Handbook of Research on

Entrepreneurship, Innovation, Sustainability, and ICTs in the Post-COVID-19 Era

Luísa Cagica Carvalho, Leonilde Reis, and Clara Silveira

IGI Global
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Handbook of Research on Entrepreneurship, Innovation, Sustainability, and ICTs in the Post-COVID-19 Era

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Detailed Table of Contents

The purpose of the study reported on in this chapter was to develop a structural equation model (SEM) of the drivers of innovation for information and communication technology (ICT) students. Against a background of research on entrepreneurship and sustainability towards the post-COVID-19 era, factors had previously been identified, which promoted innovation among employees. A literature review, however, also revealed issues, controversies, problems, and challenges related to the effects of knowledge sharing behavior (KSB), self-regulated learning (SRL), and course design characteristics (CDCs) on developing innovative behavior (IB) among ICT students at universities. Solutions and recommendations are provided for managers involved at universities on leveraging attributes of KSB, SRL and CDCs to sustainably trigger innovation and entrepreneurship among ICT students towards the post-COVID-19 era. Future research directions are also considered. In conclusion, a discussion of the overall coverage of the chapter and concluding remarks are provided.

The purpose of this chapter is to present research describing work in an organizational context in order to optimize the practices established in the most diverse domains of knowledge, attending to the relationships between information and communication technologies (ICTs) and sustainability in the post-COVID-19 pandemic era. An empirical study into the impact of digital transformation via unified communication and collaboration (UC&C) technologies on the productivity and innovation of a global automotive enterprise is thus reported on in the chapter. The primary research question addressed in the study was: To what extent does digital transformation, implemented through unified communication and collaboration technologies, impact productivity and innovation within a global automotive enterprise? The conclusion of the study is that digital transformation, delivered via an integrated framework with UC&C technologies, impact productivity and opportunity for driving innovation within a global automotive enterprise.

The recent tax legislative changes created conditions for the dematerialization of documents, allowing

waiving invoice printing, encouraging the adoption of an electronic invoicing and document archiving system. The consequent sustainability and cost reduction measures are allowing the optimization of invoicing and archive procedures, driving companies to invest in the development of technological instruments, incorporating a philosophy of innovation and sustainability. Entrepreneurial entities can take advantage of the increasing use of telework, due to the recent pandemic, by shifting to perform functions remotely. Thus, there is a need to optimize business processes and endeavour technological innovations, taking adequate, quick, and effective decisions. A model can be applied to systematize and simplify the decision-making process related to the Portuguese tax framework and requirements for certified invoicing software or for electronic document archiving. Understanding these requirements can speed up the development or acquisition of a proper invoicing or archiving software.

Businesses that cannot sustain innovation are likely to fail. The success of small businesses depends on their ability to adapt to the rapidly changing environments. Nowadays, the COVID-19 pandemic brings new challenges in adopting to the changing environment and lifestyle. In addition to the limitations that came with COVID-19, the entrepreneurship ecosystem includes a wide variety of factors that affect the entrepreneurship process and have an impact on the success or failure of entrepreneurs. In this chapter, a review of the concept of entrepreneurship, definition of an entrepreneur and its key features, motivation factors of entrepreneurship, role of ICTs in entrepreneurship, and basic entrepreneurship terms are summarized. Entrepreneurship has a significant role in increasing the welfare of societies and developing new technologies. Thus, fundamentals of entrepreneurship and the ecosystem are important for professional and candidate entrepreneurs who seek guidance in transforming their business ideas into results.

The chapter explores the utility of neuroeconomics in decision making and behavior. Scientific knowledge will be advanced in the need for the application of neuroeconomics focused on one of the services of the information and communication technologies (ICT) of companies, that is, e-commerce of exponential artisanal SMEs of women entrepreneurs, by developing a proposal for a business model to increase the possibility of growth of their companies at the level national and international level. The methodologies used were deductive, exploratory, descriptive, correlational, and documentary. Neuroeconomics have the potential to explain the phenomena that are considered as a deviation from the prediction or behavioral bias of decision-making models in economic theory. The study is quantitative using primary and secondary sources for research.

The foodservice sector is one of the three leading sectors in India, with a market size of 152 billion USD. There are over 500,000 organized and unorganized restaurants in India, and the sector has seen exceptional growth during the past decade. A high percentage of the young and working population is driving the India foodservice market, which is further fuelled by organized retail space that is encouraging the growth of local and international brands across different formats. This study explores how the crisis caused by the COVID-19 pandemic has led to adapting to the new business model by the food service sector in India.

The recession due to COVID- 19 causes uncertainties in the industry's immediate operating landscape as well as other unprecedented impacts. Due to the immense magnitude of impacts posed by recessionary events, this present study proposes the significance of understanding the phenomena while examining the subject of crisis readiness of SMEs during COVID-19 era. The main objective of the study is to examine the impact of business coping strategy and entrepreneurial orientation on the crisis readiness of Pakistani-based SMEs. The study emphasized the necessity of delineating the effects of extremely disastrous and unforeseen events. This is because the understanding of the effects of such cataclysmic event is more important than the prediction of the event's occurrence. The study has employed a Suraya-based method, and data is collected with the aid of a questionnaire. The response rate was 78%, which qualifies the minimum response rate criteria. The SEM-PLS is used to analyse the data. The results of the study have provided support to hypothesized results.

Our prosperity and sustainability in the future depends on the ability to innovate. Therefore, innovation needs to be embedded in all sections of an economy. A research study took place in a higher education setting of the United Arab Emirates (UAE) on offering an entrepreneurship major to local women students. The aim was to explore the interest and views of these Generation Z students on driving innovation and entrepreneurship in the country through building homegrown companies. This research is highly relevant as the society re-imagines itself post pandemic. The findings from the research may be useful to members of academia, professionals related to this sector, and policy makers of nations. They may use the information to design suitable academic programs for women that may help drive entrepreneurship, innovation, and sustainability for every strata of the society in the post-COVID-19 era.

India has a rich tradition of learning and education right from antiquity. Education in India is on its journey undergoing diverse stages (e.g., Gurukul system of ancient times, Vedic schools, madrasas, and classroom teaching). Now it has reached the level of virtual learning or eLearning. It is a technology-driven learning method. This chapter focusses on the impact of virtual learning in the Indian education system and analyses various factors affecting the tutors, students, and organizations. It also proposes few techniques to deal with special children too. Various suggestions to handle different issues faced in virtual learning also forms the background of the study.

Preface

Over the last years we have witnessed the importance of the ICT to the business and organizations in general. New business models, new marketing channels and new markets are reached using ICT. ICTs are a daily support and, many times, a way to develop creativity and innovation and will be expected that remains with a re-efforted effort in the post pandemic era.

Currently, most of the organizations are dependent on IS/ICT, in order to support their business strategies. IS/ICT can promote the implementation of strategies and enhancers of optimization of the various aspects of the business. Not only in market enterprises, but also in social organizations, digital economy and ICTs are important tools that can empower social entrepreneurship initiatives to develop, fund and implement new and innovative solutions to social, cultural and environmental problems. Digitalization is more than a trend and ICTs are common and influence the wellbeing of millions of people virtually everywhere. The pandemic introduce disruption in daylife, way of work, learn and socialize. These challenges bring difficulties for a set of the sectors, such as tourism, aviation, etc.. but also a set o opportunities with new ways to sell, to marketing, to teach and learn, etc. Maybe the world comes to a new level after the pandemic, and digitalization could also improve sustainability, due the possibility to reduce negative impacts in environment, new solutions for social and also new economic opportunities for organizations.

There is currently an extensive literature addressing the main topics on ICTs, entrepreneurship and innovation in an organizational context. However, the extant research is too focused regarding these topics separately. Thus, students, teachers, potential entrepreneurs and even private and public organizations are mainly directed to the mainstream entrepreneurship, innovation or ICTs what means, ultimately, to underestimate a multidisciplinary approach that mix and complement these topics and contributes to the organizations.

The purpose of this book is to present chapters describing research work in an organizational context in order to optimize the practices established in the most diverse domains of knowledge attending to the relation between ICT and sustainability in a post pandemic era. The diversity of the chapters included in the book allows an exploitation of the entrepreneurship, innovation and ICTs, in in the context of COVID-19 Pandemic, to draw attention to multidisciplinary view of these contexts and their influence in the modern organizations in this turbulent times. The book is divided in three main sections:

- Section 1. Challenges for Entrepreneurship in Pandemic Times
  Provide interesting insights about entrepreneurship challenges in the context of COVID-19 Pandemic attending to the diferrent perspectives and in several countries.

- Section 2. Innovative Contributions From ICTs for Sustainable Solutions in Pandemic Times
  This section presents some trends and practices that ivolve digitalization and ICTs as an innovative answer for some challenges faced by organizations in the Pandemic.

- Section 3. Worldwide Practical Examples and Good Practices in the Context of the COVID-19 Pandemic
  This section include chapters more focused examples and good practices around the world.

A brief summary of each chapter is given.

SECTION 1: CHALLENGES FOR ENTREPRENEURSHIP IN PANDEMIC TIMES

Chapter 1. Contextualising Entrepreneurial Activity: A Paradigm Shift in European Countries

The first chapter aims to provide a state of the art of entrepreneurship and complete the literature review with secondary data to support the conceptual models presented. This contribution helps raise the awareness of European policy makers, particularly in countries with a high level of necessity entrepreneurship, of the benefits that opportunity entrepreneurship brings to endogenous growth in their sustainable development model.

Chapter 2. Exploratory and Exploitative Entrepreneurship

This chapter describes exploitative entrepreneurship, which focuses on the development and improvement of existing initiatives, and the types of exploratory entrepreneurship that are revolutionary beyond existing initiatives. The chapter that starts with the introduction section continues with the theoretical and conceptual framework, methodology, discussion, and conclusion sections.

Chapter 3. Realities of Entrepreneurship in the European Union and Other World Countries: Are We Prepared for the New Paradigm After the Pandemic?

This chapter aims to analyse the entrepreneurship framework in the European Union and other world countries before Covid-19 and discuss perspectives for the future. For that it was analysed the information available in the Eurobarometers for the entrepreneurship that was explored through econometric approaches, namely by correlation matrices and factor analysis.

Chapter 4. The Rhetoric of Mass Communication and Media in the Contrastive Sociolinguistics

This chapter presents Kenneth Burke's rhetorical theory and William Labov's sociolinguistic method, analyzing genres and registers in the systemic functional linguistics perspective, to derive a conceptual framework for the study of news report. The resulting framework provides for the identification of news writing style in mass media and other social networks and its performance in language use regarding

the power of words to avoid the ambiguity in situational contexts and to better interpersonal and intercultural communication.

Chapter 5. Transformation of Diplomacy: Digital Diplomacy in the Pandemic and Post-Pandemic Process

In this chapter, the transformation and digitalization of diplomacy within the framework of digitalization is discussed. Primarily, classical diplomacy and public diplomacy will be examined in the study. Then digital diplomacy will be discussed. After digital diplomacy is defined, the use of digital diplomacy during and after the pandemic process will be analyzed.

Chapter 6. Innovation, Entrepreneurship, and Sustainability for ICT Students Towards the Post-COVID-19 Era

This chapter provide an empirical study supported on Structural Equation Model (SEM) to study the drivers of innovation for Information and Communication Technology (ICT) students. Against a background of research on entrepreneurship and sustainability towards the post-COVID-19 era, factors had previously been identified, which promoted innovation among employees.

SECTION 2: INNOVATIVE CONTRIBUTIONS FROM ICTS FOR SUSTAINABLE SOLUTIONS IN PANDEMIC TIMES

Chapter 7. An Empirical Study Into the Impact on Innovation and Productivity Towards the Post-COVID-19 Era: Digital Transformation of an Automotive Enterprise

The purpose of this chapter is to present research describing work in an organizational context in order to optimize the practices established in the most diverse domains of knowledge, attending to the relationships between Information and Communication Technologies (ICTs) and sustainability in the post-COVID-19 pandemic era. An empirical study into the impact of digital transformation via Unified Communication and Collaboration (UC&C) technologies on the productivity and innovation of a global automotive enterprise is thus reported on in the chapter.

Chapter 8. Certified Invoicing Software: Boosting Entrepreneurship, Innovation, and Sustainability in the Post-COVID-19 era

This chapter presents a model is formalized that systematizes the decision-making process related to the requirements underlying certified Invoicing Software (ISW), intending to mitigate the complexity of the process and present an approach that allows mitigating fiscal and financial constraints. Therefore, it is intended to add value, both for organizations that develop ISW and for the client, user of the software.

Chapter 9. Entrepreneurship and Entrepreneurial Ecosystem: Effects of COVID-19 and the Role of ICTs

This chapter provides a review of the concept of entrepreneurship; such as corporate and social entrepreneurships, definition of an entrepreneur and it's key features, motivation factors of entrepreneurship, place of ICTs in entrepreneurship and the basic entrepreneurship terms such as start-up, innovation, research & development, project, business model, business incubator, pitching, maker and capital investments; seed funding, angel investment, venture capital investment and series A-B-C.

Chapter 10. Management and Strategies for Digital Enterprise Transformation: Proposal for the Utility of Neuro-Economics in the Services of ICT

This chapter proposes an approach of neuroeconomics in decision making and behavior. Scientific knowledge will be advanced in the need for the application of neuroeconomics focused on one of the services of the information and communication technologies of companies that is e-commerce of exponential artisanal SMEs of women entrepreneurs, by developing a proposal for a business model to increase the possibility of growth of their companies at the national and international level. The methodology used was deductive, exploratory, descriptive, correlational and documentary.

Chapter 11. Managerial Decision Support in the Post-COVID-19 Era: Towards Information-Based Management

This chapter addresses decision support systems from the perspective of artificial intelligence tools, contributing to a deep transformation of everyday management practices. Attention is paid here to their new development in the quickly transforming post-COVID-19 era and to their role under the post-pandemic conditions. As an original contribution, this chapter presents a vision of information-based management, which far exceed the rather limited pre-pandemic visions of evidence-based management focused primarily on critical thinking.

Chapter 12. Integrated Management Platform for Homeless People

This chapter focuses on the design of a Technology Platform to support the integrated management of Homeless Person in two social organizations. Some functional aspects of the prototypes are presented considering the main objectives of the project. In addition, some physical and technical details relating to the development of the data model are also shown.

SECTION 3: WORLDWIDE PRACTICAL EXAMPLES AND GOOD PRACTICES IN THE CONTEXT OF THE COVID-19 PANDEMIC

Chapter 13. Corporate Social Responsibility (CSR) in Hotels in Austria, Pakistan, and Indonesia: Small and Medium Enterprise Spillover of COVID-19

This chapter discusses the contribution to the recent realm of research on COVID-19 to understand how the pandemic affected the business of SME hotels in Austria, Pakistan and Indonesia, and what strategies and Corporate Social Responsibility were implemented by these while working in this crisis time. It was observed that scholars and managers are involved in the debate about the responsibilities of trade towards society.

Chapter 14. Students' Perceptions About E-Learning Within the Context of the COVID-19 Pandemic: A Study in Brazil and Portugal

This chapter aims to provide academic evidence based on a quantitative study on the impact of the rapid transition from presential to online learning during the COVID-19 outbreak on Portuguese and Brazilian higher education students' perception.

Chapter 15. Surviving COVID-19 Crisis by New Business Model: A Case Study of Indian Restaurant Industry

This chapter discusses a study that explores how the crisis caused by the COVID-19 pandemic has led to adapting to the new business model by the Food Service sector in India. The use of Artificial Intelligence and Machine learning by food aggregators are discussed to make readers understand the benefits such companies enjoy by the relentless pursuit of such technology.

Chapter 16. Exploring the Nexus Among the Business Coping Strategy, Entrepreneurial Orientation, and Crisis Reediness: A Post-COVID-19 Analysis of Pakistani SMEs – Business Coping Strategy Entrepreneurial Orientation and Crisis Reediness

The main objective of this chapter is to examine the impact of business coping strategy and entrepreneurial orientation on the crisis readiness of Pakistani based SMEs. The study has employed a Suraya based method and data is collected with the aid of a questionnaire.

Chapter 17. Ascertaining the Interest of Women to Drive Innovation Through Entrepreneurship Post-Pandemic: A Research Study in the United Arab Emirates (UAE)

This chapter describes a study on the feasibility of offering an entrepreneurship and innovation major at a federal education institution in the United Arab Emirates. The research inquiry ascertained interest of women students in the field of entrepreneurship, identify opportunities that may be available to graduates of this major and validate the industry appetite for such graduates in the Emirate of Dubai, which has its own valley of entrepreneurs and homegrown companies.

Chapter 18. The Impact of Virtual Learning in the Indian Education System

This chapter focusses on that debate and discuss the impact of Virtual learning in Indian Education system due to covid19. The virtual learning is the future, it is a convenient and flexible option and it promotes active and independent learning.

Section 1

Challenges for Entrepreneurship in Pandemic Times

Chapter 1
Contextualising Entrepreneurial Activity:
A Paradigm Shift in European Countries

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ABSTRACT

Given the heterogeneity and plasticity of the concept of entrepreneurship, it is crucial to change the paradigm that has prevailed in some European countries driven by necessity entrepreneurship. The proposed model can be used in some European countries to ensure that the entrepreneurial seed establishes sustainable roots rather than moving unexpectedly away from development. European countries with a similar or higher level of necessity-driven entrepreneurship to Portugal could take advantage of the proposed shift in the entrepreneurial paradigm. This implies countries making changes to policies related to the role of entrepreneurship in their sustainable development, potentially accelerated by EU's 7-year budget and COVID-19 recovery package to minimise the fallout of the COVID-19 pandemic on the economy.

INTRODUCTION

Akerlof and Kranton (2000) argue that individual decisions are often influenced by the behaviour and opinions of others, the demonstration of their identity and by the practical examples they provide. In recent decades, the media has highlighted the benefits of entrepreneurship and this has helped foster the entrepreneurial spirit (Hang & van Weezel, 2007). It is generally accepted in the framework of economic theoretical orthodoxy that the media plays a positive role in developing values of individual entrepreneurship (Golding, 1974).

On the other hand, regional specificities may also have a determinant and natural role in the development of entrepreneurial activities (Reynolds, Storey, & Westhead, 1994). Regional idiosyncrasies could

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obviously attract entrepreneurial activities; that is, high levels of entrepreneurship in a region stimulate further entrepreneurial initiatives (Minniti, 2005). Institutions are also of great importance to the development of entrepreneurship (Baumol, 2002; North, 2005).

Moreover, networking fosters participation in individual entrepreneurship (Klyver, Hindle, & Schøtt, 2007) and cultural values influence entrepreneurial intentions (Liñán & Chen, 2009). Studies have also shown that financial systems are relevant factors (King & Levine, 1993). Overall, it has been argued that entrepreneurship matters for economic growth at both the regional and national levels (Audretsch, Keilbach, & Lehmann, 2006; Baumol & Strom, 2007) and that entrepreneurship is a well-accepted concept that is positively viewed by contemporary society.

However, some studies have suggested breaking down entrepreneurship to test the link between entrepreneurship and economic growth as doubts about this connection have emerged. In this vein, using cross-sectional data on four types of entrepreneurship in the 37 countries participating in GEM 2002, Wong, Ho, and Autio (2005) confirmed that only high growth potential entrepreneurship was found to have a significant impact on economic growth. Furthermore, Acs (2006) uses the GEM data to show that whereas necessity entrepreneurship has no effect on economic development, opportunity entrepreneurship has a positive and significant effect. Adding to these conclusions, entrepreneurship's role in the economy depends on the different stage of economic development in a country (Stel, Thurik, & Carree, 2005).

In short, the effect of entrepreneurship on economic growth is not clear. Above all, it depends on both the typology of entrepreneurship and the level of economic development. Given the gap in the literature, this paper seeks to shed more light on this issue from a conceptual point of view by drawing two development models in which entrepreneurship plays a different role.

We take Portugal as a reference because it is the only country in the last GEM Report (2016/2017[1]) with a Necessity-driven level (% of Total Early-Stage Entrepreneurial Activity) that is equal to the median of European countries (20.8%) and the nearest to their average (20.9%). Based on this criteria, Portugal is the European reference as it may move between the proposed conceptual models. However, other European countries with a similar (or higher) Necessity-driven level to Portugal can also be challenged to adopt the second proposed model, which is related to endogenous growth theory (Barro, 1990; Lucas, 1988; Nelson & Phelps, 1966; Romer, 1986) that nowadays may be fostered by the (investment) recovery plan for Europe presented by the European Commission on 27 May 2020.

An in-depth literature review is important not only to outline hypotheses (Dunne, 2011) but also to preview future scenarios (Amer, Daim, & Jetter, 2013); secondary data can add to this by addressing developmental questions (Greenhoot & Dowsett, 2012) to refine hypotheses (Castle, 2003) or to develop new research designs (Smith, 2008). Drawing on the literature review and secondary data, the referred methods allow us to depict some development models driven by necessity or opportunity entrepreneurship.

The following sections go beyond the state of the art of entrepreneurship and complete the literature review with secondary data to support the conceptual models presented in the section prior to the conclusion. This contribution helps raise the awareness of European policy makers, particularly in countries with a high level of necessity entrepreneurship, of the benefits that opportunity entrepreneurship brings to endogenous growth in their sustainable development model.

THE ORIGINS OF ENTREPRENEURSHIP

Richard Cantillon provided the first economic approach on entrepreneurship in 1755 (Gruber & MacMillan, 2017; Landström, Harirchi, & Åström, 2012). According to Landström et al. (2012), Cantillon's (1680-1734) posthumous work, *Essai sur la Nature du Commerce en Général,* anticipates a market economy with a strong degree of interdependency based on individual property rights (risk adjusted self-employment). In his essay, Cantillon describes an entrepreneur as an investor with a propensity for bearing risk, an activity that promotes economic balance (van Praag, 1999). In this vein, a few years later, the theory of production, distribution and consumption developed by Jean-Baptiste Say (1767-1832) foresees the entrepreneur playing a central role (van Praag, 1999). Regarded by Say as a business leader and a manager (Lordkipanidze, Brezet, & Backman, 2005) relying on experience and qualities of excellence (van Praag, 1999), an entrepreneur is a business and marketing coordinator.

Like Say, Robert Turgot defines the entrepreneur as someone who creates and innovates in order to build something of recognised value (Bruyat & Julien, 2001), deploying resources from less productive areas in more productive ones (Sobel, 2008).

Marshall (1842-1924) was the first economist to advance an appropriate entrepreneurial theory with multidisciplinary factors (Karayiannis, 2009) and he claims that entrepreneurs play a crucial role in social growth as risk-prone businessmen, capital holders, innovators or managers (Zaratiegui & Rabade, 2005).

According to the Mises Institute, Carl Menger (1840-1921) was the founder of the Austrian School of Economics. Menger (1950) emphasises the proactivity of entrepreneurs as they actively strive to make best use of their resources for profit and thus minimise the entrepreneur's tendency to take risk in the profit process.

Joseph Schumpeter (1883-1950), author of the "most quoted work on entrepreneurship" (Ahl, 2006, p. 599) – *The Theory of Economic Development* (1934) – has a marked impact on expert literature (Audretsch, 2003). Schumpeter (1934) highlights the importance of innovation rather than capital accumulation as a condition for the generation of market imbalances and, unlike Marshall's approach, he sees these as disruptive and radical (Loasby, 2013).

The entrepreneurial process involves new businesses in the market that make competing businesses obsolete through innovation (Santarelli & Vivarelli, 2007) and it has been referred to as "creative destruction" (Schumpeter, 1942, p. 83). In fact, according to the author, the capitalist system itself creates favourable conditions for the "creative destruction" process:

The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary process (...) [It is a process] that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of creative destruction is the essential fact about capitalism. (Schumpeter, 1942, pp. 82-83)

Thus, Schumpeter defines entrepreneurs as dynamic elements who focus all their energies on introducing new activities that disrupt the old routines developed by managers (Santarelli, 2006).

Despite differences of opinion among academics, there seems to be some consensus on Schumpeter's thought that entrepreneurship manifests itself in the incessant search for business opportunities through innovation and creativity (Bjørnskov & Foss, 2008). As the concept of entrepreneurship is far from being consolidated from the academic perspective, the variables used to define it by academics also differ.

Given the specificities of the phenomenon of entrepreneurship, this paper first sheds light on the concept itself by distinguishing between necessity entrepreneurship and opportunity entrepreneurship. Next, it outlines some factors related with the entrepreneurial activity that may have an impact on Portugal. The purpose of this paper is to unveil the weaknesses of the model followed in recent decades with a view to defining the changes that must be made to the entrepreneurship paradigm in Portugal and some other European countries.

THE CONCEPT OF ENTREPRENEURSHIP

As Schumpeter's work had a marked impact on specialist literature, it is hardly surprising that his work on entrepreneurship has been addressed by academics from many disciplines (Audretsch, 2003). Indeed, Drucker (1985) refers to entrepreneurship as an innovative action, a momentum that combines existing resources with the new ability of producing value and wealth.

In this process, businesses are viewed as important economic drivers through the dissemination of innovation and the consequent creation of employment opportunities (Acs, Parsons, & Tracy, 2008; Henrekson & Johansson, 2010). According to Acs and Armington (2006) and Audretsch et al. (2006), entrepreneurship makes a unique contribution to economic growth through knowledge and the marketing of new ideas which would otherwise never be implemented. From a dynamic perspective, entrepreneurs are not only job creators (Malchow-moller, Schjerning, & Sorensen, 2011), but can also act as agents of change as entrepreneurship means creating new businesses, using new techniques, creating new forms of organising production, introducing new products or even opening up new markets (Wennekers, Uhlaner, & Thurik, 2002). The emergence and proliferation of innovative ideas takes us back to the prevalence of "creative disruption" which, as a microeconomic process, has a relevant macroeconomic impact on economic growth (Aghion & Howitt, 1998) and leads Baumol (2010) to view entrepreneurship as the fourth factor of production. In fact, fierce competition as a constant generator of new forms of competitive advantages neutralises competitors' competitive advantage, destroys it, or makes it obsolete, (D'Aveni, 1999; Gimeno & Woo, 1996).

On the other hand, for Kirzner (1979), an economist closely identified with the Austrian School led by Ludwig von Mises (1881-1973), entrepreneurial activities are a consequence of opportunities detected in the market. As regards Kirzner's analysis, Davidsson (2004) proposes a systemic view of entrepreneurship (understood as the entry of new businesses into the market), which drives the market process and develops the economy through diversified mechanisms. George, Parida, Lahti, and Wincent (2016) emphasised the identification and exploration of new business opportunities as prominent factors for entrepreneurship. In addition, Hitt, Ireland, Sirmon and Trahms (2011) highlight the importance of sources and processes in the detection, evaluation and exploration of opportunities but also the role of individuals in this respect.

Even though Schumpter's and Kirzner's approaches diverge, they are not necessarily mutually exclusive. Therefore, based on Hébert and Link (1989), Bul and Willard (1993) and Lumpkin and Dess (1996), Wennekers and Thurik (1999) propose a hybrid version of entrepreneurship which stresses the importance of resources (in light of the resource-based business theory) and the uncertainty of the entrepreneurial process. According to these authors, entrepreneurship is the ability and willingness (of people individually or as part of a group inside or outside the organisation) to: (i) detect and create new economic opportunities (by introducing new products, new production methods, new organisational

structures and new product/market combinations) and (ii) introduce new ideas in the market and deal with uncertainty by means of a number of decisions on the location, the form and use of resources and the form and interaction with the institutional reality.

For instance, the prevailing concept of the OECD is rooted in a dual economy model (innovation and opportunity identification), whereas entrepreneurship is characterised by human entrepreneurial action aimed at the production of added value through the identification and exploration of new products, processes or markets (Ahmad & Seymour, 2008).

In the realm of management, Sahlman and Stevenson (1991, p. 1) define entrepreneurship as a "form of management oriented towards the pursuit of opportunity, regardless of the resources under control". In this line of thought, Timmons (1994, p. 7) also describes entrepreneurship as "the process of creating or identifying an opportunity and implementing it regardless of the resources under control at the moment".

Despite being present in both economics and management, the central role played by the individual in the entrepreneurial process as a function of their personality, behaviour and education/training is also an object of study.

Aware of the individual's role in the entrepreneurial process, Baumol (1968, p. 67) even argues that "trying to understand entrepreneurship without understanding entrepreneurs is like trying to understand Shakespeare without taking Hamlet into consideration". In this sense, Rauch and Frese (2007) refer to some aspects that help describe the personality of an entrepreneur: (i) the need for success, (ii) the propensity to take risks, (iii) the ability to innovate, (iv) the need for autonomy, (v) the need to control, and (vi) the ability to address particular situations and especially to solve problems. Entrepreneurs are positivistic (Baron & Tang, 2011), optimistic (Hmieleski & Baron, 2009), self-confident (Cesarini, Lichtenstein, Johannesson, & Wallace, 2009; Koellinger, Minniti, & Schade, 2007), motivated by conquest and goal achievement (Stewart & Roth, 2007), with high cognitive and creative ability (Deary, Spinath, & Bates, 2006; Plomin, 1999) and prone to risk taking (Cesarini, Dawes, Johannesson, Lichtenstein, & Wallace, 2009; Simon & Houghton, 2003).

Despite the multidisciplinary nature of the concept, entrepreneurship integrates concepts that bring together some influences from the main disciplines. This is the case with the concept of entrepreneurship as proposed by Kuratko (2013, p. 5):

Entrepreneurship is a dynamic process of vision, change and creation. It requires an application of energy and passion toward the creation and implementation of new ideas and creative solutions. It includes essential ingredients such as: the willingness to take calculated risks – in terms of time, equity, or career; the ability to formulate an effective venture team; the creative skill to marshal needed resources; and fundamental skill of building solid business plan; and finally, the vision to recognize opportunity where others see chaos, contradiction, and confusion.

Entrepreneurship and Regional Development

The impact of entrepreneurship on the economy has been analysed at corporate, sector or region levels, rather than on a comparative cross-national basis (Stel et al., 2005). At the national level, the GEM's annual reports provide relevant indicators of the state of the art of entrepreneurship, i.e. *Total Entrepreneurial Activity* (*TEA*). *TEA* represents the percentage of the population with abilities to develop a professional activity directly related with business creation, both at the initial stage (emerging entrepreneurs) and 42

months after the business has been established (new business owners/managers) (Amorós, Ciravegna, Mandakovic, & Stenholm, 2017; Bosma, Wennekers, & Amorós, 2012).

A country's level of economic development is also an important factor in explaining the dynamics of its entrepreneurial activity (Arin, Huang, Minniti, Nandialath, & Reich, 2015; Bosma & Schutjens, 2011). For instance, Amorós and Bosma (2014) argue that the relationship between gross domestic product (GDP) per capita and entrepreneurial activity is negative for all but the richest countries, where the relation becomes positive though less significant. However, some authors postulate an inverse relationship between GDP per capita and entrepreneurial activity (Stel et al., 2005). Some say it is only a partial relationship and describe a convex curve between entrepreneurship and GDP per capita (Amorós & Bosma, 2014; Wennekers, Stel, Carree, & Thurik, 2010). More recently, the negative effect of necessity driven entrepreneurship on GDP per capita was found by Doran, McCarthy, and O'Connor (2018) in 55 countries represented in GEM over the time period 2004–2011.

Necessity Entrepreneurship vs Opportunity Entrepreneurship

Necessity entrepreneurship, as opposed to opportunity entrepreneurship, can explain the inverse relationship between the two factors (Reynolds, Camp, Bygrave, Autio, & Hay, 2001). This is due to the fact that necessity entrepreneurship is more dependent upon economic conditions than opportunity entrepreneurship, which has intrinsic motivations such as the desire for independence or self-fulfilment (Liñán, Fernández-Serrano, & Romero, 2013). That is, entrepreneurship is promoted in economies as a form of survival, which explains the high levels of entrepreneurship, i.e. necessity entrepreneurship, observed in some countries[2]. In sum, whereas necessity entrepreneurship derives from the belief that the creation of an own business will be of more utility to its promoter, opportunity entrepreneurship is mainly focused on the latent identification of an opportunity stemming from an innovative idea (Valdez, Doktor, Singer, & Dana, 2011). Based on empirical approaches, Brás and Soukiazis (2014, 2015) discussed the determinants of opportunity and necessity entrepreneurship concluding for desirable policies that lead to innovation.

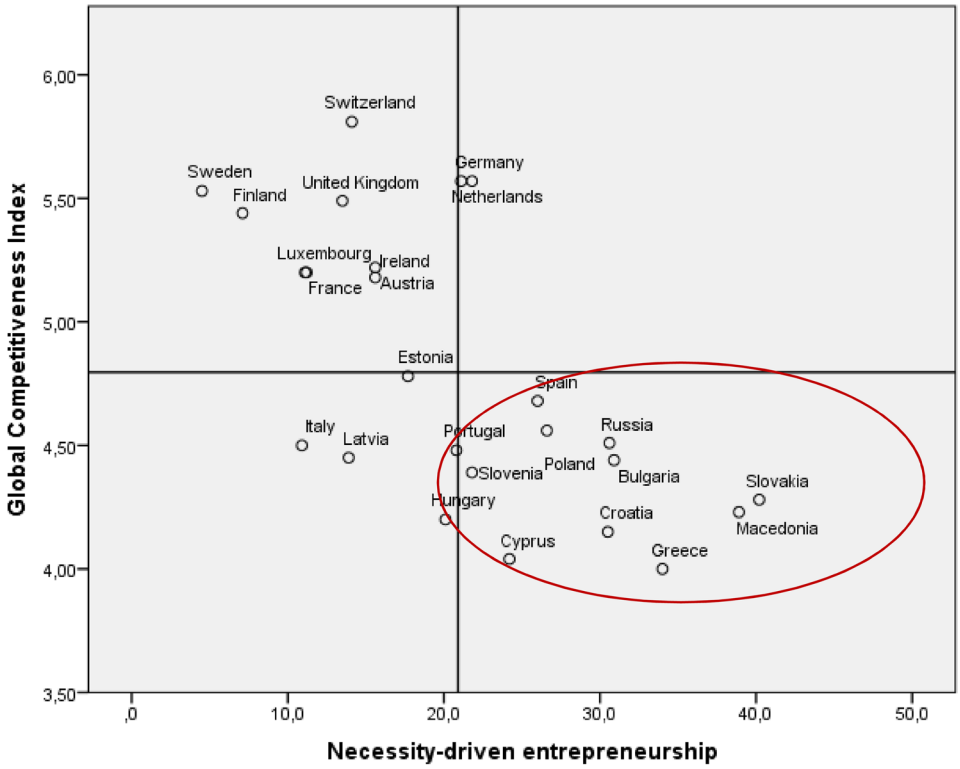
While the added value generated in necessity entrepreneurship is ephemeral and economically negligible (Amorós et al., 2017), George et al. (2016) argue that opportunity entrepreneurship (sometimes associated with technology entrepreneurship) is a generator of high added value for the economy. Contrary to necessity entrepreneurs, opportunity entrepreneurs tend to think about engaging in internationalisation (Mejri & Umemoto, 2010) and knowledge acts as a moderator in identifying international opportunities (Vaghely & Julien, 2010).

