*. Oxfordshire: Routledge. doi:10.4324/9781315468570-18

Doll, W. J., & Torkzadeh, G. (1988). The measure of end-user computing satisfaction. *Management Information Systems Quarterly*, *12*(2), 259–274. doi:10.2307/248851

Dolmans, D. H., Wolfhagen, I. H., Van Der Vleuten, C. P., & Wijnen, W. H. (2001). Solving problems with group work in problem-based learning: Hold on to the philosophy. *Medical Education*, *35*(9), 884–889. doi:10.1046/j.1365-2923.2001.00915.x PMID:11555227

Downes-Le Guin, T., Baker, R., Mechling, J., & Ruyle, E. (2012). Myths and realities of respondent engagement in online surveys. *International Journal of Market Research*, *54*(5), 1–21. doi:10.2501/IJMR-54-5-613-633

Dwivedi, Y. K., Choudrie, J., & Brinkman, W.-P. (2006). Development of a survey instrument to examine consumer adoption of broadband. *Industrial Management & Data Systems*, *106*(5), 700–718. doi:10.1108/02635570610666458

Dyer, J.H., Gregersen, H. & Christensen, C.M. (2009, Dec.). The Innovator's DNA. *Harvard Business Review*.

Džupka, P., Klasová, S., & Kováč, V. (2016). Analysis of Innovative Start-Up Companies–Case of Košice Region. *Quality Innovation Prosperity*, *20*(1), 40–56. doi:10.12776/qip.v20i1.641

Eapen, G. (2009). *Flexibility: Flexible Companies for the Uncertain World*. CRC Press. doi:10.1201/9781439816332

Earle, T. C. (2009). Trust, confidence, and the 2008 global financial crisis. *Risk Analysis: An International Journal*, *29*(6), 785–792. doi:10.1111/j.1539-6924.2009.01230.x PMID:19392679

Ebner, M. (2007). *E-Learning 2.0 = e-elarning 1.0 + web 2.0?‖ Availability, Reliability and Security.* Paper presented in International Conference on availability, reliability and security (ARES'07).

Edgeman, R. L., & Eskildsen, J. K. (2012). The C4 model of people-centered innovation: Culture, consciousness, and customer-centric co-creation. *Journal of Innovation and Business Best Practices*, *2012*, 1–14. doi:10.5171/2012.932564

Eisingerich, A. B., Marchand, A., Fritze, M. P., & Dong, L. (2019). Hook vs. hope: How to enhance customer engagement through gamification. *International Journal of Research in Marketing*, *36*(2), 200–215. doi:10.1016/j.ijresmar.2019.02.003

Elfaki, A. O., Alhawiti, K. M., AlMurtadha, Y. M., Abdalla, O. A., & Elshiekh, A. A. (2014). *Rule-based recommendation for supporting student learning-pathway selection*. Recent Advances in Electrical Engineering and Educational Technologies.

Ellis, R. A., & Goodyear, P. (2018). *Spaces of teaching and learning: Integrating perspectives on research and practice*. Springer. doi:10.1007/978-981-10-7155-3

El-Namaki, M. S. S. (1992). Creating a corporate vision. *Long Range Planning*, *25*(6), 25–29. doi:10.1016/0024-6301(92)90166-Y

eMarketer. (2019). *Global Ecommerce 2019*. Retrieved from https://www.emarketer.com/content/global-ecommerce-2019

Erdönmez, P. A. (2005). Seçilmiş ülkelerde gayrimenkul fiyatları ve bankacılık sektöründeki gelişmeler. *BankacılarDergisi*, *54*, 59–73.

Eriksson, M., & McKelvey, M. (2005). Industrial development centres (IDCs) as a regional innovation tool: Comparing policy practices in Finspång, Sweden and in the Hunter Valley, Australia. *Innovation (North Sydney, N.S.W.)*, *7*(4), 416–434. doi:10.5172/impp.2005.7.4.416

Erkan, M., & Topal Y. (2001). *Kobilerin Sermaye Piyasası Yoluyla Finansmanı ve IMKB deki Kobilerle İlgili Ampirik Bir Çalışma*. 1. Orta Anadolu Kongresi, "KOBİ'lerin Finansman ve PazarlamaSorunları", Erciyes Üniversitesi.

Ertuğrul, A. (2011),. YenilikçiKüçükİşletmelerinFinansmanı. Kadir Has Üniversitesi, Sbe, FinansveBankacılıkAnabilimdalı, YüksekLisansTezi, İstanbul.

Esteves, J. (2009). A Benefits Realisation Road-Map Framework for ERP Usage in Small and Medium-Sized Enterprises. *Journal of Enterprise Information*, *22*(1/2), 25–35. doi:10.1108/17410390910922804

Etezadi-Amoli, J., & Farhoomand, A. F. (1996). A structural model of end user computing satisfaction and user performance. *Information & Management*, *30*(2), 65–73. doi:10.1016/0378-7206(95)00052-6

Europa Report. (2019). https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180115-1

European Commission. (2002). *Benchmarking of Business Incubators*. Retrieve from https://businessincubation.com.au/wp-content/uploads/benchmarking-incubators.pdf

Evanschitzky, H., Iyer, G. R., Hesse, R. J., & Ahlert, D. (2004). E-satisfaction: A Re-Examination. *Journal of Retailing*, *80*(3), 239–247. doi:10.1016/j.jretai.2004.08.002

Everdingen, Y., & Waarts, E. (2000, April). Enterprise resource planning: ERP adoption by European midsize companies. *Communications of the ACM*, *4*(43), 27–31. doi:10.1145/332051.332064

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*(3), 272–299. doi:10.1037/1082-989X.4.3.272

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383. doi:10.2307/2325486

Familienunternehmen. (2019). *Daten, Fakten, Zahlen zur volkswirtschaftlichen Bedeutung von Familienunternehmen*. Retrieved from https://www.familienunternehmen.de/de/daten-fakten-zahlen

Familienunternehmen, S. (2019). *Die volkswirtschaftliche Bedeutung der Familienunternehmen* (5th ed.). Retrieved from https://www.familienunternehmen.de/media/public/pdf/publikationen-studien/studien/Die-volkswirtschaftliche-Bedeutung-der-Familienunternehmen-2019_Stiftung_Familienunternehmen.pdf

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, *26*(2), 132–139. doi:10.1016/j.chb.2009.10.015

FAZ. (2018). *Europaweiter Vergleich: Darum liegt Deutschland bei der Digitalisierung hinten*. Retrieved from https://www.faz.net/aktuell/politik/inland/digitalisierung-darum-liegt-deutschland-im-eu-vergleich-hinten-15480625.html

Federici, T. (2009). Factors Influencing ERP Outcomes in SMEs: A PostIntroduction Assessment. *Journal of Enterprise Information*, *22*(1/2), 81–98. doi:10.1108/17410390910922840

Fernald, L. W., Solomon, G. T., & Tarabishy, A. (2005). A New Paradigm: Entrepreneurial Leadership. *Southern Business Review*, *30*(2), 1–10.

Fidan, M., & Tuncel, M. (2019). Integrating augmented reality into problem based learning: The effects on learning achievement and attitude in physics education. *Computers & Education*, *142*, 103635. doi:10.1016/j.compedu.2019.103635

Finney, S., & Corbett, M. (2007). ERP implementation: A compilation and analysis of critical success factors. *Business Process Management Journal*, *13*(3), 329–347. doi:10.1108/14637150710752272

Fischer, G. (2000). Lifelong learning – More than training. *Journal of Interactive Learning Research, 11*(3/4), 265-294.

Fischetti, M. (2010). The web turns 20: Linked data gives people power. *Scientific American*, 12.

Fiskhinindya, A., Yunani, A., & Sompa, A. T. (2019). Implementation of good governance principles in procurement of regional government goods and services by the procurement service unit (ULP) Banjarbaru city Indonesia. *European Journal of Management and Marketing Studies*, *4*(1), 67–81.

Fonseca, J. (2002). *Complexity and Innovation in Organisations*. London: Routledge.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(1), 39–50. doi:10.1177/002224378101800104

Friedman, B. M. (2010). Reconstructing economics in light of the 2007–? financial crisis. *The Journal of Economic Education*, *41*(4), 391–397. doi:10.1080/00220485.2010.510397

Fryrear, A. (2015). *Survey Response Rates*. SurveyGizmo.

FSB. (2017). *Deutsche Bank Research*. https://www.dbresearch.com/servlet/reweb2.ReWEB?rwnode=RPS_EN-PROD$RPSHOME&rwobj=DIGITAL.alias&rwsite=RPS_EN-PROD

Fub, C., & Strahringer, S. (2007). ERP Usage in Banking: An Exploratory Survey of the World's Largest Banks. *Information Systems Management*, *24*(2), 155–171. doi:10.1080/10580530701221056

Fui-Hoon Nah, F., Lee-Shang Lau, J., & Kuang, J. (2001, August). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, *7*(3), 285–296. doi:10.1108/14637150110392782

Fulcher, G. (2004). Deluded by Artifices? The Common European Framework and Harmonization. *Language Assessment Quarterly*, *1*(4), 253–266. doi:10.120715434311laq0104_4

Gabler. (2019a). *Creativity.* Retrieved from https://wirtschaftslexikon.gabler.de/definition/kreativitaet-40039

Gabler. (2019b). *Effectuation.* Retrieved from https://wirtschaftslexikon.gabler.de/definition/effectuation-52245

Gabler. (2019c). *Innovation Management.* Retrieved from https://wirtschaftslexikon.gabler.de/definition/innovations-management-39822

Gallagher, S. A. (2015). The role of problem-based learning in developing creative expertise. *Asia Pacific Education Review*, *16*(2), 225–235. doi:10.100712564-015-9367-8

Garber, P. M. (1989). Tulipmania. *Journal of Political Economy*, *97*(3), 535–560. doi:10.1086/261615

Garber, P. M. (1990). Famous First Bubbles. *The Journal of Economic Perspectives*, *4*(2), 35–54. doi:10.1257/jep.4.2.35

García-Jurado, A., Castro-González, P., Torres-Jiménez, M., & Leal-Rodríguez, A. L. (2019). Evaluating the role of gamification and flow in e-consumers: Millennials versus generation X. *Kybernetes*, *48*(6), 1278–1300. doi:10.1108/K-07-2018-0350

Garrote Jurado, R. (2012). *Barriers to a wider Implementation of LMS in Higher Education: a Swedish case study, 2006-2011*. Academic Press.

Gatautis, R., Banyte, J., Piligrimiene, Z., Vitkauskaite, E., & Tarute, A. (2016). The impart of gamification on consumer brand engagement. *Transformations in Business & Economics*, *15*(1), 173–191.

Gaur, A. S., & Gaur, S. S. (2006). *Statistical methods for practice and research: A guide to data analysis using SPSS*. Thousand Oaks, CA: Sage.

Gautreau, C. (2011). Motivational Factors affecting the integration of a learning management system by faculty. The Journal of Educator Online, 8(1).

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. *Communications of the Association for Information Systems*, *16*(1), 5. doi:10.17705/1CAIS.01605

Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. *Management Information Systems Quarterly*, *21*(4), 389–400. doi:10.2307/249720

Gefen, D., Straub, D. W., & Boudreau, M. (2000). Structural equation modeling techniques and regression: Guidelines for research practice. *Communications of AIS*, *4*(7), 1–79.