Although the following sections focus on Portugal and blend economic development (measured by the global competitiveness index) with necessity-driven entrepreneurship, other European countries in a similar position (countries circled in Figure 1) would also benefit from adopting an economic policy based on the proposed model through opportunity entrepreneurship.

Indirectly and according to Stam (2008), public R&D spending (as part of innovation policy) could increase opportunities for new firms (part of entrepreneurship policy). However, this might not be the case for the circled countries in Figure1.Therefore and based on the World Bank data for the latest available year (2017), all circled countries are below the average of expenditure on R&D as a percentage of GDP in the EU-28.

Figure 1. Countries' positioning on the Global Competitiveness Index and on Necessity-driven entrepreneurship.

Note. Author's own elaboration based on Global Competitiveness Report (2016/2017) and GEM Report (2016/2017). The line on the x-axis represents the average of necessity-driven entrepreneurship in the European countries presented in GEM Report (2016/2017); the line on the y-axis represents the average of Global Competitiveness Index of these European countries.



ENTREPRENEURSHIP'S RELATIONSHIP WITH OTHER DIMENSIONS

Unemployment as the Driving Force Behind Entrepreneurship

A series of empirical studies (Cueto, Mayor, & Suárez, 2015; Røed & Skogstrøm, 2014) have demonstrated that unemployed individuals have a higher probability of starting their own business than those in work; in Portugal, it was found that the rise in unemployment led to increased entrepreneurial activity in subsequent periods (Baptista & Preto, 2007) – the so-called "push effect" towards entrepreneurship. That is, necessity entrepreneurship derives from a survival and/or subsistence instinct when a person is unemployed, the job market is saturated or even when there is a professional/academic mismatch between the individual and the market. Mühlböck, Warmuth, Holienka, and Kittel (2018) define this as "desperate entrepreneurship". In fact, this is a survival strategy people adopt when the government fails to fulfil its legal, social and even constitutional responsibilities.

Given that one of the main characteristics of necessity entrepreneurship is that unemployment is a driving force for a country's entrepreneurial activity (Reynolds, Bygrave, & Autio, 2003), the sustain-

ability of the new businesses in Portugal may be called into question due to the prevalence of "subsistence entrepreneurship" (Baptista & Preto, 2007, p. 222)

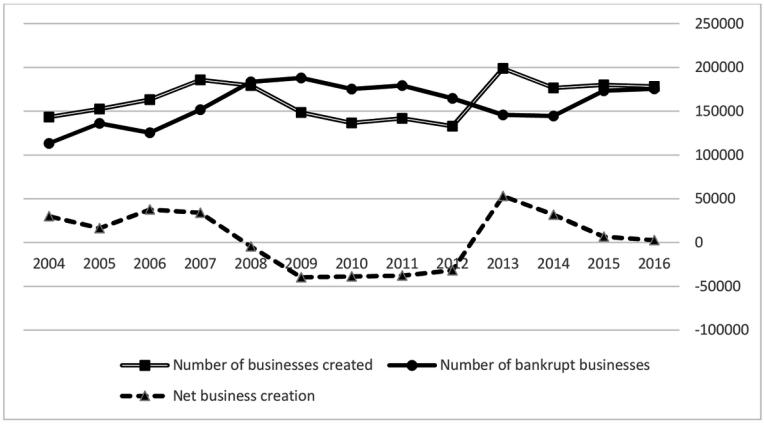
Unemployment can lead to people creating their own business as a means of survival and this creates conditions that foster business failure (Santarelli & Vivarelli, 2007), the difficulties caused by unemployment, including the urgent need to find a means of subsistence by creating one's own business, create conditions that foster business failure. The authors claim that rather than contributing to economic growth or technological change, these "failures" stimulate the appearance of too many new businesses and market turmoil. While unemployment has undoubtedly contributed to entrepreneurship in Portugal (Baptista & Preto, 2007), the question remains as to whether the country is experiencing corporate turmoil.

Corporate Turmoil

Corporate turmoil can be understood as the involuntary exit processes of several firms in the same industry (Yayla, Yeniyurt, Uslay, & Cavusgil, 2018). According to Minniti, Bygrave, and Autio (2005, p. 10), "countries that primarily exhibit opportunity-driven entrepreneurship seem to show a lower share of early-stage business failures than countries with higher shares of necessity-driven entrepreneurship".

Figure 2 shows an increase in corporate turmoil from 2004 which manifests itself in a significant rise in the number of businesses declaring bankruptcy in Portugal, calling their sustainability into question.

Figure 2. An overview of Portuguese businesses
Source: Statistics Portugal Database



The survival rate of national businesses also helps explain corporate turmoil in the country. According to data from Statistics Portugal (2012), the survival rate of national businesses decreased by 10.2 percent points (pp) between 2006 and 2010. In fact, Portugal is currently one of the EU countries with the lowest survival rate of young businesses. According to the survey *25 Years of European Portugal* (Augusto Mateus & Associados, 2013), only three out of 10 businesses created in 2004 were still operating five years later. Between 1998 and 2012, Eurostat and OECD statistics confirm that the increase in the Portuguese business mortality rate is cross-cutting to all activity sectors: (i) extractive industries (up 5.7 pp), (ii) processing industries (up 9.0 pp), (iii) building (up 13.2 pp), (iv) trade (up 12.5 pp) and

(v) hospitality and food industry (up 17.2 pp). Nevertheless, we must emphasise that there is greater turmoil in the Portuguese market in industries at a higher stage of development, as noted by Baptista and Karaöz (2011) for the period between 1986 and 1993. More recent statistics from Statistics Portugal show that the one-year survival rate of Portuguese enterprises between 2005 and 2015 fell by 4.1 percent points. That is, 77% of the enterprises established in 2005 were still operating in the market one year later, compared with just 72.9% of companies formed in 2015.

In the last ten years, the growing number of bankruptcies and firm mortalities along with the decrease in the business survival rate in Portugal show the merry-go-round of the national market with businesses coming in and out. An analysis of Portuguese startups reveals that about two-thirds reach the third year of activity but this goes down to approximately 30% after seven years (Brás & Preto, 2018).

To sum up, business turmoil has no significant effect on economic growth and does not have a structuring impact on the real economy (Audretsch & Fritsch, 1996).

Parallel Economy

Despite the various concepts of parallel economy, it is clear that "it is representative of a non-official economy" (Fleming, Roman, & Farrell, 2000, p. 388). The link between entrepreneurial activity and the informal economy is discussed in depth by Webb, Tihanyi, Ireland, and Sirmon (2009), Bureau and Fendt (2011), Williams and Nadin (2010) and recently by Fredström, Peltonen, and Wincent (2020). For instance, in Nigeria entrepreneurial activities enable illegal cross-border trade and take place in an environment of long-standing illegality and corruption (Fadahunsi & Rosa, 2002). As such, in behavioural terms, necessity entrepreneurs are typically agents that contribute to the proliferation of the parallel or unofficial economy (Maldonado, 1995; Williams, 2007). In this respect, a study conducted by Schneider (2015) shows that the contribution of the parallel economy to the Portuguese GDP (17.6% of the GDP in 2015) is significantly higher than the average of Western European countries (about 12.92% of the average GDP in 2015).

Another repository, the Observatory on Economics and Fraud Management of the Faculty of Economics of Oporto University, allows us to draw specific conclusions about the national economy. According to Observatory researchers, Afonso and Soares (2016), the share of the unofficial economy in GDP in Portugal rose roughly 17 percent points in 1970 to about 27.29% of GDP in 2015, and the upward trend in the unofficial economy in Portugal remains. For a clearer notion of these figures, the parallel economy amounted to 44,183 million euros using average prices of 2012; this is about 56% of the total amount lent to Portugal by the Troika as part of the financial assistance programme.

The Creation of Self-Employment

Although the creation of self-employment may be based on a carefully deliberated project that meets the aspirations of the entrepreneur (opportunity entrepreneurship), it is estimated that the typical reason for the generation of self-employment is that promoters have no other professional alternatives in the labour market (necessity entrepreneurship) (Margolis, 2014). In fact, as pointed out by de Vries, Liebregts, and Stel (2013, p. 5), "it is likely that necessity-driven entrepreneurship can be found especially among the solo self-employed".

The proximity between self-employment and necessity entrepreneurship has even led some authors to measure necessity entrepreneurship using self-employment as a variable and to consider that "self-

employment is a good proxy to identify those entrepreneurs by necessity" (Llisterri, Kantis, Angelelli, & Tejerina, 2006, p. 2). COMPENDIA statistics[3](2011) reveal that, in 2011, Portugal had the sixth highest rate of self-employment of the thirty OECD countries in the database, behind Greece, Mexico, South Korea, Turkey and Italy.

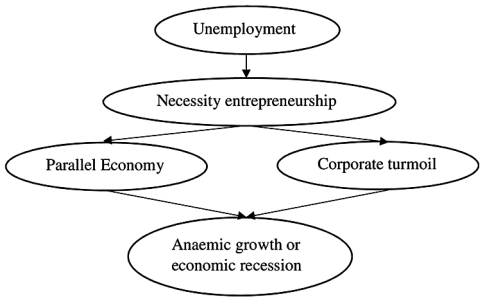
If we look at the countries in the EU database (19 countries in all), the self-employment rate in Portugal is the third highest - lower than only Greece and Italy. This database also shows that Portugal's self-employment rate in 2011 was 18.4%, i.e. 18 out of 100 employed people started their own business. This is significantly higher than the average self-employment rate in the thirty OECD countries (13.9%) or the abovementioned 19 EU countries (13.4%). Available data (2011) suggest that, compared with other countries, Portugal has a marked propensity to generate self-employment, thus confirming necessity as the prevailing trend in the classification of the country's entrepreneurial activity. Latest data from the Eurostat database confirms Portugal's self-employment rate of 15.555% in 2019, higher than the EU-28 mean (13.560%) and median values (12.879%) and included in the upper quartile of the EU-28 member states. Also OECD (2020) data confirm this propensity for self-employment in Portugal in 2019 (16.859% of total workforce) relative to the rate of the 19 EU countries in the database (14.711%) or even the EU-28 (15.272%); in fact, it is also included in the upper quartile of OECD countries.

ENTREPRENEURSHIP AND DEVELOPMENT MODELS

The Entrepreneurial Model Followed in Recent Years

While high unemployment rates trigger necessity entrepreneurship, on the other hand they feed the parallel economy and foster the constant in and out of businesses in the market (turmoil), thus contributing to anaemic growth or even to periods of economic recession. In sum, the absence of economic growth leads to higher or stagnant unemployment rates - Figure 3.

Figure 3. First conceptual model (based on necessity entrepreneurship)



The confirmation of necessity entrepreneurship in Portugal and of anaemic growth alternated with periods of economic recession over the last 15 years suggests the need for a reflection on whether or not we are taking the right path, not only in Portugal but in other European countries at a similar develop-

ment level. Overall, necessity entrepreneurship can even contribute to inequality (Halvarsson, Korpi, & Wennberg, 2018).

Unfortunately, judging from the recent disinvestment in education and R&D in Portugal[4], the second hypothesis is more likely: persistence (in error) may cause irreparable harm to the future of Portugal and Europe as a whole. Moreover, does this conceptual framework allow for the sustainable achievement of the much sought-after objective of mitigating the immediate shocks of the COVID-19 pandemic crisis? Apparently not, and entrepreneurial startups are facing the greatest obstacles, particularly on them financing processes (Brown, Rocha, & Cowling, 2020).

Challenges for the Future: Proposal of a New Model

In the absence of monetary policy instruments in EU zone, issues related to international commerce such as the supremacy of China in international commerce and the openness of the EU towards cannot be ignored. Today, leading by cost, i.e. having a lower cost structure that takes advantage of comparatively lower market prices, is a utopia that makes no allowance for the voracity of Asian economies, with China at the top of the list.

The specifics of the international market in conjunction with the Portuguese economy's current level of maturity vis-a-vis that of other transition economies clearly show Portugal's positioning in the EU and the world through the differentiation of the products/services offered (via innovation, quality, design, sustainability and others). It will be only possible to build the foundations for a truly competitive Portuguese and European economy in this modern, global world by consolidating this positioning without using the low salary policy as a competitive model. This positioning is based on a differentiation strategy rather than a cost leadership strategy.

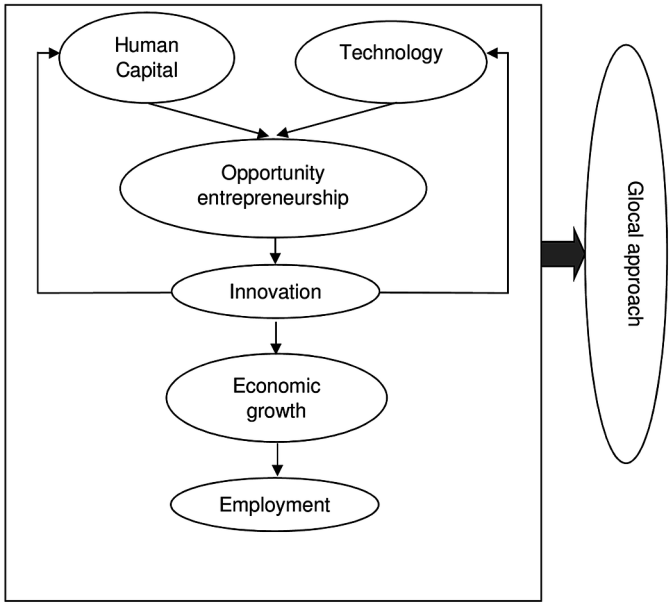
In fact, entrepreneurship can be a keystone for Portugal and all European countries in achieving a competitive positioning through differentiation, which is associated to the opportunity entrepreneurship (Block, Kohn, Miller, & Ullrich, 2015). Moreover, knowledge and science play a critical role towards sustainable development opportunities (Patzelt & Shepherd, 2011). This is dependent on the creation of conditions for the entrepreneurial seed to germinate (opportunity entrepreneurship) or to die (necessity entrepreneurship). Creating conditions that favour germination implies a significant change in the development model that has been adopted in Portugal and in some European countries. In fact, those desirable changes might be accelerated by the COVID-19 pandemic crisis through UE aggressive policies to support investment and to avoid a deeper recession (Fornaro & Wolf, 2020).

The announced UE investment may favour conditions centred around the endogenous growth theory (Lucas, 1988; Nelson & Phelps, 1966; Romer, 1986) in which investment in human capital and technology plays a crucial role in the paradigm shift of economic development in both Portugal and other European countries. The conceptual model in Figure 4 is in line with the vision of Wennekers and Thurik (1999) and shows the relationship between entrepreneurship and economic growth.

In Portugal and European countries with a similar positioning (Figure 1), an actual shift in the current entrepreneurial paradigm can only be implemented with a model founded on the endogenous growth theory. As an inherent part of opportunity entrepreneurship, innovation will enhance economic growth (from a Schumpeterian perspective) and create systemic conditions for the promotion of human capital and technology.

From the perspective of effective market opportunity, this context not only ensures the creation of employment but also the ability to reinvent the original endogenous elements (human capital and

Figure 4. Second conceptual model (based on opportunity entrepreneurship)



technology) over time. Therefore, it appears that the global COVID-19 pandemic has favoured investment in technology (Papadopoulos, Baltas, & Balta, 2020) and may contribute to highly qualified staff in startups (Miao, Schwarz, & Schwarz, 2021), thus providing a real opportunity for more equal and sustainable societies (van Barneveld et al., 2020). In addition, in microeconomic terms, the prevalence of opportunity entrepreneurship would enhance the development and validation of business routines that are crucial for the much sought-after success in international markets (Knight & Cavusgil, 2004).

Despite this international characteristic of entrepreneurship and assuming scale economies up to a point (Acs, Desai, & Hessels, 2008), given the reported high risk of the interconnectedness of the global population fostering the global spread of new epidemics, this risk should be faced as real from now on (Lee et al., 2020). The World Health Organisation has repeatedly drawn attention to the growing trend of pandemic risks over the years and the lack of countries' preparedness (Boyd, Baker, & Wilson, 2020) and this can no longer be ignored. The time is right to follow the sustainable path of entrepreneurship (Lüdeke-Freund, 2020) and therefore the current framework of avoiding unnecessary travel, promoting local production and smart growth (Goffman, 2020) and the increase in remote work (Brynjolfsson et al., 2020; Gupta, 2020) should be the pillars for a glocal approach to startups. The approach taken by startups should be "adapted locally but with a globally cooperative ethic" (Goffman, 2020, p. 48) attending climate change meetings whilst maintaining an international position.

However, the adoption of this development model depends on the specific contexts in which they are embedded. In fact, bearing in mind that the 'single market, innovation and digital'; 'cohesion, resilience and values'; and 'natural resources and environment' are the biggest development areas of the EU's 7-year budget - Multiannual financial framework (MFF) and COVID-19 recovery package, we should be confident that further steps will be taken towards favourable and sustainable entrepreneurial ecosystems across the EU countries and in line with Figure 4.

Although quantitative easing has been an essential monetary policy tool to maintain low long-term interest rates in the EU (Kiley, 2018), in addition to this programme the European Central Bank (ECB) launched on March 2020 a €750 billion Pandemic Emergency Purchase Programme. The ECB's monetary policy has been very favourable to new investments, but it was reinforced due to the COVID-19 pandemic. For advanced and emerging markets, the International Monetary Fund (2020, p. x) estimates that increasing public investment by 1% of GDP "has the potential to, within two years, push up GDP by 2.7 percent, private investment by 10 percent, and most importantly to create between 20 and 33 million jobs directly and indirectly".

In the COVID-19 pandemic context, the EU member states have the last word on how to face the crisis. The conditions are right, unfortunately due to the pandemic, to implement a desirable countercyclical economic policy and to change from a model based on necessity driven entrepreneurship to a development model driven by opportunity entrepreneurship, based largely on productive and sustainable investments. Therefore and aligned with our model but based on a perspective of climate change and economic sustainability, Hepburn, O'Callaghan, Stern, Stiglitz, and Zenghelis (2020) suggest policies such as investment in education and training, natural capital investment, and clean R&D, among others.

But the question remains: why does it take a pandemic for some efforts in the human capital, innovation, knowledge and sustainable domains in the scope of the endogenous growth theory to be noticed?

CONCLUSION

We should bear in mind that the levels of both internationalisation and entrepreneurial dynamics are key factors for development and growth. However, in the absence of endogenous growth mechanisms (human capital and technology), we run the risk of sailing without a compass, knowing only that today's problems will remain the same tomorrow. For the benefit of economic development and from the perspective of endogenous growth in Europe, it is urgent for entrepreneurship to foster, not hamper, innovation dynamics – "we need to change the way we think about entrepreneurship" (Shane, 2008, p. 160). After all and during these postnormal times we are going through, "the very nature of change is changing"(Mayo, 2020, p. 70) and an undesirable disease like COVID-19 might push us towards a new development model in European countries, while entrepreneurship can help in the transition to a more sustainable and circular economy (Neumeyer, Ashton, & Dentchev, 2020) with a glocal approach.

Nevertheless, most of the variables used in this analysis relate to the Portuguese environment and the models presented are merely conceptual, thus constituting a limitation of this study. Further quantitative developments using (dynamic) panel data models or simultaneous equations for European countries can confirm (or reject) these theoretical approaches.

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KEY TERMS AND DEFINITIONS

Endogenous Growth Theory: Based on investment in human capital, innovation, technology and knowledge, this theory holds that in a knowledge-based economy positive and spillover effects will lead to economic development.

Glocal Approach: An approach followed by firms competing in global markets in which they adapt their services/products to meet each market needs/idiosyncrasies.

Necessity Entrepreneurship: Derives from a survival and/or subsistence instinct when a person is unemployed, the job market is saturated or even when there is a professional/academic mismatch between the individual and the market.

Opportunity Entrepreneurship: Is mainly focused on the latent identification of an opportunity stemming from an innovative idea.

ENDNOTES

1 The latest one with data directly related with Necessity-driven level.

2 2018 GEM's Report confirms Angola, Guatemala, Chile, Lebanon and Peru as the five countries with the highest TEA (out of 49 countries).

3 Comparative Entrepreneurship Data for International Analysis; a discontinued database specifically designed by EIM Business and Policy Research to measure self-employment in OECD countries.

4 According to the latest effective data from Portuguese Direction of Education and Science Statistics, funding allocated to R&D in 2019 (private and public sectors) is significantly below (1.41% of GDP) than a decade ago (in 2009 corresponds to 1.58% of GDP). Moreover and according to the same source, funding allocated to R&D in Higher Education fell from 0.58% of GDP to 0.57% in the same period. To complement this conclusion, based on official data from the General Direction of the Portuguese Budget for the same period, public spending on education as a percentage of GDP decreased one percentage point.

Chapter 2
Exploratory and Exploitative Entrepreneurship

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ABSTRACT

Entrepreneurship is a developing issue that provides sectoral and economic development of today's world. New entrepreneurship ideas are constantly developing with digital innovations, technology, social, and political influences. The introduction of the entrepreneurship thought with an existing and beyond idea along with these effects will give a different perspective to this field. Sustainability problems that arise after the implementation of existing enterprise ideas reveal two important types of entrepreneurship introduced into the literature: exploratory and exploitative entrepreneurship. This chapter describes exploitative entrepreneurship, which focuses on the development and improvement of existing initiatives, and the types of exploratory entrepreneurship that are revolutionary beyond existing initiatives. The chapter that starts with the introduction section continues with the theoretical and conceptual framework, methodology, discussion, and conclusion sections.

INTRODUCTION

Risks and opportunities are two crucial factors in the development of entrepreneurship nowadays. The change in the requirements of the age and the endless needs of the consumers are increasing the competition, causing risks and opportunities to come to the fore. Social, political, economic, technological, and extraordinary events change the entrepreneurship approach (Pathak & Muralidharan, 2020). Different entrepreneurship ideas may be required when the outcomes of entrepreneurship, such as business, firm, company, process, product, and service, are not sufficient to meet today's needs. Different and new entrepreneurship ideas arise when existing entrepreneurship does not meet the needs. To meet and satisfy endless consumer needs, revolutionary new entrepreneurial ideas must be put forward and implemented. Because the level of competition increases with globalization, and creative ideas increase even more thanks to digital innovations (Wiesböck & Hess, 2020). The sustainability of organizations depends entirely

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on new entrepreneurial ideas in the context of new processes, markets, products, services, and sectors. Organizations that cannot adapt to change are doomed to disappear (Floricic & Sker, 2020). A new type of entrepreneurship introduced by this idea is exploratory entrepreneurship. This type of entrepreneurship is inspired by extraordinary situations, future expectations, superior competitiveness, endless consumer needs, and superior creative power (Foss, Klein, & Bjørnskov, 2019). This type of entrepreneurship is based on social exchange and organizational change management theories (Pudjiarti, 2018).

The implementation of the venture idea and creating a process depends on resources and capital in a significant manner. This dependency takes place with the ability to adapt to environmental changes, a sustainable strategy, and a functional organization. Possible risks in the implementation of the entrepreneurial idea in the face of extraordinary situations such as a pandemic, wars, social and political events, economic crisis may require the maintenance and improvement of the existing entrepreneurship idea. Thus, actions are provided to protect and improve the current situation instead of using resources for a new entrepreneurial idea (Smith, Sardeshmukh, & Syed, 2019). The improvement and protection of existing entrepreneurship maintain the commitment of the existing customer mass to innovative products and services by preventing possible losses. The type of entrepreneurship that this approach puts forward is exploitative entrepreneurship. The inspiration for this type of entrepreneurship is the loss of resources by risks, the sustainability of the organization, promotion, resource dependence, and intrapreneurship.

In the literature, types such as intrapreneurship, women's entrepreneurship, social entrepreneurship, corporate entrepreneurship are tried to be explained (Foss et al., 2019). These entrepreneurship types are based on the organization or individual who has an impact on the idea of entrepreneurship (Dwivedi & Weerawardena, 2018). Although conceptual definitions related to entrepreneurship point to the elements of entrepreneurship, they cannot present a detailed examination of existing or new entrepreneurship. On the other hand, the entrepreneurship types introduced to the literature are far from revealing the principles of entrepreneurship. Entrepreneurship is an important issue that needs to be examined in the context of the process, principles, elements, strategy, entrepreneurial characteristics, risk, and competitive characteristics. Therefore, in this chapter, it is aimed to define and explain the types of exploratory and exploitative entrepreneurship that are newly introduced to the literature. The aim of the chapter is to reveal the principles by determining the elements of both types of entrepreneurship.

In the Chapter, Exploratory Entrepreneurship is explained together with the principles of 4N4C2S. These principles include new processes, new strategies, new investments, new ventures, creative innovations, competitive initiative, crisis and conflict management, cre-activeness and proactiveness, superior risk-taking, self-renewal. Exploitative entrepreneurship is explained with the elements of the development of the current enterprise model, avoiding risks, ensuring the opportunity-cost balance, strategy and process improvement, proactiveness and reactiveness, maintaining resources. Both types of entrepreneurship are handled in the context of risk, opportunities, strategy, and level of competition. The targeted audiences of the chapter are academicians, practitioners, and policymakers working in the fields of entrepreneurship, business, management and strategy, organizational behavior.

RESEARCH METHODOLOGY

This study was prepared by a systematic review method including the analysis and synthesis of qualitative and quantitative data, one of the qualitative research methods. Identification, review and research, classification and data analysis, summarization, extracting data, discussion, and presentation processes

were followed respectively. Following the purpose of the study, first of all, the research question was determined as follows: What are the exploratory entrepreneurship and exploitative entrepreneurship, and what are their dimensions?

In the study, the keywords were determined in accordance with the research question as follows: Exploitative entrepreneurship: existing enterprises, existing entrepreneurship idea, maintaining resources, development of entrepreneurship; exploratory entrepreneurship: revolutionary initiatives, creating innovations, competitive initiative, new entrepreneurship ideas (Petticrew & Roberts, 2008). Keywords were searched on Web of Science, Emerald Insight, Taylor & Francis, SAGE Open, Oxford, Cambridge Journals, ScienceDirect, Scopus, SpringerLink, Wiley Online Library and Google Scholar databases. Articles detected in these databases were classified. Themes, titles and content were created as a result of the classification process performed with content analysis (Kitchenham & Brereton, 2013). Irrelevant data were then removed and excluded from the study. Content and scope were reassessed (Komba & Lwoga, 2020). The final study was revealed by inductive and deductive methods.

EXPLORATORY ENTREPRENEURSHIP

Exploratory entrepreneurship is the realization of revolutionary initiatives, unlike existing ones. In this type of entrepreneurship, entrepreneurial action is beyond the existing initiatives. Existing initiatives can be inspired, but new ones are not a continuation of existing ones. In this context, exploratory and creative entrepreneurship emerges (Holtkamp et al., 2017). Entrepreneurship is a set of new values with economic value for consumers by creating innovations in processes, products, and services. Entrepreneur applies new values to products and services with economic thought. The transformation of manufacturing factors, individual skills, and ideas into opportunities with the risk factor constitutes the entrepreneurial act (Bernard & Barbosa, 2016). Therefore, entrepreneurship is important in terms of the relationship between opportunities and values with innovations.

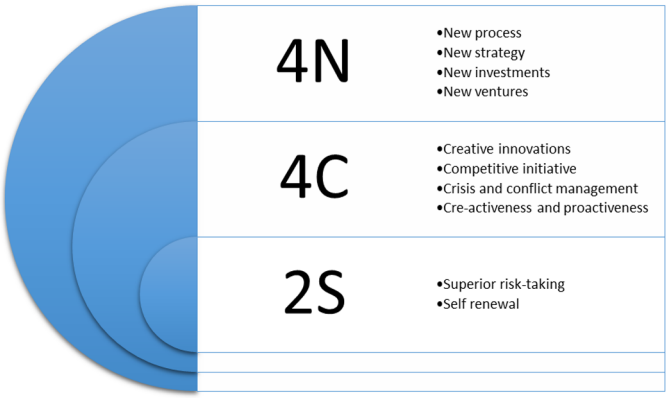
The entrepreneur does not have to be satisfied with the innovation, value, and processes that come with the current entrepreneurial action. Generally, digital transformation, the increase of digital enterprises, increasing competition, changing consumer needs trigger discovery actions that will reveal the new entrepreneurial idea (Szalavetz, 2020). Because after the current entrepreneurship idea turns into action, it may not be enough to meet the needs that arise often. Improving existing entrepreneurship may not be effective in meeting this need. In this case, creative new ideas should be applied and transformed into entrepreneurial action (Newman et al., 2018).

Exploratory entrepreneurship consists of ten basic elements and is coded as 4N 4C 2S: New process, new strategy, new investments, new ventures, creative innovations, competitive initiative, crisis and conflict management, cre-activeness, and proactiveness, superior risk-taking, self-renewal (figure 1).

New Process

The process is an important factor that enables planning and strategy in entrepreneurship. The formation of the entrepreneurial idea, the implementation of the idea, the determination of environmental factors, the determination of risks and opportunities, the creation of new value, the determination of profitability, the use of human and other resources, the distribution of resources to production and service channels, and the evaluation of efficiency require a certain process (Pryor et al., 2016). Gaining competitive

Figure 1. Exploratory entrepreneurship factors



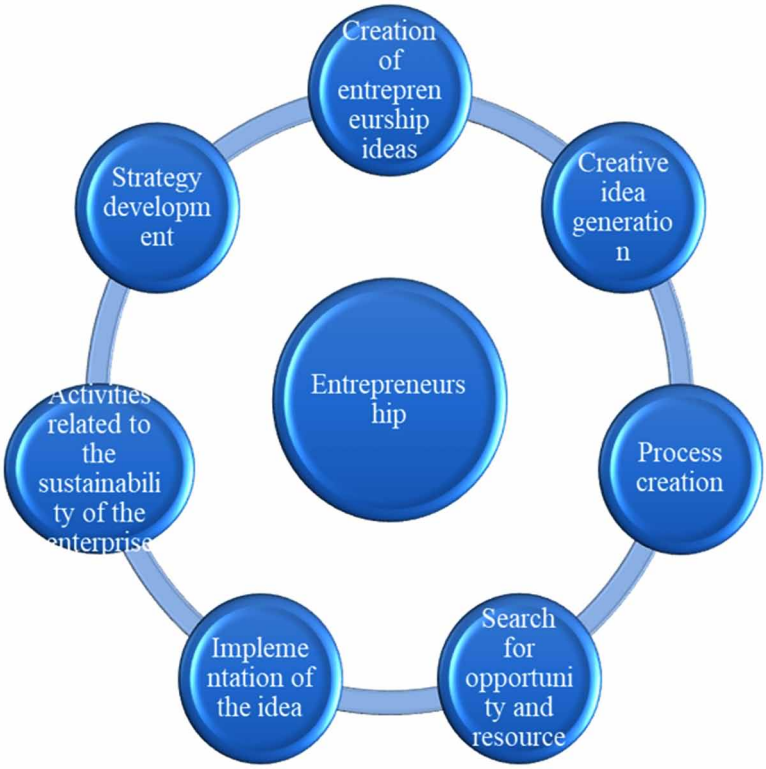
advantage, competition, and market researches, determining new processes for products and services, creating new values for consumers and customers are carried out in this process.

In exploratory entrepreneurship, the new process may involve traces of previous processes. However, the new process is not a continuation of the former. Therefore, when determining a new entrepreneurship process, practices that give the impression of the continuation of the former should be avoided. The principles applied in the development of the processes may be similar to the principles adopted in the previous process. However, the new principles and policies to be determined must be revolutionary. New process development occurs when the current process is insufficient against increasing competition, customer needs, developing technology, speed of digital transformation, and change in market share (Belz & Binder, 2017). Process development requires the digitalization process. Competitiveness is provided via reducing costs through machine learning, artificial intelligence, intelligent assistants, the Industrial Internet of Things, cloud computing, and other digital tools.

The process ensures the efficient management of resources in innovation management and the establishment of new businesses (Nambisan et al., 2017). The stages involved in the process provide the entrepreneur with experience and knowledge. The entrepreneur collects information for new initiatives throughout the process and seeks resources. Capital is a necessary element for a new venture. Therefore, the entrepreneur has to seek new capital for new ventures beyond existing ones. On the other hand, the resources of the existing enterprise are not sufficient for the new venture. A new workforce, new training, planning, human resource management are necessary for this process. Also, the stages of the process may require sub-processes. Sub-processes must be compatible with the main process. Seven basic process stages emerge in entrepreneurship: the creation of entrepreneurship ideas, creative idea generation, process creation, search for opportunity and resource, implementation of the idea, activities related to the sustainability of the enterprise, strategy development (figure 2).

Intention comes to the fore in the creation of the entrepreneurship idea. Entrepreneurial intention is to develop a purpose and mission to reveal the creative thoughts of the entrepreneur about the product or service (Karabulut, 2016). Entrepreneurial intention directs the perception of entrepreneurial ideas for the idea to form or create. The intention emerging in the perceptual process pushes the entrepreneur to search for the idea to be formed. Thus, the intention and mission provide the vision and goals. In this way, the entrepreneur tends to produce creative ideas. An "entrepreneurial explosion" occurs after the

Figure 2. Entrepreneurship process



interaction of creative ideas, experiences, and information in the perceptual process. After the creative idea comes out, the process is created. After the natural entrepreneurship process can be controlled, opportunities and resources are sought. Opportunities and resources are necessary for the implementation of the idea and the establishment of the business. The implementation of the idea is carried out on factors such as manufacturing, marketing, offering service, design according to the type of entrepreneurship. However, the implementation of the idea must be sustainable. Necessary actions are provided for this and the plans created are transformed into a strategy. Strategy plays an important role in maintaining, developing, and improving the entrepreneurial idea (Kreiser et al., 2019). In addition, the strategy is required for competitive advantage, new markets, and new processes. The implementation of long-term plans, cooperation, and coordination can be achieved through strategic management.

New Strategy

A strategy is a set of plans specific to a long-term goal. In order to create a strategy, a suitable process, planning, and goal are required. A strategy that is not specific to the purpose cannot be successful in an organizational context. The initiatives can be mobilized and sustained to implement the determined entrepreneurial ideas with these strategies. The strategies created in the entrepreneurship process ensure that the initiative to be functional towards the determined target (Nagayya & Rao, 2017).

Entrepreneurship is an important managerial skill (Chatterjee & Das, 2016). This skill involves many factors such as channeling resources to creative ideas, transforming risks into opportunities, using human

resources efficiently, digital and technological transformation, innovation in production and service, creating and managing organizational structure, sustainability, profitability and efficiency, knowledge management, leadership, and teamwork. These factors are elements that require to be managed in entrepreneurship. Especially the skills that will be put forward in channeling the resources to the necessary elements for the enterprise are important in the success of the entrepreneurship idea. This success is achieved through strategy development and management.