Gerbing, D. W., Anderson, J. C., & Carlo, M. (1993). Evaluation of goodness-of-fit indeces for Stractural Equations Models. *Sociological Methods & Research*, *21*(2), 132–160. doi:10.1177/0049124192021002002

Gliddon, D. G. (2006). *Forecasting a competency model for innovation leaders using a modified delphi technique*. Retrieved from https://etda.libraries.psu.edu/files/final_submissions/1385

Gliddon, D. G. (2018). Innovation Leadership. In D. Lang, M. Handley, & K. Jablokow (Eds.), *W.: The competencies of innovation leaders*. Abington: Taylor and Francis. doi:10.4324/9781315178219

Glover, S., & Romney, M. B. (1999). Implementing ERP: Internal auditing can help eliminate mistakes that commonly derail organisations' ERP initiatives. *Internal Auditor*, *56*, 40–47.

Goffin, K. & Pfeiffer, R. (1999). *Innovation Management in UK and German Manufacturing Companies.* London: Anglo-German Foundation for the Study of Industrial Society.

Gollotto, J. C., & Kim, S. (2003). Market valuation of Dot Com companies; R&D versushype. *Managerial Finance*, *29*(11), 61–72. doi:10.1108/03074350310768562

Gompers, P. (2006). Venture Capital. In B. EspenEckbo (Ed.), Handbook of Empirical Corporate Finance (pp. 481-509). Elsevier.

Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *The Journal of Strategic Information Systems*, *19*(3), 207–228. doi:10.1016/j.jsis.2010.05.001

Gorsuch, R. (1983). *Factor Analysis*. Hillsdale, NJ: Erlbaum.

Grabski, S., & Leech, S. (2007). Complementary controls and ERP implementation success. *International Journal of Accounting Information Systems*, *8*(1), 17–39. doi:10.1016/j.accinf.2006.12.002

Granlund, M., & Malmi, T. (2002). Moderate impact of ERPS on management accounting: A lag or permanent outcome? *Management Accounting Research*, *13*(3), 299–321. doi:10.1006/mare.2002.0189

Griffith, D. A. (1996). Some guidelines for specifying the geographic weights matrix contained in spatial statistical models. Practical Handbook of Spatial Statistics, 65–82.

Grünbaum, N. N. (2007). Identification of ambiguity in the case study research typology: What is a unit of analysis? *Qualitative Market Research*, *10*(1), 78–97. doi:10.1108/13522750710720413

Guilford, J. P. (1966). Measurement and creativity. *Theory into Practice*, *5*(4), 185–189. doi:10.1080/00405846609542023

Gummerus, J., Liljander, V., Pura, M., & Riel, A. V. (2004). Customer loyalty to content-basedWeb sites: The case of an online healthcare service. *Journal of Services Marketing*, *18*(3), 175–186. doi:10.1108/08876040410536486

Gunasekaran, A., McGaughey, R. E., Ngai, E. W., & Rai, B. K. (2009). E-Procurement adoption in the Southcoast SMEs. *International Journal of Production Economics*, *122*(1), 161–175. doi:10.1016/j.ijpe.2009.05.013

Gurău, C. (2002). Online Banking in Transition Economies: The Implementation and Development of Online Banking Systems in Romania. *International Journal of Bank Marketing*, *20*(6), 285–296. doi:10.1108/02652320210446742

Hackett, S. M., & Dilts, D. M. (2004b). A systematic review of business incubation research. *The Journal of Technology Transfer*, *29*(1), 55–82. doi:10.1023/B:JOTT.0000011181.11952.0f

Hadeel, A., & Sandhu, K. (2021). PLS Model Performance for Factors Influencing Students Acceptance of Elearning Analytics Recommender. *International Journal of Virtual and Personal Learning Environments*.

Hagel, J. III, & Armstrong, A. (1997). *Net gain: expanding markets through virtual communities*. Boston: Harvard Business School Press.

Hair, J., Anderson, R., Tatham, R., & Black, W. (1995a). Multivariate data analysis. (4th ed.). Prentice-Hall Inc.

Hair, J., Jr., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review*, *26*(2), 106–121. doi:10.1108/EBR-10-2013-0128

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis.* Pearson Prentice Hall.

Hakkinen, L., & Hilmola, O. (2008). ERP Evaluation during the Shakedown Phase: Lessons from an After-Sales Division. *Information Systems Journal*, *18*(1), 73–100. doi:10.1111/j.1365-2575.2007.00261.x

Hamari, J. (2015). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, *71*, 469–478. doi:10.1016/j.chb.2015.03.036

Handelsblatt. (2019). *Der deutschen Wirtschaft droht längere Rezession*. Retrieved from https://www.handelsblatt.com/politik/konjunktur/nachrichten/hri-konjunkturprognose-der-deutschen-wirtschaft-droht-laengere-rezession/25058770.html?ticket=ST-39690048-Zafj6Bb1CYxAgWF4qjyj-ap2

Handy, C. (1995). *Trust and the Virtual Organization*. Retrieved from https://hbr.org/1995/05/trust-and-the-virtual-organization

Hansen, M. T., Chesbrough, H. W., Nohria, N., & Sull, D. N. (2000). *Networked incubators: hothouses of the new economy.* Retrieved from https://hbr.org/2000/09/networked-incubators-hothouses-of-the-new-economy

Harper-Anderson, E., & Lewis, D. (2018). What Makes Business Incubation Work? Measuring the Influence of Incubator Quality and Regional Capacity on Incubator Outcomes. *Economic Development Quarterly*, *32*(1), 60–77. doi:10.1177/0891242417741961

Harris, L. (2011). *Trading and Exchanges: Market microstructures for practitioners*. New Delhi: Oxford University Press.

Harvard Management Communication Letter. (2000). *Creating Successful Virtual Organizations.* Boston: Harvard Business School Publishing.

Hawkins, R. (2004). Looking beyond the dot com bubble: exploring the form and function of business models in the electronic marketplace. In *E-life after the dot com bust* (pp. 65–81). Heidelberg: Physica. doi:10.1007/978-3-662-11659-3_4

Hayırsever, Baştürk, & Feride. (2004). F/K oranı ve Firma Büyüklüğü Anomalilerinin Bir Arada Ele Alınarak Portföy Oluşturulması ve Bir Uygulama Örneği. Anadolu Üniversitesi Yayınları.

Hellmann, T., & Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. *The Journal of Finance*, *57*(1), 169–197. doi:10.1111/1540-6261.00419

Hemmelgarn, T., Nicodeme, G., &Zangari, E. (2012). The Role of Housing Tax Provisions. *Taxation and the Financial Crisis*, 61-87. doi:10.1093/acprof:oso/9780199698165.003.0003

Hildebrand, D. S. (2008). *The powerful benefits of lifelong learning*. Winnetka. Retrieved 2011Nov. 15, Retrieved from: https://www.officearrow.com/training/the-powerful-benefits-of-lifelong-learning-oaiur-861/view.html

Hill, B. E., & Power, D. (2001). *Inside Secrets to venture capital*. New York: John Wiley.

Hitt, L., & Zhou, X. (2002). Investment in Enterprise Resource Planning: Business Impact and Productivity Measures. *Journal of Management Information Systems*, *19*(1), 71–98. doi:10.1080/07421222.2002.11045716

Hmelo-Silver, C. E., & Eberbach, C. (2012). Learning theories and problem-based learning. In *Problem-based learning in clinical education* (pp. 3–17). Dordrecht: Springer. doi:10.1007/978-94-007-2515-7_1

Hofacker, C., Ruyter, K. D., Lurie, N. H., Manchanda, P., & Donaldson, J. (2016). Gamification Design for Mobile Marketing Effectiveness. *Journal of Interactive Marketing*, *34*, 25–36. doi:10.1016/j.intmar.2016.03.001

Hoffman, K. D., & Bateson, J. E. G. (2010). Services Marketing: Concepts, Strategies, & Cases (4th ed.). Cengage Learning.

Holland, C., & Gibson, N. (1999). A critical success factors model for enterprise resource planning implementation. *Proceedings of the 7th European Conference on Information Systems, 1*, 273–297.

Hong, K., & Kim, Y. (2002). The critical success factors for ERP implementation: An organisational fit perspective. *Information & Management*, *40*(1), 25–40. doi:10.1016/S0378-7206(01)00134-3

Hoppit, J. (2002). The Myths Of The South Sea Bubble. *Transactions of the Royal Historical Society*, *12*, 141–165. doi:10.1017/S0080440102000051

Horth, D. M., & Vehar, J. (2012). *Becoming a Leader Who Fosters Innovation*. Center for Creative Leadership. Retrieved from https://www.ccl.org/wp-content/uploads/2014/03/BecomingLeaderFostersInnovation.pdf

Hsin Chang, H., Tsai, Y.-C., & Hsu, C.-H. (2013). E-procurement and supply chain performance. *Supply Chain Management*, *18*(1), 34–51. doi:10.1108/13598541311293168

Hsu, C., & Chen, M. (2018). How gamification marketing activities motivate desirable consumer behaviors: Focusing on the role of brand love. *Computers in Human Behavior*, *88*, 121–133. doi:10.1016/j.chb.2018.06.037

https://www.business2community.com/business-intelligence/digital-transformation-starts-with-erp-02255484

Huang, C.-K., Chen, C.-D., & Liu, Y.-T. (2019). To stay or not to stay? Discontinuance intention of gamification apps. *Information Technology & People*, *32*(6), 1423–1445. doi:10.1108/ITP-08-2017-0271

Huang, H., Yang, M., Yang, C., & Lv, T. (2019). User Performance Effects with Graphical Icons and Training for Elderly No Vice Users: A Case Study on Automatic Teller Machines. *Applied Ergonomics*, *78*, 62–69. doi:10.1016/j.apergo.2019.02.006 PMID:31046960

Huang, J. H., Yang, C., Jin, B. H., & Chiu, H. (2004). Measuring satisfaction with business-to-employee systems. *Computers in Human Behavior*, *20*(1), 17–35. doi:10.1016/S0747-5632(03)00047-5

Huang, S., & Lin, M. (2004). Assessing risk in ERP projects: Identify and prioritize the factors. *Industrial Management & Data Systems*, *104*(8), 681–688. doi:10.1108/02635570410561672

Huck, S. W. (2007). Reading Statistics and Research (5th ed.). Allyn & Bacon.

Huh, Y. U., Keller, F. R., Redman, T. C., & Watkins, A. R. (1990). Data quality. *Information and Software Technology*, *32*(8), 559–565. doi:10.1016/0950-5849(90)90146-I

Huin, S. F. (2004). —Managing deployment of ERP systems in SMEs using multi-agents. *International Journal of Project Management*, *22*(6), 511–517. doi:10.1016/j.ijproman.2003.12.005

Hunter, S. T., & Cushenbery, L. (2011). Leading for innovation: Direct and indirect influences. *Advances in Developing Human Resources*, *13*(3), 248–265. doi:10.1177/1523422311424263

Hunter, S. T., Thoroughgood, C. N., Myer, A. T., & Ligon, G. S. (2011). Paradoxes of Leading Innovative Endeavors: Summary, Solutions, and Future Directions. *Psychology of Aesthetics, Creativity, and the Arts*, *5*(1), 54–66. doi:10.1037/a0017776

Huntgeburth, J., Parasie, N., Steininger, D., & Veit, D. (2012). Increasing the adoption of e-procurement services at the municipal level. *e-Service Journal: A Journal of Electronic Services in the Public and Private Sectors, 8*(3), 3-23.

Hunton, J., & Reck, J. (2003, September). Enterprise resource planning systems: Comparing firm performance of adopters and non adopters. *International Journal of Accounting Information Systems*, *4*(3), 165–184. doi:10.1016/S1467-0895(03)00008-3

Hussain, R., Nasser, A. A., & Hussain, Y. K. (2014). (in press). Service quality and customer satisfaction of a UAE-based airline: An empirical investigation. *Journal of Air Transport Management*, 1–9.

Hwang, J., & Choi, L. (2020, January). Having fun while receiving rewards?: Exploration of gamification in loyalty programs for consumer loyalty. *Journal of Business Research*, *106*, 365–376. doi:10.1016/j.jbusres.2019.01.031

IDC. (2019). *Top predictions for global digital transformation in 2019.* Retrieved from https://www.analyticsinsight.net/top-predictions-for-global-digital-transformation-for-2019/

IfM Bonn. (2019). *Definitionen*. Retrieved from https://www.ifm-bonn.org/definitionen/

Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. L. (1997). Personal computing acceptance factors in small firms: A structural equation model. *Management Information Systems Quarterly*, *21*(3), 279–305. doi:10.2307/249498

Information for Development Program. (2011). *Lessons on Virtual Business Incubation Services.* Retrieved from http://www.infodev.org/articles/lessons-virtual-business-incubation-services

İpekten, O. B. (2006). Risk Sermayesi FinansmanModeli. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *7*(1), 385–408.

IS07498-2. (Ed.). (2004). International Organization for Standardization.

Iskandar, Ismed, Mohd, R., & Noraini. (2014). Multi-Mode Failure Models for Attribute Test Data in Reliability Systems, A bayesian Analysis Approach Using Multi-Nomial Distribution Model. *Journal of Advanced Amterial Research*, 6.

Iskander, M. (2008). *Innovative techniques in instruction technology, e-learning, e-assessment and education*. Springer Science & Business Media. doi:10.1007/978-1-4020-8739-4

ITU International Telecommunications Union. (2019). http://stats.areppim.com/stats/stats_internetxfcstx2017.htm

Ives, B., Olson, M. H., & Baroudi, J. J. (1983). The measurement of user information satisfaction. *Communications of the ACM*, *26*(10), 785–793. doi:10.1145/358413.358430

Jansen, J., & Leukfeldt, R. (2015). How People Help Fraudsters Steal Their Money: An Analysis of 600 Online Banking Fraud Cases. *Proceedings of 2015 Workshop on Socio-Technical Aspects in Security and Trust*, 24-31. 10.1109/STAST.2015.12

Jansen, J., & Schaik, P. V. (2018). Testing A Model of Precautionary Online Behaviour: The Case of Online Banking. *Computers in Human Behavior*, *87*, 371–383. doi:10.1016/j.chb.2018.05.010

Jeng, L. A., & Wells, P. C. (2000). The determinants of venture capital funding: Evidence acrosscountries. *Journal of Corporate Finance*, *6*(3), 241–289. doi:10.1016/S0929-1199(00)00003-1

Jiménez, J. R. Z., & Díaz, I. A. (2019). Educational Level and Internet Banking. *Journal of Behavioral and Experimental Finance*, *22*, 31–40. doi:10.1016/j.jbef.2019.01.004

Jin, J. (2012). Sounds of Silence: Examining Silence in Problem-Based Learning (PBL) in Asia. In S. Bridges, C. McGrath, & T. Whitehill (Eds.), *Problem-Based Learning in Clinical Education. Innovation and Change in Professional Education* (Vol. 8). Dordrecht: Springer. doi:10.1007/978-94-007-2515-7_11

Johannessen, J., Stokvik, H., Johannessen, J., & Stokvik, H. (2018). Innovation and Value Creation. In Evidence-Based Innovation Leadership. Emerald Publishing Limited. doi:10.1108/978-1-78769-635-820181004

Johannisson, B. (2009). Towards a practice theory of entrepreneuring. *Small Business Economics*, *36*(2), 135–150. doi:10.100711187-009-9212-8

Johnson, M. D., Anderson, E. W., & Fornell, C. (1995). Rational and adaptive performance expectations in a customer satisfaction framework. *The Journal of Consumer Research*, *21*(March), 128–140. doi:10.1086/209428

Jones, B. A., Madden, G. J., & Wengreen, H. J. (2014). The FIT game: Preliminary evaluation of a gamification approach to increasing fruit and vegetable consumption in school. *Preventive Medicine*, *68*, 76–79. doi:10.1016/j.ypmed.2014.04.015 PMID:24768916

Jones, M., & Ryan, S. (2006). Exploring knowledge sharing in ERP implementation: An organisational culture framework. *Decision Support Systems*, *41*(2), 411–434. doi:10.1016/j.dss.2004.06.017

Juniper Research. (2018). https://www.juniperresearch.com/press/press-releases/digital-banking-users-to-reach-2-billion

Juul, J. (2003). The game, the player, the world: Looking for a heart of gameness. In M. Copier & J. Raessens (Eds.), *Proceedings of Level-Up: Digital games research conference* (pp. 30–45). Utrecht, Netherland: University of Utrecht.

Kaizoji, T. (2006). A precursor of market crashes: Empirical laws of Japan's internet bubble. *The European Physical Journal B*, *50*(1-2), 123–127. doi:10.1140/epjb/e2006-00142-9

Kallunki, J., & Silvola, H. (2011). Impact of enterprise resource planning systems on management control systems and firm performance. *International Journal of Accounting Information Systems*, *12*(1), 20–39. doi:10.1016/j.accinf.2010.02.001

Kang, S., & Yang, H. (2008, Summer). ERP Alignment for Positive Business Performance: Evidence From Korea's ERP Market. *Journal of Computer Information Systems*, 25–38.

Kannan, P. K., Chang, A. M., & Whinston, A. B. (2000). Electronic communities in e-business: Their role and issues. *Information Systems Frontiers*, *1*(4), 415–426. doi:10.1023/A:1010022226639

Kaplan, S. N., & Lerner, J. (2010). It ain't broke: The past, present, and future of venture capital. *Journal of Applied Corporate Finance*, *22*(2), 36–47. doi:10.1111/j.1745-6622.2010.00272.x

Kaplan, S. N., & Stromberg, P. (2003). 04). Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts. *The Review of Economic Studies*, *70*(2), 281–315. doi:10.1111/1467-937X.00245

Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. San Francisco, CA: Pfeiffer.

Karahasan, F. (2012). *Taşlar Yerinden Oynarken Dijital Pazarlamanın Kuralları*. İstanbul: Doğan Egmont.

Karamustafa, K., & Ozoğlu, B. (2015). Turkiye'de Internet Bankaciligi Hizmetlerinin Onem Basarım Analizi ile Degerlendirilmesi: Yozgat Ili Orneği. *Erciyes Universitesi Sosyal Bilimler Dergisi*, *39*, 108–131.

Karan, M. B. (2001). *Yatırım Analizi ve Portföy Yönetimi*. Ankara: Gazi Kitabevi.

Karapanos, E. (2013). User experience over time. In *Modeling users' experiences with interactive systems* (pp. 57–83). Heidelberg, Germany: Springer. doi:10.1007/978-3-642-31000-3_4

Kartono, K., Arumsasi, P. D., & Mariani, S. (2019). Analysis of students' mathematical reflective thinking on problem based learning (PBL) based from learning styles. *Unnes Journal of Mathematics Education*, *8*(1), 34–41.

Kats, Y. (2010). *Learning Management System Technologies and Software Solutions for Online Teaching: Tools and Applications: Tools and Applications*. IGI Global.

Kaudela-Baum, S., Holzer, J., & Kocher, P.-Y. (2014). *Innovation Leadership: Führung zwischen Freiheit und Norm*. Berlin: Springer.

Kaya, O. (2019). Artificial Intelligence in Banking. *Artificial Intelligence, Deutche Bank Research*. https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD0000000000495172/Artificial_intelligence_in_banking%3A_A_lever_for_pr.pdf

Kenett, R. S., & Salini, S. (2011). Modern analysis of customer satisfactionsurveys: Comparison of models andintegrated analysis. *Applied Stochastic Models in Business and Industry*, *27*(5), 465–475. doi:10.1002/asmb.927

Keskin, S. (2019). The Analysis of the Reasons Why Bank Customers Are Not Using Internet Banking. *Kırıkkale University Journal of Social Sciences*, *9*(1), 99–110.

Khafajeh, H. (2014). *Evaluation the Impact of Training and the Role on the Principals from their Point of View to Reinforcement Decision-Making Process through their Use of E-Learning System EDUWAVE) in the Jordanian Ministry of Education*. Academic Press.

Khwaldeh, S. M., Al-Hadid, I., Masa'deh, R. e., & Alrowwad, A. (2017). The Association between E-Services Web Portals Information Quality and ICT Competence in the Jordanian Universities. *Asian Social Science*, *13*(3), 156. doi:10.5539/ass.v13n3p156

Kilcrease, K. (2012). The Batavia Industrial Center: The Hatching of the World's First Business Incubator. *New York History*, *93*(1), 71–93. Retrieved from http://www.jstor.org/stable/23645409

Kilimlioğlu, S. (2006). *Kobi'lerin Risk Sermayesi Finansman Modelinden Yararlanma Olanakları ve Beklenen Faydalar (Eskişehir İl Merkezindeki KOBİ'ler Örneği)*. Eskişehir: Osmangazi Üniversitesi.

Kim, S., Youn, J., & Kim, Y. (2012). *Design of Expanded Assessment Management System for Open-Source Moodle LMS Module.* Paper presented at the 3rd International Conference on e-Education, e-Business, e-Management and e-Learning (IPEDR).

Kim, K. K., & Umanath, N. S. (2005). Information transfer in B2B procurement: An empirical analysis and measurement. *Information & Management*, *42*(6), 813–828. doi:10.1016/j.im.2004.08.004

Kim, M. (2008). Factors influencing the acceptance of e-learning courses for mainstream faculty in higher institutions. *International Journal of Instructional Technology and Distance Learning*, *5*(2), 29–44.

Kindleberger, C. P., & Aliber, R. Z. (2001). *Manias*. Panics and Crashes; doi:10.1057/9780230536753

Klarner, P., Sarstedt, M., Hoeck, M., & Ringle, C. M. (2013). Disentangling the effects of team competences, team adaptability, and client communication on the performance of management consulting teams. *Long Range Planning*, *46*(3), 258–286. doi:10.1016/j.lrp.2013.03.001

Kline, P. (1997). *An Easy Guide to Factor Analysis*. London: Routledge.

Knowles, M. S. (2016). *What does Malcom Knowles know about adult learning theory*. Retrieved from: https://www.ispringersolutions.com/blog/hat-does-malcom-knowles-knows-about-adultlearning-theory

Knowles, M. S. (1980). *The Modern Practice of Adult Education*. Chicago: Association Press.

Kortum, S., & Lerner, J. (2001). Does venture capital spur innovation? In *Entrepreneurial inputs and outcomes: New studies of entrepreneurship in the United States* (pp. 1–44). EmeraldGroup Publishing Limited. doi:10.1016/S1048-4736(01)13003-1

KPMG Annual Report 2018. (2019). https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/the-pulse-of-fintech-2018.pdf

Kraiser, H. (1958). The varimax criterion for analytic rotation in factor analysis. *Psychometrika*, *23*(3), 187–200. doi:10.1007/BF02289233

Kremer, H., Villamor, I., & Aguinis, H. (2019). Innovation leadership: Best-practice recommendations for promoting employee creativity, voice, and knowledge sharing. *Business Horizons*, *62*(1), 65–74. doi:10.1016/j.bushor.2018.08.010

Kressel, H., & Lento, T. V. (2010). *Investing in Dynamic Markets : Venture Capital in the Digital Age*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511730061

Kuğu, T. D. (2004). Finansman Yöntemi Olarak Risk Sermayesi. *Yönetim ve Ekonomi Dergisi*, *11*(2), 141–153.