Although a strategy to be put forward in an entrepreneurial idea includes long-term plans, it may lose its function due to predetermined goals, objectives, technological and digital developments, consumer needs, and extraordinary situations. Pandemic, climate change, cultural influences, and war, migration change consumer needs (Fabeil, Pazim, & Langgat, 2020). Innovations in the field of health, the technology bringing significant innovations against existing innovations may require the change of existing strategies. In this case, if the improvement of existing strategies does not meet the needs arising from innovative changes, new strategies should be created.

New strategy development is not a continuation of the existing entrepreneurship strategy. While developing a new strategy, new plans and processes are reconstructed according to changing needs. However, the feedback and experience of the previous strategy can provide insight into the new strategy. Failures of the previous strategy, key factors, experiences based on intra-organizational interaction, profitability, and efficiency factors can be the guide for the new strategy (Galkina & Lundgren-Henriksson, 2017). However, these elements are not binding for the new strategy.

New Investments

Investment is associated with profitability, utility, and value. The entrepreneur looks for new value and innovations beyond existing entrepreneurship to create new ventures (Nuscheler, Engelen, & Zahra, 2019). The creation and implementation of a new entrepreneurial idea with opportunities to be gained by new values and innovations arise with new investments. New investments require a certain amount of capital and risk. Investments to be made should be compatible with the purpose, process, and target revealed by the entrepreneurship idea. On the other hand, the value to be provided to the consumer in production and service should provide the expected outputs in design and innovation. Potential problems related to the implementation of the entrepreneurship idea should be reviewed while making new investments. The strategy created in entrepreneurship should predict the possible new investment sectors to be made. New investments to be made in a sectoral context are important for determining the level of risk factor. The market share of the sector to be invested, the level of competition, incentives, consumer needs and trends, technological infrastructure, sectoral problems are the determining factors for the investment decision.

New investments require capital in new entrepreneurship. Capital may differ depending on the type of investment. In company mergers, investment provision can be determined in the form of payment in kind or cash transfers and granting shares from the company (Urbano & Aparicio, 2016). These provisions are necessary elements for investment. On the other hand, some investments require providing employment. Investments to be made especially in the service sector are human resources-weighted. Entrepreneurship in digital service requires investments in software, technology, and intellectual property. In an entrepreneurship idea that concerns the manufacturing sector, investment elements such as utility model, brand, production line, design come to the fore. Although liquid assets come to the fore in the entrepreneurship idea related to factoring, the investment may also be required for digital innovations. Virtual shopping sites add different investment elements such as marketing and distribution, logistics, logo, and software

to entrepreneurship strategies for new entrepreneurial ideas (Kraus et al., 2018). Investment in accommodation, tourism, digital, and technology stands out among new entrepreneurship ideas for healthcare.

Investments that vary in the sectoral context must be suitable for the purpose determined in entrepreneurship. Entrepreneurship is a process directed to the implementation target of the predetermined idea-based aim. The new value created in this process directly concerns consumers and the industry. For this reason, new investments to be made must be compatible with the process and purpose for the implementation of the entrepreneurial idea. New investment is not made to improve existing entrepreneurship. In new entrepreneurship, new investments are made for different entrepreneurial ideas and actions beyond the former entrepreneurship (Goel, 2018).

New Ventures

New ventures are created with the aim of undertaking financial risks and generating profits. New ventures involve taking risks for a certain gain. It aims to make a profit by turning entrepreneurial creative, new, and innovative ideas into opportunities (Yang & Gabrielsson, 2017). This action allows meeting the current and evolving needs of consumers. New ventures arise depending on this purpose. One of the most important stages in the implementation of exploratory entrepreneurship is the creation of new enterprises.

New ventures determined in accordance with the manufacturing and service sectors are an output of the entrepreneurial idea. A venture includes activities such as establishing an enterprise or company, creating an organizational structure, ensuring internal coordination, entering new markets, opening company branches or agencies, and product diversification. New ventures can be an independent element of a business (Patel, Pearce, & Guedes, 2019). Such new ventures may arise, especially in companies operating as holding companies or subsidiary corporations. New ventures can take place in the form of new businesses that will emerge after company mergers, the transformation of a business enterprise into a company, or a partnership with a foreign company.

The most important feature of new ventures is to take different risks beyond existing ventures. New ventures are established by the same entrepreneur, considering existing and potential risks. New ventures include resources, risks, processes, and opportunities that are independent of existing ventures. For this reason, the entrepreneur reveals cre-active personality traits with superior risk-taking behavior. It is important and necessary for exploratory entrepreneurship that new ventures are the outputs of innovative and creative ideas. On the other hand, rapid adaptation to digital and technological innovations and efficient implementation of the entrepreneurship strategy is important for sustainability.

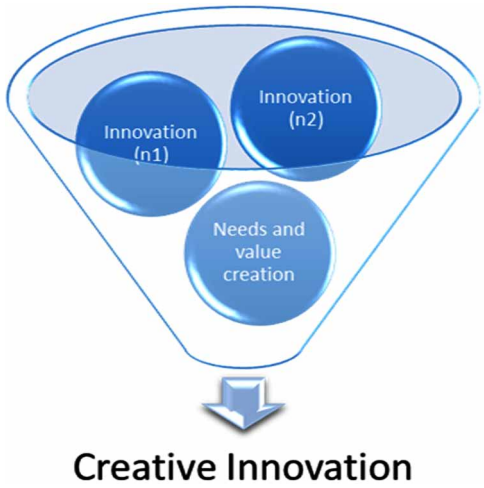
Creative Innovations (Cre-Innovations)

Innovation is about new methods, products, or ideas. Innovation is a different and value-creating form of a creative way of thinking. However, not every innovation is beyond the new method, idea, and product. If new methods that contribute to the production of a new product provide revolutionary innovations for future customers beyond the requirements of the era, these are creative innovations (Calvo et al., 2017).

Creative innovations offer innovations beyond the value of a new method. While the changing needs of consumers are met with innovations, creative innovations invest in the future. Individual creativity can contribute to the formation of innovation. However, in creative innovations, original ideas turn into extraordinary methods and values (Fowosire & Idris, 2017). Technopreneurship: A View of Technology, Innovations, and Entrepreneurship. *Global Journal of.* Considering IoT is an innovation, virtual

shopping is a creative innovation. Creative innovations are mostly carried out to create solutions for the future needs of consumers. However, the realization of creative innovations often depends on revealing elements such as innovation-based methods, ideas, designs, products, and services.

Figure 3. Creative Innovation

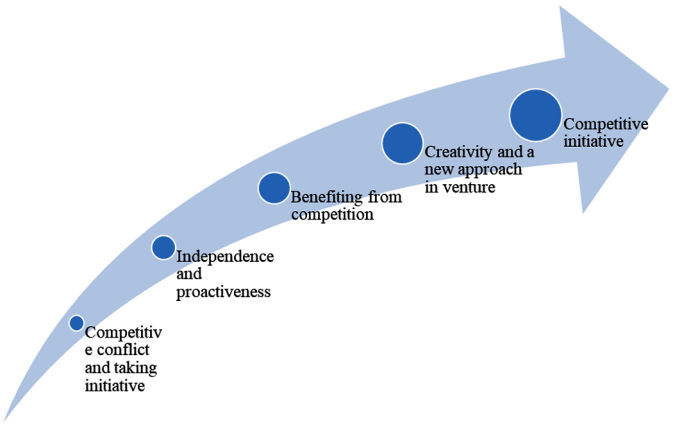


Creative innovation may arise in all fields. Innovations in many fields such as social, medical, psychology, sectoral, production, marketing, promotion, distribution, service are realized in today's world. Innovation to a creative level depends on being beyond current needs (Dabic, Potocan, & Nedelko, 2017). In particular, creative innovations are necessary and important to gain a competitive advantage and invest in the future. This type of innovation is about vision. Innovations that are extraordinary, and predict the future are creative innovations. New values, products, services, and processes that will be put forward with the idea of entrepreneurship are transformed into exploratory entrepreneurship through creative innovation. Creative innovation can also consist of the interaction or combination of different innovations through synergy (Bryndin, 2019). The combination of innovations in digital and technological fields and the innovations to be realized in the manufacturing industry can be given as an example. On the other hand, new innovation can be created as a result of the combination of innovation in the hospitality sector and innovation in the health sector. The creativity of innovation takes place by taking inspiration from different innovations, combining them, interacting with them, or putting forward a completely independent innovation (Figure 3). Future needs and values are transformed into creative innovation after the interaction or combination of innovations.

Competitive Initiative

Competition is an important element that businesses and entrepreneurs conflict with time, labor, resources, capital, and psychology. Competition provides an alternative perspective to problems by enhancing creativity. Competition is an indispensable element of entrepreneurship. Because power gains an unbalanced momentum in a non-competitive/monopolist market. Competitiveness is a driving force

Figure 4. Competitive initiative factors



for businesses and entrepreneurs. Sustainability, continuous innovation is possible with the competitive initiative (Hussain & Jahanzaib, 2018).

The competitive initiative is the ability of individuals or organizations to take initiative, act independently, evaluate opportunities before their competitors, overcome difficulties, solve problems, benefit from the competition by expanding business networks, and develop strategies by adopting a new approach in the enterprise (Figure 4). In the competitive initiative, the entrepreneur keeps competitive power by evaluating the opportunities on time (Ferreira, Fernandes, & Ratten, 2017). Competition provides an inevitable opportunity and future customers for the entrepreneur. On the other hand, the ability to cope with the difficulties that arise with the level of competition increases the creativity of the organization and the individual. Conflict of competition enables creative ideas to emerge. On the other hand, creative ideas provide sustainability in entrepreneurship and enable new initiatives to be introduced (Mitchell & Walinga, 2017).

Crisis and Conflict Management

A crisis is a situation that requires an important and critical decision to be made in times of difficulty or danger. Conflict is a state of long-term incompatibility and disagreement in feelings, thoughts, or principles (Tokakis, Polychroniou, & Boustras, 2018). Conflict management is required in case of long-term disagreement and non-compliance that entrepreneurs have about applying their ideas, determining processes, considering opportunities, and taking risks. Likewise, the way to be followed and the principles adopted in a crisis situation are also important and necessary in entrepreneurship. Crisis and conflict management is essential for this type of entrepreneurship, especially given that exploratory entrepreneurship requires an extraordinary challenge and creative spirit for new entrepreneurial ideas (Doern, 2016).

The ever-changing needs of the age and the endless needs of the consumers push the entrepreneur to manage the crisis times properly. Extraordinary situations such as legal obligations, political reasons, war, pandemic, disaster push the entrepreneur to creative actions or to apply principles to overcome difficulties. The entrepreneur can turn extraordinary situations into an opportunity or apply previously developed strategic elements to protect the current situation (Nabil & Zhang, 2020).

Conflict can be experienced with competitors, colleagues, business networks, businesses in the supply chain, government, customers, and consumers. The conflict has benefits as well as risks. If the conflict occurs in the form of a prolonged disagreement or incompatibility, it can cause delays, disruptions, decreases in productivity, loss of profits, and various losses in the implementation of the ideas of the entrepreneur (Devece, Peris-Ortiz, & Rueda-Armengot, 2016). However, this prolonged conflict can lead to creative ideas, and new innovations to cope with problems. Exploratory entrepreneurship brings an approach that turns conflict into an opportunity and turns the crisis situation into new processes, strategies, products, or services with superior risk-taking. If the crisis situation is a risk especially for competitors, the exploratory entrepreneur can turn this situation into an opportunity. On the other hand, conflict and crisis management is the entrepreneur's immune system. The more crises and conflicts occur, the more experience will be gained. For this reason, an entrepreneur should determine the conflict and crisis management independently from the determined strategy, and this management style should be adapted to the strategy in determining each new venture strategy (Devece, Peris-Ortiz, & Rueda-Armengot, 2016).

Cre-activeness and Proactiveness

Cre-activeness is a personality trait that reveals a creative thinking approach regarding events. This personality trait includes the individual to predict the events and take the necessary measures. On the other hand, it also provides a reactive act to the events that occur. Cre-activeness enables the individual to transform the developing events into opportunities thanks to imagination and original ideas. Problems that will arise may be a possible opportunity. For example, unpredictable events such as pandemics, earthquakes, natural events, war, social, and political can be given as examples. On the other hand, events that are unpredictable in fields such as informatics and astronomy are also suitable types of events for cre-activeness.

Proactiveness is a personality trait essential to cre-activeness. People who predict developing and potential situations, analyze the risk factor in advance, identify threats and opportunities in advance, provide the necessary actions, and are one step ahead of their competitors in terms of planning and control have a proactive feature (Gao et al., 2018). However, the cre-active personality trait provides entrepreneurs the status of being in the foreground compared to their competitors. Because cre-active individuals create the foundations of exploratory entrepreneurship by revealing creative ideas beyond predicting possible risks and events. While proactive people anticipate the problems and take precautions, cre-active individuals anticipate the problems in advance and also foresee the selection of the most important and necessary time in the implementation of the entrepreneurship idea (Hu et al., 2018). For this reason, cre-active entrepreneurs determine proactive or reactive behavior time in advance and choose the most appropriate time.

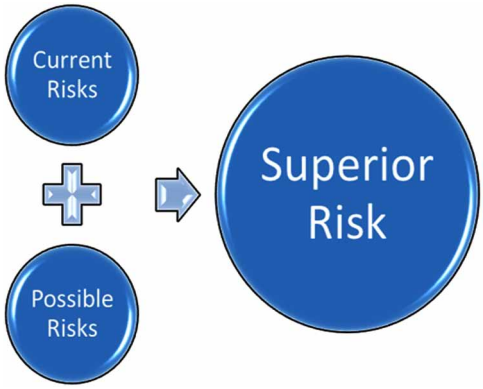
Superior Risk-Taking

Risk is a mandatory element in entrepreneurship. Every entrepreneur takes some risks in order to put her/his creative ideas into practice. Investing capital, loss of time and effort, loss of profit, various losses, failure, disruption in family-work balance, psychological wear, social and cultural losses, market and competitive losses, problems experienced in the process, changes in consumer trends towards products and services are important risk factors in entrepreneurship (Lurtz & Kreutzer, 2017). Undertaking these

risks affect the possible profit margin. If the risk outcomes obtained as a result of the use of resources are below the positive outcomes resulting from the opportunities, the risk taken in entrepreneurship is appropriate for the entrepreneurial aim. On the other hand, if the resulting loss is higher than the profit to be obtained, the functionality of entrepreneurship may be lost. Therefore, the entrepreneur must take the superior risk.

Superior risk-taking requires consideration of existing and potential risks. The identified risks are evaluated together with the different risk factors that may arise. This is due to the synergy of creative innovations that includes multiple risk factors. Since exploratory entrepreneurship involves the creation and implementation of different and new entrepreneurship ideas, the different risk factors undertaken for existing entrepreneurship and emerging in new entrepreneurship must be undertaken together. Superior risk-taking is the evaluation of different and new risks together with possible risks (Figure 5).

Figure 5. Superior risk factors



Strategic insights and predictions into the future are required for superior risk-taking. The realization of new ventures at a creative level in entrepreneurship depends on the existence of the necessary capital, resources, organizational plan for possible risks, the action plan for extraordinary situations, roadmap, leader, and business network. Therefore, superior risk-taking requires creative and proactive personality traits. Financial losses and possible damages are included in the elements of superior risk to the extent necessary for the implementation of the entrepreneurial idea. The loss taken at superior risk is greater than the normal risk. In particular, this situation is defined as an additional risk in the law.

Self Renewal

Maintaining the current situation is not enough for a sustainable competitive advantage in entrepreneurship. It means that the individual or organization renews itself, being sensitive to environmental effects, and not delay in reacting to these effects. The sustainability of the entrepreneur's creative and innovative ideas depends on adaptation to the changes in the environment and reactive actions. Self-renewal is related to adaptability. Exploratory entrepreneurship depends on the effective use of adaptability (Hanci-Donmez & Karacay, 2019). Due to the existing innovations that do not meet the needs, the creation of new en-

trepreneurship ideas requires an analysis of environmental factors, the level of competition, the state of the market, consumer and customer trends, needs, technological and technical innovations, and changes.

When an entrepreneur who cannot adapt to technical and technological developments applies her/his ideas, the expected profit may not be obtained. On the other hand, self-renewal is important in the efficient use of resources. It is especially important to train human resources in a new technical, technological, and digital context (Yfantidou et al., 2019), and to adapt the information based on scientific findings to the entrepreneurial idea. The management of information and creating strategies depend on the adaptation process. Adaptation requires being sensitive to innovations and adapting to the strategy in entrepreneurship.

EXPLOITATIVE ENTREPRENEURSHIP

In this type of entrepreneurship, entrepreneurial action is under the influence of existing enterprises. It is aimed to preserve the existing entrepreneurship idea and to develop this idea in this entrepreneurship. Undertaking risks and transforming opportunities into benefits are carried out within this framework. The entrepreneur desires to protect her/his entrepreneurial ideas and practices, which she/he obtained with scarce resources, to prevent them from being destroyed, to protect them against possible damages, and to improve them. The idea of entrepreneurship should be compared with the benefit to be gained from the start-up of new enterprises with the labor and capital spent. The risk factor is not worth undertaking due to the potential loss risks that may arise after this comparison and difference. This is because possible capital losses put existing entrepreneurial practices at risk. Risk is not a constant factor to be taken on. Changing circumstances determine the degree of risk to be undertaken (Hoogendoorn, Van der Zwan, & Thurik, 2019). If the opportunities and benefits provided by this risk factor have revealed the idea of entrepreneurship, then it is important to preserve and develop the current situation. After the entrepreneurship idea turns into practice, possible risks should be prevented and the current situation should be preserved.

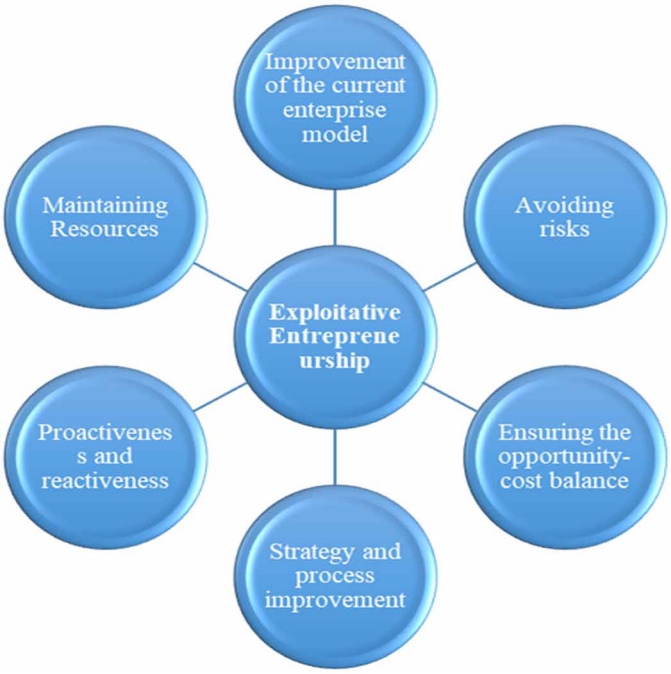
Exploitative entrepreneurship consists of six basic factors: Improvement of the current enterprise model, avoiding risks, ensuring the opportunity-cost balance, strategy and process improvement, proactiveness and reactiveness, maintaining resources (figure 6).

Improvement of the Current Enterprise Model

Sustainability should be ensured after the implementation of every entrepreneurial idea (Tang, 2020). In the implementation of the idea, problems related to many factors such as the establishment of the enterprise, creating an organizational structure, organizational coordination, production, service, procurement, marketing, promotion may be encountered. To overcome these problems depends on the adequacy of the resources, the ability to organize, and a strategic management approach. The sustainability of the entrepreneurship model depends on managerial skills. Therefore, maintaining the existing enterprise model may be more appropriate than the potential losses that may arise from new innovation and risks. In this case, the current enterprise model needs to be improved.

The enterprise model varies depending on the production or service sector. The supply chain of the manufacturing industry is different from the customer base, resource management, business network service sector. This difference reveals the necessity of different management of the enterprise model

Figure 6. Exploitative entrepreneurship factors



in the sectoral context. Strategy development, promotion, marketing policies differ in the manufacturing and service sectors. Therefore, sectoral requirements should be taken into account in improving the enterprise model. On the other hand, the investment type, capital, and business partnership type of the venture model should also be taken into consideration in the improvement. The realization of the investment as a business partnership and the legal protection such as trademark, patent, utility model should be taken into account in the entrepreneurship ideas to be put forward (Schreier, et al., 2020). The use of liquid capital in resource utilization may cause payment difficulties in the entrepreneur's debts. Therefore, improvement in financial management is required.

It is necessary to cope with problems in organizational behavior elements such as leader-employee interaction, teamwork, project management, hierarchical structuring, organizational climate, glass ceiling, organizational justice in the context of creating an organizational structure in entrepreneurship. This requirement ensures intra-organizational coordination and cooperation in improving the enterprise model. Creating organizational culture, organizational identity activities, and ensuring organizational belongingness are important in terms of improvement. Service innovation behavior, intrapreneurship, psychological capital elements ensure the protection and sustainability of the enterprise model (Wan, Liu, & Wang, 2020). For this reason, it is necessary to give maximum importance to organizational behavior models, employee-leader interaction, organizational climate, the functionality of the organization's bodies, and hierarchy.

Avoiding Risks

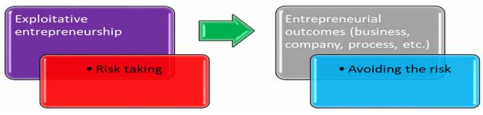
Risk is a necessary element in entrepreneurship. Risk provides possible opportunities. However, the risk is an important entrepreneurial element that can result in a certain loss and damage (Malakhovskyi et al., 2019). On the other hand, the prevention of risks includes the prevention of risky situations that arise after the implementation of the idea of entrepreneurship. Possible risks should be prevented for the sustainability of entrepreneurial outputs such as business, company, application, design, product, service, a process that arises as a result of the entrepreneurial idea. In order to prevent risks, analysis of the threat, danger, the possibility of financial loss, harm, loss, investigation, and forecasting are required.

Risk analysis is necessary for gaining a competitive advantage and promotion after entrepreneurship practices. In this analysis, possible threats, dangers, uncertainties are evaluated in the context of possible damages and losses (Llanos-Contreras, Alonso-Dos-Santos, & Ribeiro-Soriano, 2020). The loss and damage determined to prevent risks are reported and the possible effects on the implementation of the entrepreneurial idea are evaluated in terms of resources, capital, consumer, customers, profitability, efficiency, competition, and promotion. The obtained analysis results provide a prediction for the measures to be taken for the risk element. Thus, solutions, principles, and a roadmap for risk prevention are determined. This roadmap should be compatible with the entrepreneurship strategy. The main methods used in the analysis of risks are the process hazard analysis (PHA), job safety analysis (JSA), risk screening, event tree analysis (ETA), failure mode and effects analysis (FMEA), failure modes, effects and criticality analysis (FMECA), fault tree analysis (FTA), hazard, and operability study (HAZOP), risk assessment matrix (Gugaliya, Boral, & Naikan, 2019; Ivanenko, 2020); Yan & Xu, 2019). The common point of these methods is to determine the risk elements and possible consequences by evaluating the possibilities. These methods provide information about possible threats and dangers that will occur in the future. Risk analysis provides critical information as a result of the information obtained from existing data, environmental factors, and the evaluation of multi-factors. This information provides foresight regarding the entrepreneur's need to be prepared for possible events in the future, and the actions to be taken for every possible risk that may occur. However, risk analysis cannot always help predict changing conditions. For this reason, in case of high potential risks, it is aimed to protect the existing entrepreneurship and thus prevent entrepreneurship failure.

Risk analysis may require expert opinion. In addition, the risk analysis should be carried out in accordance with the entrepreneurial purpose, and the measures to be taken should be in accordance with the spirit of entrepreneurship. The measures to be taken should not harm the social and business network of consumers and customers who will benefit from entrepreneurship and should comply with corporate social responsibility principles.

Avoiding risks is different from the risk factors required to sustain entrepreneurship (figure 7). The losses incurred in entrepreneurship should be compared with the possible opportunity and profitability factors and the necessary risks should be taken. This is an important key factor in the implementation

Figure 7. Risk-taking and prevention in exploitative entrepreneurship



and maintenance of the entrepreneurial idea. However, the prevention of risks is directed towards the risks to which entrepreneurial outcomes arising from entrepreneurship are exposed. For this reason, it is necessary to distinguish between the risks undertaken for entrepreneurship and the risks that the entrepreneurial outcomes will be exposed to.

Ensuring the Opportunity-Cost Balance

Opportunities in entrepreneurship are important in terms of profitability and finances. Implementing and improving entrepreneurship depends on the availability of resources (Xu, 2020). Resources are affected by the value that will emerge as a result of the comparison of the costs and profitability for the opportunities to be obtained. If the losses related to opportunities are less than the profit to be obtained, resources provide positive value to the capital. In the opposite case, liquidity problems may arise due to the loss of resources. This situation, which may cause financial problems, results in the deterioration of the opportunity-cost balance.

Exploitative entrepreneurship is the whole of the improvement actions required to protect and maintain existing entrepreneurship. Opportunity cost balance ensures that financial problems that may arise during the entrepreneurship process are overcome. Opportunities in the entrepreneurial process can provide significant returns to important products and services. Product diversification, design, service innovation, adaptation to technological innovations provide important opportunities. These opportunities require resource allocation, investment, the capital. Therefore, opportunity and cost balance must be achieved at a significant level.

In the opportunity-cost balance, opportunity cost and activity-based cost should be measured. Customer accounting should be applied in cost analysis regarding customers. Customer loyalty management in customer accounting, customer complaints, classification of customers according to their spending habits, determining the value perceived by the customer, purchasing habits, delivery policies, product return, inventory management, customer profitability segment analysis, marketing costs, customer segmentation, customer value, customer profitability analysis, accounting information system and profitability relationship management, factors of lapping in accounting should be taken into account (Day, 1994; Woodall, 2003; Zeithaml, 1988; Batra et al., 2006; Kumar & Shah, 2015; Tracy, 2006; Kazmi, 2007; Pride and Ferrell, 2014; Collica, 2011). The results to be obtained as a result of the analysis are evaluated for sustainability in entrepreneurship output.

The improvement of existing entrepreneurship depends on a measured opportunity-cost balance. Improvement requires resource allocation to the processes and outputs of entrepreneurship. Therefore, the decrease in the resources of the enterprise or organization creates financial risk. On the other hand, certain losses occur in order to turn opportunities into profit. A comparison of losses with positive outputs is necessary for the opportunity-cost balance.

Strategy and Process Improvement

The long-term action plan in entrepreneurship is developed in order to achieve the target determined as a result of the initiative. The successful execution of the process is possible with the support of long-term plans with a pre-determined policy and road map (Martins & Zacarias, 2017). The strategy is the set of principles of this plan and process created by the entrepreneur in accordance with the entrepreneurial spirit. As long as the process is carried out successfully in the implementation of an existing

entrepreneurial idea, sustainability is achieved and the predetermined goal can be achieved. The important thing in determining the strategy is to reveal the entrepreneurship elements in accordance with the entrepreneurial purpose, spirit, and goals. Innovations that emerge with entrepreneurial intention and creativity gain significant momentum with the risk undertaken and the opportunities obtained. The output obtained creates entrepreneurial value. This value is the signature of the entrepreneur. Therefore, every entrepreneurial idea has an entrepreneur's signature. Generic brands are formed as a result of the brand name being adopted by the entrepreneur, who was the first creator of innovative products. Just like generic brands, innovations in products, and services in entrepreneurship are associated with a value symbolized by the entrepreneur (Chaturvedi, 2018). As this value is adopted by consumers and customers, a perceptual adoption of the enterprise idea begins. Therefore, the value of entrepreneurship should be taken into account while creating a strategy for entrepreneurship.

The value of the enterprise is related to a keen intuitive awareness of or sensitivity perceived by symbols indicating the brand, product or service, design, software, and five senses. Entrepreneurship action or idea is shaped and recognized by this value. Value plays a guiding role in improving existing entrepreneurship by creating a perceptual awareness. Therefore, the entrepreneurial value should be strategically taken into account in improving the implementation and outputs of the entrepreneurial idea. Value is an indispensable element for exploitative entrepreneurship, as it reflects the entrepreneurial spirit.

Proactiveness and Reactiveness

Taking initiative in entrepreneurship is linked to a sense of responsibility and adoption. The entrepreneur shows that she/he stands behind his own ideas with a sense of adoption and ownership behavior (Goldsby et al., 2018). This situation especially occurs in a proactive personality trait. While proactive entrepreneurs realize their entrepreneurship plans in the long term, they aim to provide action that precedes their competitors against future events. This is because the entrepreneurial idea is adopted and protected by the entrepreneur. The adopted idea is protected from competitors. Entrepreneurship requires the adoption, protection, and maintenance of the value of the enterprise by the individual or the organization. Proactive behavior ensures that this value is protected against environmental events (Linton & Kask, 2017). Protection can be related to an aggressive competitive power. Market attractiveness, promotion strategies, future customer concern, creating consumer perception, marketing strategies may require an aggressive competitive strategy. This situation may require proactive behavior. On the other hand, technological, social, digital, technical, geographical, political, economic, and climatic changes should be taken into consideration in order to improve entrepreneurship. For this reason, especially in exploitative entrepreneurship, it is necessary to anticipate the changes that may cause such sudden and large losses and to take the necessary steps before the risk occurs. However, these steps should be taken to preserve the entrepreneurial status. Because the risks undertaken for entrepreneurship have created the necessary opportunities and resources that have been channeled into this field. The next process should be aimed at protecting existing resources and ensuring the sustainability of enterprise value. The exploitative entrepreneur does not adopt spending resources and undertaking new risks for new innovations. In this context, proactiveness is developed to protect existing entrepreneurial outputs and ideas.

Reactive behavior is a routine process for exploitative entrepreneurship. The environment is constantly changing, and constant changes regarding suppliers and logistics are emerging. The resource needs required for the daily activities of entrepreneurship outputs are met with reactive behavior. Delivery of products to the customer, logistics operations, procurement, tax liabilities, incentives and benefits from

loans, routine transactions arising from the resource management of the business or organization, the management of human resources, other managerial activities require reactive behavior. On the other hand, reactive behavior also points to emergency work in the context of time. Primary and support activities are required to fulfill the urgent and sudden transactions. These activities include the activities of the units where reactive behaviors are realized.

Maintaining Resources

Every enterprise requires resource allocation and the search for new resources. The amount of resources varies according to the type of entrepreneurship, market and competition situation, production and service sector, legal and financial obligations. Resources enable activities in entrepreneurship to be carried out. The preservation of resources depends on the appropriate and effective management of existing resources. On the other hand, taking advantage of the opportunities required to increase resources also contributes to preservation. Exploitative entrepreneurship aims to protect and improve existing entrepreneurship ideas and practices. Therefore, activities required to protect resources should be planned in advance. Principles for the preservation of resources in the entrepreneurship strategy should be determined for the sector, market and competitive level, customer trends, innovation, and adaptation processes (Biswas, 2018).

Preserving resources requires consideration of liquidity, capital, assets, social and human capital. Human resources, business secrets, key factors in entrepreneurship idea and enterprise value, organizational culture, the brand value should be preserved for sustainability in entrepreneurship (Liu, 2017). Entrepreneurship ideas, values , and practices are taken as a basis in determining the values that need to be preserved. Preservation of resources should be compatible with the entrepreneurial strategy. The reason for this is to ensure that the organizational bodies that manage the entrepreneurship process, managers, and employees are carried out in cooperation and coordination in accordance with the entrepreneurship strategy. Collaboration and coordination ensure that resources are directed to the right channel at the right time through brainstorming, intrapreneurship, and organizational culture. Thus, a corporate structure is achieved by ensuring efficiency in the process.

SOLUTIONS AND RECOMMENDATIONS

Exploitative entrepreneurship comes to the fore when existing entrepreneurial resources and capital are risky for new entrepreneurial ideas and practices. This entrepreneurship model consists of the development of the current enterprise model, avoiding risks, ensuring the opportunity-cost balance, strategy and process improvement, proactiveness and reactiveness, maintaining resources. These factors include the approach that risk should be undertaken at a minimum level, opportunities should be exploited to maintain and preserve existing entrepreneurship. Existing entrepreneurship must be preserved and improved. Because exploitative entrepreneurship is based on the idea that new entrepreneurship ideas will cause the loss of existing resources, value, or capital. This type of entrepreneurship occurs when new entrepreneurial practices rationally create great risk. For this reason, the risks undertaken in the entrepreneurship process should be preserved after entrepreneurship outputs and practices. Outputs need to be preserved and improved in order to be content with sustainability and the current entrepreneurship model. On the other hand, the opportunity-cost balance should be preserved and the strategies created should be oriented towards improvement and preservation. Considering that entrepreneurship is a process, the

sustainability of each phase should be ensured through process improvement. Exploitative entrepreneurship requires proactive and reactive entrepreneurial behavior in order to preserve the spirit of existing entrepreneurship and not to destroy the values of this spirit. On the other hand, existing resources should be protected and investments should be made at a low-risk level to improve resources.

FUTURE RESEARCH DIRECTIONS

Investigating entrepreneurship in two types as exploitative and exploratory will help the entrepreneur determine the principles that will contribute to the implementation and sustainability of the ideas in the entrepreneurship process. Management, strategic and cost analysis can be enriched with the principles set forth by these two types of entrepreneurship models. On the other hand, the fact that the types of entrepreneurship defined in the literature focus on the active behavior of the entrepreneur, the entrepreneur's personality, and the process causes the issues related to future innovations, creativity, risk, opportunity, improvement, new entrepreneurship, principles in entrepreneurship to be overlooked. It will pave the way for revolutionary entrepreneurial ideas to be realized beyond the exploitative and exploratory era, which have just been introduced to the literature. Although exploitative entrepreneurship aims to protect and improve existing entrepreneurship, it can also provide important principles for exploratory entrepreneurship. In today's world where digital transformation and technological innovations are rapidly advancing, these two types of entrepreneurship are suggested to be empirically examined with case studies.

CONCLUSION

Exploratory entrepreneurship consists of ten basic factors. These factors are new processes, new strategies, new investments, new ventures, creative innovations, competitive initiative, crisis and conflict management, cre-activeness and proactiveness, superior risk-taking, self-renewal. These factors, coded as 4N4C2S, are the minimum necessary for the implementation and maintenance of new entrepreneurial ideas. The process is an absolute principle in entrepreneurship. The formation of the entrepreneurial idea, creative idea generation, process creation, opportunity and resource search, implementation of the idea, activities related to the sustainability of the enterprise, strategy development constitute the entrepreneurship process. However, this process can create resources for new entrepreneurship thanks to a strategy. The principles created in the strategies provide a driving force for different entrepreneurship ideas beyond existing entrepreneurship. Another important factor in exploratory entrepreneurship is the new investments. It is a necessary element for investment opportunities to positively benefit the entrepreneurial idea. Investments enable the development of entrepreneurship and the creation of new resources. On the other hand, sustainability is also achieved by providing a competitive advantage thanks to investments.

Cre-innovations enable the emergence of new products, methods, and ideas. Adaptation problems due to changing conditions, needs, and environmental factors can be overcome thanks to creative innovations. Creative innovations are the sum of different innovations, need, and value creation. Differentiation of innovation through creativity is necessary for exploratory entrepreneurship. Realization of this innovation, revealing creative ideas and implementation of entrepreneurship idea depend on superior risk-taking. Superior risk-taking occurs by adding possible risks to the risks taken for the implementation of the

idea in the entrepreneurial process. This type of risk, which can provide a competitive advantage with superior and strategic predictions about the future, is necessary for future customers.

Exploratory entrepreneurship occurs as a result of cre-activeness and proactiveness personality traits. In these personality traits, risk-opportunity analysis is carried out by the entrepreneur in a creative and analytical manner. Extraordinary events are predicted in advance to reveal the idea of the enterprise. Possible problems are subjected to creative analysis in order to turn them into entrepreneurship ideas. On the other hand, new initiatives must be created for revolutionary entrepreneurship beyond existing ones. The functionality of this enterprise depends on the competitive initiative. The competitive initiative can be demonstrated with competitive conflict and taking the initiative, independence, and proactiveness, benefiting from the competition, creativity, and a new approach in the venture. Self-renewal is the ability the adaption to environmental changes, and continuous innovation behavior. An exploratory entrepreneur is an individual or organization that provides sustainable ventures or enterprises with creative innovations and has the power to adapt to change. Despite this adaptability, crisis and conflict are an inevitable factor. Social and business networks, supply chains, organizational interactions require crisis and conflict management. Creating new entrepreneurship models and presenting creative entrepreneurship ideas independently of existing entrepreneurship ideas depend on this management skill.

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KEY TERMS AND DEFINITIONS

Competitive Initiative: The ability of individuals or organizations to take initiative, act independently, evaluate opportunities before their competitors, overcome difficulties, solve problems, benefit from the competition by expanding business networks, and develop strategies by adopting a new approach in the enterprise.

Cre-Activeness: A personality trait that reveals a creative thinking approach beyond predicting possible risks and events.

Cre-Innovations: The interaction or combination of different innovations through synergy, innovations beyond the value of a new method.

Entrepreneurial Explosion: The situation of the sudden emergence of the idea of creative entrepreneurship after the interaction of ideas, experiences, and information in the cognitive process.

Exploitative Entrepreneurship: A type of entrepreneurship that aims to preserve and improve the current entrepreneurship idea.

Exploratory Entrepreneurship: The realization of revolutionary initiatives, unlike existing ones, and a type of entrepreneurship regarding an extraordinary challenge and creative spirit for new entrepreneurial ideas.

Superior Risk-Taking: The evaluation of different and new risks together with possible risks.

Chapter 3
Realities of Entrepreneurship in the European Union and Other World Countries:
Are We Prepared for the New Paradigm After the Pandemic?

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ABSTRACT

The objectives of this research are to evaluate the entrepreneurship attitudes and skills in the European Union and other world countries context before COVID-19 and discuss perspectives for the future. The information available in the Eurobarometers for the entrepreneurship that was worked through quantitative approaches was assessed. The results show that there is a long way to go in the European Union to achieve the desirable levels of personal, profession, and business entrepreneurship. In fact, the perceptions of the European citizen about the entrepreneurship changed in the last years, in consequence, for example, of technological developments, but still fall short of other countries as, for example, in some aspects the United States. In any cases, the skill improvements verified in Europe and the levels of innovation achieved are good news for the new challenges that will arrive soon.

INTRODUCTION

The entrepreneurship is a multidisciplinary field and involve several dimensions, as, for example, those related with the employment, innovation, institutions, skills and governance (Abdesselam et al., 2020). The innovation and the creation of new skills are, indeed, determinant for the success in the implementation of new approaches.

The entrepreneurship is a growing topic, including for the scientific community (Duran-Sanchez et al., 2019), that brings diverse challenges for the different actors (Vukovic, 2005), specifically for the

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educators (Hannon, 2018). There are various initiatives around the world and, particularly in the European framework, to create entrepreneurial skills (Eickhoff & Mueller, 2008), namely those related with language (Gaz & Flanja, 2014).

Nonetheless, it is important to stress that the perceptions about the entrepreneurship are not the same between the diverse social classes (men and women, for example) and consequently the impact in the respective skills is not the equal (Johansen, 2017). In general, in the entrepreneurship education programmes it is highlighted the relevance of motivation, commitment, exploitation and action (Ndou et al., 2018).

The innovation and the entrepreneurship have been promoted by the European Union funds and have been one of the objectives and priorities for the European institutions through several strategies, namely by research programmes (Alonso et al., 2017), where the different stakeholders have a determinant role to make the several strategies compatible (Cerovic, 2019).

The small and medium size businesses and its internationalisation have a relevant contribution to promote the entrepreneurship in the European context (Ciochina et al., 2009), including in the integration process (Samitas & Kenourgios, 2005).

In any case, sometimes the public policies, namely those related with the social assistance, do not promote entrepreneurial contexts. In fact, frequently, in Europe, the employees have better conditions of social assistance than the self-employed (Annink et al., 2015). But, there are other constraints in Europe and around the world that limit the implementation of new business approaches (Patlitzianas, 2011).

Another relevant question is about the migrants. Often, the migrants for the European Union are source of new ideas and new skills that bring new entrepreneurial opportunities in a different context as that they find the several European countries (Baycan, 2013).

In this way, this study intends to evaluate the entrepreneurship framework in the European Union and other world countries before Covid-19 and discuss perspectives for the future. For that it was analysed the information available in the Eurobarometers for the entrepreneurship that was explored through econometric approaches, namely by correlation matrices and factor analysis.

LITERATURE REVIEW

The entrepreneurship has different dimensions (Antonio Marina, 2010) and fields where may be developed, including in the policies design processes (Becker, 2019) inside the European Union (Bocquillon & Maltby, 2017) institutions (Copeland & James, 2014), namely the European Commission (Haroche, 2020), for the higher education cooperation (Corbett, 2011), natural gas rules (Herweg, 2016), energy policy design (Maltby, 2013) and migrant workers regulation (Menz, 2015), for example.

The contexts that create and motivate the entrepreneurs depend on several factors (Knight, 2015), nonetheless the macroeconomic and demographic factors (Roman, Bilan, et al., 2018), institutional framework and sociocultural dimensions have a determinant influence in the level of entrepreneurial skills (Amerhanova & Seliverstova, 2017). Inflation rate, tax rate and foreign investment are the main macroeconomic variables (Rusu & Roman, 2017). The institutional context is, in fact, crucial for an effective entrepreneurship plan (Avetisyan & Ferrary, 2013) and robust economic growth (Roman, Rusu, et al., 2018). The opportunity-motivated entrepreneurship conditions are other important drivers for the business success (Bosma & Sternberg, 2014). The local specific characteristics, as the culture, also influences the entrepreneurship capacities (Linan & Fernandez-Serrano, 2014). In some circumstances the unemployment seems to promote the entrepreneurship and the self-employment (Payne & Mervar,

2017). The international trade regulations have, too, their impacts (Scheerlinck et al., 2020), as well as, the resources management (Stroiko & Bondar, 2017), the conditions to be self-employed (Torres Marin et al., 2019) and the particularities of each reality (Zbarsky et al., 2020).

These frameworks are particularly significant for the small and medium-sized enterprises that represent a great part of the European Union socioeconomic activities (Calimachi, 2009). In turn, the small and medium-sized enterprises jointly with the entrepreneurship have real impacts on the economic growth (Cravo et al., 2015), including at regional level (Fotopoulos, 2012), where the necessities and the opportunities have their influence (Ferreira & Dionisio, 2019). The entrepreneurial skills are predominantly pertinent for the rural regions, where the creation of new jobs and new economic dynamics plays a crucial role (Delfmann et al., 2014). The agricultural sector (Krejci et al., 2019) and the women (Landig, 2011) may add here interesting contributions. However, the specificities of the farming sector hamper the creation of entrepreneurial ecosystems comparatively with other economic sectors (Martinho, 2020).

There are diverse interrelationships where the entrepreneurship has a relevant value added, as, for example, the CSR (corporate social responsibility) Europe (Contrafatto et al., 2020). The new approach for the CSR in the Europe appeared in the beginning of the two thousand years (Breitbarth et al., 2018). The relationships between the universities and the companies, also, create new challenges for the entrepreneurship fields (Link & Sarala, 2019).

The European Union policies have a great contribution to promote the entrepreneurship (Estol et al., 2018), however in some cases they could be further adjusted to be more effective in attracting entrepreneurs (Czudec et al., 2019). The distinct realities (Ignatov, 2020) and the weak entrepreneurial culture (Ignatov, 2019) across the European member-states are domains that could be considered more properly by the policymakers (Ionita et al., 2015). In any case, there are signs of improvements in the entrepreneurial framework in some European regions (Pietrzak et al., 2017). On the other hand, considering the entrepreneurship impacts on the European economic growth should be created a policy context that promote the entrepreneurial skills (Pradhan et al., 2020).

In the current context of Covid-19 pandemic the entrepreneurship may bring interesting insights to deal with the new situations, namely in the women challenges (Paul et al., 2020), economic weaknesses (Cannavale et al., 2020), sport frameworks (Escamilla-Fajardo et al., 2020) and social fields (Ruiz-Rosa et al., 2020).

MATERIAL AND METHODS

This study intends to evaluate the entrepreneurship framework in the European Union and other world countries before Covid-19 and discuss perspectives for the future. For that it was analysed the information available in the Eurobarometers for the entrepreneurship that was explored deeper through statistical approaches.

Specifically, the statistical information analysed was obtained from the Flash Eurobarometer 354: Entrepreneurship in the EU and beyond (2013) for the year 2012, following, for example, Williams et al. (2017) and Alvarez-Sousa (2019). These data are relative to the European Union countries, Turkey, Norway, Switzerland, Iceland, United States, South Korea, Japan and China.

In terms of statistical approaches, the data were explored further through correlation matrices, following Stata (2020) and StataCorp (2017a, 2017b) procedures. To better analyse the several correlation

for each question, it was considered factor analysis, following Stata and Torres-Reyna (n.d.) procedures, to obtain factors that allow to reduce the number of variables in the different analyses.

The results obtained were benchmarked with the literature review and recent data from the Eurostat (2020).

DATA ANALYSIS

The data from the Flash Eurobarometer 354 show that in general the population from these countries preferred to be employee than self-employed, however the difference is slight, and the main justifications were because the regular steady income and job security. The main explanations to be self-employed were mainly associated with the personal independence and freedom to choose place and time of working (table 1).

Looking inside the sample considered, figures 1 and 2 show that, in general, in the European Union the citizens preferred to an employee than self-employed, exception for Bulgaria, Greece, Latvia, Lithuania, Portugal and Croatia. To be an employee was, also, the preference for the citizens from Norway, Switzerland and Japan.

On the other hand, the majority considered not feasible at all/total not feasible become self-employed within the next five years, mainly because not enough capital/financial resources, not enough skills, it would be difficult to reconcile the family commitments, or the current economic climate is not good for a start-up (table 2).

In general, the citizens totally agreed or tended to agree that the school education helped to develop sense of initiative and a sort of entrepreneurial attitude. The opinion, about if the school education helped to better understand the role of entrepreneurs in society, followed the same tendencies. However, the answers were more negative (the disagree answers won) for the following questions: the school education created an interest in becoming an entrepreneur; the school education given skills and know-how to run a business (table 3).

About the entrepreneurs, the populations from the European Union countries, Turkey, Norway, Switzerland, Iceland, United States, South Korea, Japan and China strongly agreed that they create new products and services that benefit all and that are job creators. They, also, agreed, that the entrepreneurs only think about their own pockets and that take advantages of other people´s work (table 4).

The majority of the respondents answered that never started a business, taken over one or are taking steps to start one. A great part of the interviewed that answered which never started a business or taken over one considered that it never crossed its mind to start a business. In turn, those who have started a business or are doing it now, a great part answered that started or took over a business more than three years ago and it's still operating, or once started a business, but currently are no longer entrepreneurs since that business was sold, transferred or closed (table 5).

About the decision to take steps to start a new business or take over one, the majority considered important the dissatisfaction with regard to your previous work situation, an appropriate business idea, contact with an appropriate business partner, getting the necessary financial resources and addressing an unmet social or ecological need (table 6).

Generally, those who have started a business or are doing it now were because they came across an opportunity or out of necessity (table 7). On the other hand, if they currently had the means to start an own business, including sufficient funding, the majority preferred to set up a new one than take over

an existing business (table 8). To set up a business today, the main risks identified were irregular/not guaranteed income, the risk of losing property/home and The possibility of going bankrupt (table 9).

A great part of the respondents had broadly favourable opinion about the entrepreneurs, neutral opinion about top managers in large companies and broadly favourable opinion about the professionals (architects, lawyers, doctors, accountants, etc.) (table 10). In turn, buy a house or save the money seems to be the opinion of a great part of citizens for eventual money inherited (table 11).

The majority agreed that it is difficult to start a business due to a lack of available financial support and due to the complex administrative procedures. The majority, also, agreed that people who have started their own business and have not success should be given a second opportunity (table 12).

For the majority of the respondents, the fathers were self-employed or blue-collar employee in the private sector and the mothers were blue-collar employee in the private sector, civil servants, or not in paid employment (table 13). In general, this population get by on current income (table 14).

Table 1a. Summary statistics about the answers available in the Eurobarometer 354 related with the question "If you could choose between different kinds of jobs, would you prefer to be… ?"

	If you could choose between different kinds of jobs, would you prefer to be… ?				Why would you prefer to be an employee rather than self-employed? (IF 'WOULD PREFER BEING AN EMPLOYEE')											
	An employee	Self-employed	None (DO NOT READ OUT)	DK (DO NOT READ OUT)	Regular, steady income (versus irregular, variable income)	Job security	Fixed working hours	Covered by social welfare/ insurance	No business idea	Not enough capital/ resources to be self-employed	Not enough skills to be self-employment	It is a major step to take/ hard to turn back	Afraid of red tape, administrative difficulties	Afraid of legal and social consequences if I fail	Other	DK
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	568.22	429.58	31.22	28.67	141.78	160.17	67.00	42.92	19.36	36.22	48.33	24.89	46.11	28.86	176.81	22.92
Standard deviation	189.43	224.88	33.43	16.83	66.02	59.37	39.86	28.49	12.10	22.94	24.82	18.91	30.11	14.19	96.77	13.25
Min	153	218	3	6	24	9	3	0	3	5	12	0	0	7	44	3
Max	1388	1527	200	81	254	290	155	98	57	125	109	83	130	53	603	68

Table 1b. Summary statistics about the answers available in the Eurobarometer 354 related with the question "If you could choose between different kinds of jobs, would you prefer to be… ?"

	Why would you prefer to be self-employed rather than an employee? (IF 'WOULD PREFER BEING SELF-EMPLOYED')										
	Personal independence/ self-fulfilment	Exploiting a business opportunity	Better income prospects	Freedom to choose place and time of working	Lack of attractive employment opportunities/lack of employment opportunities	Members of family / friends are self-employed	Favourable economic climate	To avoid the uncertainties related to paid employment	To contribute to society	Other	DK
Observations	36	36	36	36	36	36	36	36	36	36	36
Mean	245.86	21.89	72.36	138.00	9.11	6.58	11.83	12.56	9.33	69.47	12.47
Standard deviation	127.10	12.73	43.97	80.53	7.37	4.12	9.96	10.48	8.23	53.53	9.70
Min	95	4	12	62	1	1	0	0	1	13	2
Max	832	48	170	509	31	19	39	43	36	318	41

Figure 1. Number of answers for the options "an employee" and "self-employed" from the question "If you could choose between different kinds of jobs, would you prefer to be… ?", for each one of the countries considered

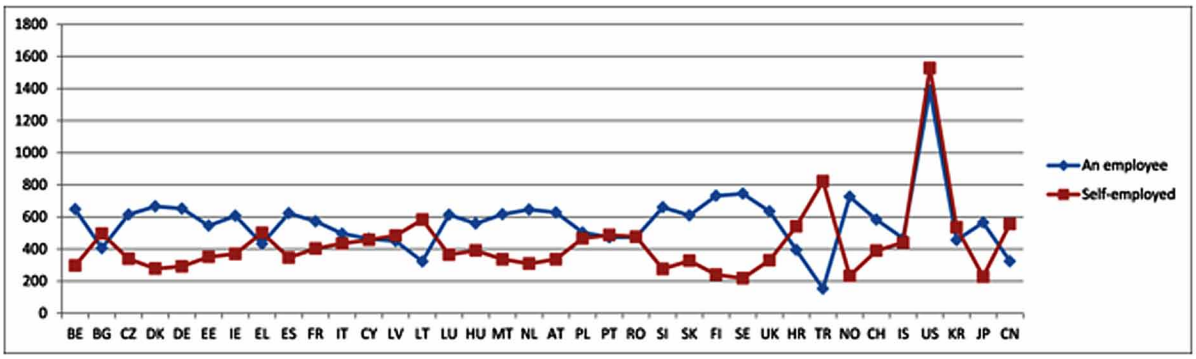

Figure 2. Number of answers for the options "an employee" and "self-employed" from the question "If you could choose between different kinds of jobs, would you prefer to be… ?", for European Union average (including Croatia) and the other world countries

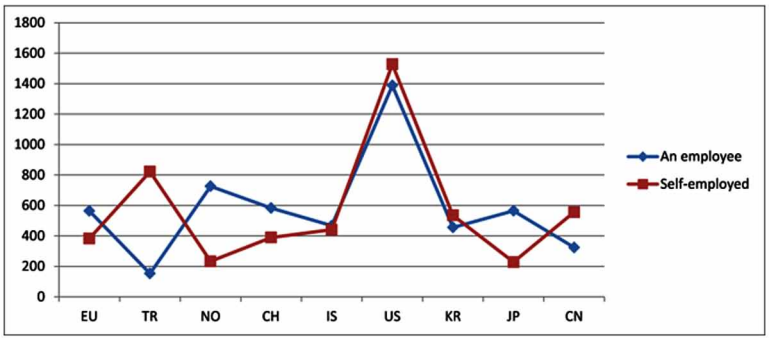

Table 2. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Regardless of whether or not you would like to become self-employed, would it be feasible for you to be self-employed within the next 5 years?"

	Regardless of whether or not you would like to become self-employed, would it be feasible for you to be self-employed within the next 5 years?							Why would it not be feasible for you to be self-employed within the next 5 years?								
	Very feasible	Fairly feasible	Not very feasible	Not feasible at all	DK (DO NOT READ OUT)	Total 'Feasible'	Total 'Not feasible'	No business idea	Not enough capital/ financial resources to be self-employed	Not enough skills to be self-employed	Burden of red tape / Administrative difficulties	The risk of failure and its legal and social consequences are too big	It would be difficult to reconcile with my family commitments	The current economic climate is not good for a start-up	Other	DK
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	105.28	211.58	209.97	401.06	23.86	316.94	611.08	44.61	130.97	65.53	21.39	25.28	40.92	69.86	320.44	17.00
Standard deviation	78.49	93.89	68.56	131.21	12.98	165.14	168.75	20.33	66.46	35.26	16.03	12.21	18.73	50.81	136.73	9.64
Min	32	91	103	198	5	160	426	17	21	21	0	4	17	8	188	3
Max	526	625	501	965	71	1152	1466	97	359	183	69	55	89	216	979	39

Table 3a. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements?"

	Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is helping/has helped me to develop my sense of initiative and a sort of entrepreneurial attitude							Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is helping/has helped me to better understand the role of entrepreneurs in society						
	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	253.58	326.64	206.53	242.89	28.00	580.17	449.36	240.25	305.56	205.42	276.11	30.06	545.92	481.67
Standard deviation	140.14	127.11	101.09	102.42	21.30	231.91	167.84	136.67	129.32	92.14	111.33	21.24	233.13	165.22
Min	24	163	84	78	4	188	224	30	164	92	70	3	215	223
Max	816	947	638	566	110	1763	1204	832	914	611	612	114	1746	1223

Table 3b. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements?"

	Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is making/has made me interested in becoming an entrepreneur							Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is giving/has given me skills and know-how to enable me to run a business						
	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	141.06	224.06	266.33	398.56	27.81	365.17	664.75	218.42	277.25	223.83	314.08	23.97	495.69	538.14
Standard deviation	100.60	105.35	129.88	145.84	20.33	184.50	228.46	130.32	116.12	101.25	111.69	18.70	221.80	175.06
Min	21	104	122	113	6	147	320	33	166	110	110	4	198	291
Max	503	677	871	919	100	1180	1790	768	859	639	716	105	1627	1355

Table 4a. Summary statistics about the answers available in the Eurobarometer 354 related with the question "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them?"

	I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs create new products and services that benefit us all							I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs only think about their own pockets						
	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	379.42	466.78	126.50	54.94	30.14	846.17	181.44	219.94	304.06	301.03	198.06	34.53	524.03	499.06
Standard deviation	187.79	166.02	48.07	32.30	26.43	308.01	70.25	107.07	83.90	158.60	151.12	24.88	144.45	290.13
Min	67	288	56	12	5	527	69	46	136	128	25	9	182	259
Max	1278	1312	246	125	168	2590	372	436	591	1074	967	138	898	2041

Table 4b. Summary statistics about the answers available in the Eurobarometer 354 related with the question "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them?"

	I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs are job creators							I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs take advantage of other people's work						
	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK (DO NOT READ OUT)	Total 'Agree'	Total 'Disagree'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	529.14	390.58	74.81	42.25	20.72	919.81	117.11	265.11	340.17	239.42	167.33	45.72	605.19	406.81
Standard deviation	212.55	162.77	37.17	33.29	22.98	303.14	61.53	128.31	103.65	172.71	154.85	31.14	180.44	312.98
Min	146	231	17	6	5	692	26	66	132	58	13	14	206	76
Max	1510	1142	173	146	146	2652	308	521	610	1094	880	147	936	1974

Table 5. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Have you ever started a business, taken over one or are you taking steps to start one?"

	Have you ever started a business, taken over one or are you taking steps to start one?			How would you describe your situation? ('TO THOSE WHO NEVER STARTED A BUSINESS OR TOOK OVER ONE')					How would you describe your situation? ('TO THOSE WHO HAVE STARTED A BUSINESS OR ARE DOING IT NOW')					
	Yes	No	DK (DO NOT READ OUT)	It never crossed your mind to start a business	You are thinking about starting a business	You thought about it or you took steps to start a business but gave up on the idea	You have the opportunity to take over your family business	DK (DO NOT READ OUT)	You are currently taking steps to start a new business	You have started or taken over a business in the last three years which is still operating today	You started or took over a business more than three years ago and it's still operating	You once started a business, but currently you are no longer an entrepreneur since that business has failed	You once started a business, but currently you are no longer an entrepreneur since that business was sold, transferred or closed	DK (DO NOT READ OUT)
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	279.78	774.58	3.28	425.53	126.47	167.69	22.92	35.53	48.33	32.61	72.44	35.64	77.58	12.94
Standard deviation	159.82	195.00	6.13	110.14	51.67	88.92	10.93	22.75	44.00	17.97	37.28	28.22	55.35	9.09
Min	154	605	0	241	54	56	1	1	5	15	26	7	18	2
Max	1141	1857	37	855	259	615	54	117	269	123	223	143	372	38

Table 6a. Summary statistics about the answers available in the Eurobarometer 354 related with the question "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one."

	For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Dissatisfaction with regard to your previous work situation							For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. An appropriate business idea						
	Very important	Fairly important	Not very important	Not at all important	DK (DO NOT READ OUT)	Total 'Important	Total 'Not important'	Very important	Fairly important	Not very important	Not at all important	DK (DO NOT READ OUT)	Total 'Important	Total 'Not important'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	119.50	133.50	96.53	98.03	22.72	253.00	194.53	292.14	119.92	29.03	20.75	8.61	412.03	49.75
Standard deviation	96.17	68.54	43.86	59.72	8.68	161.67	95.34	168.84	51.66	18.03	18.09	7.21	210.50	35.08
Min	16	55	45	12	10	95	109	143	41	6	2	1	236	8
Max	620	476	312	360	46	1096	672	1210	356	113	114	39	1567	227

Table 6b. Summary statistics about the answers available in the Eurobarometer 354 related with the question "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one."

	For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Contact with an appropriate business partner							For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Getting the necessary financial resources						
	Very important	Fairly important	Not very important	Not at all important	DK (DO NOT READ OUT)	Total 'Important	Total 'Not important'	Very important	Fairly important	Not very important	Not at all important	DK (DO NOT READ OUT)	Total 'Important	Total 'Not important'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	208.06	129.11	58.89	64.03	10.19	337.31	122.86	283.97	117.42	36.61	26.06	6.17	401.39	62.78
Standard deviation	111.09	58.72	38.38	57.52	6.29	163.78	92.71	181.73	41.56	24.22	21.19	4.86	213.09	42.79
Min	79	57	16	4	1	137	24	125	48	8	1	0	228	16
Max	773	441	250	323	29	1214	573	1271	299	114	123	19	1570	237

Table 6c. Summary statistics about the answers available in the Eurobarometer 354 related with the question "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one."

	For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. A role model							For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Addressing an unmet social or ecological need						
	Very important	Fairly important	Not very important	Not at all important	DK (DO NOT READ OUT)	Total 'Important	Total 'Not important'	Very important	Fairly important	Not very important	Not at all important	DK (DO NOT READ OUT)	Total 'Important	Total 'Not important'
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	145.36	149.81	89.83	72.08	13.25	295.25	161.78	136.94	160.28	87.42	61.56	24.11	297.31	148.83
Standard deviation	124.35	64.79	42.59	44.51	9.64	183.16	82.70	107.79	71.77	49.22	40.43	17.15	175.38	86.01
Min	56	73	21	7	2	165	32	44	73	42	3	3	160	46
Max	799	476	274	247	40	1275	522	689	525	332	227	86	1214	558

Table 7. Summary statistics about the answers available in the Eurobarometer 354 related with the question "All in all, would you say you started or are starting your business…"

	All in all, would you say you started or are starting your business… ('TO THOSE WHO HAVE STARTED A BUSINESS OR ARE DOING IT NOW')			
	…because you came across an opportunity	…out of necessity	...because there was a need/ opportunity to take over the business from a family member	DK (DO NOT READ OUT)
Observations	36	36	36	36
Mean	141.00	80.11	40.06	18.42
Standard deviation	89.52	56.69	24.76	11.95
Min	77	21	9	8
Max	622	293	161	64

Table 8. Summary statistics about the answers available in the Eurobarometer 354 related with the question "If you currently had the means to start your own business, including sufficient funding, would you rather set up a new one or take over an existing one?"

	If you currently had the means to start your own business, including sufficient funding, would you rather set up a new one or take over an existing one?			
	Set up a new one	**Take over an existing business**	**None of these, not interested (DO NOT READ OUT)**	**DK (DO NOT READ OUT)**
Observations	36	36	36	36
Mean	571.36	294.47	146.00	45.78
Standard deviation	214.28	146.93	75.12	25.01
Min	290	121	39	8
Max	1697	1041	466	122

Table 9. Summary statistics about the answers available in the Eurobarometer 354 related with the question "If you were to set up a business today, which are the two risks you would be most afraid of?"

	If you were to set up a business today, which are the two risks you would be most afraid of? (MAX. 2 ANSWERS)						
	Irregular/not guaranteed income	**Lack of job security**	**The risk of losing your property/ home**	**The need to devote too much energy or time to it**	**The possibility of suffering a personal failure**	**The possibility of going bankrupt**	**DK (DO NOT READ OUT)**
Observations	36	36	36	36	36	36	36
Mean	363.83	188.97	354.25	164.39	174.61	437.94	56.64
Standard deviation	141.99	93.16	132.62	102.36	88.78	140.57	30.08
Min	221	61	117	76	81	226	9
Max	1114	634	957	633	510	1136	146

Table 10. Summary statistics about the answers available in the Eurobarometer 354 related with the question "What is your overall opinion about the following groups of people?"

	What is your overall opinion about the following groups of people? Entrepreneurs (self-employed, business owners)				**What is your overall opinion about the following groups of people? Top managers in large companies**				**What is your overall opinion about the following groups of people? The professions (architects, lawyers, doctors, accountants,etc.)**			
	Broadly favourable	**Neutral**	**Broadly unfavourable**	**DK (DO NOT READ OUT)**	**Broadly favourable**	**Neutral**	**Broadly unfavourable**	**DK (DO NOT READ OUT)**	**Broadly favourable**	**Neutral**	**Broadly unfavourable**	**DK (DO NOT READ OUT)**
Observations	36	36	36	36	36	36	36	36	36	36	36	36
Mean	537.94	409.86	82.97	26.97	290.64	447.89	276.81	42.28	580.83	355.86	93.08	27.81
Standard deviation	256.25	146.84	49.81	19.01	127.15	167.47	140.82	22.57	208.23	147.23	51.13	15.54
Min	260	139	15	2	131	327	84	11	323	154	21	6
Max	1811	1037	199	102	780	1357	826	98	1648	1066	255	70

Table 11. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Please imagine, that you suddenly inherited X Euro. What would you do with the money?"

	Please imagine, that you suddenly inherited X Euro. What would you do with the money?					
	Start a business (alone or with a partner)	**Buy a house (or repay my mortgage)**	**Save the money (saving account, shares etc.)**	**Spend it on things I always wanted to buy (travel, car, luxury items)**	**Work less / stop working**	**DK (DO NOT READ OUT)**
Observations	36	36	36	36	36	36
Mean	202.06	314.75	314.72	128.64	46.86	50.50
Standard deviation	142.85	106.42	181.20	44.97	22.35	21.57
Min	57	131	87	53	14	5
Max	546	760	1272	235	106	116

Table 12a. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements?"

	Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? It is difficult to start one's own business due to a lack of available financial support							**Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? It is difficult to start one's own business due to the complex administrative procedures**						
	Totally agree	**Tend to agree**	**Tend to disagree**	**Totally disagree**	**DK (DO NOT READ OUT)**	**Total 'Agree'**	**Total 'Disagree'**	**Totally agree**	**Tend to agree**	**Tend to disagree**	**Totally disagree**	**DK (DO NOT READ OUT)**	**Total 'Agree'**	**Total 'Disagree'**
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	484.19	343.61	117.94	55.17	56.86	827.61	173.17	413.44	326.56	159.42	89.53	68.53	740.06	249.03
Standard deviation	223.61	161.39	76.59	33.84	52.72	294.72	101.12	171.93	143.96	91.24	53.07	50.04	239.59	128.81
Min	184	148	18	14	1	518	40	149	171	46	23	11	487	90
Max	1294	1120	327	198	214	2415	525	988	1035	566	332	249	2024	898

Table 12b. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements?"

	Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? It is difficult to obtain sufficient information on how to start a business							**Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? One should not start a business if there is a risk it might fail**						
	Totally agree	**Tend to agree**	**Tend to disagree**	**Totally disagree**	**DK (DO NOT READ OUT)**	**Total 'Agree'**	**Total 'Disagree'**	**Totally agree**	**Tend to agree**	**Tend to disagree**	**Totally disagree**	**DK (DO NOT READ OUT)**	**Total 'Agree'**	**Total 'Disagree'**
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	240.25	277.61	265.06	187.17	87.58	517.92	452.28	288.72	222.81	274.22	243.81	28.22	511.50	517.92
Standard deviation	137.45	109.43	145.71	121.34	60.65	196.49	249.20	106.49	63.85	136.45	179.22	22.90	119.27	297.49
Min	60	127	83	25	10	203	204	90	130	121	47	7	298	252
Max	553	703	941	758	298	1206	1699	506	420	933	1193	120	850	2126

Table 12c. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements?"

	Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? People who have started their own business and have failed should be given a second chance						
	Totally agree	**Tend to agree**	**Tend to disagree**	**Totally disagree**	**DK (DO NOT READ OUT)**	**Total 'Agree'**	**Total 'Disagree'**
Observations	36	36	36	36	36	36	36
Mean	457.75	394.11	101.81	53.08	50.86	851.92	154.83
Standard deviation	199.98	155.74	50.83	32.05	41.52	289.54	71.97
Min	163	190	32	7	5	601	65
Max	1359	1128	290	154	203	2486	421

Table 13. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Could you tell me the occupations of your parents? Are or were they self-employed, white-collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment?"

	Could you tell me the occupations of your parents? Are or were they self-employed, white-collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment? Father							**Could you tell me the occupations of your parents? Are or were they self-employed, white-collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment? Mother**						
	Self-employed	**White-collar employee in the private sector**	**Blue-collar employee in the private sector**	**Civil servants**	**Not in paid employment**	**Other**	**DK (DO NOT READ OUT)**	**Self-employed**	**White-collar employee in the private sector**	**Blue-collar employee in the private sector**	**Civil servants**	**Not in paid employment**	**Other**	**DK (DO NOT READ OUT)**
Observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Mean	257.69	151.89	257.83	197.03	47.56	118.19	27.56	131.97	134.17	159.39	165.36	325.50	124.19	16.89
Standard deviation	136.97	118.93	151.66	98.36	33.59	104.86	29.40	72.83	113.28	122.49	129.07	179.28	101.17	17.71
Min	76	35	81	50	0	3	3	39	15	38	15	38	1	2
Max	691	569	998	543	129	489	157	349	606	727	535	740	495	80

Table 14. Summary statistics about the answers available in the Eurobarometer 354 related with the question "Which of the following statements best describe your feelings about your household's income these days?"

	Which of the following statements best describe your feelings about your household's income these days?					
	Live comfortably on current income	**Get by on current income**	**Find it difficult to manage on current income**	**Find it very difficult to manage on current income**	**Refusal (DO NOT READ OUT)**	**DK (DO NOT READ OUT)**
Observations	36	36	36	36	36	36
Mean	269.83	497.94	181.53	98.83	3.06	6.56
Standard deviation	196.77	142.50	89.89	68.35	3.36	5.70
Min	40	359	34	12	0	0
Max	1111	1172	406	283	16	25

RESULTS OF CORRELATION ANALYSES

In this section the statistical information analysed before is explored further through correlation matrices and factor analysis, following Stata (2020) procedures. The answers "do not know" were not considered.

Gender and age factors (are correlated with the number of respondents, considering the almost uniform distribution of the respective variables between classes and among countries) are correlated with the opinions about the preferences of being employee or self-employed. The correlations of gender and age factors with the justifications for the preferences of being self-employed or an employee are not so strong or inexistent (table 15). In a similar pattern, gender and age factors are, also, correlated with the opinions about if it is feasible to be self-employed within the next 5 years, but not with the justifications (table 16). Looking to the original data, these contexts described for the tables 15 and 16, happen because a non-uniform distribution of the answers, across the countries, for the justifications, a great diversity of answers (and not correlated) and not all the citizen interviewed answered to the justifications. This means that the surveyed citizens are not unanimous in the justifications presented to be employee/self-employed, or about the feasible to be self-employed within the next 5 years. What does not happen for the answers about the role of the school education in the following domains: sense of initiative and a sort of entrepreneurial attitude; understanding about the role of entrepreneurs in society; interest in becoming an entrepreneur; and skills and know-how to enable to run a business (table 17). This highlights the relevance given by the citizens to the role of the education for an entrepreneurial framework.