Kwateng, K. O., Atiemo, K. A., & Appiah, C. (2019). Acceptance and Use of Mobile Banking: An Application of UTAUT2. *Journal of Enterprise Information Management*, *32*(1), 118–151. doi:10.1108/JEIM-03-2018-0055

Laal, M., Laal, A., & Aliramaei, A. (2013). Continuing education; Lifelong learning. *Procedia Behavioral Sciences*, 4052-4056.

Lai, I. K. W., & Lai, D. C. F. (2013). User acceptance of mobile commerce: An empirical study in Macau. *International Journal of Systems Science*, *45*(6), 1321–1331. doi:10.1080/00207721.2012.761471

Landers, R. N., & Landers, A. K. (2014). An Empirical Test of the Theory of Gamified Learning: The Effect of Leaderboards on Time-on-Task and Academic Performance. *Simulation & Gaming*, *45*(6), 769–785. doi:10.1177/1046878114563662

Langenwalter, G. (2000). *Enterprise Resources Planning and Beyond: Integrating Your Entire Organisation*. Boca Raton, FL: St. Lucie Press.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, *28*(4), 563–575. doi:10.1111/j.1744-6570.1975.tb01393.x

Lean, O. K., Zailani, S., Ramayah, T., & Fernando, Y. (2009). Factors influencing intention to use e-government services among citizens in Malaysia. *International Journal of Information Management*, *29*(6), 458–475. doi:10.1016/j.ijinfomgt.2009.03.012

Leech, N., Barrett, K., & Morgan, G. A. (2005). *SPSS for intermediate statistics: Use and interpretation* (2nd ed.). London: Lawrence Erlbaum Associates.

Lee, M. C. (2010). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation–confirmation model. *Computers & Education*, *54*(2), 506–516. doi:10.1016/j.compedu.2009.09.002

Lee, Y. C., Wang, Y. C., Lu, S. C., Hsieh, Y. F., Chien, C. H., Tsai, S. B., & Dong, W. (2016). An empirical research on customer satisfaction study: A consideration of different levels of performance. *SpringerPlus*, *5*(1), 1577–1586. doi:10.118640064-016-3208-z PMID:27652150

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, *40*(3), 191–204. doi:10.1016/S0378-7206(01)00143-4

Leigh Star, S. (2010). This is not a boundary object: Reflections on the origin of a concept. *Science, Technology & Human Values*, *35*(5), 601–617. doi:10.1177/0162243910377624

Leimeister, J. M., Sidiras, P., & Krcmar, H. (2006). Exploring Success Factors of Virtual Communities: The Perspectives of Members and Operators. *Journal of Organizational Computing and Electronic Commerce*, *16*(3-4), 279–300. doi:10.1080/10919392.2006.9681204

Lewis-Beck, M., Bryman, A. E., & Liao, T. F. (2003). *The Sage encyclopedia of social science research methods*. Sage Publications.

Lewis, D., Harper-Anderson, E., & Molnar, L. (2011). *Incubating Success. Incubation Best Practices That Lead to Successful New Ventures*. University of Michigan.

Li, X., Pillutla, S., Zhou, H., & Yao, D.-Q. (2015). Drivers of Adoption and Continued Use of E-Procurement Systems: Empirical Evidence from China. *Journal of Organizational Computing and Electronic Commerce*.

Lindgren, P., & Abdullah, M. (2013). Conceptualizing Strategic Business Model Innovation Leadership for Business Survival and Business Model Innovation Excellence. *Journal of Multi Business Model Innovation and Technology*, *1*, 115–134.

Lin, H. F., & Lee, G. C. (2006). Determinants of success for online communities: An empirical study. *Behaviour & Information Technology*, *25*(6), 479–488. doi:10.1080/01449290500330422

Liu, Y., Alexandrova, T., & Nakajima, T. (2011). Gamifying intelligent environments. In *Proceedings of the 2011 International ACM Workshop on Ubiquitous Meta User Interfaces* (pp. 7–12). Scottsdale, AZ: ACM Press 10.1145/2072652.2072655

Long, J. B., &Summers, L. (1990). *Equipment Investment and Economic Growth*. doi:10.3386/w3515

Long, J. B., & Summers, L. H. (1991). 05). Equipment Investment and Economic Growth. *The Quarterly Journal of Economics*, *106*(2), 445. doi:10.2307/2937944

Lowenstein, R. (2004). *Origins of the crash: The great bubble and its undoing*. New York: Penguin Books.

Luo, M. M.-l., Remus, W., & Chea, S. (2006, August 4-6, 2006). *Technology Acceptance of Internet-based Information Services: An Integrated Model of TAM and U&G Theory.* Paper presented at the Proceedings of the Twelfth Americas Conference on Information Systems, Acapulco, Mexico.

Mabert, V., & Venkataramanan, M. (2003, April 16). Enterprise resource planning: Managing the implementation process. *European Journal of Operational Research*, *146*(2), 302–314. doi:10.1016/S0377-2217(02)00551-9

Machajewski, S. (2014). Open Source Analytics for Blackboard Learn BbStats–Activity Dashboard Conference paper. *2014 Big Data Conference*.

Macoun, A., & Miller, D. (2014). Surviving (thriving) in academia: Feminist support networks and women ECRs. *Journal of Gender Studies*, *23*(3), 287–301. doi:10.1080/09589236.2014.909718

Majdalawi, Y. K., Almarabeh, T., & Mohammad, H. (2014). *Factors Affecting Students' Usage of Learning Management System at the University of Jordan*. Academic Press.

Majed, A. (2000). Enterprise-Wide Information Systems: The Case of SAP R/3 Application. *Proceedings of the Second International Conference on Enterprise Information Systems*, 3-8.

Majed, A., & Mohamed, Z. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, (146), 352–364.

Malik, F. (2014). *Führen, Leisten, Leben - Wirksames Management für eine neue Welt*. Frankfurt am Main: Campus Verlag.

Malone, T. W., & Crowton, K. (1993). The Interdisciplinary Study of Coordination. *ACM Computing Surveys*, *26*(1), 87–119. doi:10.1145/174666.174668

Mandal, P., & Gunasekaran, A. (2003). Issues in implementing ERP: A case study. *European Journal of Operational Research*, *146*(2), 274–283. doi:10.1016/S0377-2217(02)00549-0

Marathe, S., & Sundar, S. S. (2011). What drives customization?: Control or identity? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp.781–790). Vancouver, BC, Canada: ACM Press

Marczewski, A. (2017). The ethics of gamification. XRDS: Crossroads. *The ACM Magazine for Students*, *24*(1), 56–59. doi:10.1145/3123756

Marks-Maran, D., & Thomas, B. G. (2000). Assessment and Evaluation in Problem-based Learning. In S. Glen & K. Wilkie (Eds.), *Problem-based Learning in Nursing*. London: Nurse Education in Practice. Palgrave. doi:10.1007/978-0-333-98240-2_8

Marr, B. (2015). *Big Data: Using Smart Big Data Analytics and Metrics to Make Better Decisions and Improve Performance*. West Sussex: Wiley.

Martínez-López, F. J., Gázquez-Abad, J. C., & Sousa, C. M. (2013). Structural equation modelling in marketing and business research: Critical issues and practical recommendations. *European Journal of Marketing*, *47*(1/2), 115–152. doi:10.1108/03090561311285484

Mason, C. (2019). Digital Transformation Starts With ERP. *Business (Atlanta, Ga.)*, 2.

Mas-Verdú, F., Ribeiro-Soriano, D., & Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research*, *68*(4), 793–796. doi:10.1016/j.jbusres.2014.11.030

Mat Roni, S. (2014). *Introduction to SPSS*. School of Business, Edith Cowan University.

Matheson, R., & Haas, B. (2010). Exploring the foundations for problem-based learning. *Problem-based learning in health and social care*, 9-24.

Mathiassen, L., Saarinen, T., Tuunanen, T., & Rossi, M. (2004). *Managing requirements engineering risks: an analysis and synthesis of the literature*. Working paper 379, Helsinki School of Economics.

McClelland, D. C. (1967). *The Achieving Society*. New York: Free Press.

McCue, C., & Roman, A. V. (2012). E-procurement: Myth or reality. *Journal of Public Procurement*, *12*(2), 221–248. doi:10.1108/JOPP-12-02-2012-B003

McDaniel, R., Fanfarelli, J. R., & Lindgren, R. (2017). Creative Content Management: Importance, Novelty, and Affect as Design Heuristics for Learning Management Systems. *IEEE Transactions on Professional Communication*, *60*(2), 183–200. doi:10.1109/TPC.2017.2656578

McHaney, R., & Cronan, T. P. (1998). Computer simulation success: on the use of the end-user computing satisfaction instrument: a comment. *Decision Sciences*, *29*(2), 525–534. doi:10.1111/j.1540-5915.1998.tb01589.x

McIntosh, D. (2014). Vendors of learning management and e-learning products. *Learning Manage. Vendors*, 88-96.

McIntosh, J., & Torres, M. I. (2014). *Learning Management Systems: Revisiting Learning Management Systems at the University Level*. The University of Tampa.

McLeod, R., Jr., & Schell, G. (2001). Management Information Systems 8/E. In *Marketing Information System*. Academic Press.

Mekler, E. D., Brühlmann, F., Tuch, A. N., & Opwis, K. (2015). Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior*, *71*, 525–534. doi:10.1016/j.chb.2015.08.048

Mennin, S., Schwartz, P., & Webb, G. (Eds.). (2001). *Problem-based Learning: Case Studies, Experience and Practice*. Kogan Page.

Mermertaş, Ş. (2010). *Rhea Girişim Sermayesi Yatırım Ortaklığı Analist Toplantısı Notları*. TSKB Araştırma.

Mettler, T., & Rohner, P. (2009). E-procurement in hospital pharmacies: An exploratory multi-case study from Switzerland. *Journal of Theoretical and Applied Electronic Commerce Research*, *4*(1), 23–38. doi:10.4067/S0718-18762009000100004

Milgrom, E. (2001). The new engineering curriculum at the University Catholic of Louvain. *SEFI News Winter, 2002*, 9-11.

Mishra, A. N., & Agarwal, R. (2010). Technological frames, organizational capabilities, and IT use: An empirical investigation of electronic procurement. *Information Systems Research*, *21*(2), 249–270. doi:10.1287/isre.1080.0220

Misseyanni, A., Lytras, M. D., Papadopoulou, P., & Marouli, C. (2018). *Active Learning Strategies in Higher Education: Teaching for Leadership, Innovation, and Creativity*. Emerald Publishing Limited. doi:10.1108/9781787144873

Mitchell, R., Schuster, L., & Jin, H. S. (2020, January). Gamification and the impact of extrinsic motivation on needs satisfaction: Making work fun? *Journal of Business Research*, *106*, 323–330. doi:10.1016/j.jbusres.2018.11.022

Mkhize, P., Mtsweni, E. S., & Buthelezi, P. (2016). Diffusion of Innovations Approach to the Evaluation of Learning Management System Usage in an Open Distance Learning Institution. *The International Review of Research in Open and Distributed Learning*, *17*(3). doi:10.19173/irrodl.v17i3.2191

Mohd Daud, N., Mohammad, N., Azmi, A. E., & Mohamed, I. S. (2013). Factors influencing the usage of e-Procurement among contractor companies in Malaysia. *Business & Management Quaterly Review*, *4*(3&4), 62–80.

Montazemi, A. R., & Qahri-Saremi, H. (2013). Factors Affecting Adoption of Online Banking: A Meta-Analytic Structural Equation Modeling Study. *Information & Management*, *52*(2), 210–226. doi:10.1016/j.im.2014.11.002

Montesdioca, G. P. Z., & Maçada, A. C. G. (2014). (in press). Measuring User Satisfaction with Information Security Practices. *Computers & Security*. doi:10.1016/j.cose.2014.10.015

Moore, N. (2006). *How to do research: a practical guide to designing and managing research projects* (3rd ed.). London: Facet Publishing.

Moosa, I. (2019). The Bitcoin: A Sparkling Bubble or Price Discovery? *Economia e Politica Industriale*. doi:10.100740812-019-00135-9

Moro, S., Ramos, P., Esmerado, J., & Jalali, S. M. (2019). Can we trace back hotel online reviews' characteristics using gamification features? *International Journal of Information Management*, *44*, 88–95. doi:10.1016/j.ijinfomgt.2018.09.015

Mota, F. P. B., & Rodrigues Filho, J. (2011). Public e-procurement and the duality of technology: A comparative study in the context of Brazil and of the state of Paraíba. *JISTEM-Journal of Information Systems and Technology Management*, *8*(2), 315–330. doi:10.4301/S1807-17752011000200003

Mrkajic, B. (2017). Business Incubation models and institutionally void environments. *Technovation*, *68*, 44–55. doi:10.1016/j.technovation.2017.09.001

Murphy, A. E. (2017). The first financial market bubble. *The Foundations of Political Economy and Social Reform: Economy and Society in Eighteenth Century France*.

Murphy, E. C., & Murphy, M. A. (2002). *Leading on the edge of chaos: The 10 critical elements for success in volatile times.* Prentice-Hall.

Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.

Murray, H., Walker, M., Dawson, J., Simper, N., & Maggio, L. A. (2019). Teaching Evidence-Based Medicine to Medical Students Using Wikipedia as a Platform. *Academic Medicine*. PMID:31725466

Murray, J. G., Rentell, P. G., Holland, T., & Locker, S. (2011). Why collaborate on local government procurement? The experience of UK councils. *Journal of Service Science and Management*, *4*(03), 325–333. doi:10.4236/jssm.2011.43038

Muylle, S., Moenert, R., & Despontin, M. (2004). The conceptualization and empirical validation of website user satisfaction. *Information & Management*, *41*(5), 543–560. doi:10.1016/S0378-7206(03)00089-2

Mwalumbwe, I., & Mtebe, J. S. (2017). Using Learning Analytics to Predict Students' Performance in Moodle Learning Management Systems: A case of Mbeya University of Science and Technology. *The Electronic Journal on Information Systems in Developing Countries*, *79*(1), 1–13. doi:10.1002/j.1681-4835.2017.tb00577.x

Nadkarni, S. (2017). An integrative innovation leadership framework. In *The Relationship of Leadership and Innovation in Family Businesses. BestMasters*. Wiesbaden: Springer Gabler. doi:10.1007/978-3-658-16255-9_4

Nah, F., & Kuang, J. (2001). *Critical factors for successful implementation of enterprise systems*. Academic Press.

Nasri, W., & Charfeddine, L. (2012). Factors Affecting the Adoption of Internet Banking in Tunisia: An Integration Theory of Acceptance Model and Theory of Planned Behavior. *The Journal of High Technology Management Research*, *23*(1), 1–14. doi:10.1016/j.hitech.2012.03.001

Nicolaou, A., & Bajor, L. (2004). ERP systems implementation and firm performance. *The Review of Business Information Systems*, *8*(1), 53–60. doi:10.19030/rbis.v8i1.4504

NIST-Special-Publication-800-16. (1998). *Information Technology Security Training Requirements: A Role-and Performance-Based Model*. Gaithersburg: National Institute of Standards and Technology.

Normalini, M. K., & Ramayah, T. (2019). The Impact of Security Factors towards Internet Banking Usage Intention among Malaysians. *Global Business and Management Research*, *11*(2), 241–251.

Normann, R., & Ramirez, R. (1993). Designing Interactive Strategy: From Value Chain to Value Constellation. *Harvard Business Review*, *71*(4), 65–78. PMID:10127040

Novack, R. A., & Simco, S. W. (1991). The industrial procurement process: A supply chain perspective. *Journal of Business Logistics*, *12*(1), 145.

Nowak, M., & Grantham, C. (2000). The virtual incubator: Managing human capital in the software industry. *Research Policy*, *29*(2), 125–134. doi:10.1016/S0048-7333(99)00054-2

Nunnally, J. (1978). Psychometric Theory (2nd ed.). New York: NY: McGraw-Hill.

O'Berine, R. & Garnett, F. (2005). E-literacy and andragogy- a view through the Community content lens. *Journal of Eliteracy, 2*.

O'Reilly, C. A. III, & Tushman, M. L. (2013). Organizational ambidexterity: Past, present and future. *The Academy of Management Perspectives*, *27*(4), 324–338. doi:10.5465/amp.2013.0025

Obama, B. (2019). *Bits & Pretzels.* ICM.

OECD. (2016). *Insights: the marginal cost of such distribution is near zero*. Retrieved from http://oecdinsights.org/2016/06/03/digital-innovation-what-does-it-really-mean/

Ofek, E., & Richardson, M. (2003). Dot Com Mania: The Rise and Fall of Internet Stock Prices. *The Journal of Finance*, *58*(3), 1113–1137. doi:10.1111/1540-6261.00560

Oh, S., Yang, H., & Kim, S. W. (2014). Managerial capabilities of information technology and firm performance: Role of e-procurement system type. *International Journal of Production Research*, *52*(15), 4488–4506. doi:10.1080/00207543.2013.867084

Okoye, H. C., Meka, I. A., Ugwu, A. O., Yahaya, I. A., Otokunefor, O., Ojo, O. O., & Ugwu, E. O. (2019). Perception of problem based learning versus conventional teaching methods by clinical medical students in Nigeria. *The Pan African Medical Journal*, *33*, 33. doi:10.11604/pamj.2019.33.311.19169 PMID:31692835

Oliech, C. O., & Mwangangi, P. (2019). Effect of strategic procurement management on performance of level five hospitals in Kenya. *International Journal of Supply Chain Management*, *4*(1), 39–62.

Oliver, R. W. (1999). ERP is Dead, Long Live ERP. *Management Accounting*, 20-27.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *JMR, Journal of Marketing Research*, *17*(4), 460–469. doi:10.1177/002224378001700405

Oliver, R. L. (1997). *Satisfaction: A Behavioral Perspective on the Consumer*. New York: McGraw-Hill.

Onwuegbuzie, A. J., & Leech, N. L. (2005). Taking the "Q" out of research: Teaching research methodology courses without the divide between quantitative and qualitative paradigms. *Quality & Quantity*, *39*(3), 267–295. doi:10.100711135-004-1670-0

Organisation for Economic Co-operation and Development & European Commission. (1999). *Business Incubation: International Case Studies*. Retrieved from https://read.oecd-ilibrary.org/urban-rural-and-regional-development/business-incubation_9789264173781-en#page1

Organisation for Economic Co-operation and Development & European Commission. (2019). *Policy Brief on Incubators and Accelerators that Support Inclusive Entrepreneurship*. Retrieved from https://www.oecd-ilibrary.org/docserver/d7d81c23-en.pdf?expires=1566536147&id=id&accname=guest&checksum=B658E9721ADB96017371417AA3706D28

Organisation for Economic Co-operation and Development. (2017). *Enhancing the Contributions of SMEs in and Global and Digitalised Economy.* Retrieved from https://www.oecd.org/mcm/documents/C-MIN-2017-8-EN.pdf

Osterwalder, A. (2004). *The Business Model Ontology-a proposition in a design science approach*. Academic Press.

Özçam, F. (1996). *Teknik analiz ve İstanbul Menkul Kıymetler Borsası*. Ankara: Sermaye Piyasası Kurulu.

Özhan, T. (2016). *Finansal Krizler ve Etkileri: Açıklamalı ve Diyagramlarla*. eKitap Projesi via Publish Drive.

Pairat, R., & Jungthirapanich, C. (2005). A chronological review of ERP research: an analysis of ERP inception, evolution, and direction. *Proceedings of the IEEE International Engineering Management Conference*, 1, 288-292. 10.1109/IEMC.2005.1559137

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications, Inc.

Pena, I. (2002). Intellectual capital and business start-up success. *Journal of Intellectual Capital*, *3*(2), 180–198. doi:10.1108/14691930210424761

Peng, L. S., Moghavvemi, S., & Teng, L. S. (2019). Trust and Loyalty among Islamic and Conventional Bank Customers in Malaysia. *Social Sciences & Humanities*, *27*(2), 1275–1295.

Peng, W., Lin, J., Pfeiffer, K. A., & Winn, B. (2012). Need Satisfaction Supportive Game Features as Motivational Determinants: An Experimental Study of a Self-Determination Theory Guided Exergame. *Media Psychology*, *15*(2), 175–196. doi:10.1080/15213269.2012.673850

Phan, P. H., Siegel, D. S., & Wright, M. (2005). Science Parks and incubators: Observations, synthesis and future research. *Journal of Business Venturing*, *20*(2), 165–182. doi:10.1016/j.jbusvent.2003.12.001

Phillipo, J., & Krongard, S. (2012). *Learning Management System*. LMS.

Piccoli, G. (2008). *Information systems for managers: Text and cases*. John Wiley & Sons, Inc.

Pickernell, D., Kay, A., Packham, G., & Miller, C. (2011). Competing agendas in public procurement: An empirical analysis of opportunities and limits in the UK for SMEs. *Environment and Planning. C, Government & Policy*, *29*(4), 641–658. doi:10.1068/c10164b

Picoto, W. N., Bélanger, F., & Palma-dos-Reis, A. (2014). An organizational perspective on m-business: Usage factors and value determination. *European Journal of Information Systems*, *23*(5), 571–592. doi:10.1057/ejis.2014.15

Piotrowicz, W., & Irani, Z. (2010). Analysing B2B electronic procurement benefits: Information systems perspective. *Journal of Enterprise Information Management*, *23*(4), 559–579. doi:10.1108/17410391011061816

Pires, G. D., & Stanton, J. (2005). A research framework for the electronic procurement adoption process: Drawing from Australian evidence. *Journal of Global Business and Technology*, *1*(2), 12–20.

Platform, P. (2019). *Digital procurement and procurement transformation*. Retrieved from https://www.procuredesk.com/digital-procurement/

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–904. doi:10.1037/0021-9010.88.5.879 PMID:14516251

Pomerleano, M. (2005). *The morning after: Restructuring in the aftermath of an asset bubble. Asset Price Bubbles: The Implications for Monetary*. Regulatory, and International Policies.

Ponce, D. (2003). *What can e-Learning Learn from Knowledge Management*. Paper presented in 3rd European Knowledge Management Summer School.

Porter, C. E. (2006). A Typology of Virtual Communities: A Multi-Disciplinary Foundation for Future Research. *Journal of Computer-Mediated Communication*, *10*(1), 00. doi:10.1111/j.1083-6101.2004.tb00228.x

Porter-O'Grady, T., & Malloch, K. (2010). *Innovation leadership: Creating the landscape of healthcare*. Burlington: Jones & Bartlett Learning.

Potts, H. E. (1944). The Definition of Invention in Patient Law. *The Modern Law Review*, *7*(3), 113–124. doi:10.1111/j.1468-2230.1944.tb00974.x

Pourshafie, T., & Murray-Harvey, R. (2013). Facilitating problem-based learning in teacher education: Getting the challenge right. *Journal of Education for Teaching*, *39*(2), 169–180. doi:10.1080/02607476.2013.765190

Prabhu, G. (1999). Social entrepreneurial leadership. *Career Development International*, *4*(3), 140–145. doi:10.1108/13620439910262796

Preda, A. (2004). Informative Prices, Rational Investors: The Emergence of the Random Walk Hypothesis and the Nineteenth-Century" Science of Financial Investments. *History of Political Economy*, *36*(2), 351–386. doi:10.1215/00182702-36-2-351

Project, T. C. C. (2008). *Campus Computing*. Encino.