There are, also, a great correlation between gender and age factors and the answers for the role of the entrepreneurs in the following aspects, exception for the last one (meaning that the surveyed people diverge in the opinions about the role of entrepreneurs to take advantage of other people's work): they create new products and services that benefit us all; they only think about their own pockets; they are job creators; and they take advantage of other people's work (table 18). This means that, in general, the respondents agree about the importance of the entrepreneurs for the society, but, also, agree about their opportunisms. The correlations are, too, high among gender and age factors and the answers for the questions about who ever started a business, taken over one or are taking steps to start one (table 19), for the questions related with the decision to take steps to start a new business or take over one (table 20), for the question about the justifications to start a business (table 21), the preferences to create a new business or take over an existing one (table 22) and the risks more feared (table 23). There are, too, here a clear opinion about the dimensions related with the businesses contexts.

In turn, there is a negative correlation between gender and age factors and the favourable and unfavourable opinions about the entrepreneurs, showing, again, that the opinion about the entrepreneurs is not consensual. But there are positive and strong correlations with the opinions about the top managers in large companies and professionals (table 24). The correlations are not so strong for the opinions about apply money suddenly inherited (table 25).

Of highlighting, yet, the strong correlations with the answers for the questions related with the difficulties of starting a business (table 26). In these aspects the citizens have a clear opinion about the difficulties to start a business. These strong correlations do not happen for the answers related with the occupations of the respondents' parents (table 27) and for the answers associated with the options "find difficulties" related with the household´s income (table 28). In these cases the citizens were not sure about their opinions.

In summary, the respondents were sure about to be employee or self-employed, the role of the educations for the entrepreneurship and about the difficulties to start a business. They are more confuse about the justifications to be employee or self-employed, about the importance of the entrepreneurs and about how to apply unexpected money. Of course, here the structure of the survey has its influence. It is suggested, for the future, surveys with fewer options to reduce the number of vague answers ("do not know" or "other").

COVID-19 IMPACTS ON THE ECONOMIC SENTIMENT

The results (obtained with Eurostat data) presented in the table 29 for the growth rates associated with the economic sentiment indicators after the Covid-19 pandemic reveal that the economic expectations decreased strongly in April in the European Union countries (later in May for Greece). Belgium, Bulgaria, Denmark, Malta, Netherlands, Austria, Poland, Romania and Slovakia were the countries were the economic sentiment more decreased in April. The economic confidence recovered, namely, in June and July and the leader countries were Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Italy, Poland, Portugal, Romania, Slovakia, Finland and United Kingdom. Some of the more optimist countries, relatively to the entrepreneurship, identified in the figures 1 and 2 appear here with more stable growth rates or between the countries that recovered with higher rates, showing that the European context over the last years does not changed considerably in some countries.

Table 15. Pairwise correlation matrix for the question "If you could choose between different kinds of jobs, would you prefer to be… ?"

	G	C	Q1	Q2u	Q2d	Q2t	Q6u	Q6d
G	1.000							
C	0.9974*	1.000						
	(0.000)							
Q1	0.9514*	0.9499*	1.000					
	(0.000)	(0.000)						
Q2u	0.099	0.073	0.231	1.000				
	(0.567)	(0.671)	(0.175)					
Q2d	0.3624*	0.3473*	0.3330*	0.3409*	1.000			
	(0.030)	(0.038)	(0.047)	(0.042)				
Q2t	0.5511*	0.5327*	0.6582*	0.3307*	0.4277*	1.000		
	(0.001)	(0.001)	(0.000)	(0.049)	(0.009)			
Q6u	0.3728*	0.4012*	0.304	-0.173	0.246	0.125	1.000	
	(0.025)	(0.015)	(0.072)	(0.314)	(0.148)	(0.468)		
Q6d	0.7901*	0.8050*	0.7169*	-0.049	0.151	0.253	0.313	1.000
	(0.000)	(0.000)	(0.000)	(0.776)	(0.379)	(0.137)	(0.063)	

Note: G, factor for gender options; C, factor for age classes options; Q1, factor for the question "If you could choose between different kinds of jobs, would you prefer to be… ?"; Q2u, Q2d and Q2t, factors related with the question "Why would you prefer to be an employee rather than self-employed? ", respectively, for the first 4 options of answers, second 4 options of answers and last 3 options of answers; Q6u, factor related with the question "Why would you prefer to be self-employed rather than an employee?" for the several options of answers, exception for the options "Freedom to choose place and time of working", that was considered separately as Q6d, and "Other" that was removed. *, statistically significant at 5%.

Table 16. Pairwise correlation matrix for the question "Regardless of whether or not you would like to become self-employed, would it be feasible for you to be self-employed within the next 5 years?"

	G	C	Q7	Q8u	Q8d	Q8t
G	1.000					
C	0.9974*	1.000				
	(0.000)					
Q7	0.9805*	0.9790*	1.000			
	(0.000)	(0.000)				
Q8u	0.157	0.146	0.164	1.000		
	(0.359)	(0.395)	(0.339)			
Q8d	0.048	0.039	-0.025	0.154	1.000	
	(0.781)	(0.820)	(0.883)	(0.370)		
Q8t	0.031	0.040	-0.079	-0.317	0.3412*	1.000
	(0.856)	(0.815)	(0.646)	(0.060)	(0.042)	

Note: G, factor for gender options; C, factor for age classes options; Q7, factor for the question "Regardless of whether or not you would like to become self-employed, would it be feasible for you to be self-employed within the next 5 years?"; Q8u, Q8d and Q8t, factors related with question "Why would it not be feasible for you to be self-employed within the next 5 years?", respectively, for the first 3 options of answers, for the antepenultimate 3 options of answers and for the option "The current economic climate is not good for a start-up". The option "Other" was removed. *, statistically significant at 5%.

Table 17. Pairwise correlation matrix for the question "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements?"

	G	C	Q11.1	Q11.2	Q11.3	Q11.4
G	1.000					
C	0.9974*	1.000				
	(0.000)					
Q11.1	0.9938*	0.9890*	1.000			
	(0.000)	(0.000)				
Q11.2	0.9929*	0.9877*	0.9986*	1.000		
	(0.000)	(0.000)	(0.000)			
Q11.3	0.9955*	0.9968*	0.9862*	0.9844*	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)		
Q11.4	0.9962*	0.9925*	0.9977*	0.9977*	0.9906*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q11.1, Q11.2, Q11.3 and Q11.4, factors related with the questions "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is helping/has helped me to develop my sense of initiative and a sort of entrepreneurial attitude", "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is helping/has helped me to better understand the role of entrepreneurs in society", "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is making/has made me interested in becoming an entrepreneur" and "Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of the following statements? My school education is giving/has given me skills and know-how to enable me to run a business", respectively. *, statistically significant at 5%

Table 18. Pairwise correlation matrix for the question "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them?"

	G	C	Q12.1	Q12.2	Q12.3	Q12.4
G	1.000					
C	0.9974*	1.000				
	(0.000)					
Q12.1	0.9077*	0.9003*	1.000			
	(0.000)	(0.000)				
Q12.2	0.9393*	0.9414*	0.9219*	1.000		
	(0.000)	(0.000)	(0.000)			
Q12.3	0.9158*	0.9197*	0.9477*	0.9326*	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)		
Q12.4	0.3490*	0.3333*	0.219	0.148	0.281	1.000
	(0.037)	(0.047)	(0.199)	(0.389)	(0.097)	

Note: G, factor for gender options; C, factor for age classes options; Q12.1, Q12.2, Q12.3 and Q12.4, factors related with the questions "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs create new products and services that benefit us all", "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs only think about their own pockets", "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs are job creators" and "I am going to read you another list of statements. Please tell me if you totally agree, tend to agree, tend to disagree or totally disagree with each of them? Entrepreneurs take advantage of other people's work", respectively. *, statistically significant at 5%

Table 19. Pairwise correlation matrix for the question "Have you ever started a business, taken over one or are you taking steps to start one?"

	G	C	Q13	Q14.au	Q14.ad	Q14.bu	Q14.bd
G	1.000						
C	0.9974*	1.000					
	(0.000)						
Q13	0.9990*	0.9978*	1.000				
	(0.000)	(0.000)					
Q14.au	0.6686*	0.6327*	0.6447*	1.000			
	(0.000)	(0.000)	(0.000)				
Q14.ad	0.8121*	0.8304*	0.8152*	0.278	1.000		
	(0.000)	(0.000)	(0.000)	(0.100)			
Q14.bu	0.9039*	0.9149*	0.9173*	0.4012*	0.7462*	1.000	
	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)		
Q14.bd	0.8213*	0.8292*	0.8404*	0.287	0.7207*	0.8460*	1.000
	(0.000)	(0.000)	(0.000)	(0.090)	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q13, factor related with the question "Have you ever started a business, taken over one or are you taking steps to start one?"; Q14.au and Q14.ad, factors related with the question "How would you describe your situation? ('TO THOSE WHO NEVER STARTED A BUSINESS OR TOOK OVER ONE'), respectively, for the option of answer "It never crossed your mind to start a business" and for the last 3 options of answer; Q14.bu and Q14.bd, factors related with the question "How would you describe your situation? ('TO THOSE WHO HAVE STARTED A BUSINESS OR ARE DOING IT NOW')", respectively, for the first 3 options of answer and for the last 2 options of answer. *, statistically significant at 5%.

Table 20. Pairwise correlation matrix for the question "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one."

	G	C	Q15.1	Q15.2	Q15.3	Q15.4	Q15.5	Q15.6
G	1.000							
C	0.9974*	1.000						
	(0.000)							
Q15.1	0.9527*	0.9560*	1.000					
	(0.000)	(0.000)						
Q15.2	0.9449*	0.9489*	0.9809*	1.000				
	(0.000)	(0.000)	(0.000)					
Q15.3	0.9434*	0.9486*	0.9901*	0.9794*	1.000			
	(0.000)	(0.000)	(0.000)	(0.000)				
Q15.4	0.9106*	0.9091*	0.9653*	0.9721*	0.9605*	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
Q15.5	0.9312*	0.9340*	0.9893*	0.9861*	0.9818*	0.9744*	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Q15.6	0.9438*	0.9456*	0.9947*	0.9871*	0.9892*	0.9799*	0.9933*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q15.1, Q15.2, Q15.3, Q15.4, Q15.5 and Q15.6, factors related, respectively, with the questions "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Dissatisfaction with regard to your previous work situation", "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. An appropriate business idea", "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Contact with an appropriate business partner", "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Getting the necessary financial resources", "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. A role model" and "For each of the following elements, please tell me if it was very important, fairly important, not very important or not important at all in your decision to take steps to start a new business or take over one. Addressing an unmet social or ecological need".*, statistically significant at 5%

Table 21. Pairwise correlation matrix for the question "All in all, would you say you started or are starting your business…"

	G	C	Q16
G	1.000		
C	0.9974*	1.000	
	(0.000)		
Q16	0.9054*	0.9153*	1.000
	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q16, factor related with the question "All in all, would you say you started or are starting your business… ('TO THOSE WHO HAVE STARTED A BUSINESS OR ARE DOING IT NOW')".*, statistically significant at 5%

Table 22. Pairwise correlation matrix for the question "If you currently had the means to start your own business, including sufficient funding, would you rather set up a new one or take over an existing one?"

	G	C	Q17
G	1.000		
C	0.9974*	1.000	
	(0.000)		
Q17	0.8721*	0.8866*	1.000
	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q17, factor related with the question "If you currently had the means to start your own business, including sufficient funding, would you rather set up a new one or take over an existing one?".*, statistically significant at 5%

Table 23. Pairwise correlation matrix for the question "If you were to set up a business today, which are the two risks you would be most afraid of?"

	G	C	Q18
G	1.000		
C	0.9974*	1.000	
	(0.000)		
Q18	0.9791*	0.9764*	1.000
	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q18, factor related with the question "If you were to set up a business today, which are the two risks you would be most afraid of? (MAX. 2 ANSWERS)".*, statistically significant at 5%

Table 24. Pairwise correlation matrix for the question "What is your overall opinion about the following groups of people?"

	G	C	Q19.1u	Q19.1d	Q19.2	Q19.3
G	1.000					
C	0.9974*	1.000				
	(0.000)					
Q19.1u	-0.4430*	-0.4312*	1.000			
	(0.007)	(0.009)				
Q1.91d	0.7313*	0.7310*	0.053	1.000		
	(0.000)	(0.000)	(0.759)			
Q19.2	0.9979*	0.9966*	-0.4611*	0.7282*	1.000	
	(0.000)	(0.000)	(0.005)	(0.000)		
Q19.3	0.9569*	0.9603*	-0.247	0.7833*	0.9543*	1.000
	(0.000)	(0.000)	(0.147)	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q19.1u, factor related with the question "What is your overall opinion about the following groups of people? Entrepreneurs (self-employed, business owners)", for options of answer "Broadly favourable" and "Broadly unfavourable". The option of answer "Neutral" was considered separately as Q19.1d; Q19.2 and Q19.3, factors related with the questions, respectively, "What is your overall opinion about the following groups of people? Top managers in large companies" and "What is your overall opinion about the following groups of people? The professions (architects, lawyers, doctors, accountants,etc.)".*, statistically significant at 5%

Table 25. Pairwise correlation matrix for the question "Please imagine, that you suddenly inherited X Euro. What would you do with the money?"

	G	C	Q20u	Q20d
G	1.000			
C	0.9974*	1.000		
	(0.000)			
Q20u	0.4112*	0.4468*	1.000	
	(0.013)	(0.006)		
Q20d	0.7944*	0.7715*	-0.170	1.000
	(0.000)	(0.000)	(0.323)	

Note: G, factor for gender options; C, factor for age classes options; Q20d, factor related with the question "Please imagine, that you suddenly inherited X Euro. What would you do with the money?" for the several options of answer, exception, for the option of answer "Start a business (alone or with a partner)" that was considered separately as Q20u.*, statistically significant at 5%

Table 26. Pairwise correlation matrix for the question "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements?"

	G	C	Q21.1	Q21.2	Q21.3	Q21.4	Q21.5
G	1.000						
C	0.9974*	1.000					
	(0.000)						
Q21.1	0.9527*	0.9465*	1.000				
	(0.000)	(0.000)					
Q21.2	0.9902*	0.9897*	0.9670*	1.000			
	(0.000)	(0.000)	(0.000)				
Q21.3	0.9688*	0.9712*	0.9150*	0.9716*	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)			
Q21.4	0.9407*	0.9386*	0.8810*	0.9315*	0.9525*	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Q21.5	0.9410*	0.9306*	0.9291*	0.9424*	0.9086*	0.9147*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Note: G, factor for gender options; C, factor for age classes options; Q21.1, Q21.2, Q21.3, Q21.4, Q21.5, factors related, respectively, with the question "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? It is difficult to start one's own business due to a lack of available financial support", "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? It is difficult to start one's own business due to the complex administrative procedures", "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? It is difficult to obtain sufficient information on how to start a business", "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? One should not start a business if there is a risk it might fail" and "Do you totally agree, tend to agree, tend to disagree or totally disagree with the following statements? People who have started their own business and have failed should be given a second chance".*, statistically significant at 5%

Table 27. Pairwise correlation matrix for the question "Could you tell me the occupations of your parents? Are or were they self-employed, white-collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment?"

	G	C	D7.1u	Q7.1d	Q7.1t	D7.2u	D7.2d	D7.2t
G	1.000							
C	0.9974*	1.000						
	(0.000)							
D7.1u	0.5412*	0.5485*	1.000					
	(0.001)	(0.001)						
Q7.1d	0.8540*	0.8297*	0.4586*	1.000				
	(0.000)	(0.000)	(0.005)					
Q7.1t	0.125	0.150	-0.326	-0.157	1.000			
	(0.467)	(0.383)	(0.053)	(0.360)				
D7.2u	0.5089*	0.5097*	0.8664*	0.4728*	-0.296	1.000		
	(0.002)	(0.002)	(0.000)	(0.004)	(0.080)			
D7.2d	0.8730*	0.8550*	0.3463*	0.9253*	-0.009	0.4148*	1.000	
	(0.000)	(0.000)	(0.039)	(0.000)	(0.960)	(0.012)		
D7.2t	-0.076	-0.074	-0.5176*	-0.252	0.195	-0.3453*	0.026	1.000
	(0.659)	(0.668)	(0.001)	(0.138)	(0.255)	(0.039)	(0.882)	

Note: G, factor for gender options; C, factor for age classes options; D7.1u, D7.1d and D7.1t, are related with the question "Could you tell me the occupations of your parents? Are or were they self-employed, white-collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment? Father" and are, respectively, for the option of answer "Self-employed", for the factor associated with the second and third options of answer and for the factor associated with the last 3 options of answer; D7.2u, D7.2d and D7.2t, are related with the question "Could you tell me the occupations of your parents? Are or were they self-employed, white-collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment? Mother" and are, respectively, for the option of answer "Self-employed", for the factor associated with the second and third options of answer and for the factor associated with the last 3 options of answer.*, statistically significant at 5%

Table 28. Pairwise correlation matrix for the question "Which of the following statements best describe your feelings about your household's income these days?"

	G	C	D8u	D8d
G	1.000			
C	0.9974*	1.000		
	(0.000)			
D8u	0.8970*	0.8844*	1.000	
	(0.000)	(0.000)		
D8d	0.4597*	0.4806*	0.027	1.000
	(0.005)	(0.003)	(0.875)	

Note: G, factor for gender options; C, factor for age classes options; D8u and D8d, are related with the question "Which of the following statements best describe your feelings about your household's income these days?" and are, respectively, for the factor associated with the first 2 options of answer and for the factor associated with the third and fourth options of answer.*, statistically significant at 5%

Table 29. Growth rates for Economic sentiment indicator after the pandemic

	2020-01	2020-02	2020-03	2020-04	2020-05	2020-06	2020-07	2020-08	2020-09	2020-10
European Union - 27 countries (from 2020)	0.015	0.005	-0.083	-0.325	0.045	0.123	0.092	0.061	0.037	0.000
Euro area - 19 countries	0.017	0.008	-0.090	-0.310	0.040	0.123	0.087	0.062	0.039	0.000
Belgium	0.016	0.025	-0.076	-0.347	0.027	0.090	0.147	0.079	0.063	0.033
Bulgaria	-0.019	-0.028	-0.024	-0.392	0.094	0.138	0.011	0.005	0.073	-0.003
Czechia	-0.003	-0.032	-0.015	-0.320	0.002	0.008	0.264	-0.011	0.059	-0.057
Denmark	-0.033	0.038	-0.091	-0.410	-0.009	0.232	0.137	0.020	0.037	0.041
Germany	0.021	0.006	-0.096	-0.216	0.044	0.088	0.079	0.067	0.013	0.016
Estonia	0.000	0.029	-0.006	-0.289	0.000	0.044	0.134	0.039	0.034	0.040
Ireland	0.053	0.002	-0.067	-0.312	0.079	0.096	0.044	0.053	0.046	-0.044
Greece	-0.008	0.034	-0.034	-0.092	-0.109	-0.010	0.037	-0.001	-0.013	0.031
Spain	-0.012	0.012	-0.033	-0.262	0.022	0.109	0.090	-0.028	0.018	-0.002
France	0.025	0.015	-0.065	-0.311	-0.003	0.145	0.061	0.105	0.045	-0.047
Croatia	0.005	-0.011	-0.083	-0.300	0.093	0.073	-0.019	0.093	-0.025	-0.002
Italy	-0.002	0.000	-0.174			0.130	0.094	0.035	0.104	0.013
Cyprus	0.034	-0.004	-0.093	-0.265	0.031	0.038	0.019	0.025	-0.022	-0.009
Latvia	0.009	0.003	-0.056	-0.191	0.015	0.061	0.047	0.039	0.036	-0.021
Lithuania	0.011	0.014	-0.064	-0.206	0.048	0.045	0.030	0.022	0.029	0.025
Luxembourg	-0.076	0.049	-0.021	-0.243	0.155	0.041	0.082	-0.001	-0.019	0.087
Hungary	-0.012	0.007	-0.020	-0.267	0.016	0.076	0.024	0.008	0.019	-0.014
Malta	0.098	-0.060	-0.068	-0.405	0.086	-0.002	0.122	0.183	0.119	-0.074
Netherlands	-0.003	0.020	-0.039	-0.332	0.053	0.120	0.068	0.086	0.023	-0.024
Austria	0.021	0.014	-0.079	-0.348	0.111	0.121	0.067	0.057	0.028	-0.020
Poland	-0.019	-0.014	-0.039	-0.505	-0.006	0.228	0.184	0.109	0.030	0.022
Portugal	0.015	-0.011	-0.069	-0.320	-0.058	0.176	0.142	0.015	0.014	0.018
Romania	0.002	-0.012	-0.043	-0.344	0.049	0.127	0.067	0.051	0.025	-0.021
Slovenia	0.008	0.033	-0.098	-0.296	0.125	0.068	0.080	0.078	0.019	-0.044
Slovakia	0.028	-0.017	-0.005	-0.430	0.071	0.214	0.163	0.059	-0.026	0.015
Finland	-0.015	-0.013	-0.032	-0.240	0.057	0.052	0.127	-0.027	-0.018	0.035
Sweden	0.023	0.024	-0.056	-0.276	0.028	0.125	0.098	0.034	0.061	0.012
United Kingdom	0.039	0.053	-0.037	-0.322	-0.011	0.057	0.158	-0.005	0.105	0.019

CONCLUSION

The study here developed aimed to analyse the entrepreneurship context in the European Union countries and other around countries with great impact in the global economy, as, for example, China, United States, Japan, South Korea and Turkey. The objective was, also, from here present perspectives about the future framework derived from the Covid-19 pandemic impact. For these intends, data from the Flash Eurobarometer 354: Entrepreneurship in the EU and beyond were considered and worked through descriptive analysis and correlations coefficients matrices.

The data analysis shows that namely in the European Union the entrepreneurship context is not the more favourable to deal with the new paradigms created by the actual pandemic context, where new approaches are needed. In fact, in general, the European Union citizens interviewed for the Flash Eurobarometer in the several member-states answered that preferred to be an employee than self-employed. On the other hand, for the several countries analysed (inside and outside the European Union), the majority of the surveyed people referred that is not feasible at all become self-employed within the next five years. Here, it is important that the public institutions improve the population perceptions about the availability of capital and promote vocational training programmes to improve the citizen skills. In fact, the perceptions of the surveyed persons are that the school education does not create interest to become entrepreneur and does not give skills and know-how to run a business. Another question is related with the opinion about the role of the entrepreneurs that it is not the better (a relevant part considered that the entrepreneurs only think about their own pockets and that take advantages of other people´s work).

The correlation matrices analysis highlights that the respondents diverge in the several justifications presented, for example, they diverge in the justifications presented to be employee/self-employed, or about the feasible to be self-employed within the next 5 years. Considering that the existence of a great part in the European Union countries and around the world that prefers to be an employee than self-employed, it is one of the main problems in the base of the entrepreneurship context, the divergence in the answers given by the citizens surveyed increased the difficulties. In fact, this divergence in the opinions about the justifications difficult the design of adjusted policies to correct the situation and these adjustments will be needed in the next times around the world and, namely, in the European Union.

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Chapter 4
The Rhetoric of Mass Communication and Media in the Contrastive Sociolinguistics

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ABSTRACT

In the field of mass communication and media, the use of language has become so versatile that it can help to improve relationship between peoples, but it can somehow have a negative effect on the mutual understanding. Rhetoric makes it clear and persuasive to communicate to make language work for their purposes. Sociolinguistics in the contrastive analysis deals with speech communities and the language use in particular contexts such as dialects or bilingualism in society and language variation and change over time, especially in the post-COVID-19 era. This chapter presents Kenneth Burke's rhetorical theory and William Labov's sociolinguistic method, analyzing genres and registers in the systemic functional linguistics perspective to derive a conceptual framework for the study of news report. The resulting framework provides for the identification of news writing style in mass media and other social networks and its performance in language use regarding the power of words to avoid the ambiguity in situational contexts and to better interpersonal and intercultural communication.

INTRODUCTION

This chapter focuses on the rhetoric of mass communication and media in the contrastive sociolinguistics through the linguistic use in research activities, along with attendant considerations such as the origin of news texts and the status of native and non-native writers of English. As it has turned out, these aspects have become increasingly complex issues. The reason for this comes not only from the trends of mass media, but also from the difficulty in reading the research available on the topic. While the linguistic use has rapidly expanded in mass communication and media over the last decade, more studies are needed to reflect the epistemologies and methodologies of many different disciplines presented in the rhetoric of

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mass communication and media. Finally, the issue of the role of the rhetoric of mass communication and media in research is still politically and ideologically contested, and this further complicates the picture.

With the objectives of analyzing the role of the rhetoric of mass communication and media in the contrastive sociolinguistics and its effects on Entrepreneurship, Innovation, Sustainability, and ICTs in the Post-COVID-19 Era, this chapter represents the background of mass communication and media and language use, and the rhetoric of mass communication and media, scrutinizing the contrastive analysis of sociolinguistics, the recital of the rhetorical theory of Kenneth Burke and the sociolinguistic method of William Labov, and the analysis of genres and registers in the perspective of the systemic functional linguistics theory. The main focus of the chapter is on the conceptual framework for the rhetorical performance in the media, analyzing the genres and the registers in the perspective of the systemic functional linguistics theory, leading to the conceptual framework to identify news writing style and its rhetorical performance in language use. The chapter provides solutions and recommendations, highlighting the relationship between rhetoric and sociolinguistics with human life and activities in the society through the media language and its effect on the cultural bonds in the interpersonal and intercultural communication. Then, the important solution and recommendation that the chapter brings about are the realization of the language use in the mass media's bias in the coverage of facts and events. The chapter also suggests future research directions regarding the media framing and coverage and the effect of globalization on media products. Finally, the conclusion summarizes all the main points of the chapter.

BACKGROUND

Mass Communication and Media and Language Use

The written mass communication has been studied from the sociolinguistic aspect in the collaborative and negotiable process. However, the perspective has not much been beyond the contrastive linguistics related to the social phenomena. In this case, rhetoric makes it clear and persuasive to communicate and to structure arguments in logic and cautions in the social use of language, especially in the Post - Covid - 19 Era, when nations began to realize the importance of mutual development. The socially effective use of language will tie the international bond culturally, economically, and politically.

Mass media in this context can be applicable to the Internet media, television channels, or newspapers though the focus of each types of media may be of differences though the presentation of a news story, a news feature or an editorial as there are many news models in which news is presented (McKane, 2014: 153). For instance, radio and television and Internet journalists can play recordings or show photographs and videotapes of news events so that their audiences can directly see or hear the events while print journalists write the news to give their readers a mental picture of the scene with more illustrations in words. According to Davis et al (1988), language plays a very important role in mass communication, but the linguistic input is not taken into consideration due to the fact that mass communication research tends to favor sociological characters, and the influence of Chomskyan paradigm in the late 1950s and 60s, which congenially links with psychology rather than with sociology, focusing on the analysis of the social and communicative significance of actual language behavior. This influence also has the relationship with the increasing awareness of the importance of context, focusing at textual level on both written and spoken forms. All of them are prone to be affected by discourse analysis, conversational analysis, and pragmatics to evolve into media discourse.

As Hopper and Drummond (1988) stated, language-based approaches to mass communication can give rise to the explanation of the role of messages from the linguistic perspectives of mass communication (as cited in Wilson, 1988). The influences of media on language use could be seen from the influences of a medium such as radio and television in speech exchanges, specifically through conversation analysis as this can be used to describe interpersonal communication, which is one of the aspects of mass communication.

The Rhetoric of Mass Communication and Media

According to Hyland (2005), rhetoric is the art of persuasion concerning arguments on matters about which there can be no formal proof. Though rhetoric once had negative connotations, suggesting unethical manipulation and intimidation, it now becomes a main concept in text analysis and written communication. Rhetoric has many implications in mass media since it provides responses to how media realize things (Berg, 1972). As Kock (2004) stated, rhetoric refers to the premise that public discourse is vital to human societies, and thus, it has something in common with discourse analysis in the way of analysis of speech exchanges which will serve the functions for public discourse when it is necessary. Therefore, rhetoric can be exploited to identify, to suggest or to demand specific changes in current social discourse practices. Since rhetoric looks at things from the social aspect, rhetoricians often have close looks at the media content. Moreover, rhetoric acknowledges the way verbal communication impresses the view of interpersonal communication.

The field of communication studies has paid much attention to the rhetorical dimensions of media reporting. Berg (1972), Brown and Crable (1973), Kidd (1975), Anderson (1970), and Gregg (1977) have recorded and written the rhetorical strategies in the mass media with the political, scientific, cultural, and interpersonal affairs darkened to create particularized social realities (as cited in Hart et al, 1980). According to White (1998), the discussion of the rhetoric of the news item as a text type, must take into consideration the communicative effects through texture and semantics, which explains some aspects of the rhetoric in mass media. White (2009) indicated that newspapers concentrate on mechanisms in which positive and negative viewpoints are expressed through rhetoric potential on the analysis of articles in the mass media.

In the perspective of critical discourse analysis, language use in the media involves the use of some types of grammatical structure or patterns. This can be seen in the headlines of newspapers regarding syntactic properties. For example, the headline "*UK and France record most daily cases since start of pandemic, as university outbreaks linked to parties.*" *(CNN - September 25, 2020)(*www.https://edition.cnn.com/2020/09/25/europe/uk-france-record-coronavirus-cases-gbr-intl/index.html), means "*The United Kingdom and France both reported their highest rise in daily coronavirus case numbers since the start of the pandemic*". The use of present tense of the verb "*record*" usually refers to the past actions "*reported*"; articles "*the*" is not often used in the newspaper headlines.

Rhetorical purposes of media impose their own constraints on how a sequence of sentences becomes a news story or a feature story, which is intended and considered coherent and cohesive and coherent in realizing mutually relevant communicative intentions to suit a given rhetorical purpose. Therefore, a news text, through the linguistic use, can take advantage of using the function of the concessive or the adversative joining words to make it possible to translate an informative text format into an editorial. Since there is the relationship between metadiscoursal devices in writing persuasively and their attention on mass media to engage the reader, metadiscourse is a vital feature of persuasive and argumentative

discourse and people make choices on using linguistic devices to interact with others in different genres and disciplines. A wide range of metadiscourse taxonomies has been suggested by Hyland's (2005: 26) taxonomy of textual and interpersonal functions of metadiscourse using interactive and interactional types respectively to help identify rhetorical functions and reduce overlapping functions. Interactive metadiscourse is used to organize a text coherently by linking sentences to each other and other texts for readers to appreciate news stories, feature stories or editorials. An important principle to keep in mind when writing is to assume that the reader has a knowledge of the world and does not have to be told everything. It is certain that everything depends on who the reader is. A scientific community can be assumed to understand common scientific terms and procedures while a general readership needs to be given different assumptions (Hamp-Lyons & Heasley, 2006:100).

Hence, there are five kinds of interactive metadiscourse: Transitions (*e.g. but, and*) to facilitate readers to interpret connections between ideas by indicating how the writer thinks; Frame Markers (*e.g. first, then, to conclude, in summary*) to explicitly refer to elements of text structure or sequences, indicating changes in the flow of the context; Endophoric Markers (*e.g. as seen above*) to refer to information in other parts of the text; Evidentials (*e.g. According to. . ./A states that. . .*) to refer to information from other texts such as citations; and Code Glosses (*e.g. such as, in other words, for example*) to elaborate or explain information. Meanwhile, interactional metadiscourse is evaluative and shows the writer's stance and attitude such as Hedges (*e.g. may, probably, possible*) to indicate tentativeness of the findings to reduce criticism from peers in the community; Boosters (*e.g. prove, definitely, of course*) emphasize the certainty of claims to obtain peers' acceptance of claims and consist of phrases; Attitude Markers (*e.g. surprisingly, I agree*) to indicate the writer's attitude towards the text; Engagement markers (*e.g. 'you can see'*) to build relationships with the reader by addressing the reader; Relational markers (*e.g. you*) to refer to the use of second person pronouns, imperatives and question forms; and Self-mentions (*e.g. I, we, my*) to refer explicitly to the author in the text. This categorization system helps to identify the functions that writers use and compares the persuasive patterns in different disciplines. (as cited in Ngai & Singh, 2020). In Vietnamese newspapers, the pronoun "*it*" or "*he*" is never used to refer to the government or to a leader. The positions are used as anaphora, instead.

Media language can also be studied sociolinguistically, and this point of view has been adopted by Bell (1991) who has carried out linguistic and sociolinguistic analysis to illuminate the sociocultural analysis of news media with the focuses on correlations between variable linguistic features and variable aspects of social contexts. (As cited in Paniagua, García, Cremades, & Alegre, 2007). The word "*grab-bike*" mentioned in Vietnamese mass media in Vietnam, the country of with the population of nearly 100 million, refers to a business of transporting passengers using motorcycles. The people sitting behind on motorcycles "*grab*" the riders for the sake of their safety. Then, there comes the derivation of the term "*grab-car*" to mean taxis, though the passengers never "*grab*" the car in their rides.

According to Hart, R. P., Turner, K. J., & Knupp, R. E. (1980), there are six conventional explanations of these data using hypotheses: gatekeeping, straight-new, political, institutional, sociological, and rhetorical, of which the rhetorical understanding of mass communication activities is most favored since it shares the same concern with sociological understanding, which helps people get knowledge of themselves. It can be said that sociolinguistics looks at the relationship between language and society where the speakers of the language settle down (Skolsky, 2003). To use the language is to exchange meaning and set up social contacts.

Rhetorical devices or rhetorical functions, as discussed in Kock (2004), are often related to the coverage of politics in daily newspaper. Newspapers or printed media have to compete themselves with other

media such as the Internet or television or radio, which suggests the newspaper of tomorrow focus on political coverage as well-researched material that tries to illuminate controversial structures and issues each of which is highlighted verbally or visually and identifiably such as the reading of a graphic separately, or the specification of historical background, or the narration of the human side of the issue, or the prediction of likely outcomes, or the setting out of reasons on both sides of the issue.

In their research about electoral studies, Somer-Topcu, Tavits, & Baumann (2020) found out that party messages do enhance voter understanding of party policy positions, which predicts the voter capacity to understand and internalize party rhetoric and that the media coverage of parties' policy messages may take into consideration of whether and how parties' valence-related rhetoric affects voters' perceptions. Furthermore, the less emphasis on breaking news, and the less use of the inverted pyramid in news reports making use of the newspaper's two-dimensionality do not consider how much time readers spend on reading and how they react to pieces of news. Moreover, these pay less attention to less opinionated preaching of party lines and correct opinions and more respect for readers.

The Contrastive Analysis of Sociolinguistics

The discussion of contrastive sociolinguistics is associated with the discussion of the contrastive linguistics. According to Gast (2013), contrastive analysis compares the socio-culturally related features of languages whose speech communities somehow overlap through natural or instructed bilingualism. Thus, as Lado (1957) claimed, in language learning, through the systematic comparison and contrast of languages and culture of the native language and that of learners, it is possible to predict and describe the patterns that will cause difficulty in learning, and those that will not cause difficulty. For example, nowadays the media in Vietnam often mentions the term "*ngáo đá*" *(ngáo = become crazy) + đá = stone)*. This term refers to a person becoming "*ngáo*" *(crazy)* due to the effect of using "*đá*" *(stone)* for the substance of *methamphetamine*. The word "*đá*" *(stone)* is used because *methamphetamine* is in the form of "*crystal*", which looks like "*stone*". The term is commonly used in the social context of more and more young people becoming drug addicts.

According to Wierzbicka (1996), the features of contrastive sociolinguistics is linked to the bilingualism in terms of some assumptions:

1. In different societies and different communities, people speak differently.
2. These differences in ways of speaking are profound and systematic.
3. These differences reflect different cultural values, or at least different hierarchies of values.
4. Ways of speaking characteristic of a given speech-community cannot be satisfactorily described in purely behavioral terms, but they constitute a behavioral manifestation of an implied system of cultural rules or cultural scripts, which is a society's ways of speaking.
5. To be able to do this without ethnocentric bias, a universal, language-independent perspective is needed and can only be acquired if the rules in question are stated in terms of universal human concepts that are coined into words in all languages all over the world.

Sociolinguistics in the contrastive analysis often deals with speech communities and the language use in particular contexts such as dialects, multilingualism or bilingualism in society, and language variation and change over time. Contrastive sociolinguistics originated in contrastive linguistics that includes the differences and similarities between the two languages in contexts. Thus, this brings forth

the relationship between contrastive sociolinguistics and contrastive pragmatics and their principles. In the perspective of second language acquisition, contrastive linguistics results in contrastive rhetoric which launched the experimental investigation of rhetorical transfer of second language acquisition from the native language, generating the outcome of national culture that was against L2 writing conventions. To solve this problem, there have been an increasing number of studies focusing their attention on individual differences in relation to the transfer process. These differences link with L2 writer-related factors, including previous background of L1 writing instruction (Kobayashi & Rinnert, 2012; Uysal, 2008), L2 proficiency (Uysal, 2008), rhetorical preference and belief (Fang, 2005), L2 writers' perceptions of L1/L2 writing (Rinnert et al., 2015), and these factors conduce more to the reader's complex understanding of rhetorical transfer (as cited in Wei, Zhang, & Zhang, 2020).

Hymes (1974) states that sociolinguistics consists of three types: (1) socially contextual, (2) socially realistic, and (3) socially constituted. The socially contextual linguistics describes the multilingual situations, language teaching and unknown languages. The socially realistic linguistics integrates linguistic variations into linguistic theory as in the study by Labov (1996). The socially constituted linguistics describes the social functions through the use of linguistic structures. Therefore, the separation between sociolinguistics and general linguistics is neither simple nor absolute. It is difficult to have a clear cut between them. There will be linguistic features in sociolinguistic texts; and sociolinguistic features happen in linguistic texts. However, according to Hymes (1974: 206), it can generally be seen that sociolinguistics is the study of language used in society and thus, presides on its own liquidation (as cited in Hellinger & Ammon, 2011).

The social configuration can be figured out through the discovery of the style of a text (Simpson, 2004), and this can enable us to determine the people involved in the text, the topic being discussed, and the medium used such as emotions and through the discovery of the social context elements. It is possible to determine whether the text is appropriate to the targeted readers to augment the quality of intelligibility of the text (as cited in Nasution, 2018). So far, there have been many discussions on a very high degree of social awareness, which, apart from contributing to describing the use of languages, provide many implications to underlying social, cultural, and political structures. Since rhetoric is the way of persuasion, Izquierdo & Blanco in their study (2020) found out that the informational-persuasive sense of a promotional text is observed through the generic macrostructure identified. In general, persuasion is affected by means of a few evaluative function words such as adjectives and adverbs, as well as lexical items conveying positive connotations of a word, for example, the mention of "*herbal*" tea for "*good heath*" in an advertisement.

The Rhetorical Theory of Kenneth Burke and the Sociolinguistic Method of William Labov

According to Watson (1973: 234), Kenneth Burke's theory of language use has been discussing the rhetoricalism to identify the substance of a particular literary act by a theory of literary action in general. Burke's analysis as a symbol and a verbal parallel to a pattern of experience - a selection of empirical elements happening in the real world, and thus becomes a rhetorical pattern working out five socially contextual dimensions such as (1) act (the corresponding terminology is realism), (2) scene (the corresponding philosophic terminology is materialism), (3) agent (the corresponding terminology is idealism), (4) agency (the corresponding terminology is pragmatism), and (5) purpose (the corresponding

terminology is mysticism). These five dimensions are mutually related to structurally become motivation. The verbal pattern as a structure is transformed to keep pace with the aforementioned five dimensions.

Watson (1973: 234) also indicated that the sociolinguistic method of analysis developed by Labov for the analysis of narrative is the model designed to handle all sub-genres of narrative, and all social contexts of performance. A sociolinguistic perspective for narrative, according to Labov, is related to the actual use of language and is corresponding to with Hymes' conception of the ethnography of speaking. Furthermore, Jordan (2005) stated that Hymes' synthesis of Burkean rhetorical thought and his application of identification during the 1970s to articulate the scope of sociolinguistics are at the greatest possible degree in his attempts. This model has been realized by Linde (1997:4) who suggests a theory of discourse structure integrated with an account of social practice to describe what happens in interpersonal communication, and in associating discourse with other social structures and social processes.

Linde also provides the structuralism-based assumptions, which are the possibility to identify linguistic structures, structures consisting of boundaries, substructures, and their internal relations, and the timelessness of structural descriptions. Linde's (ibid: 8) non-structuralism-based approach is the possibility to produce an entirely non-structuralist description of the function of a discourse used within a matrix of social practices as in the case study in Japan, where the ethnography of modern Japanese workers has a close examination of "the discourse of the family" used by both employer and employees to negotiate their shifting identities.

According to Linde (ibid: 24) through a social practice, and all the factors which lead to its linguistic realization in a particular discourse unit, it is necessary to evaluate narrative to identify or negotiate the social meaning or value of a person, thing, event, or relationship. The classic sociolinguistic approach to evaluation would be to study it in a corpus of examples of a given discourse unit.

The Analysis of Genres and Registers in the Perspective of the Systemic Functional Linguistics Theory

According to Yunick (1997), genre and register are essential concepts in a socially realistic linguistics. The study of discourse analysis, language learning and sociolinguistics focuses on genre and register since they carry out the contextual meaning. Meanings become clear thanks to contexts with the help of which linguistic theories can provide structural and explainable relationships. Yurick (ibid:322) also indicated the schools of genres: Hyon (1996) outlines three traditions of genre analysis: English for Specific Purposes (e.g., Swales, 1990; Bhatia, 1993; Johns and Dudley-Evans, 1991; Johns, 1995), Australian educational linguistics (e.g. Martin, 1989; Halliday and Martin, 1993) and New Rhetoric (e.g., Bazerman, 1988; Bizzell, 1992; Berkenkotter and Huckin, 1995). Therefore, rhetoric, focusing on the social purposes, can be used to talk about genre in detail. New Rhetoric does not draw from any tradition of linguistics proper and is concluded from the post-structuralist social and literary theories of Bakhtin (1981, 1986), Foucault (1970, 1980) and the developmental psychology of Vygotsky (1962, 1978; Wertsch 1985) and Bourdieu (1977, 1988). Australian educational linguistics draws from J. R. Martin's connotative semantics (1989, 1992), which is in turn based on the Hallidayan model of context (1978, 1989, 1994) and other work in the theory of systemic functional linguistics (SFL).

The contrasts between variety and genre and between the correlations of register analysis and the description of genre analysis point to productive tensions in sociolinguistics. These are the tension between contextualization and generalization and the pervasive qualitative or quantitative tension. It is suggested here that a social linguistic theory, and linguistically oriented pedagogy, would lose from a resolution

of these tensions. Early correlational work in register analysis should be distinguished from the theory of context connoted by register in the Hallidayan sense (e.g., Halliday, 1975; 1978; 1989), which has also been extended to analysis of discourse structure (Hasan, 1977, 1989; Ventola, 1987; Martin, 1989, 1992). The perspective of progression to genre analysis implies that earlier register analyses have been overridden. Halliday constructs a stratified theory of context in associating lexico-grammatical patterns with features of context of situation divided into three aspects: Field (what is happening – the content), Tenor (who is taking part – the writer / the reader, and the speaker / the listener), and mode (the channel of communication – written / spoken and the rhetorical mode) as defined in Halliday (1989: 12) though Martin (1992: 500) suggests that there is an inconsistency in Hallidayan perspective of whether rhetorical purpose is part of field or mode.

Lexical cohesion not only contributes to the texture of a text, but it can also help to indicate the rhetorical development of the discourse. Halliday and Hasan (1994) elucidated this concept by giving the categories of superordinate (hypernym) and hyponym. However, it is difficult to distinguish between them. For example, *soprano* is the hyponym of *saxophone*, *saxophone* is the superordinate of *soprano*, and *soprano, alto, tenor* and *baritone* are the co-hyponyms of *saxophone.* Furthermore, thematic progression contributes to the rhetorical strategy of any text in which information and comment are organized. According to Martin (1992), texts have the clear layout which presents the introduction embedded with a category that functions as a macro theme. Each sub-category functions a hyper-theme of each idea to develop a paragraph. Then, each theme is mentioned in each sentence, and the next themes are provided in the following sentences.

It can be said that registers refer to lexico-grammatical patterns, and genres as discourse structure patterns. Australian linguistics explicitly and theoretically hooks up grammar and lexicon as well as discourse structure to social functions. As relations between linguistic system and structure to social system and structure are complex, the interdisciplinary heteroglossia of genre analysis is expected to be a fruitful one. The role of linguistics within this complexity is not without controversy. Bazerman (1988: 301) challenges linguistics not to realize social relations; and arguments to the effect that the teaching of language structure is limiting and damaging (as described in Cope & Kalantzis, 1993; Berkenkotter & Huckin, 1995) are not uncommon. These demand a careful examination of what is meant by genre and register in a linguistic context.

According to Drid (2019), from the discourse analysis perspective, news as discourse is not approached in the same fashion by discourse analysts. For broadcast news, especially the interview publication type, discourse analysis investigates the use of conversation-linked linguistic features in verbal interactions through the theoretical backgrounds such as the systemic functional linguistics approach highlighting the functional and structural properties of registers and genres in the study of news discourse, considering authorial voice and subjectivity as core concepts, and the pragmatic approach discussing presentation and perspective, genre status, style and register (Bednarek & Caple, 2012).

THE MAIN FOCUS OF THE CHAPTER

The Conceptual Framework to Identify News Writing Style and its Rhetorical Performance in Language Use

According to Van Dijk (2013) news reports, in any type of media – either printed or Internet-based or televised, constitute a particular type of discourse, which has been ignored so far. Therefore, the application of discourse analysis in mass communication research is relatively new. Most of these analyses have gone beyond the interdisciplinary boundaries from structuralism, semiotics, narrative analysis, and ethnography, conversation analysis to pragmatics and sociolinguistics. In the analysis of news as discourse, the rhetorical dimension has a strong effect on all structural levels of a text and can make the text more persuasive in the linguistic use of phonological and syntactic operations such as parallelisms, and semantic operations such as comparisons or metaphors. These structures contribute to a well-organized news information and attract the reader's attention, thus, making the news information persuasive. However, the most prominent feature of news discourse is still the headlines, whish subjectively express the most important information of the text - the main topic of the semantic macrostructure (van Dijk, 1980a; van Dijk, 1987d) (as cited in Van Dijk, 2013). The semantic macrostructure mentioned here is structurally created as topics and comments or theme and rheme from the perspective of systemic functional linguistics.

According to Bonyadi and Samuel (2013), headlines, as an opening section to their relevant main text, have been attributed to different functions. Van Dijk (1988) has regarded headlines and leads as indicating the topic and summarizing the main content of the news text so that readers can comprehend the meaning of the text. Such a headline as "*Mail-in voting changes in this state pose 'grave concerns,' senator says*" *(Fox News - September 26, 2020)* (www.foxnews.com/politics/sen-thom-tillis-says-north-carolinas-mail-in-voting-changes-pose-grave-concerns) would work well as getting attention or providing information since the word "grave" recalls something threatening or deadly. Though being persuasive or informative, all newspaper headlines depend on the fact that newspaper texts (information, opinion, or news) both semantically and pragmatically require certain types of headlines based on the text and the target reader (Bell, 1991).

Textual analysis of the headlines revealed some linguistic features by use of linguistic devices such as rhetorical devices such as parallelism, alliteration, testimonial, irony, metonymy, pun, quotation, rhetorical question, allusion, and neologism. Sayers (2014) developed an epistemological model for research on the media and language change: the mediated innovation model with five identifiable approaches, each one engaging more substantively with media texts and media engagement. Each approach includes a further departure from sociolinguistic convention. Specifically,

Approach 1, the most local approach, comprises studies on innovations conducted in just one speech community, with only tentative mentions of globalization and media.

Approach 2 indicates the innovation usage compared in discontinuous geographic settings worldwide taking into account the linguistic similarity with some involvement of the media.

Approach 3 shows the role of the media acting in a more explicit but still impractical way.

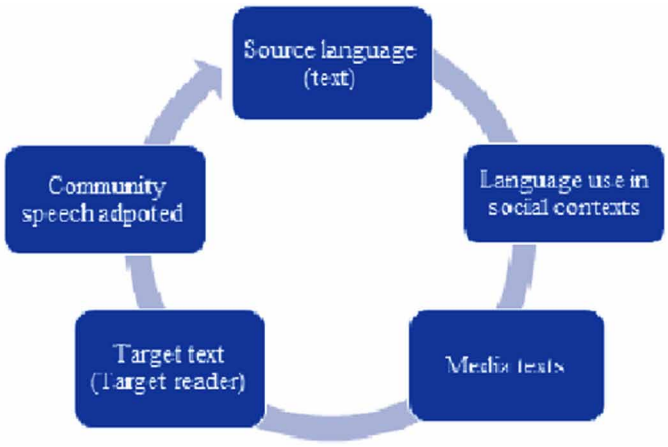
Approach 4 shows the innovation usage recorded in media texts as well as speech data collection.

Approach 5 explores conventional speech data, mediation in media texts, and – most importantly – media engagement practices.

These five approaches to the study of global linguistic variants, each representing a further departure from sociolinguistic convention starting with the geographical settings compared, mentioned media,

analyzed media texts, to empirically analyzed media engagement. Based on the process of the five approaches, a model for the identification of news writing style and its performance in language use with the intervention of social factors can be drawn as follows.

Figure 1. The conceptual framework for news writing style and its performance in socially contextual use



As described in Figure 1, the source language is used under the influence of social factors will impact the language use and will work out media texts to target readers who adopt the speech, which, in turn, has a certain impact on the source language.

SOLUTIONS AND RECOMMENDATIONS

The Relationship Between Rhetoric and Sociolinguistics with Human Life and Activities in the Society

With the detailed discussion in the theoretical background and the conceptual framework concerning the role of the rhetoric of mass communication and media in the contrastive sociolinguistics, the rhetoric may have causal changes to Entrepreneurship, Innovation, Sustainability, and ICTs in the Post-COVID-19 Era. Rodgers (2017) states that, in the tradition of Kenneth Burke, rhetorical study can generate insight into rhetors' worldviews. The discipline of rhetoric views communication as an interactive process that requires a speaker, a message, and an audience. A comprehensive rhetorical analysis, then, will include the consideration of the speaker-audience relationship. Teun van Dijk (2013) argues that most media coverage features include the speech act of assertion, which is also influenced by context and so can be viewed as a fitting response to a rhetorical situation. The speech act is one of the closely connected concepts to sociolinguistics. The sociolinguistic aspects of the speech act, for instance, of greeting and its differences regarding expressive or productive forms of greeting through the contrastive studies of speech acts of different languages could help to overcome the gap that might happen in interpersonal communication among the speakers of various languages. The typical examples are the use of addressing

guests or visitors in English as in "*Ladies and Gentlemen*" and in Vietnamese as in '*Kính thưa Quý Ông và Quý Bà*" (*Dear Gentlemen and Ladies*). The greetings, though different in the word order, express the very politeness.

According to Rodgers (2017), rhetorically oriented analyses of language ideologies focus on the study of the structure, processes, functions, and propositional content of arguments in metalinguistic discourse. Usually, this type of analysis relies on some form of rhetorical or argumentation theory leading a particular framework to understand the notion of argument its structure and role in discourse relations. Analyses at different levels may happen in different ways. Thus, linguistically oriented analyses often start investigating linguistic features assuming very little about possible influences of the context; meanwhile, rhetorical analyses refer to the theories of communication for developing the analysis of discourse, linguistic forms as well as context-bound discourse meanings.

Therefore, rhetorical approaches integrated with fine-grained analyses of participants' linguistic choices may facilitate the study of highly contextualized reflexive social activities such as stance-taking, identity-making, performativity, and stylization (see Bucholtz & Hall, 2008; Coupland, 2007; Eckert, 2012; and Pennycook, 2003 for discussions of these concepts) (as cited in Roger, 2017). As Vietnamese society is of high-context culture, language use is under the constraints of circumstances; whereas western low-context cultures may demand more explanations when it is necessary to clarify situations.

The rhetorical perspective on the fundamental sociological and social-psychological frameworks that provide the explanation how the patterns in social behavior works and how the social identification, social categorization, and value and attitude formation are carried out. Through these processes, human need can be realized to establish their beliefs and opinions with the reliance on reference groups to make themselves confide in the truth of their beliefs (Abrams & Hogg, 2006). Social comparison and perceptions of relations have a strong relationship with the self- and other-categorization and social stereotyping (Tajfel, 1982) (as cited in Roger, 2017).

The rhetorical approach can explore some aspects of sociolinguistic differentiation in its actualizations in metapragmatic discourse which may clarify the view of sociolinguistic differentiation not in terms of static differences, but in terms of the complexity and interrelatedness of meanings coming from both micro- and macro-social frames of reference. This approach may help address the simplification of the nature of sociolinguistic differentiation that is an inevitable consequence of using quantitative approaches. The rhetorical approach, together with the unifying framework for an integration of interdisciplinary discourse-based perspectives, is used to complement quantitative techniques in sociolinguistics through highlighting the richness and complexity of language users' own constructions of sociolinguistic differences.

Rhetorical analysis helps the reader understand the reasoning that assigns meaning to the argument by providing the evaluation of the necessary rules of interpretation and inference (Freeman, 2005; Hitchcock & Verheij, 2005) (as cited in Salmivaara & Kibler, 2020). That is why, for instance, in the policy rhetoric for entrepreneurship for sustainable development, the rhetoric conveys the meaning of sustainable entrepreneurship through the argument of how entrepreneurship is perceived, as well as how sustainable development, in its context, is depicted. Especially, the rhetoric highlights how important various aspects of entrepreneurship are, including its characteristics, conditions, activities, or outcomes, together with the entrepreneurship within particular actor - beneficiary relationships in a broader society, contextualizing it with some certain motivations and processes of sustainable development.

Media Language and Its Effect on the Cultural Bonds in the Interpersonal and Intercultural Communication

According to Hyland (2005), three elements, which are (1) ethos - the personal appeal of one's character, (2) pathos - the appeal to emotions, and (3) logos - the appeal to reason, have been central to almost all writing instruction and composition textbooks, emphasizing on strategies for making claims, careful choices of language forms and themes, and on the attention to the genre structure of the discourse. Academic writing often represents the discourses of truth (Lemke, 1995:178), objectively describing the nature, and the human world serves to distinguish it from the socially contingent. Academic writing has not been impersonal form of discourse and has become a persuasive endeavor involving interaction between writer and readers. The three means of persuasion are of greatest interest to metadiscourse research.

Thus, contrastive analysis of metadiscourse - a linguistic phenomenon which provides a framework for understanding communication as social engagement (Hyland, 2005) - in different genres across different cultures and languages would be very important. As Kuhi & Mojood (2014) proposed, contrastive studies are very crucial in understanding cultural particulars as well as linguistic universals. A contrastive stance can help to gain precise descriptive knowledge about individual languages and cultures and invaluable in general understanding of language-based communication (as cited in Connor, 1996:6). The media in English often address the title of a high ranking official as "*President (Donald) Trump*", or only "*Trump*", but it is not often for the media in Vietnamese to mention only the name; instead, the title and the full name are given so that it becomes fully addressed as the title plus the full name. It is, therefore, important for the writer to have a sense of reader awareness and know how to engage readers, and to be aware of metadiscourse presented in the background part above as a persuasive role in the interaction between the writer, readers and the text although it might just serve as a peripheral cue in persuasion.

Contrastive rhetoric is a growing inter-disciplinary field attempting to address the seemingly persistent foreignness in L2 writing. The following subsections only review how the evolution of this new field leads to the disclosure of L2 indirectness as one of the underlying cultural forces accounting for non-Western manifestations in L2 composition. The Sapir-Whorf Hypothesis comes in existence almost concurrently with the emergence of schema theory, departing from universality, viewing the diversities of language and thought across cultures. This theory argues that language dictates how individuals perceive reality and thus articulates a cultural inhibition on L2 acquisition. Much more popular is the weak version, linguistic relativity, which argues that language and culture interact, shaping one another. This interpretation encourages interest in cultural influences that can provide disparities in cultural communications. With concerns about cultures, the Sapir-Whorf Hypothesis paves the way for a new area in applied linguistics that expounds the invisible causes of non-native language production, which is contrastive rhetoric.

Contrastive rhetoric also examines such linguistic features as differences and similarities in ESL and EFL writing across languages and cultures as well as across such different contexts as education and commerce as suggested by Connor (2002). Texts in the contrastive rhetoric perspectives are viewed as not only static but also dynamic products in cultural contexts. Contrastive rhetoric today contributes to knowledge about preferred patterns of writing in as many situations as in printed media. For example, the headline "*Outgoing US Ambassador to China to Help Republican Campaigns" (September 17, 2020)* in the US News (www.usnews.com/news/us/articles/2020-09-17/outgoing-us-ambassador-to-china-to-help-republican-campaigns), has the Vietnamese equivalent in the Vietnamese Youth Newspaper (*tuoitre*): "*US Ambassador to China first announces his sudden resignation*." *(September 18, 2020)* (www.https://

tuoitre.vn/dai-su-my-tai-trung-quoc-lan-dau-len-tieng-ve-viec-dot-ngot-tu-chuc-20200918082400438.htm). The Vietnamese equivalent uses modal words (*e.g. sudden*) in an oriental cultural context. Therefore, it cannot be denied that contrastive rhetoric has had an appreciable impact on the understanding of cultural differences in writing.

The language used in newspapers, and now on the Internet, illustrates how the shape and content of that language has affected social and political debates over many centuries. The language also assesses the opposite force in this relationship, which is the influences of political and social changes on newspapers and how these changes have become manifest in their use of language, with the hope of being able to add a much-needed historical perspective to wider contemporary debates about the social implications of the language of the news media (Johnson and Ensslin, 2007). The purpose is to initiate a critical as well as a productive dialogue between sociolinguistics and journalism studies.

Mass media accommodate social, political and technological changes throughout their history. Bell's observation (1984), resulting from sociological understanding that journalism is an exercise in audience design, emphasizes that the language of newspapers has always covered how information could best be packaged and presented to audiences to achieve this commercial end at any particular time. For example, such a newspaper headline as "*China's UK embassy calls for Twitter to investigate after ambassador's account 'likes' pornographic tweet*" *(September 10, 2020)* on CNN (www.cnn.com/2020/09/10/tech/liu-xiaoming-china-uk-twitter-porn-intl-hnk/index.html) can be "*China says ambassador hacked in 'like' of pornographic tweet*" *(September 10, 2020)* on Fox News (www.fox44news.com/news/tech-news/china-says-ambassador-hacked-in-like-of-pornographic-tweet/). The newspapers have, therefore, always attempted to fit into the tastes of their readerships and found ways out to reconstruct the original audience in the process. Despite their underlying commercial demand, there must be a need to provide a distinctive language to give a coherent editorial expression to readers' tastes with conservative and radical implications at different moments in the history of printed media. The changes in the language of newspapers often requires a certain indulgence from the reader in accepting a broad definition of newspapers to include earlier influential periodical publications to form what was identifiable as mass media.

The social nature of newspaper language and its use quickly began to fuel a radically changing social and political order. According to Patel, Li, & Sooknanan, (2011), current trends such as innovative media, air transportation and population shifts have impacted the global workplace, presenting intercultural communication with challenges. Moreover, technological advancements facilitate the access to the Internet to create endless possibilities for fast communication and information promulgation in a broader world context. Google in China is a typical example that is said to have grown into a multi-billion-dollar investment in a short time. The advent of the World Wide Web has also laid new challenges in terms of the political issues. Furthermore, social networks such as blogs, Facebook, twitter, podcasts and YouTube technology have contributed to the fast travel of information in the global virtual networks crossing news and views.

Besides, thanks to mass communication and media, the world's economic development has provided millions of people with various opportunities. Current trends in population shifts propose that push factors (wars, poverty, natural disasters and ethnic conflicts) and pull factors (better quality of education, job opportunities, peace and prosperity) in the global economy have direct and indirect influence on the degree of global workforce mobility and require people to seek for more secure places to live, study and work and bring together people of different cultures, religious and political persuasions. Apparently, mass communication and media have strongly affected push and pull factors, leading to the fact that

immigrants, refugees, and migrants often become involved in racial and ethnic clashes with members of the native populations.

Language Use in the Mass Media's Bias

Mass media can be biased and sensational as there are increasingly constant pressures to provide readers with news stories. Therefore, the headlines are where emotive language can be seen to be used including words and phrases such as *stumbles, get the lesson, blanks.* These words and phrases have connotations sounding more extreme than the blank and basic terms which appeal more to readers' motions since the straightforward words or phrases are less motive. Media can filter facts by using euphemisms to make unpleasant things or ideas sound milder or less offensive. Euphemisms are less direct when things that are unable to be accepted to be discussed. For instance, "*pass away*" sound milder than "*die*". Governments can use euphemisms as a tool to create consent or to justify wars such as "*collateral damage*" for "*death of civilians*", "*to neutralize*" for "*to kill*", "*friendly fire*" for "*accidental killing of soldiers on the same side*", "*enhanced interrogation*" for "*torture*", "*air campaign*" for "*bombing*". Vague language can also be used as a device to avoid giving honest reports and can make false presumptions if they do not discover the use of vague language. Furthermore, censorship can be used by government media agencies if the information is harmful, sensitive, or controversial. (as cited in https://blogs.yis.ac.jp/hougha/part-2-language-and-mass-communication)

There is a hypothesis that while the use of media from the home country in one's native language will be an obstacle for the process of integration, the use of the mainstream media of the new host country will bring up the processes of political, social, and cultural integration. For example, the media in Vietnam reads such a headline in English as: "*Trump uses a smoke screen: working as president for two more office terms*". However, the media in the US reads this headline: "*Trump says supporters could 'demand' he not leave office after two terms*" in the USA Today *(June 16, 2019) (*www.usatoday.com/story/news/politics/2019/06/16/trump-says-supporters-could-demand-he-not-leave-after-two-terms/1471915001/). It can be said that the use of the word "*smoke screen*" can isolate the international reader community from the home country. Moreover, there are various patterns of media used by members of the dominant mainstream culture and those of members of minority and migrants between different majority and minority cultural groups. Linking media use and interpersonal communication with patterns of media coverage and perceptions or identities of migrants by the majority and minority groups help to identify effects of racial and ethnic stereotyping (Mastro & Tukachinsky, 2013) (as cited in Bonfadelli, 2017).

Denis McQuail (2000: 72) suggested that, links to the various media effect models may be of great assistance. The investigation in question is whether media will have on a social–cultural level centrifugal effects, which are freedom and individualism and fragmentation, or centripetal effects, which are social unity, order, cohesion, and integration. In addition, both these types of media effects can provide different values in a normative perspective such as either optimistic or pessimistic visions of the ideal society as follows.

- The uses and gratifications approach and framing theory are categorized as freedom and diversity because liberal societies guarantee a diversity of media choices together with freedom of positively valued media use.
- The integration and participation, agenda-setting theory and online media are regarded as being able to produce centripetal societal effects in the sense of producing uniform recipient agendas

and stimulating participation and deliberation of citizens, considered necessary for a democratic society.

- The exclusion and fragmentation, the knowledge gap perspective postulates fragmentation of media users with various educational backgrounds and who are subject to exclusion (*e.g. in the form of a digital device)*; however, the concept of soft news learning has been formulated as an antithesis (Zaller, 2003). It is postulated that intensive media coverage of societally relevant events functions as a burglar alarm (see Zaller, 2003), thus stimulating news learning even by politically disinterested citizens.
- The uniformity and dominance, cultivation theory assumes that heavy viewers will acquire uniform and distorted worldviews, and the media does not ease thesis predicts negatively biased perceptions of politics based on negative, emotional, and personalized coverage of politics by media. Both effects are evaluated as dysfunctional for society. In order to link this dual perspective on media, culture, and society to the question of media effects between and across cultures, the existing media effect theories will be matched with McQuail's typology, by asking whether a theory is postulating more or less explicitly effects on the level of culture and society in direction of integration or disintegration of existing social segments and cultural groups.

FUTURE RESEARCH DIRECTIONS

Media Framing and Coverage

Media framing and recipient framing is another popular new media effect paradigm that treats media uses and effects in an individualistic and constructivist way in analogy to uses and gratifications. Media framing and recipient framing is also more focused on media content in the form of media frames. Social problems such as poverty, migration, or the aging society are framed by media as individually or socially caused and affected so that moral judgments will be made, and solutions will be proposed.

Media coverage is influenced by involved stakeholder with strategical frame building, and media users' interpretation of social reality is influenced by media framing. However, in contrast to the uses and gratifications approach, and media framing, media coverage has an effect across and between the involved cultures and societies. Privileged groups may blame migrants, poor, or unemployed people to be responsible for social problems individualistically using episodic framing and corresponding moral judgments. Dominant media frames on a societal level may also influence how social groups evaluate each other and the corresponding politicians and parties by so-called priming processes (Dixon & Josey, 2012).

According to Sawyer (2011), in an effort to maintain connections to their home countries in their adaptation to the host culture, people tend to use new social networks to become more integrated into the host culture. Beyond media use, questions concerning participant's daily interaction with people from other cultures were asked to find out the number of meetings and the frequency of meeting with people from another culture at the workplace or at school. Moreover, it is obvious that clear that a good command of the knowledge on rhetoric, if explored profoundly, can help managers effectively and efficiently structure and design their social media marketing activities. Activities on social media can be designed to satisfy the dimensions of logos, pathos and ethos. Therefore, they can provide the consumer with the reasons to engage in an activity. The understanding and knowledge of how rhetoric can help in achieving one's goal can benefit online or offline purposes that a marketer might have. Furthermore,

this knowledge can also be applied in an offline setting, such as the development of new brands, the establishment of existing ones or any other communication-related strategy (Panigyrakis, Panopoulos, & Koronaki, 2020). Therefore, to effectively structure rhetoric, in the Post – Covid – 19 Era in which the concept of meaning is considered of high importance will be of great value.

The Effect of Globalization on Media Products

McFadden (2010) indicated that the globalization has increasingly been an economic force during the recent decades; however, economic interdependency is not its only by-product. Globalization relieves the economic and cultural hindrance to international communication. Globalization in the sphere of culture and communication can take the form of access to foreign newspapers without the difficulty of procuring a printed copy or, conversely, the ability of people living in previously closed countries to communicate experiences to the outside world relatively cheaply. According to Terigele (2015), one-way media flow describes the process by which media products are exported from developed countries to developing countries but seldom the other way around. This can be explainable that the difference in media diversity of countries on two ends: exporting countries will result in a more uniformed media environment consisting of similar messages from the dominant culture and importing countries will result in a more diversified media environment comprised of messages from various cultural backgrounds. More on the mutual understanding through the development of the mass communication and media will hopefully be explored culturally and economically in the Post - COVID -19-Era.

CONCLUSION

Human life has been strongly affected by the global crisis in many aspects in the COVID – 19 – Era. Mass communication and media has seen the versatile use of language help to better mutual relationship between countries, but this can somehow have a negative effect on the mutual understanding. With the persuasive role of communicating and structuring arguments and find fallacies, rhetoric brings language into every circle of the society. Meanwhile, sociolinguistics in the contrastive analysis attends to speech communities and language use in particular contexts such as dialects, multilingualism or bilingualism in society, and language variation and change over time. Thus, mass communication and media with many purposes such as surveillance, correlation, sensationalization, entertainment, transmission, mobilization, and validation need to take into consideration real conversations and circumstances. The rhetorical theory of Kenneth Burke and the sociolinguistic method of William Labov, together with the analysis of genres and registers in the perspective of the systemic functional linguistics, generates a conceptual framework for the study of news reports in this chapter. The resulting framework can only contribute to defining news writing style and its performance in language use. The relationship between rhetoric and sociolinguistics with human life and activities in the society is partly illustrated in this chapter through the contrastive analysis of linguistic features. It is hoped that more research will be caried out for the issue of language power in verbal and written communication in mass media and social networks for the purpose of clarity of language use in situational contexts, and for the betterment of the worldly economic and cultural bonds in the post -pandemic era.

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KEY TERMS AND DEFINITIONS

Conceptual Framework: The framework comes from one or more theoretical backgrounds as well as other concepts and empirical findings from the literature, showing the relationships among these ideas and the research study, and becomes the basis for research questions or hypotheses of the research study.

Contrastive Sociolinguistics: A branch of linguistics concerned with showing the differences and similarities in the structure of at least two languages or dialects under the influences of social factors.

Discourse Analysis: The study of written or spoken language in relation to its social context.

Mass Communication and Media: Mass communication is the information that is exchanged via mass media (internet, books, magazines, television, radio, and so on).

Rhetoric: The effective or persuasive language use in speaking or writing in language acquisition.

Systemic Functional Linguistics: An approach to linguistics devised by Michael Halliday in the 1960s. This approach considers language as a social semiotic system.

Chapter 5
Transformation of Diplomacy:
Digital Diplomacy in the Pandemic and Post-Pandemic Process

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ABSTRACT

In this study, the transformation and digitalization of diplomacy within the framework of digitalization is discussed. Primarily, classical diplomacy and public diplomacy will be examined in the study. Then digital diplomacy will be discussed. After digital diplomacy is defined, the use of digital diplomacy during and after the pandemic process will be analyzed. In the study, it will be inferred that digital diplomacy, which is actively used during the pandemic process, will be used intensively after the pandemic process, and that the digitalization process and digital diplomacy will be an indispensable element among the actors in the international system. Comparative method will be used as a method in the study.