Pureta, I. (2015). *Lifelong learning process using digital technology*. Paper presented at the conference of Interdisciplinary Management Research, Opatija.

Quiescenti, M., & Perrone, G. (2006). Business process-oriented design of enterprise resource planning (ERP) systems for small and medium enterprises. *International Journal of Production Research*, *44*(18/19), 3797–3811. doi:10.1080/00207540600688499

Rahim, M., & Kurnia, S. (2014). *Understanding E-Procurement System Benefits using organisational Adoption Motivation Lens: a Case Study.* Paper presented at the PACIS.

Rahim, M., Chen, X., & Kurnia, S. (2008). *Understanding benefits of electronic procurement systems adoption: experience of an Australian City Council*. Academic Press.

Rahim, M. M., & As-Saber, S. N. (2011). E-procurement adoption process: An arduous journey for an Australian city council. *International Journal of Electronic Finance*, *5*(2), 150–168. doi:10.1504/IJEF.2011.040458

Rahim, M., & Kurnia, S. (2014). *Understanding E-Procurement System Benefits using organisational Adoption Motivation Lens: a Case Study*. PACIS.

Ramasubbu, N., Mithas, S., & Krishnan, M. (2008). High tech, high touch: The effect of employee skills and customer heterogeneity on customer satisfaction with enterprise system support services. *Decision Support Systems*, *44*(2), 509–523. doi:10.1016/j.dss.2007.06.005

Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2015). Investigating success of an e-government initiative: Validation of an integrated IS success model. *Information Systems Frontiers*, *17*(1), 127–142. doi:10.100710796-014-9504-7

Rank, u. U. (2019). *Jordanian University Ranking 2019*. Retrieved from https://www.4icu.org/jo/

Reich, R. (1991). *The Work of Nations*. London: Simon & Schuster.

Reilly, J. R., Vandenhouten, C., Gallagher-Lepak, S., & Ralston-Berg, P. (2012). Faculty Development for E-Learning: A Multi-Campus Community of Practice (COP) Approach. *Journal of Asynchronous Learning Networks*, *16*(2), 99–110. doi:10.24059/olj.v16i2.249

Rekkedal, T. (2001). *Assessment and Evaluation Techniques in SESAM/NKI ELearning courses*. Article prepared for the EL Socrates Minerva Project —Student support series in elearning.

ReportT. T. (2017). https://www2.deloitte.com/us/en/insights/focus/tech-trends/2017.html

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3*. Boenningstedt: SmartPLS GmbH. http://www. smartpls. com

Robinson, J. (2009). Triandis theory of interpersonal behaviour in understanding software privace behaviour in the South African context (Masters degree). University of the Witwatersrand, Johannesburg, South Africa.

Rodrigues, L. F., Oliveira, A., & Costa, C. J. (2016). Playing seriously – How gamification and social cues influence bank customers to use gamified e-business applications. *Computers in Human Behavior*, *63*, 392–407. doi:10.1016/j.chb.2016.05.063

Rogers, E. (1995). *Diffusion of Innovations*. The Free Press.

Rogers, E. M. (2010). Diffusion of Innovations (5th ed.). Free Press.

Rokeach, M. (1973). *The nature of human values*. New York: Free Press.

Rom, A., & Rohde, C. (2007). Management accounting and integrated information systems: A literature review. *International Journal of Accounting Information Systems*, *8*(1), 40–68. doi:10.1016/j.accinf.2006.12.003

Ronchi, S., Brun, A., Golini, R., & Fan, X. (2010). What is the value of an IT e-procurement system? *Journal of Purchasing and Supply Management*, *16*(2), 131–140. doi:10.1016/j.pursup.2010.03.013

Rosario, J. G. (2000). On the leading edge: Critical success factors in ERP implementation projects. *Business World, 27*.

Roscorla, T. (2010). *The 7 Steps to Innovative Leadership*. Retrieved from http://www.convergemag.com/policy/The-7-Elements-of-Innovative-Leadership.html

Rosenthal, R. W. (1981). Games of perfect information, predatory pricing and the chain-store paradox. *Journal of Economic Theory*, *25*(1), 92–100. doi:10.1016/0022-0531(81)90018-1

Rosing, K., Frese, M., & Bausch, A. (2011). Explaining the heterogeneity of the leadership-innovation relationship: Ambidextrous leadership. *The Leadership Quarterly*, *22*(5), 956–974. doi:10.1016/j.leaqua.2011.07.014

Roztocki, N., & Weistroffer, H. (2008). Information technology investments in emerging economies. *Information Technology for Development*, *14*(1), 1–10. doi:10.1002/itdj.20084

Ryan, R. M., & Deci, E. L. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, *11*(4), 319–338. doi:10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67. doi:10.1006/ceps.1999.1020 PMID:10620381

Ryan, R. M., & Deci, E. L. (2000c). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*(1), 68–78. doi:10.1037/0003-066X.55.1.68 PMID:11392867

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic dialectial perspective. In R. M. Ryan & E. L. Deci (Eds.), *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Ryan, R. M., Frederick, C. M., Lepes, D., Rubio, N., & Sheldon, K. M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology*, *28*, 335–354.

Saadé, R., & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: An extension of the technology acceptance model. *Information & Management*, *42*(2), 317–327. doi:10.1016/j.im.2003.12.013

Sachs, P. (1995). Transforming Work: Collaboration, Learning and Design. *Communications of the ACM*, *38*(9), 36–44. doi:10.1145/223248.223258

Saha, P., Nath, A., & Salehi-Sangari, E. (2010). Success of Government E-Service Delivery: Does Satisfaction Matter? In EGOV 2010 LNCS (Vol. 6228, pp. 204-215). IFIP International Federation for Information Processing.

Sahlman, W. A. (1990). The structure and governance of venture-capital organizations. *Journal of Financial Economics*, *27*(2), 473–521. doi:10.1016/0304-405X(90)90065-8

Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, *69*, 371–380. doi:10.1016/j.chb.2016.12.033

Sailer, M., Hense, J., Mandl, H., & Klevers, M. (2013). Psychological perspectives on motivation through gamification. *Interaction Design and Architecture(s). Journal*, *19*, 28–37.

Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. Cambridge, MA: MIT Press.

Samak, A., & Tawfik, Z. (2017). *Exploration of Jordanian English Language Teachers' Attitudes*. Skills, and Access as Indicator of Information and Communication Technology Integration in Jordan.

Sanders, A. (2008). The subprime crisis and its role in the financial crisis. *Journal of Housing Economics*, *17*(4), 254–261. doi:10.1016/j.jhe.2008.10.001

Sarasvathy, S. D. (2008). *Effectuation: Elements of entrepreneurial expertise*. Cheltenham, UK: Edward Elgar Publishing. doi:10.4337/9781848440197

Sathye, M. (1999). Adoption of Internet Banking by Australian Consuners: An Empiricial Investigation. *International Journal of Bank Marketing*, *17*(7), 324–334. doi:10.1108/02652329910305689

Savery, J. R. (2019). *The Wiley Handbook of Problem-Based Learning*. Wiley.

Savin-Baden, M. (2000). Problem-Based Learning. In *Higher Education: Untold Stories: Untold Stories*. McGraw-Hill Education.

Scharmer, C. O. (2019). Theorie U. Berlin: Entrepreneurship Summit.

Schein, E. H. (2010). *Organizational culture and leadership* (2nd ed.). New York: John Wiley & Sons.

Schork, S. (2014b). *Berufung Innovator: Wahrer des gesellschaftlichen Fortschritts.* Paper presented at the Digital Leadership Forum, Frankfurt am Main, Germany.

Schork, S. (2015). *Descriptive Online Study Report.* Retrieved from https://sabrinaschork.files.wordpress.com/2015/06/20150615_descriptive-report_leadership-innovation_sabrina-schork.pdf

Schork, S., & Terzidis, O. (2014). *Guiding behavior favoring Sustainable Enterprise Innovation Capability*. Paper presented at the 8th Interdisciplinary Entrepreneurship Conference, Oldenburg, Germany.

Schork, S., & Terzidis, O. (2015). *Erfolgreiche Führungsprinzipien im Innovationsbereich*. Paper presented at the 19th Interdisciplinary Entrepreneurship Conference, Kassel, Germany.

Schork, S., Heblich, B., & Terzidis, O. (2016). *Effective Innovation Leadership.* Paper presented at the University-Industry-Innovation-Network, Amsterdam, The Netherlands.

Schork, S. (2014a). Arbeiten in einer innovationsgetriebenen Wirtschaft. In T. Arns, M. Bentele, J. Niemeier, P. Schütt, & M. Weber (Eds.), *Zukunft der Wissensarbeit* (pp. 51–58). Berlin: BITKOM.

Schork, S. (2017). *Wirksame Führung von Innovation: Werte, Stärken und Praktiken*. Berlin: Pro Business.

Schork, S. (2018). The Application of the Effective Innovation Leadership Model in ICT Practice. In A. Press & O. Terzidis (Eds.), *Technology Entrepreneurship* (pp. 99–109). Cham: Springer. doi:10.1007/978-3-319-73509-2_5

Schrag, F. (1992). In defense of positivist research paradigms. *Educational Researcher*, *21*(5), 5–8. doi:10.3102/0013189X021005005

Schwartz, M., & Göthner, M. (2009). A multidimensional evaluation of the effectiveness of business incubators: An application of the PROMETHEE outranking method. *Environment and Planning. C, Government & Policy*, *27*(6), 1072–1087. doi:10.1068/c0897b

Scott, J., & Vessey, I. (2000). Implementing enterprise resource planning systems: The role of learning from failure. *Information Systems Frontiers*, *2*(2), 213–232. doi:10.1023/A:1026504325010

Seaborn, K., & Fels, D. I. (2015). Gamification in thoery and action: A survey. *International Journal of Human-Computer Studies*, *74*, 14–31. doi:10.1016/j.ijhcs.2014.09.006

Semeijn, J., Riel, A. C. R., Birgelen, M. J. H., & Streukens, S. (2005). E-services and offline fulfilment: How e-loyalty is created. *Managing Service Quality*, *15*(2), 182–194. doi:10.1108/09604520510585361

Sergeeva, N. (2018). *Making Sense of Innovation in the Built Environment*. Routledge.

Seymour, A. (2013). A qualitative investigation into how problem-based learning impacts on the development of team-working skills in occupational therapy students. *Journal of Further and Higher Education*, *37*(1), 1–20. doi:10.1080/0309877X.2011.643774

Shang, S., & Seddon, P. (2002). Assessing and managing the benefits of enterprise systems: The business manager's perspective. *Information Systems Journal*, *12*(4), 271–299. doi:10.1046/j.1365-2575.2002.00132.x

Shanks, G., Bekmamedova, N., & Johnston, R. (2012). *Exploring process theory in information systems research.* Paper presented at the Information Systems Foundations Workshop, Canberra, Australia.

Shanks, G., & Seddon, P. (2000). Differences in critical success factors in ERP systems implementation in Australia and China: A cultural analysis. *Proceedings of the 8th European Conference on Information Systems*, 537–544.

Shavinina, L. V. (2011). Discovering a Unique Talent: On the Nature of Individual Innovation Leadership. *Talent Development & Excellence*, *3*(2), 165–185.

Sherman, H., & Chappell, D. S. (1998). Methodological challenges in evaluating business incubator outcomes. *Economic Development Quarterly*, *12*(4), 313–321. doi:10.1177/089124249801200403

Sheu, C., & Krumwiede, D. (2003). The Effect of National Differences on Multinational ERP Implementation: An Exploratory Study. *Total Quality Management & Business Excellence*, *14*(6), 641–651. doi:10.1080/1478336032000053807

Sia, S. K., & Soh, C. (2007). An assessment of package–organisation misalignment: Institutional and ontological structures. *European Journal of Information Systems*, *16*(5), 568–583. doi:10.1057/palgrave.ejis.3000700

SightsD. (2019). https://www2.deloitte.com/us/en/insights/industry/financial-services/online-banking-usage-in-mobile-centric-world.html

Silverman, S., & Solmon, M. (1998). The unit of analysis in field research: Issues and approaches to design and data analysis. *Journal of Teaching in Physical Education*, *17*(3), 270–284. doi:10.1123/jtpe.17.3.270

Singh, J., & Wilkes, R. (1996). When consumers complain: A path analysis of the key antecedents of consumer complaint response estimates. *Journal of the Academy of Marketing Science*, *24*(4), 350–365. doi:10.1177/0092070396244006

Siriginidi, S. R. (2000). Enterprise Resource Planning in re-engineering business. *Business Process Management Journal*, *6*(5), 376–391. doi:10.1108/14637150010352390

Slimov, K. (2019). *ERP and Digital Transformation*. ERP News.

Small Business Council. (1989). *Business Incubators*. Canberra: Australian Government Publishing Service.

Soares-Aguiar, A., & Palma-dos-Reis, A. (2008). Why do firms adopt e-procurement systems? Using logistic regression to empirically test a conceptual model. *IEEE Transactions on Engineering Management*, *55*(1), 120–133. doi:10.1109/TEM.2007.912806

Söğüt, M. A. (2001). *Küçük ve Orta Boy İşletmelerin Finansman Sorunlarının Çözümünde Alternatif Finansman Yöntemleri*. Orta Anadolu Kongresi "KOBİ'lerin Finansman ve Pazarlama Sorunları", Erciyes Üniversitesi Nevşehir İ.İ.B.F.

Soh, C., & Tay, J. (2000, April). Enterprise resource planning: cultural fits and misfits: is ERP a universal solution? *Communications of the ACM*, *4*(43), 47–51. doi:10.1145/332051.332070

Soja, P., & Paliwoda-Pękosz, G. (2009). *What are real problems in enterprise system adoption?* Academic Press.

Soja, P., & Paliwoda-Pękosz, G. (2009, May 22). What are real problems in enterprise system adoption? *Industrial Management & Data Systems*, *109*(5), 610–627. doi:10.1108/02635570910957614

Somasundaram, R., & Damsgaard, J. (2005). Policy recommendations for electronic public procurement. *The Electronic*. *Journal of E-Government*, *3*(3), 147–156.

Somers, T., & Nelson, K. (2001). The Impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations. *34th Annual Hawaii International Conference on System Sciences (HICSS-34)*, 8, 8016. 10.1109/HICSS.2001.927129

Sönmez, A., & Toksoy, A. (2014). Türkiye'de Girişimcilik ve Türk Girişici Profili Üzerine Bir Analiz. *Yönetim ve Ekonomi*, *21*(2), 41–58.

Sorescu, A. (2017). Data-Driven Business Model Innovation. *Journal of Product Innovation Management*, *34*(5), 691–696. doi:10.1111/jpim.12398

Soydemir, S. (1993). Risk Sermayesi. *Ekonomik Yaklasim*, *4*(11), 77. doi:10.5455/ey.10170

Spaulding, T. (2010). How can virtual communities create value for business? *Electronic Commerce Research and Applications*, *9*(1), 38–49. doi:10.1016/j.elerap.2009.07.004

Srai, J. S., & Lorentz, H. (2019). Developing design principles for the digitalisation of purchasing and supply management. *Journal of Purchasing and Supply Management*, *25*(1), 78–98. doi:10.1016/j.pursup.2018.07.001

Srinivas, V., & Wadhwani, R. (2018). The value of online banking channels in a mobile-centric world. *Deloitte Consulting Report*. https://www2.deloitte.com/us/en/insights/industry/financial-services/online-banking-usage-in-mobile-centric-world.html

Stacey, R. (2001). *Complex Responsive Process in Organizations: Learning and Knowledge Creation*. London: Routledge.

Stamenkov, G., & Dika, Z. (2016). Bank employees' internal and external perspectives on e-service quality, satisfaction and loyalty. *Electronic Markets*, *26*(3), 291–309. doi:10.100712525-016-0221-6

Statista Report. (2019). https://www.statista.com/statistics/455418/number-of-digital-banking-users-usa/

Statista. (2015). *Was waren die zentralen Themen in Ihren Coachings letztes Jahr (2015)?* Retrieved from https://de.statista.com/statistik/daten/studie/398769/umfrage/umfrage-zu-top-coaching-themen-in-deutschland/

Statista. (2017a). *Größte Familienunternehmen Deutschlands nach Umsatz im Jahr 2017 (in Millionen Euro).* Retrieved from https://de.statista.com/statistik/daten/studie/198382/umfrage/top-deutsche-familienunternehmen-nach-umsatz/

Statista. (2017b). *Mittelstand in Deutschland.* Retrieved from https://de.statista.com/themen/3996/mittelstand-in-deutschland/

Statista. (2018). *Value of the gamification market worldwide in 2016 and 2021 (in billion U.S. dollars).* Retrieved from https://www.statista.com/statistics/608824/gamification-market-value-worldwide/

Statista. (2019). *Global digital population as of July 2019 (in millions).* Retrieved from https://www.statista.com/statistics/617136/digital-population-worldwide/

Stead, P., Morgan, G., & Scott-Roberts, S. (2010). 14: Becoming lifelong learners in health and social care. *Problem Based Learning in Health and Social Care*, 173.

Stevens, J. (2001). Applied multivariate statistics for the social sciences (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Stevenson, J. E. (2012). Breaking Away - A New Model for Innovation Leadership. *Employment Relations Today*, *39*(2), 17–25. doi:10.1002/ert.21361

Stiftung, B. (2019). *China 2013: Szenarien und Strategien für Deutschland*. Retrieved from https://china-szenarien.bertelsmann-stiftung.de/images/China_Szenarien_Digital.pdf

Stjelja, M. (2013). The case study approach: Some theoretical, methodological and applied considerations. Adelaide: Defence Science and Technology Organisation Edinburgh (Australia) Land Operations Div.

Straub, D., Boudreau, M.-C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information Systems*, *13*, 380–427. doi:10.17705/1CAIS.01324

Suliantoro, H., Ghozali, I., & Wibowo, M. A. (2015). E-Procurement Adoption in Government Institution: Predicting Social Values Effect on Intention and Usage Behavior of E-Procurement. *International Journal of Business and Society*, *16*(2). doi:10.33736/ijbs.562.2015

Sumner, M. (2000). Risk Factors in Enterprise-wide/ERP Projects. *Journal of Information Technology*, *15*(4), 317–327. doi:10.1177/026839620001500407

Süngü, S. (1994). *Etkin Sermaye Piyasası Teorisi ve Menkul Kıymetler Piyasalarının Düzenlenmesi*. Sermaye Piyasası Kurulu Araştırma Raporu.

SuphakorntanakitN. (2008). *Web 3.0*. Retrieved from http://www.webuser.hs-furtwangen.de/~heindl/ebte-08ss-web-20-suphakorntanakit.pdf

Swamy, R. (1990). The making of a social entrepreneur: The case of Baba Amte. *Vikalpa*, *15*(4), 29–39. doi:10.1177/0256090919900404

Swanson, R. A., & Holton, E. F. (2005). *Research in organizations: Foundations and methods in inquiry*. Berrett-Koehler Publishers.

Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. *Management Science*, *42*(1), 85–92. doi:10.1287/mnsc.42.1.85

Szymanski, D. M., & Hise, R. T. (2000). E-satisfaction: An initial examination. *Journal of Retailing*, *76*(3), 309–322. doi:10.1016/S0022-4359(00)00035-X

Taherdoost, H. (2016a). How to Design and Create an Effective Survey/Questionnaire; A Step by Step Guide. *International Journal of Academic Research in Management*, *5*(4), 37–41.

Taherdoost, H. (2016b). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management*, *5*(3), 28–36. doi:10.2139srn.3205040

Taherdoost, H. (2017a). Measurement and Scaling Techniques in Research Methodology; Survey / Questionnaire Development. *International Journal of Academic Research in Management*, *6*(1), 1–5.

Taherdoost, H. (2017b). Understanding of E-service Security Dimensions and its effect on Quality and Intention to Use. *Information and Computer Security*, *25*(5), 535–559. doi:10.1108/ICS-09-2016-0074

Taherdoost, H. (2018). Development of an adoption model to assess user acceptance of e-service technology: E-Service Technology Acceptance Model. *Behaviour & Information Technology*, *37*(2), 173–197. doi:10.1080/0144929X.2018.1427793

Tai, Y.-M., Ho, C.-F., & Wu, W.-H. (2010). The performance impact of implementing web-based e-procurement systems. *International Journal of Production Research*, *48*(18), 5397–5414. doi:10.1080/00207540903117915

Tarhini, A., El-Masri, M., Ali, M., & Serrano, A. (2016). Extending the UTAUT Model to Understand the Customers' Acceptance and Use of Internet Banking in Lebanon: A Structural Equation Modeling Approach. *Information Technology & People*, *29*(4), 830–849. doi:10.1108/ITP-02-2014-0034

Tavoletti, E. (2013). Business incubators: Effective Infrastructures or Waste of Public Money? Looking for a Theoretical Framework, Guidelines and Criteria. *Journal of the Knowledge Economy*, *4*(4), 423–443. doi:10.100713132-012-0090-y

TBB Reports. (2019). https://www.tbb.org.tr/Content/Upload/istatistikiraporlar/ekler/965/Dijital-Internet-Mobil_Bankacilik_Istatistikleri-Mart_2018.pdf

Tezcanlı, M. V. (1996). *İçeriden öğrenenlerin ticareti ve manipülasyonlar*. İstanbul: İstanbul Menkul Kıymetler Borsası.

The 2018 Global Digital Report. (2019). https://digitalreport.wearesocial.com/

Themistocleous, M., & Paul, R. (2001) ERP Problems and Application Integration Issues: An Empirical Survey. *Proceedings of the 34th Hawaii International Conference on System Sciences*, 9045-9054. 10.1109/HICSS.2001.927240

Thomas, B., Basil, M., Christina, M., Fedra, K., & Manuela, T. (2013). Measuring Users Satisfaction of an e-Government portal. *Procedia Technology*, *8*, 371–377. doi:10.1016/j.protcy.2013.11.049

Thom, J., Millen, D., & Dimicco, J. (2012). Removing gamification from an enterprise SNS. In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work - CSCW 12* (pp. 1067-1070). Seattle, WA: ACM Press

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: understanding concepts and applications*. Washington, DC: American Psychological Association. doi:10.1037/10694-000

Thomson, J. D. (2009). Remodelled and Restyled e-Procurement-New Power Relationships Down Under. *Electronic*. *Journal of E-Government*, *7*(2).

Thorpe, A. S., & Roper, S. (2017). The Ethics of Gamification in a Marketing Context. *Journal of Business Ethics*, *155*(2), 597–609. doi:10.100710551-017-3501-y

Toda, A., Carmo, R. M., Silva, A. P., Bittencourt, I. I., & Isotani, S. (2019). An approach for planning and deploying gamification concepts with social networks within educational contexts. *International Journal of Information Management*, *46*, 294–303. doi:10.1016/j.ijinfomgt.2018.10.001

Tojib, D. R., Sugianto, L.-F., & Sendjaya, S. (2006). A Conceptual Model for B2E Portal User Satisfaction. *Proceedings of the International Conference on Business and Information*.