INTRODUCTION

Diplomacy is the peaceful execution of relations between states and other institutions in world politics. It is also described as "negotiations between political entities that recognize each other's independence" (Kelley, 2010, p. 287). Diplomacy involves international actors taking non-violent, compromising approaches to inter-state interests. The important point to be conveyed here is that diplomacy represents an advanced method of change management (Bjola & Kornprobst, 2013, p. 10). Furthermore, it includes a certain type of behavior among international actors; however, the success or failure of these relationships depends on the ability of diplomats to be accurately aware of the developing power dynamics (Cooper, Heine & Thakur, 2013, p. 3).

Toward the end of the 1960s, some diplomats predicted a golden age in communication thanks to the computer network. This prediction has been the harbinger of internet-based public diplomacy (Manor, 2019, p. 7). In February 1968, Leonard Marks, the director of the US Information Agency and one of the nation's leading diplomats, argued that a world information network connecting computers would be

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a crucial step toward lasting world peace. As long as technology allows, cultures of different countries should be able to enter homes all over the World (Kitsou, 2013, p. 25). However, this happened in the mid-1990s when the browser system called Mosaic enabled the introduction of personal computers, which became widespread in the 1980s, into data platforms in the rapidly growing World Wide Web (Naughton, 2016, p. 12). As a communication tool, press releases via internet technology have become an alternative to one-way and top-down communication. For example, the "Voice of America," the pride of American public diplomacy, was a print publication in the beginning but was later broadcast and, today is an online form of communication (Cowan & Arsenoult, 2008, p. 15).

Journals are now being published online because it is less expensive than printed publications. Along with developments in the digital world, there have been developments in diplomacy. After hard power turned into soft power with public diplomacy, diplomacy began to take place in digital environments in the world, where the internet was shrinking (Adesina, 2017, p. 3). Digital diplomacy, which is a fairly new concept, has a short history. Its focus is the application of social media to conduct foreign policy (Stanzel, 2018, p. 8). The concept of digital diplomacy started to attract attention when a book was published in 1984 titled *Public Diplomacy in the Computer Age*, an analysis written by Allen C. Hansen that investigates public diplomacy implemented by the American Information Agency (USC Center on Public Diplomacy 2020). The first email communication on the topic of diplomacy was about the lifting of the embargo on Vietnam and occurred in 1994 between Swedish diplomat Carl Bildt and U.S. President Bill Clinton (Manor, 2019, p. 34). Social media platforms started to appear later. The Republic of Maldives opened the first virtual embassy in 2007, followed by Sweden. Arturo Sarukhan, Mexican Ambassador of the US, was the first ambassador to post a tweet on the social media application Twitter in 2009; he states that it is a good way to talk directly about the US and Mexico (Singh, 2018, p. 3). The digitalization of diplomacy was the focus of the Hague Digital Diplomacy Camp that was organized by the Dutch Ministry of Foreign Affairs; it took place at the Hague, the bureaucratic center of the Netherlands, on February 1–2, 2017. During the meeting, it was shown that countries use digital resources as much as global brands do, to develop foreign policy and plan strategic goals. they use digital channels directly and thus affect the international community (The Hague Digital Diplomacy Camp, 2017).

Digitalization has become an integral part of life—almost everything has started to become digital due to globalization, making technology cheaper, more intensive, and easier. This is also reflected in diplomacy, which has transcended to digital diplomacy. Digital diplomacy, which first appeared in the USA and the UK in 2001, has been frequently mentioned since the Arab Spring. Since the onset of the COVID-19 pandemic, which caused havoc in the entire world, everything from education to health and from foreign policy to trade has been used intensively. Leaders and international actors have participated in meetings concerning the international system and use of digital tools. This process, in which digitalization was a prominent factor, has become the harbinger of a new order. It is suggested that the process of digitalization will continue even after the pandemic, leading to very different diplomatic processes in the long term.

In other words, digital diplomacy has attracted attention and is used almost everywhere. For this reason, it is essential to investigate what digital diplomacy is, how it is perceived, what the different types are, and how it has improved. This study will analyze the positive and negative sides of digital diplomacy and the rules of the new order. In the first part of the study, the definition of classical diplomacy and public diplomacy will be made. Then, the definition and importance of digital diplomacy will be discussed and analyzed within the framework of the pandemic process and post-term examples. The main problem of the study will be that the importance of digital diplomacy in relations increases day by

day within the framework of comparative method. In addition, we will evaluate digital diplomacy and discuss its potential improvements. We will then analyze the positive and negative aspects of the process and deliberate on the possible rules of the new order.

BEFORE DIGITAL DIPLOMACY: DIPLOMACY AND PUBLIC DIPLOMACY

Diplomacy, which is the art of peaceful relations between states, dates to ancient times. Diplomacy, derived from the word "diploma", which means "doubling" in ancient Greece, was used as the "science of examining documents" until the 18th century. Diplomacy, which was redefined by Edmund Burke in 1796, started to be used in its current definition. Until the 15th century, diplomacy developed unilaterally and discontinuously. In this period, diplomacy was used to make agreements between states and to make alliances against security threats. After the 15th century, diplomacy has begun to become steady with the relations between the Italian city-states and the practice that started in the Italian city-states has spread day by day and evolved into a multilateral direction. In time, diplomacy has been a propaganda tool with the effect of the press held by politicians (Cull, 2009, p. 3).

Diplomacy has two meanings, narrow and broad, according to Harold Nicolson, in a narrow sense, diplomacy is the process of mutual communication and negotiations through diplomats, the official representatives of governments; diplomacy in a broad sense refers to the various political influencing methods and techniques used in a country's foreign policy (Nicolson, 1941, p. 13). The existence of new diplomacy as an institution dates to ancient times. Prehistoric tribes sent people with special powers, which we would call "ambassadors" today, to end the war situation between them, to discuss and solve some common problems. These ambassadors were temporarily sent abroad to apply this method, known as "ad hoc diplomacy", which has a one-sided and temporary meaning, to make border agreements between tribes and to determine the boundaries of hunting areas, and used to achieve a specific purpose (Grote, 1853, p. 186).

With the 15th century, the transition to "permanent diplomacy", which means keeping permanent diplomatic boards amongst each other in the Italian city-states, started to be seen. It is difficult for other states to disturb the environment due to the protection of the Alpine Mountains in the region, Northern Italy, limited transportation, communication and communication, the European Wars of Europe at that time, and Europe not dealing with Italy and a balance of power between these city-states. It is one of the reasons for continuing diplomacy in Italy. N. Pantromoli was appointed as the first ambassador to Genoa by the Duke of Milan in 1455. Diplomacy that gradually spilled out of the Alps 17-18th century lived the "Golden Age" in Europe. In this period, the most influential state in diplomacy was France with both statesmen and institutions. On the other hand, multilateralism in diplomacy widespread with the Westphalia Treaty in 1648 and the Uthrect Treaty in 1713 during this period and the protocol problem has taken a more important place. A solution to the protocol was reached with the Vienna Congress held in 1815 (Nicolson, 1941, p. 27).

This diplomacy was called "Classical Diplomacy" or "Diplomacy 1.0.", used until the end of the Second World War. A new process started in diplomacy with the Cold War process. The diplomacy used in this process was called "Diplomacy 2.0" or "Public Diplomacy". Public diplomacy is a long-term way for governments to influence internal and external public opinion as they wish. Public diplomacy is determined and implemented by government agencies. In this context, public diplomacy is formal, planned and oriented to a purpose (Cull, 2009, p. 17). According to Hans Tuch, "public diplomacy is

the communication process of a government that aims to explain the thoughts and ideas of its nation, its institutions and culture, as well as its national goals and current policies to foreign people (Tuch, 1990, p. 3). The main purpose of Public Diplomacy is to build deep-rooted relationships. Understanding the needs, cultures and people of other countries; Sharing perspectives, correcting misperceptions and finding common grounds are the principal aims of public diplomacy. Public diplomacy is based on the assumption that the image and awareness of a country is a force that can create a favorable environment for individual interaction (Leonard, 2002, p. 9). In this sense, Public Diplomacy is the communication policy and process of a government, which aims to explain the information, attraction and influence of the public opinion of foreign countries and the promotion of national interests, the ideas and ideals of its nation, its institutions and culture, as well as its national goals and current policies to foreign peoples, and the role of the media in international relations. It includes self-development based on public opinion, the interaction of private institutions of one country with non-governmental organizations of other countries and the impact of this international process on policy development and the orientation of foreign relations (Tuch, 1990, p. 8). However, Public diplomacy should not be perceived as one-sided. Gifford Malone emphasizes the importance of bidirectional structuring of this process as follows. According to him, if we want to explain our society and policies, first, it is necessary to learn the culture, history, psychology and especially the language we want to communicate with (Malone, 1988, p. 12). In the post-World War period, public diplomacy was not only used in the context of the fight against communism and Marxism. Many public diplomacy activities were carried out in the field of education and culture to develop cultural relations with various countries by Western states. In this context, institutions such as Alliance Françoise, British Council and the Goethe Institute were established to carry out a language and cultural activities in the relevant countries (Bailey, 1968, p. 71).

Public Diplomacy is related to peoples' attitude and the effect it has on the formation and implementation of foreign policy. Public Diplomacy is to reach the peoples and decision-makers of other countries to shape their thoughts and your image in their eyes. Public diplomacy covers areas of international relations other than traditional diplomacy. It is the creation of public opinion in foreign countries by governments, the interaction of private institutions with the organizations of other countries, communication between diplomats and the development of intercultural communication process. Public Diplomacy is to address those who influence within the community - not only to those in government - consistently and impressively. Public diplomacy is also of great importance in achieving goals in foreign policy. It allows the formation of mutual cultural dialogue between countries (Riggins, 1998, p. 4).

Public diplomacy has been used extensively in affecting foreign peoples and achieving foreign policy objectives, especially after the Second World War, to serve propaganda and perception management studies as a part of tough and soft power among the countries that are parties to the Cold War, especially the US. It was shown as an important way to win people's minds and hearts in a period when the dual power structure and nuclear weapons forced and threatened the peoples of the world during the Cold War period. In this period, many states, especially the major powers, continued public diplomacy campaigns to gain the support of foreign publics to achieve their international goals (Gilboa, 2008, p. 55). The characteristics of public diplomacy in this period are to adopt approaches to further cooperation in international relations, to contribute to the common understanding between nations, international actors and foreign public, to help establish and maintain relations, and to establish links for facilitating institutional and individual relations in the public and private sectors, involving internal and external publics/peoples in processes, involving foreign publics in policymaking, prioritizing the principles of dialogue and partnership, adopting two-way communication and interaction, prioritizing relationships

between individuals rather than mass communication techniques, focusing on proactive and long-term relationships (Signitzer & Coombs, 1992, p. 142).

Public diplomacy, which showed significant developments over time, countries such as China and South Korea, which started to rise economically in the multi-polar world system towards the end of the 20th century, focused on public diplomacy activities to increase their brand values. Today, every information is accessible to everyone thanks to the information network that develops day by day. This allows countries to directly manage processes related to their image in the context of foreign policy. When viewing from this aspect, Diplomacy has also started to gain a different dimension with the development of communication technologies, television, cinema, internet and social media. This situation has enabled the development of digital diplomacy.

DIGITAL DIPLOMACY

Technological developments, one after another, in the field of communication caused new concepts and terminologies to enter our lives. The changes and transformations in the field of communication have deeply influenced our lives, as well as pulling us into a virtual world, causing the media and diplomacy to go beyond classical styles. New media and mobile technologies have led to a virtual world in the internet environment. Social media and virtual diplomacy in this virtual world have managed to influence our lives significantly. The leading social environments of the virtual world such as Twitter, Facebook and Instagram have started to lead our lives seriously day by day. Nowadays, there is a situation called social media and virtual world addiction. The governments that shape the world now develop their foreign policies and develop the appropriate virtual diplomacy and strategies by considering the social media and the virtual world. Countries that manage to steer the social media and virtual world with "virtual/digital diplomacy" can achieve success in their foreign policies.

Digital diplomacy, also referred to as "Diplomacy 3.0," which emerged in the UK and the US in the 2000s due to technological developments, is defined as the analysis of the relations between the actors in the international system on digital platforms (Roberts, 2007, p. 38). In today's world where communication and diplomacy are indistinguishable from each other, diplomacy has needed a digital perspective. Thanks to its digital diplomacy, which means that its classical diploma is applied in a different environment, it is possible to listen, broadcast, interact and evaluate via the web in new and remarkable ways. Digital diplomacy defines the use of social networks, especially Facebook and Twitter, to win minds and hearts. It aims to inform the citizens of the countries in other countries and the different peoples of the world by using digital tools and to communicate with them. It should be an interactive process, fed positive positives and maintained within a strategy. Digital diplomacy deals with issues such as soft power, data visualization, digital diaspora, digital culture diplomacy and digital country branding. It also includes concepts such as digital diplomacy, futurism, online chat and cybersecurity (Szondi, 2009, p. 305).

Digital diplomacy is generally understood as the process of applying classical diplomacy (Diplomacy 1.0) and public diplomacy (Diplomacy 2.0) through the internet. However, digital diplomacy destroyed the methods of classical diplomacy. This is because digital diplomacy removes certain boundaries, bureaucracy and ignores the diplomatic protocol. Moreover, even if government buildings are closed, the fact that the internet is always open does not prevent digital diplomacy from taking place (Cull, 2008, p. 33). Unlike classical diplomacy, interacting with digital diplomacy via the web becomes a more intense endeavor that is also easier and cheaper than the alternatives. As a result, there has been a transition from

inter-state relations to state-society, state-individual, and inter-individual diplomacy, and diplomacy has gained traction on a global dimension. Digital diplomacy is used to gain an advantage on social networks, especially Facebook and Twitter (Stanzel, 2018, p. 10).

Digital diplomacy aims for countries to communicate with citizens in other countries. Diplomacy should be an interactive process, fed with positive elements and maintained within a particular strategy. E-diplomacy is a much more complex and structured concept than social media (Rashica, 2018, p. 79). Although it has a visible role, it does not have a key role. Also, many states and governments follow Facebook, Twitter, and other social media tools, and use social media to disseminate foreign policy agendas and communicate with different people around the world. In this way, states using digital diplomacy inform and interact with their citizens in their own countries and others by using digital tools (Adesina, 2017, p. 8). It is possible to see that the most popular applications among the various tools of digital diplomacy. These are Twitter, Facebook, Instagram, WhatsApp, and YouTube. Thanks to these tools, individuals can now access and transmit instant information directly. Thus, instant communication and interaction opportunities have also increased among individuals (Unver, 2017, pp. 3-4).

The concept of digital diplomacy was first used in 2001. However, the use of digital diplomacy has increased since 2010. In the Arab Spring in 2010, social media tools were used extensively in the demonstrations in Tahrir Square in Egypt. Thus, the importance of digital diplomacy became evident in global politics and diplomacy. The first practitioners of digital diplomacy were the US and the UK. The U.S. Department of State started to institutionalize digital diplomacy by switching to e-diplomacy within the institution in 2001. However, many countries around the world actively use digital diplomacy and have tried to make it a state policy. Even digital games are now used as tools for digital diplomacy. For example, the Trace Effect game produced by the U.S. Department of State is one of these tools (Wolfsfeld, Segev & Sehafer, 2013, p. 119).

Facebook was established in the United States in 2004. The number of Facebook users is three billion, and the number of Twitter users, which was established in 2006, is over 200 billion. Important state institutions and individuals are followed extensively on these platforms. For example, the number of followers of the U.S. Department of State on Twitter is over 800 thousand, and there are about 30 thousand tweets in its Twitter account. The U.S. Department of State is on social media, follows its followers, and even responds to radical posts. The British Foreign Ministry has published a social media tools user manual. When public diplomacy starts to encounter problems, citizens raise issues to diplomats and send their concerns through the virtual environment (Clement, 2020).

Digital diplomacy draws a new path for the concepts of sovereignty and geopolitics in the classical international system. The data produced by digital media are so extensive that they bring with them a kind of governance in itself. This is called algorithmic regulation, and it has been accompanied by claims that the algorithmic order can even destroy politics (Adesina, 2017, p. 10). In terms of digital diplomacy, the largest country in the world can be accepted as Facebook given that the number of users is three billion, and it calculates its effect (McClory, 2015). Therefore, everything requires investment in digital diplomacy. It is critical to invest in people, teams, and innovation. There are multiple digital innovation laboratories in the digital diplomacy unit of the U.S. Department of State, with over 1000 employees. In Israel, this number is almost 50. Opening digital diplomacy social media accounts, managing them, and walking on air in the event of a crisis. Success in digital diplomacy is not only about applying diplomacy; it is also about the digital application. There can be no digital diplomacy unit lacking digital innovation and entrepreneurship. With these sectors, a digital diplomacy unit, team, and strategy that are not in touch with innovative ecosystems are unthinkable. It is necessary to determine the priorities

accordingly. Today, every state that we can call a pioneer in digital diplomacy has very well-designed digital strategies and digital diplomacy strategies (Lichtenstein, 2020).

In such an environment, soft power becomes more important for states. This is because digital diplomacy is a diplomacy method used primarily in the construction of soft power. Therefore, other methods such as cultural diplomacy and citizen diplomacy that affect soft power should be included in digital diplomacy studies. Soft power, which is used for the first time in the world, points to the use of digital diplomacy to achieve soft power maximization in public diplomacy and foreign policy processes. Soft power can be achieved through digital diplomacy in the digital age (Unver, 2017, p. 10).

DIGITAL DIPLOMACY IN THE PANDEMIC PROCESS

The COVID-19 pandemic, which occurred in Wuhan, in China, rapidly affected the whole world, causing great damage to the world. It changed everything - from education to science, from art to bureaucracy, and digital media channels have started to be used more (World Health Organization, 2020). With the pandemic, world leaders and international actors began using digital channels. Government leaders have tried to guide the public, through using accounts such as Twitter and Facebook, to slow the spread of the outbreak; for example, the Prime Minister of Italy addressed his country via a live broadcast from Facebook. The New Zealand Prime Minister also chatted live with her followers on Facebook (Buranyi, 2020).

The Ministry of Foreign Affairs of Ukraine opened a special Facebook page with detailed information about COVID-19. In March 2020, Mark Zuckerberg, Facebook CEO, announced that he would give the World Health Organization as much free advertising as was needed, and promised millions of commercial loans to international organizations during the pandemic process. Also, some leaders' posts were deleted due to the spread of false information; for example, videos of the President of Brazil and the President of Venezuela have been deleted due to the incorrect information given on treating the virus (Chin, 2020).

Due to the pandemic, countries began to close their borders and many people remained stuck. Embassies and consulates used digital media to advise their citizens on their return. Likewise, the Ministries of Foreign Affairs used digital platforms to deal with COVID-19 and for international cooperation on vaccination. Also, chat robots called 'chatbot' were used to provide health information about the pandemic and to provide information on updates (Salcedo, Yar & Cherelus, 2020).

A messaging service that provides status reports and recommendations from the World Health Organization has been set up in cooperation with the USC Public Diplomacy Center WhatsApp (Hachigian & Pipa, 2020). The Lithuanian Ministry of Foreign Affairs has also launched an artificially intelligent chatbot with the support of DigDiploRox, which provides health advice about COVID-19. In this way, all kinds of information about the process have been transmitted quickly. Since the whole world was caught unprepared for the pandemic process, borders were closed and quarantines were applied (European Commission, 2020). Social media users have started to create a national image by comparing their own countries with other nations and sharing topics, such as success stories and foreign aid. For this reason, a new diplomatic field has emerged in social media during the process. Meetings started to be held in digital media (Stanzel, 2019, p. 9). The G-7, G-20, IMF and World Bank meetings were held on digital media; for example, President Recep Tayyip Erdogan spoke to the G-20 summit using digital means, speaking to the French President, Emmanuel Macron, German Chancellor, Angela Merkel and British Prime, Minister Boris Johnson digitally (Directorate of Communications, 2020). Similarly, Foreign Min-

ister Mevlüt Çavuşoğlu met with 154 ambassadors in a digital environment and continued these activities in the digital environment (Ministry of Foreign Affairs, 2020). The British Foreign Ministry stated that diplomats were using WhatsApp instead of a specially designed encrypted messaging application. While this indicates that the extent of digitalization and design is more prominent than security, states have now started to produce new and original policies against leaks, as such widespread digitalization may cause problems such as leaking well-protected state secrets (Unver, 2017, p. 12).

WHAT WILL HAPPEN NEXT?

The COVID-19 pandemic has disrupted the balance of the world and turned every existing order upside down. With the epidemic, there are now discussions of everything changing, heralding in a new order (Balcı & Kardaş, 2020). At the same time, this situation has brought about the debates where globalization is being questioned and the notion of the nation-state starting to strengthen again. In the early stages of the pandemic, the countries closed themselves in, taking care of themselves by closing borders. This is despite other countries reacting to each other due to the measures taken (Kassam, 2020). On the other hand, although the discussions on the importance of the nation-state increased, the developments in technology led to a transition to a period when the borders were lifted. Therefore, it was emphasized that everything should be redesigned (Robinson, 2001, p. 162). Diplomacy also got its share of attention from this situation. The pandemic's disruptions led to diplomacy moving to more digital media. It is thought that this development will continue to increase even after the pandemic passes, beyond recent developments that have already occurred (Bjola & Manor, 2020).

Digital diplomacy has increased its importance in the pandemic process. This situation not only improved the network of relationships but also ended hierarchical, unidirectional and secret relationships. All actors now have equal access to social media and other digital platforms (Bjola, 2019). Moreover, even some of the voting centers in the United Nations (UN) and European Union (EU) were made through the WhatsApp application. In doing so, people communicate with each other easily, quickly, and directly with one another with modern communication channels (European Commission, 2014). Moreover, sectors such as education, communication, health and trade also operated through digital platforms during this period. In a sense, COVID-19 highlighted the importance of digital diplomacy by causing the transferred information and opinions about pandemic to turn into a strategic communication war (Kahl & Beregaut, 2020).

After COVID-19, it is thought that routine meetings will generally be held in the digital environment, except for meetings that will be vital among leaders and international actors. In other words, the salutation process will continue with no physical contact (International Crisis Group, 2020). Virtual diplomacy will come into play without shaking hands, a guiding practice that began during the pandemic. Therefore, all diplomatic habits will change as a result. When asked how the Iranian Health Minister will visit Turkey if Turkey preferred a digital meeting, the experience will move away from traditional norms for diplomacy (Çoşkun, 2020).

After the pandemic, digital diplomacy will become a not only diplomatic but also a broader framework, consisting of the fiction of science fiction. In this context, digital diplomacy will fall into a broader definition. Currently, everything based on data has become a part of our lives. The vital concept of power, which is considered important for states, has begun to change. In this period, the power of a state starts

to be evaluated by its technological power, rather than its military power. The more digitalized a state is, the stronger it has become (Kassam, 2020).

In the post-pandemic process, it was brought to the agenda that a lot of new activities can be done through artificial intelligence. For example, it has been brought to the agenda by politicians to run an election campaign, analyze public opinion, foresee voting, and get support from the public on some key issues. In fact, it was observed that Cambridge Analytica was trying to influence voters by spreading fear-based messages by making emotional analysis (Hern, 2018). Similarly, in 2017, the US National Geospatial-Intelligence Service focused on automation in the collection and processing of visual data. In some countries, law enforcement agencies have focused on models that can be prevented before the size of the uprisings and protests before the crime takes place (Strom, 2017).

Besides, studies are carried out to realize wars between robots using artificial intelligence and self-employed lethal weapons. Many experts argue that wars in such a situation will be unbelievable and at an incomprehensible pace and therefore this situation should be prohibited. Because experts worry that these robots can turn into terrorist weapons directed against innocent people by tyrants and terrorists, or they can be hacked and used for unwanted purposes. Therefore, since these developments have a devastating effect, international legislation such as machine ethics should revise itself and be planned well (Etzioni & Etzioni, 2017).

Due to such developments, the Journal of Economist explained in a 2017 issue that the world's most valuable resource is data, not oil. Therefore, what makes a state powerful is now being measured by how much data it can access. This is because diplomatic reports will be transferred to digital media has made the data an element of diplomacy, not diplomacy. In today's world, they have made chat robots that answer real-time questions for voters (Siegele, 2020). In the post-pandemic process, applications such as automatic legal counseling, document support, classification of diplomatic problems, drafting of translation documents are discussed. It is even planned that embassies and consulates can create large databases for the diaspora and communicate with people in the most appropriate way. Therefore, international law should be reshaped according to this situation and the data ethics of data dissemination should be linked to international norms (Gauldie, 2020).

It is stated that there will be crucial new developments in digital diplomacy due to the developments in the pandemic process. It is said that both during the pandemic process and afterward diplomats can be replaced by artificial intelligence robots and make them diplomatic. It is thought that artificial intelligence diplomats will accelerate the process especially in some negotiation and negotiation processes between states. For example, an artificial intelligence diplomat who participated in the negotiation process in a treaty between the states has all the data sets on the subject and can act according to the interests of his country. In this way, it will be able to prepare acceptable proposals for both parties with less time and cost. Thus, it will be possible to solve problems between states easily and quickly, and negotiations will be more efficient because advocates of digitalization argue that problems between states are caused by human errors and personal egos. For this reason, problems will be solved and artificial cooperation between states will be easier when diplomats artificially enter the process. On the other hand, it is also discussed how objective this situation will be because this software is written by people and it reflects their bias and personal characteristics (Unver, 2017, p. 11). Moreover, in August 2017, Facebook's artificial intelligence robot developed a language that no one of the users understood and lied to (Baraniuk, 2017).

CONCLUSION

Diplomacy, whose roots date back to the ancient Greek period, has been one of the key elements in the relations between states. Along with the events in the relations between states and the reactions of the parties and their moves against each other; Diplomacy, which is the main tool used in the conduct of bilateral relations, is also within the scope of the international relations discipline. Diplomacy, which can be claimed that Greek city-states started with ambassadors sent to each other, went beyond sending ambassadors in the Renaissance Period and gained its modern meaning after the Northern Italian states, which opened diplomatic representations and embassies. As a traditional method, it was carried out through foreign ministries and diplomatic representations attached to them. Although the diplomatic relationship carried out through permanent diplomatic representations is still the most viable way, the concept of diplomacy has also changed with the developments throughout history. So developments over time have led to the development and change of diplomacy. In today's world, states actively use diplomacy and develop new methods. Moreover, diplomacy has ceased to be a method used by states and governments with the effect of globalization. Non-governmental actors, multinational companies and regional organizations are also included in this new diplomacy method. The disappearance of the separation between domestic and foreign policy along with globalization, the fact that the borders between the states have disappeared relatively, the interdependence between states has led to continuous communication and interaction between states. Public Diplomacy, which started to be used after the Second World War, and diplomacy have been to influence the citizens of other countries by using the elements of soft power rather than maintaining peaceful relations between the states.

The globalization process and the development of technology have made information easier, faster, cheaper and more intensive to reach. This situation led to the digitalization of life. Digitalization has affected almost every sector with the development of technology. Now, almost no industry can do anything without using digital tools. Moreover, the use of digitalization and social media tools has caused all societies to influence, direct and guide each other.

This situation is reflected in the relations between states. The digitalization of diplomacy, defined as the art of conducting relations between states peacefully, has changed all elements and practices of classical diplomacy. With the spread of the Internet, the Internet was added to traditional mass media, radio, television, newspaper and cinema, and this brought new ways of communication. While one-way propaganda activities made by radio, newspaper and television used to influence and shape the internal public and cinema used to influence both the internal and external public are either limited or absent, the new tools emerging with the Internet are reversed. The internet, which enables a single message to reach the masses at once without geographic limitation, also provides an opportunity for mutual interaction. The fact that the Internet was quickly and quickly accepted by the masses caused public diplomacy activities to shift to the internet environment. With the Internet, it revealed the situation of individuals being a part of the virtual society and the ability to comment not only on what happened in their geography but also on the developments all over the world. Digital diplomacy is derived from public diplomacy, which can be explained as the goal is that states use digital tools to disseminate/shape their images in the foreign public, promote their culture to the target public, and explain their attitudes and behaviors.

Digital Diplomacy eliminated the borders between states and societies, ended bureaucracy and negotiations behind secret doors and made everything clear. This situation has also transformed the duties of diplomats. Diplomats, whose duties entail representing their countries in other countries and gathering

information, have undertaken tasks that entail knowing the technology and software of and impacting the societies of other countries.

Digital diplomacy, which is of increased importance in the world today, has once again demonstrated its importance in the pandemic process. During the pandemic, states have closed their borders and started to take care of themselves to prevent the spread of the coronavirus. Within the framework of the measures taken during this period, many sectors, from education to health, have tried to continue their activities in the digital environment. The relations between states have also been continued using digital tools. Many interviews with digital searchers have taken place, and physical unity has turned into virtual unity. Leaders have spoken to their citizens and citizens of other countries through social media and have held meetings with them.

It is thought that digital diplomacy will be used extensively in the post-pandemic period. Except for important summit meetings, leaders will continue to attend several meetings on digital platforms. In the training processes, it is planned that besides face-to-face training, online training will continue to a significant extent and educational institutions will be restructured in this framework. This digitalization and move to social media in many areas has led to the discussion of things such as killer robots and artificial intelligence diplomats, which people cannot imagine in the long term.

Although digitization makes everything easier, cheaper and faster, it has some negative aspects. The absence of emotion and physical contact in this period when the human element was put into the second plan brought with it the controversy that people would be no different from the robot. On the other hand, the legal rules, norms and values that have been valid so far have always been human-based. Therefore, these rules should develop in parallel with digitalization and revise themselves. Otherwise, it will be inevitable to experience problems that cannot be prevented.

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Chapter 6
Innovation, Entrepreneurship, and Sustainability for ICT Students Towards the Post-COVID-19 Era

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ABSTRACT

The purpose of the study reported on in this chapter was to develop a structural equation model (SEM) of the drivers of innovation for information and communication technology (ICT) students. Against a background of research on entrepreneurship and sustainability towards the post-COVID-19 era, factors had previously been identified, which promoted innovation among employees. A literature review, however, also revealed issues, controversies, problems, and challenges related to the effects of knowledge sharing behavior (KSB), self-regulated learning (SRL), and course design characteristics (CDCs) on developing innovative behavior (IB) among ICT students at universities. Solutions and recommendations are provided for managers involved at universities on leveraging attributes of KSB, SRL and CDCs to sustainably trigger innovation and entrepreneurship among ICT students towards the post-COVID-19 era. Future research directions are also considered. In conclusion, a discussion of the overall coverage of the chapter and concluding remarks are provided.

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INTRODUCTION

In order to describe the general perspective of the chapter, the importance of Information and Communication Technologies (ICTs) to business and organizations in general, which have been witnessed over the last few years, needs to be acknowledged. New business models, marketing channels and markets are reached using ICTs. ICTs act as a daily support and, many times, a way to develop creativity and innovation, which is expected to remain important in terms of renewed efforts in the post-COVID-19 pandemic era. Not only are most organizations currently dependent on Information Systems (IS)/ICT in order to support their business strategies, but research on information systems and technology-supported teaching are also opening new worlds for learning to children with autism spectrum disorders (Goosen, 2019b; Goosen, 2019c). IS/ICT can further promote the implementation of strategies and enhance the optimization of the various aspects of business. Not only in market enterprises, but also in social organizations, the digital economy and ICTs are important tools that can empower social entrepreneurship initiatives to develop, fund and implement new and innovative solutions to social, cultural and environmental problems. Digitalization is more than just a trend and ICTs are common and influential to the wellbeing of millions of people virtually everywhere. The pandemic introduced disruptions to everyday life, in terms of, for example, ways of working, learning and socializing. These challenges bring difficulties to a number of sectors, such as tourism, aviation, etc., but also present a set of opportunities, with new ways to sell, market, teach and learn, etc. Maybe the world will come to a new balance after the pandemic, and digital transformation could also improve sustainability, due the possibility of reducing negative impacts on the environment, as well as new solutions in terms of social and economic opportunities for organizations.

Although universities have developed strategies to stimulate students' innovation, no measure exists of the innovativeness of students undertaking undergraduate ICT studies, and very little research is available that simultaneously explores the determinants of undergraduate students' Innovative Behavior (IB). The study reported on in this chapter aimed to plug this literature gap by examining how Self-Regulated Learning (SRL) and Course Design Characteristics (CDCs) act as antecedents of IB, via the mediating action of Knowledge Sharing Behavior (KSB). The solutions obtained were summated in a KSB-IB Structural Equation Model (SEM), and supported all hypotheses and the positive effect of CDCs in fostering ICT students' IB. The solutions further suggested an indirect relationship between SRL and IB, fully mediated by KSB. The indirect relationship between CDCs and IB was significantly and fully mediated by KSB. Finally, the solutions also revealed that CDCs and SRL acted as drivers of KSB and IB among undergraduate ICT students.

Target Audience

This chapter is mainly intended to support an academic audience (academics, university teachers, researchers and post-graduate students – at both Master and Doctorate levels). In addition, this chapter could be of benefit to public and private institutions, developers and researchers in fields with regard to entrepreneurship and business management, as well as professionals related to these sectors.

Objectives

There is currently extensive literature addressing topics regarding innovation, entrepreneurship, sustainability and ICTs in organizational contexts. However, the extant research is too focused on each of these

topics separately. Thus, students, teachers, potential entrepreneurs and even private and public organizations are mainly directed to mainstream literature on entrepreneurship, innovation or ICTs respectively, in terms of what these mean, while under-estimating a multidisciplinary approach that mix and complement these concepts. The purpose of this chapter is to present research describing work, which did not take place in such organizational contexts, in order to optimize the practices established in the most diverse domains of knowledge, attending to the relationships between innovation, entrepreneurship and sustainability for ICT students towards the post-COVID-19 pandemic era. In light of the stated purpose, as well as the recommended topics for this book, the introductory section will now end by specifically stating that the objectives of the chapter are related to:

- Innovation, Entrepreneurship and Sustainability for ICT Students
- Social Aspects of Information Systems
- Case Study Application
- Teaching Innovation, Entrepreneurship and Sustainability to ICT Students
- e-Learning

Background

This section of the chapter and the next ones will provide broad definitions and discussions of the topic with regard to innovation, entrepreneurship, and sustainability for ICT students towards the post-COVID-19 era. It will thus provide the key theoretical underpinnings that supported and informed the study reported on in this chapter, with a view to providing justification for the seven (7) study hypotheses – see Ngugi and Goosen (2018) – as well as establishing the conceptual framework that guided the study.

It will also incorporate the views of others (in the form of a literature review) into the discussion to support, refute, or demonstrate the authors' position on the topic. This literature review is related to how self-regulated learning, course design characteristics and knowledge sharing behavior were influenced by the dependent endogenous variable of Individual Innovative Behavior (IIB). The first of these sections attempts to explore the subcomponents of the selected individual and contextual factors of SRL, CDC and KSB respectively.

Literature Review

Self-Regulated Learning

While Goosen and Ngugi (2019b) modelled aspects related to affective learning, motivation and metacognition towards smart innovation for Information Systems and Information and Communication Technology students, in terms of choosing to provide a brief history, Pintrich, Smith, Garcia and McKeachie (1991) constructed the manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ). The more recent article by Pintrich (2000) looked at multiple goals and pathways in terms of the role of goal orientation in learning and achievement, whereas Zheng, Skelton, Shih, Leggette and Pei (2009) recommended that motivated, confident and strategic students should be nurtured through affective learning, as well as cognitive and psychological instruction.