Tomfort, A. (2017). Detecting asset price bubbles: A multi factor approach. *International Journal of Economics and Financial Issues*, *7*, 46–55.

Torun Nalbant, F., & Tunca, M. Z. (2019). Technology Acceptence Model Based Investigation of Internet Banking as an Alternative Channel. *Suleyman Demirel University the Journal of Faculty of Economics and Administrative Sciences*, *24*(2), 215–236.

Toshkov, D. (2016). *Research design in political science*. Macmillan International Higher Education. doi:10.1007/978-1-137-34284-3

Tran, H. T. T., & Corner, J. (2016). The Impact of Communication Channels on Mobile Banking Adoption. *International Journal of Bank Marketing*, *34*(1), 78–109. doi:10.1108/IJBM-06-2014-0073

Trochim, W. M. (2006). Qualitative measures. *Research Measures Knowledge Base, 361*, 2-16.

TuranovaG. (2017). *Is bitcoin a bubble?* https://www.nasdaq.com/article/is-bitcoin-a-bubble-cm898150

Turban, E., Sharda, R., & Delen, D. (2011). *Decision Support and Business Intelligence Systems*. Pearson.

Turner, M., Kitchenham, B., Brereton, P., Charters, S., & Budgen, D. (2010). Does the technology acceptance model predict actual use? A systematic literature review. *Information and Software Technology*, *52*(5), 463–479. doi:10.1016/j.infsof.2009.11.005

Tzafestas, S. (2008). The Art and Impact of Physical and Virtual Enterprise Incubators: The Greek Paradigm. In *The Open Knowledge Society. A Computer Science and Information Systems Manifesto* (pp. 549–559). Berlin: Springer. doi:10.1007/978-3-540-87783-7_70

Uçkun, N. (2009). KOBİ'lerin Finansal Sorunlarına Melek Sermaye Çare Olabilir mi? *Muhasebe ve Finansman Dergisi*, *41*, 121–131.

Umble, E., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, *146*(2), 241–257. doi:10.1016/S0377-2217(02)00547-7

Ünal, A., & Kaya, H. (2009). *Küresel Kriz ve Türkiye*. İstanbul: Ekonomi ve Politika Araştırmaları Merkezi.

Unwin, T., Kleessen, B., Hollow, D., Williams, J. B., Oloo, L. M., Alwala, J., ... Muianga, X. (2010). Digital learning management systems in Africa: Myths and realities. *Open Learning*, *25*(1), 5–23. doi:10.1080/02680510903482033

Uwizeyemungu, S., & Raymond, L. (2010). Linking the effects of ERP to organisational performance: Development and initial validation of an evaluation method. *Information Systems Management*, *27*(1), 25–41. doi:10.1080/10580530903455122

Vaidya, K., Sajeev, A., & Callender, G. (2006). Critical factors that influence e-procurement implementation success in the public sector. *Journal of Public Procurement*, *6*(1/2), 70–99. doi:10.1108/JOPP-06-01-02-2006-B004

Vaidyanathan, G., & Devaraj, S. (2008). The role of quality in e-procurement performance: An empirical analysis. *Journal of Operations Management*, *26*(3), 407–425. doi:10.1016/j.jom.2007.08.004

Vaidyanathan, G., Devaraj, S., & D'Arcy, J. (2012). Does Security Impact E-procurement Performance? Testing a Model of Direct and Moderated Effects. *Decision Sciences*, *43*(3), 437–458. doi:10.1111/j.1540-5915.2012.00354.x

Valliere, D., & Peterson, R. (2004). Inflating the bubble: Examining dot-com investor behaviour. *Venture Capital*, *6*(1), 1–22. doi:10.1080/1369106032000152452

van Tilburg, J., van der Sijde, P., Molero, J., & Casado, P. (2002). Virtual Incubation of Research Spin-Offs. *International Journal of Entrepreneurship and Innovation*, *3*(4), 285–293. doi:10.5367/000000002101299330

Varis, T., & Al-Agtash, S. (2008). *Ubiquitous ICT for sustainable education and cultural literacy*. Citeseer.

Velcu, O. (2010). *Strategic alignment of ERP implementation stages: An empirical investigation*. Academic Press.

Velcu, O. (2010, April). Strategic alignment of ERP implementation stages: An empirical investigation. *Information & Management*, *47*(3), 158–166. doi:10.1016/j.im.2010.01.005

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *Management Information Systems Quarterly*, *23*(2), 239–260. doi:10.2307/249753

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. doi:10.1287/mnsc.46.2.186.11926

Verhaeghe, A., & Kfir, R. (2002). Managing innovation in a knowledge intensive technology organization (KITO). *R & D Management*, *32*(5), 409–417. doi:10.1111/1467-9310.00272

Vernon, D. T., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine*, *68*(7), 550–563. doi:10.1097/00001888-199307000-00015 PMID:8323649

Vlok, A. (2012). A leadership competency profile for innovation leaders in a science-based research and innovation organization in South Africa. *Procedia: Social and Behavioral Sciences*, *41*, 209–226. doi:10.1016/j.sbspro.2012.04.025

von Briel, F., Davidsson, P., & Recker, J. (2018). Digital technologies as external enablers of new venture creation in the IT hardware sector. *Entrepreneurship Theory and Practice*, *42*(1), 47–69. doi:10.1177/1042258717732779

Waghodekar, P. H. (1989). Choice-Centered Class Room-A Case Study. *Journal of Engineering Education Transformations*, *3*(2), 6–15.

Wah, L. (2000, Mar.). Give ERP a chance. *Management Review*, 20–24.

Wang, L., Wang, S., & Zhang, J. (2013). 04). Venture Capital Backing and Overvaluation: Evidence from the High-Tech Bubble. *Financial Review*, *48*(2), 283–310. doi:10.1111/fire.12004

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *Management Information Systems Quarterly*, xiii–xxiii.

Wee, S. (2000). *Juggling toward ERP success: Keepkey success factors high*. ERP News.

Wei, C. (2008). Evaluating the Performance of an ERP System Based on The Knowledge of ERP Implementation Objectives. *International Journal of Advanced Manufacturing Technology*, *39*(1-2), 168–181. doi:10.100700170-007-1189-3

Weimer, D. L., & Vining, A. R. (2017). *Policy analysis: Concepts and practice*. Routledge. doi:10.4324/9781315442129

Welt. (2019). *50 Erfindungen, die die Welt veränderten*. Retrieved from https://www.welt.de/wirtschaft/karriere/leadership/gallery12202607/50-Erfindungen-die-die-Welt-veraenderten.html

Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Philadelphia, PA: Wharton Digital Press.

Whelan, R., & Bhartu, D. (2007). Factors in the deployment of a learning management system at the University of the South Pacific. *Proceedings Ascilite Singapore*, 1053-1062.

Whitcombe, S. W. (2012). *Problem-based Learning and the Development of Capital*. Academic Press.

Wieder, B., & Ossimitz, M. (2006). The Impact of ERP Systems on Firm and Business Process Performance. *Journal of Enterprise Information Management*, *19*(1), 13–29. doi:10.1108/17410390610636850

Williamson & Kirsty. (2018). Qualitative Data Analysis. *The Journal of Research Methods*, 2-9.

Williams, P. (2002). The learning web: The development, implementation and evaluation of internet-based undergraduate materials for the teaching of key skills. *Active Learning in Higher Education*, *3*(1), 40–53. doi:10.1177/1469787402003001004

Wimpenny, K., Adefila, A., & DeWinter, A. (2018). *Jordan Opportunity for Virtual Innovative Teaching and Learning: A Needs Analysis Report Contextualising the State of the Art in International Online Teaching and Learning, with Particular Attention to the Jordanian Case*. Academic Press.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, *16*(1), 85–102. doi:10.1287/isre.1050.0042

Wollscheid, C. (2013). *Rise and burst of the dotcom bubble.* Academic Press.

Wong, D. (2007). A Critical Literature Review on e-Learning Limitations. *JASA, 2*, 55-62. Retrieved from www.en.wikipedia.org/wiki/Lifelong_learning

World Population Prospects. (2019). *The 2019 Revision*. https://population.un.org/wpp/

Wu, F., Zsidisin, G., & Ross, A. (2007). Antecedents and outcomes of e-procurement adoption: An integrative model. *IEEE Transactions on Engineering Management*, *54*(3), 576–587. doi:10.1109/TEM.2007.900786

Xi, N., & Hamari, J. (2019). Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management*, *46*, 210–221. doi:10.1016/j.ijinfomgt.2018.12.002

Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, *60*, 244–256. doi:10.1016/j.tourman.2016.11.020

Yenidünya, S. T. (2006). Risk Sermayesinin Türkiye'de Uygulama Olanakları. Marmara Üniversitesi.

Yew, E. H., & Goh, K. (2016). Problem-based learning: An overview of its process and impact on learning. *Health Profession Education*, *2*(2), 75–79. doi:10.1016/j.hpe.2016.01.004

Yin, R. K. (2014). *Case Study Research: Design and Methods*. Thousand Oaks, CA: SAGE Publications, Inc.

Yongwen, X., Johnson, P., Moore, C. A., Brewer, R. S., & Takayama, J. (2013). SGSEAM: Assessing Serious Game Frameworks from a Stakeholder Experience Perspective. In *Gamification 2013: 1st International Conference on Gameful Design, Research, and Applications* (pp.75-78). Toronto, Ontario, Canada: ACM Press.

Yoon, H. S., & Steege, L. M. B. (2013). Development of A Quantitative Model of the Impact of Customers' Personality and Perceptions on Internet Banking Use. *Computers in Human Behavior*, *29*(3), 1133–1141. doi:10.1016/j.chb.2012.10.005

Youssefmir, M., Huberman, B. A., & Hogg, T. (2002). *Bubbles and Market Crashes.* Academic Press.

Yuan, Y., Lai, F., & Chu, Z. (2018). Continuous Usage Intention of Internet Banking: A Commitment Trust Model. *Inforfmation Systems and E-Business Management*, *17*(1), 1–25.

Yücel, Ö. (2016). Finansal Piyasa Etkinliği: Borsa Istanbul Üzerine Bir Uygulama. *International Review of Economics and Management*, *4*(3). doi:10.18825/irem.16916

Yusuf, Y., & Abthorpe, M. (2004). Enterprise information systems project implementation: A case study of ERP in rolls-royce. *International Journal of Production Economics*, *87*(3), 251–266. doi:10.1016/j.ijpe.2003.10.004

Zavalkoff, A. (2016). Investigating Social Justice Education Through Problem Based Learning: A Subject Area Resource Specialist's Perspective. In M. Filipenko & J. A. Naslund (Eds.), *Problem-Based Learning in Teacher Education*. Cham: Springer. doi:10.1007/978-3-319-02003-7_11

Zavalkoff, A. (2016). Measures of Success in Problem Based Learning: Triple Jump Assessments and E-Folios. In M. Filipenko & J. A. Naslund (Eds.), *Problem-Based Learning in Teacher Education*. Cham: Springer. doi:10.1007/978-3-319-02003-7_13

Zeren, F., Kara, H., & Arı, A. (2013). Piyasa etkinliği hipotezi: İMKB için ampirik bir analiz. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi,* (36), 141-148.

Zhang, X., Prybutok, V., & Huang, A. (2006). An empirical study of factors affecting e-service satisfaction. *Human Systems Management*, *25*, 279–291.

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