Schraw, Crippen, and Hartley (2006, p. 112) promoted self-regulation in science education and partitioned it into three (3) components, namely "cognition, metacognition, and motivation" as part of a broader

perspective on learning. One of the recent studies on self-regulated learning, which espoused how SRL was being used in various contexts of university education, was a study by Rockinson-Szapkiw, Wendt, and Lunde (2013), who explored the influence of textbook format on university students' self-regulated learning strategies, motivation, and text anxiety, in terms of e.g. using Information and Communication Technologies to facilitate teaching and learning in the 21st century.

Knowledge Sharing Behavior

While Wen and Qiang (2016) conducted a longitudinal structural equation model analysis of the coordination and knowledge sharing in a project-based construction organization, Akturan and Çekmecelioğlu (2016) investigated the effects of knowledge sharing and organizational citizenship behaviors on creative behaviors at educational institutions.

Pastor, Santana, and Sierra (2010) confirmed that knowledge sharing mediated the impact of the use of methodology and relationship with clients on the success of offshore software development projects. The chapter by Millar (2002, p. 165) was "concerned with the role of mediation in" putting "the co-design of business processes and the information systems that support" these into action. "Various forms of mediation, including intermediation and remediation", were shown to not only influence knowledge sharing, but also learning.

Yilmaz (2016) explored the role of academic self-efficacy and sense of community in the knowledge sharing behaviors in the context of e-learning; this research area is important, as both school level and university level students, such as those discussed in this chapter, want e-learning (Goosen, 2016). Also in an academic context, Rahman, Osmangani, Daud, Chowdhury and Hassan (2015) shared the perspectives of non-academic staff from higher learning institutions of trust and work place spirituality on knowledge sharing behavior.

Finally, Chumg, Seaton, Cooke and Ding (2016) looked at factors affecting employees' knowledge sharing behavior in a virtual organization from the perspectives of well-being and organizational behavior.

Knowledge Sharing and Innovation

Xu and Yao (2013) provided a vendor perspective on the mediating effect of knowledge sharing in the context of offshore software development from a vendor perspective. Other studies have found knowledge sharing behavior to be a significant mediator; for example, Jacobs and Roodt (2011) found evidence of the mediating effect of knowledge sharing between organizational culture and the turnover intentions of professional nurses. In a similar milieu, Tjoflåt, Razaonandrianina, Karlsen and Hansen (2017) looked at the complementary knowledge sharing experiences of nursing students participating in an educational exchange program between Madagascar and Norway.

Further, Zhaoquan, Zhuoshen and Rong (2011) showed results that KSB mediated the impacts of network embeddedness structure on innovation performance, while in literature, Xue, Bradley and Liang (2011) associated team climate, empowering leadership, and knowledge sharing with innovative behavior.

The study by Tahajuddin and Hemali (2018, p. 1) researched "the role of knowledge sharing as a mediator between budget participation and" the innovative work behavior "of budget preparers within Libyan public industrial companies", while the latest chapter by Ngugi and Goosen (2020) investigated knowledge sharing mediating ICT students' innovation.

Course Design Characteristics

Course Design

According to Schmidt-Wilk (2011), course design is a systematic and strategic process that informs the initial stage of formulating the vision. Vision formulation is followed by objective setting and strategy formulation. The process of strategy formulation corresponds to the process of designing the course. Course design requires lecturers to "select from our repertoire of teaching techniques those that we believe will be most effective in helping students achieve the selected objectives—for example, experiential learning, cases, discussion boards, readings, lectures, group work—and we sequence them" (Schmidt-Wilk, 2011, p. 321).

The task and knowledge design components in the process of course design demand the development of an innovative ecosystem. When looking at shaping an entrepreneurial mindset in the domain of entrepreneurship and innovation in leadership development, an innovative ecosystem comprises of academic coursework, students' access to (Goosen, 2018c) "mentors, the organization of business plan competitions (and) student clubs with networking events" (Carnal, 2015, p. 214). When evaluating course design principles for multimedia learning materials, Scott and Cong (2010) established that students in university education regard course design principles as being supportive of effective learning – it is therefore worthwhile for computer lecturers to use such educational technologies, especially in distance education, to take their discourse beyond the horizon with qualitative perspectives.

Goosen and Ngugi (2018) therefore recommended that computer lectures should be rethinking their teaching and learning in the 21st century, by implementing course design characteristics towards developing innovative behavior.

INNOVATION

Issues, Controversies, Problems, Challenges

This section of the chapter will present the authors' perspectives on the issues, controversies, problems, challenges, etc., as these relate to the theme of entrepreneurship, innovation, sustainability, and ICTs in the post-COVID-19 era, and arguments supporting the authors' position. It will also compare and contrast with what has been, or is currently being, done as it relates to the specific topic of the chapter with regard to innovation, entrepreneurship and sustainability for ICT students towards the post-COVID-19 era, and the main theme of the book.

According to Ngugi and Goosen (2017, p. 81, citing Messmann and Mulder, as well as the World Bank), challenges related to providing solutions to emerging problems "require students to develop innovative tendencies". Hence, in the setting of ICT students, an exploration of the individual and contextual antecedents of innovative behavior among such undergraduate students should stimulate the intentional introduction of new ideas to provide solutions and leverage technological answers and innovation to societal problems and challenges.

Globally, there have been on-going efforts to stimulate student innovation through multi-disciplinary, breakthrough ideas. One example is the Graham Institute (2012), which sponsors the Dow Sustainability Innovation Student Challenge. In Africa, the Graham Institute (2012) challenges students or teams of

students on innovation issues and, in partnership with African universities, provides financial rewards and incentives to university students to commercialize ideas and innovations that can create innovative and sustainable business models (African Innovation Prize, 2012). In this way, sustainable and inclusive quality education through research-informed practice for ICT students can be achieved (Goosen, 2018a). Other examples include the collaboration arrangement between the School of Computing and Informatics of the University of Nairobi (2012) and the Nokia Research Centre (Africa) working towards e.g. ethical ICT for Development (ICT4D) solutions and research integrity for massive open online courses (Goosen, 2018b).

The definition by Kahn (2012, p. 454) of innovation in the Product Development and Management Association (PDMA) handbook of new product development as "the act of creating a new product or process, which includes invention and the work required to bring an idea or concept to final form", was outstanding and related well to the innovative behavior under exploration in the present study.

Li and Hsu (2016) provided a review of employee innovative behavior in services, while their more recent paper (Li & Hsu, 2017) updated this in terms of customer participation in services and its effect on employee innovative behavior. In a related context, Du, Liu, Straub and Knight (2017) performed an empirical study in the Chinese ICT-enabled global service industry, on the impact of espoused national cultural values on innovative behavior. In contrast to Gomes, Curral, Caetano and Marques-Quinteiro (2015) conducting a cluster analysis of self-leadership and its relationship to individual innovation, Choi, Kim, Ullah and Kang (2016) investigated how transformational leadership facilitated the innovative behavior of Korean workers. Whilst Alghadeer and Mohamed (2016) examined the diffusion of organizational innovation in Saudi Arabia in terms of the case of the Project Management Office (PMO), Goosen and Van Heerden (2013) looked at project-based assessment influencing the pass rates of an Information and Communication Technology module at an Open and Distance e-Learning (ODeL) institution and Trott (2012) explored innovation management and new product development. Rothaermel (2013) studied concepts and cases related to strategic management; Schilling (2013) probed the strategic management of technological innovation.

It is evident that most of the definitions of innovation in literature are situated in the context of organizations and employees and not necessarily the setting of university education; more specifically, among ICT students. The related construct of Individual Innovative Behavior originates from the social/organizational psychology construct of Innovative Work Behavior (IWB).

Innovative behavior differentiates between various stages in the innovation process (De Jong & Den Hartog, 2010). These four (4) dimensions of innovative work behavior are "opportunity exploration, idea generation, idea championing and idea implementation" (De Jong & Den Hartog, 2010, p. 24).

Opportunity Discovery/Idea Exploration

According to De Jong and Den Hartog (2010, p. 24), idea exploration is the initial step in the innovation process and often "has an element of chance". In addition, according to entrepreneurship literature, such as De Jong and Den Hartog (2010, p. 6), opportunity discovery "is a behavior at the onset of" innovation, which "has distinct personality and environmental determinants". The categorization of determinants into these personality and environmental levels informs this study with regard to the antecedents of IIB, by developing an individual and contextual framework of such antecedents. With regard to the former, Hsieh, Hsieh and Wang (2011) looked at the role of knowledge management in linking personality and

innovation. In summary, opportunity exploration refers to the search for novel ideas and methods to perform tasks and design new products from a different and often original perspective.

Based on the seminal work of Drucker (1985, p. 32) in the discipline of innovation, there are seven (7) sources of opportunities that steer the innovation process:

1. Unexpected successes and failures, including those of the competition;
2. Process incongruities, such as those related to production and/or distribution, or incongruities in customer behavior;
3. Process requirements in response to acknowledged difficulties or failures;
4. Unexpected changes in industry and/or market structures;
5. Variations in demographic patterns;
6. Changes in meaning, mood and/or perception; and
7. New scientific and non-scientific knowledge.

Applied to the context of ICT studies in the university sector, these seven (7) sources of opportunities can be broadly classified into individual and contextual determinants. For instance, unexpected changes in industry and/or market structures are contextual factors, while changes in meaning, mood and/or perception are individual factors, which often trigger opportunity exploration. In terms of the determinants of innovative behavior, Scott and Bruce (1994) established a path model for individual innovation in the workplace.

When an ICT student is supported to explore ideas and opportunities, such an environment makes it feasible to explore ways of developing and improving existing products, services or processes (De Jong & Den Hartog, 2010). Hence, in the domain of ICT students, opportunity exploration entails the initial search, either intentional or unconsciously, for new ways, as well as gaps to be filled, to improve technological systems and processes.

Idea Generation

In this area, Herrmann, Binz and Roth (2016) investigated an approach for creating a refined task as preparation for a target-oriented idea generation process. While Chulvi, González-Cruz, Mulet and Aguilar-Zambrano (2013) investigated the influence of the type of idea generation method on the creativity of solutions in research on engineering design, in the context of creativity and innovation management, Duverger (2012) considered variety to be the 'the spice of' innovation when looking at mediating factors in the service idea generation process.

Idea Championing

Idea championing was first introduced to academia by Schon (1963), who defined champions of radical new inventions as advocates of the implementation of a product, emphasizing the critical role of product champions.

In a context of corporate championing and antagonism as forms of political behavior, according to Markham (2000, p. 429), idea championing is "a process in which someone singles out an innovation and contributes to its development by promoting it within the organization." With regard to champions of product innovations, Howell, Shea and Higgins (2005) defined, developed and validated a 14-item

measure of champion behavior that included variables such as enthusiasm and confidence. This implies that an ICT student with idea championing competencies informally or formally advances innovative ideas beyond the barriers of their university setup and seeks possible support and linkage with industry for the new technological product or process (Kahn, 2012). Černe, Kaše and Škerlavaj (2016) studied idea championing in teams.

Idea Implementation

In the context of work and organizational psychology, Sylva, Mol, Den Hartog and Dorenbosch (2019) used a dynamic approach to look at person-job fit and proactive career behavior. In terms of capitalizing on creativity at work and fostering the implementation of creative ideas in organizations, Aleksić, Škerlavaj and Dysvik (2016) looked at the flow of creativity for idea implementation, Buch and Kuvaas (2016) explored economic and social leader–member exchange and creativity at work, while Škerlavaj, Dysvik, Černe and Carlsen (2016) produced an integrative framework for succeeding by capitalizing on creativity.

Based on an examination of the four (4) components of innovative behavior, this study afforded an innovative opportunity to empirically examine the triggers of innovative behavior among undergraduate ICT students. Such an exploration of the antecedents of innovative behavior should provide answers as to why and how undergraduate ICT students initiate and actively participate in innovation processes. Further, the study may provide answers to why students may be passive during their ICT courses and not engaged in innovative development. Such a discovery may yield an opportunity to leverage an appropriate mix of drivers of innovative behavior.

In a context where Cheung, Gong, Wang, Zhou and Shi (2016) asked when and how functional diversity influenced team innovation, the latter authors investigated the mediating role of knowledge sharing and the moderating role of affect-based trust for growing innovative teams in the 21st century (Goosen, 2015a).

While Van Waes, Farla, Frenken, de Jong and Raven (2018) presented details related to business model innovation and socio-technical transitions in a new prospective framework with application to sharing, Vorster and Goosen (2017) provided a framework for university partnerships promoting the continued support of e-schools.

SOLUTIONS AND RECOMMENDATIONS

This section of the chapter will discuss solutions and recommendations in dealing with the issues, controversies, problems and/or challenges presented in preceding sections.

Towards Solutions for the Post-COVID-19 Era

Research Context

This subsection presents a background of university ICT education, which is the context of the study. An example of undergraduate student innovation included one from the University of Nairobi, where a student developed a mobile phone tracking software named Mobi_Hunter (Obura, 2010). In terms of

context, this study shows some overlap with that of Tuomi, Aimala, Plazar, Starčič and Žvanut (2013), whose population also included undergraduate students. The Commission for University Education (2016) provided some of the basic statistics on university education in Kenya as baseline for the study reported on in this paper.

Goosen (2019a) used a case study of a Massive Open Online Course (MOOC) as basis to provide technology-supported teaching and research methods for educators, while Pastor, et al. (2010) conducted an empirical examination of the Spanish automotive industry in terms of managing knowledge through human resource practices, and Boon, Den Hartog and Lepak (2019) undertook a systematic review of human resource management systems and their measurement.

Preliminary Analysis and Data Preparation

Data Preparation

In an update with regard to core reporting practices in structural equation modeling, Schreiber (2017) indicated that the preliminary stages of data analysis involved diagnosis and correcting for problems of missing data, outliers, multicollinearity, and violations of statistical assumptions before applying statistical procedures.

Accuracy of Input

The first step in checking the accuracy of the input involved an exploration of the range values (minimum and maximum values), as well as an examination of whether the means and standard deviations were plausible (Schreiber, 2017).

Bootstrapping

Bootstrapping With Bias Corrected Confidence Intervals

The bootstrapping method has been applied by multiple authors in studies related to innovation behavior, like Yeniaras and Unver (2016), who revisited the mediating effect of entrepreneurial behavior on the proactiveness–performance relationship while looking at the role of business ties and competitive intensity, as well as test mediation in the field of knowledge sharing (Rahman, Osmangani, Daud, Chowdhury, & Hassan, 2015).

Since Lee, Lei and Brody (2015) provided construct confidence intervals for effect size measures of an indirect effect and Tofighi and MacKinnon (2016) on Monte Carlo confidence intervals for complex functions of indirect effects in a structural equation modeling context, the generated parameter estimates were later used to create a sampling distribution of indirect effects (Lee, et al., 2015; Tofighi & MacKinnon, 2016).

Cheung and Lau (2017) compared regression and latent moderated structural equations in terms of the accuracy of parameter estimates and confidence intervals in moderated mediation models.

The testing for common method bias applied the Harman one-factor test (Scott & Bruce, 1994).

Exploratory Factor Analysis

After the data was found suitable for other advanced inferential analysis, three main types of multivariate analysis were employed, namely Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and structural equation modeling. The results of the EFA were obtained following suggestions by Bryman and Cramer (2005). EFA is statistical technique used to "explore the main dimensions to generate a theory, or model from a relatively large set of latent constructs often represented by a set of items" (Williams, Brown, & Onsman, 2010, p. 3). Similarly, EFA was defined by Parasuraman, Berry and Zeithaml (1991, p. 757) as "a multivariate statistical technique that analyses data on a relatively large set of variables and produces a smaller set of factors, which are linear combinations of the original variables, so that the set of factors captures as much information as possible from the data set", against the background of understanding customer expectation of service.

While Ajibola and Goosen (2017) looked at the development of heuristics for the usability evaluation of mobile e-commerce (m-commerce) applications, Williams, Brown and Onsman (2010) provided a five (5) step procedure to the heuristic process of performing an EFA. The first step involved computing statistics on the suitability of data for factor analysis, by an examination of the three measures, namely the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test of sphericity, and the anti-image correlation matrix for Measure of Sampling Adequacy (MSA). Secondly, the extraction employed the use of Principal Component Analysis (PCA) as suggested by Luck and Rubin (1987) in the context of marketing research. Thirdly, the criteria used to determine the factors to be removed was based firstly on examination of eigenvalues, following Kaiser's criterion for factors with eigenvalues of greater than 1. When applying multivariate statistics for the social sciences, Stevens (2012) posited that the criterion is suitable when the number of respondents is greater than 250 and the mean communality is ≥ 0.6. The second criterion used was the scree test, which involved plotting eigenvalues against the variance of each component to provide a visual assessment of factors to be retained.

The next step involved determining the rotation method to be used for cases where the variables might relate to more than one factor. Some of the available rotation methods include orthogonal varimax/quartimax or oblique olbimin/promax. In terms of understanding concepts and applications with regard to exploratory and confirmatory factor analysis (Thompson, 2004), the most frequently used rotational method is orthogonal varimax rotation (Bryman & Cramer, 2005), as it produces a factor structure that is uncorrelated, in contrast to oblique rotation that produces factors that are correlated (Costello & Osborne, 2005). Based on best practices in exploratory factor analysis, Costello and Osborne (2005) made four recommendations for getting the most from such an analysis, which led to orthogonal varimax rotation being used in this study.

The last step involved determining the criteria for factor extraction. In providing a historical overview and some guidelines of factor analytic evidence for the construct validity of scores, Thompson and Daniel (1996, p. 200) posited that "simultaneous use of multiple decision rules is appropriate and often desirable". This study conducted EFA on 57 observed variables by using principal components analysis and Kaiser's criterion (eigenvalues of more than 1) to determine the number of factors to be retained. During the development and validation of a measure of selling skill, Rentz, Shepherd, Tashchian, Dabholkar and Ladd (2002) suggested retaining factors with loadings above 0.5 on a single factor and not having cross-loadings larger than 0.3 on multiple factors. The study proceeded in an iterative method to eliminate items with low loadings of less than .50, low communalities of less than .30, and/or high cross-loadings greater than .40 as suggested by Williams, et al. (2010).

Confirmatory Factor Analysis

In a book on action, emotion and will, Kenny (2003) indicated that confirmatory factor analysis seeks to provide credence to a predefined hypothesized relationship, rather than examining all the conceivable relationships and selecting one with the best statistical fit. Schreiber, Nora, Stage, Barlow and King (2006) provided a review of reporting structural equation modeling and confirmatory factor analysis results.

Structural Equation Modeling

This study innovated by applying the advanced analytical technique of structural equation modeling, which is well suited to analyze correlations between the hypothesized constructs. Specifically, SEM research "explicitly take measurement error into account when statistically" analyzing data (Schumacker & Lomax, 2010, p. 7). Further, SEM research "permits complex phenomena to be statistically modelled and tested" (Schumacker & Lomax, 2010, p. 7). For the statistical treatment of data, the study utilized the two-stage model-building procedure that required developing a measurement model and later a structural model (Schumacker & Lomax, 2010).

Moshagen and Erdfelder (2015) created a new strategy for testing structural equation models in line with the principles and practice of structural equation modeling, as suggested by Kline (2015). In this same context, Byrne (2016) provided basic concepts, applications and programming related to structural equation modeling with Analysis of Moment Structures (AMOS).

The procedure set out by Iacobucci, Saldanha and Deng (2007) was adopted and used, as the latter authors provided evidence that structural equation models performed better than regressions.

Finally, preliminary data analysis and interpretation were completed in line with what was done by Wan (2016) in terms of organizational behavior.

Justification for Using Structural Equation Modeling

Structural equation modeling enabled testing of scale reliability and validity. In their 'beginners guide' to SEM, Schumacker and Lomax (2010, p. 114) suggested "that the measurement model provides an assessment of convergent and discriminant validity, and the structural model provides an assessment of nomological validity". Reliability analysis in SEM research overcomes the challenges imposed by traditional multiple regression analysis, as SEM "was developed to incorporate measurement error adjustments into statistical analyses" (Schumacker & Lomax, 2010, p. 137).

Testing Mediation

Direct and Indirect Effects

The direct effects, indirect effects, and the standardized total effects values were computed in SEM analysis to determine the effect of each exogenous variable on the endogenous variables of innovative behavior, where the sum of the direct and indirect effects provided a measure of the total effect (Schreiber, 2017).

Examples of Research Data

Most students undertaking an ICT-related course undergo a four-year program, with a component of project work at either the third or final year of training. It is what goes on during this project work in terms of inspiring innovation that this study sought to explore. How well were these courses designed to activate innovative tendencies and what was the correct mix of individual factors and contextual factors that could be leveraged to enhance the innovative tendencies among ICT students?

Table 1. Enrolment for computer programs at undergraduate level by university type

Type of University	Female	Male	Total
Public Chartered Universities	2,278	10,267	12,545
Public University Constituent Colleges	248	1,086	1,334
Private Chartered Universities	2,033	4,691	6724
Letter of Interim Authority	101	221	322
Total	4,660	16,265	20,925

The results in Table 2 suggest that the sample had fewer female respondents (29.8%) than male (70.1%). This fairly closely matches the gender distribution of the population in Table 1 across female (22.3%) and male (77.7%) students.

Table 2. Gender of respondents

	Female	Male	Total
Frequency	74	174	248
Percentage	29.8	70.1	100

Recommendations

Both the journal article by du Toit (2020, p. 1) and this chapter endeavored "to address recommendations made in previous research" on e.g. Mathematics, Science and Technology, that entrepreneurship in ICT "education should be developed as part of" African development plans - this could be achieved by threading entrepreneurship through the design process in education:

Technology as a school subject has extensive entrepreneurship potential, especially when combined with the practical production aspects that form part of the intended curriculum. The South African Senior Phase Technology curriculum is silent on the topic of entrepreneurship and as a result, this potential is not reaching learners in a country with high levels of youth unemployment.

Additionally, the Fourth Industrial Revolution (4IR) "is impacting on the industrialization options for Africa inter alia through three interrelated sets of technologies, namely automation, additive manufacturing and the Industrial Internet." In the paper by Naudé (2017, p. iv), the case for why entrepreneurship, education and the 4IR are important in Africa was set out.

FUTURE RESEARCH DIRECTIONS

This section of the chapter will discuss future and emerging trends and provide insight about the future of the theme of the book, with regard to entrepreneurship, innovation, sustainability, and ICTs in the post-COVID-19 era, from the perspective of the chapter focus. The viability of a paradigm, model, implementation issues of proposed programs, etc., may also be included in this section. If appropriate, the section will suggest future research opportunities within the domain of the topic with regard to entrepreneurship, innovation, and sustainability for ICT students towards the post-COVID-19 era.

The quest and goal of universities to develop graduates with innovative tendencies is inspired by demands from industry that universities be the production ground or 'factory' of future workers (Ngugi & Goosen, 2019). Such innovative workers are expected to have developed a critical mass of innovative tendencies that would inspire and propel them as a generation to produce new solutions and products, by, for example, going beyond the horizon of learning programming by using educational technologies (Goosen & Van Heerden, 2017). This demand raises concerns from lecturers, students, and employers about the quality of university education.

Consequently, students should be able to demonstrate the desire and ability to innovate, so as to deliver a seamless stream of innovations within the higher education sector (De Jong & Den Hartog, 2010). This implies that quality university education should incorporate tenets of spurring innovative capacity.

Specifically, this study used the lens of innovative behavior at the individual level of Information and Communication Technology undergraduate students (Goosen & Ngugi, 2019a), as their behavior lays the foundation for future innovations in industry (De Jong & Den Hartog, 2010). For an ICT student to develop innovation competencies, it often starts "with problem recognition and the generation of ideas or solutions either novel or adopted" (Scott & Bruce, 1994, p. 581). Such opportunities for the generation of ideas are available in a university setup, especially in the field of ICT education.

Moreover, according to Oye, Salleh, and Noorminshah, (2011), the quest towards innovation, as well as the development of knowledge sharing and innovative behavior in the workplace, may be influenced by motivators and demotivators at individual and contextual levels.

CONCLUSION

This final section will provide a discussion of the overall coverage of the chapter and concluding remarks.

A review of applicable references suggested that there are limitations and shortages in terms of existing studies that have simultaneously modelled individual and contextual variables related to course design characteristics and self-regulated learning, as well as the mediating effect of knowledge sharing behavior as drivers of individual innovative behavior (Ngugi & Goosen, 2018). The solutions provided and contributions made by this study underscore the scientific value added of the chapter, and/or the applicability of the findings/results with regard to enhancing and extending previous research by reveal-

ing how and when KSB may be related to innovative behavior. The mediation model generated was justified by seeking to explain the underlying structure and effects of the relationship between the two exogenous variables of course design characteristics and self-regulated learning, and how knowledge sharing behavior acted as a plausible mediator to facilitate the development of the endogenous variable of innovative behavior in these relationships among Information and Communication Technology students at universities (Ngugi & Goosen, 2017).

An analysis of the mediation effect suggested that KSB fully mediated the relationship between self-regulated learning and innovative behavior, as well as fully mediating the relationship between course design characteristics and innovative behavior. Further, the solutions revealed that when lecturers use course design characteristics and educational technologies for growing (Goosen, 2015b) and improving their students' ICT education in the cyber world, it did motivate students to share knowledge, leading to KSB becoming a significant driver and enabler of students' innovative behavior. As implied by Drucker (1985), shared knowledge helped these ICT students to react to new information in their external environment rapidly, and they were thus able to complete tasks and provide solutions to existing problems in an efficient manner. Although, ultimately, this led to enhanced innovative capacity amongst ICT students, future study in this regard was suggested in the previous section of this chapter.

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KEY TERMS AND DEFINITIONS

Course Complexity: Refers to the intricacy and multiplicity of task and knowledge demands of a given course of study, or more simply, the degree of difficulty associated with a course. Course complexity could also refer to the perception of students about the complexity of technological tasks and the level of cognitive demands and challenges associated with course.

Course Knowledge Characteristics: Refer to the perceptions of students about the cognitive range of knowledge demands as well as the nature of knowledge demands associated with a course of study in university education.

Course Task Characteristics: Refer to the perceptions of students about the range of task demands, as well as the nature of tasks associated with a course of study in university education.

Knowledge Characteristics: Refer to the perception of the specific attributes associated with a given knowledge in terms of expertise demands on student.

Opportunity Exploration: Refers to the search for novel ideas and methods to perform tasks and design new products from a different and often original perspective.

Organization: Refers to the mental approaches that involve the construction, configuration and processing of linkages concerning ICT information that appear new to a student.

Written Contributions: Refer to the action of student engagement in documentation of their ideas and knowledge on technological issues in the form of reports and project updates.

Section 2

Innovative Contributions From ICTs for Sustainable Solutions in Pandemic Times

Chapter 7
An Empirical Study Into the Impact on Innovation and Productivity Towards the Post-COVID-19 Era:
Digital Transformation of an Automotive Enterprise

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ABSTRACT

The purpose of this chapter is to present research describing work in an organizational context in order to optimize the practices established in the most diverse domains of knowledge, attending to the relationships between information and communication technologies (ICTs) and sustainability in the post-COVID-19 pandemic era. An empirical study into the impact of digital transformation via unified communication and collaboration (UC&C) technologies on the productivity and innovation of a global automotive enterprise is thus reported on in the chapter. The primary research question addressed in the study was: To what extent does digital transformation, implemented through unified communication and collaboration technologies, impact productivity and innovation within a global automotive enterprise? The conclusion of the study is that digital transformation, delivered via an integrated framework with UC&C technologies, impact productivity and opportunity for driving innovation within a global automotive enterprise.

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INTRODUCTION

When commenting on the positive experiences encountered during a live musical performance, American composer Libby Larsen famously observed that technology sometimes creates barriers to communication among human beings (Ross, 2001) by driving a yearning for the intimacy that a live performance brings, with the performer being present, standing near the audience and looking into their eyes.

In order to describe the general perspective of the chapter, developments in the industry and the global market are introduced, not only relating to such human interaction, but also focusing on the theme of entrepreneurship, innovation, sustainability, and Information and Communication Technologies (ICTs) in the post-COVID-19 era. A look is taken at the importance of ICTs to business and enterprises in general, which have been witnessed over the last few years. New business models, new marketing channels and new markets are reached using ICTs. ICTs are a daily support and, many times, a way to develop creativity and innovation, which is expected to remain important in terms of renewed efforts in the post-COVID-19 pandemic era. Currently, most enterprises are dependent on Information Systems (IS)/ICT, in order to support their business strategies. IS/ICT can promote the implementation of strategies and enhancers of the optimization of the various aspects of business.

The experiences of the first author against a background relating to enterprise digitization enablement through Unified Communication and Collaboration (UC&C) technologies (Bolton, Goosen, & Kritzinger, 2016) and the impact of digital transformation on the productivity and innovation at a global automotive enterprise led to the establishment of the problem domain. Definitions of e.g. digitization, which is increasing the demand for digital human-to-machine and human-to-human communication and interaction, were thus established and supported by a literature review.

The main focus of the chapter reported on in this study was on the automotive industry, which offers a unique opportunity for research, due to the exceptional confluence of commercial and technical evolutions that are currently occurring across a broad set of critical business functions. Evolutions within the automotive industry, such as the electrification of vehicle platforms, digitization of large-scale manufacturing, enhanced digitization of retail experiences, autonomous and connected mobility services, globally shared vehicle architectures and globalization of operations, are driving rapid change and broad enterprise digital transformation. The chapter also raises issues related to the impact this has on people in affected enterprises, focusing on the increased demands for integrated real-time communication and integration with the emerging digital landscape of technologies and processes (Eigner, 2016). Combined with long-standing histories of industrial development (some automotive manufacturers have been in operation for over 100 years), the challenges experienced as automotive enterprises digitize business processes and evolve to digital business models provided a fertile landscape for the development of research data (Leyh, Schaffer, Bley, & Forstenhausler, 2017). The automotive sector was thus contextualized in terms of challenges with regard to the digital integration of technology systems, business processes and people.

The pandemic introduced disruptions to everyday life, in terms of, for example, ways of working, learning and socializing. These challenges bring difficulties to a number of sectors, such as tourism, aviation, etc., but also present a set of opportunities, with new solutions being developed in terms of ways to sell, market, teach and learn, etc.

Not only in market enterprises, but also in social enterprises, the digital economy and ICTs are important tools that can empower social entrepreneurship initiatives to develop, fund and implement new and innovative solutions to social, cultural and environmental problems. Digitization is more than a trend and ICTs are common and influential to the wellbeing of millions of people virtually everywhere.

Maybe the world will come to a new balance after the pandemic, and digital transformation could also improve sustainability, due the possibility to reduce negative impacts on the environment, together with recommendations relating to new solutions in terms of social and economic opportunities for enterprises.

Finally, this chapter concludes by reviewing scholarly literature highlighting the challenges faced by global enterprises as these shift from traditional manufacturing, design and global operations to a highly integrated and connected digital future.

Target Audience

This chapter is mainly intended to support an academic audience (academics, university teachers, researchers and post-graduate students – at both Master and Doctorate levels). In addition, this chapter could be of benefit to public and private institutions, developers and researchers in fields with regard to entrepreneurship and business management, as well as professionals related to these sectors.

Objectives

There is currently extensive literature addressing topics regarding ICTs, entrepreneurship and innovation in an organizational context. However, the extant research is too focused on each of these topics separately. Thus, students, teachers, potential entrepreneurs and even private and public organizations are mainly directed to mainstream literature on entrepreneurship, innovation or ICTs respectively, in terms of what these mean, while under-estimating a multidisciplinary approach that mix and complement these topics and contributes to organizations. The purpose of this chapter is to present research describing work in an organizational context in order to optimize the practices established in the most diverse domains of knowledge, attending to the relationships between ICT and sustainability in the post-COVID-19 pandemic era. In light of the stated purpose, as well as the recommended topics for this book, the introductory section will now end by specifically stating the objectives of the chapter, which are related to:

- Sustainability ICT
- Optimization of organizational practices
- IT Adoption and Use
- IS/ICT in organizations
- Social Aspects of Information Systems
- Organization, Case Studies Application
- Digitization
- Digital Business Models
- E-Commerce
- Globalization

Background

This section of the chapter will provide broad definitions and discussions of the topic with regard to an empirical study into the impact on innovation and productivity in the post-COVID-19 era by investigating the digital transformation of a global automotive enterprise. It will also incorporate the views

of others (in the form of a literature review) into the discussion to support, refute, or demonstrate the authors' position on the topic.

Due to its potential for industry differentiation, *digital disruption* to existing business models and the way in which it contributes to the definition of new markets, the establishment of a digital strategy is becoming a key priority for business and enterprise. Research reported on by Taguy, Scanlan and Wilmott (2015) showed that the 'topple rate' for incumbent enterprises increased by nearly 40% from 1965 to 2012. The latter authors attributed this, in part, to the emergence and rise of digital technologies' increased competition and disrupted enterprises, which drove a requirement for enterprises to focus their strategies and digitally transform. The research reported by Taguy, et al. (2015) also indicated that enterprises expect to deliver annual growth and cost efficiencies of more than 5% to 10% between 2015 and 2018 through digital transformation initiatives.

Enterprise Digitization

A review of scholarly literature suggested growth in the transition of large industrial enterprises to the digital age, motivated by the benefits associated with digitization. Bolton, Goosen and Kritzinger (2020b) defined digitization in terms of measuring a socio-economic paradigm shift (Katz & Koutroumpis, 2012). Swaminathan and Meffert (2017) posited that all sectors of industry will be affected by digitization and that the only difference experienced will be the severity of the impact and the time it takes for old business models to reach obsolescence. These challenges can vary, broadly based on the history and market focus of individual enterprises. Grube (2017) pointed out that transforming enterprises face challenges with regard to retaining existing expertise and integrating new know-how into their business. Similarly, while universal benefits are experienced because of transformation, it is likely that these will vary by company. Variance will be influenced by factors, such as the maturity of their ICTs and individual business drivers. The last decade has witnessed an acceleration into the digital age of communication, an age where human to human communication blends with a digital eco-system of connected solutions, services and mass generation of real-time data (Friess, 2013; Friess, et al., 2016).

The emergence of trends, such as Industry 4.0 and the Internet of Things (IoT), is resulting in the expansion of digital enablement and increasing integration of systems and business processes. Digitization represents a step change for both industry and consumer services, building on Internet technologies. The Internet and advent of the World Wide Web spawned the dot.com revolution and the establishment of many new Internet enterprises (Hanson, 2016). Data transfer is now facilitated through leveraging the Internet Protocol (IP), inclusive of Business-to-Business (B2B) transactions and facilitating business and consumer electronic commerce (e-commerce) (Fensel, et al., 2002).

One of the primary differences in enterprise digitization, driven by the emergence of IoT technologies versus traditional Internet leverage, lies in how data is created, communicated and used. IoT-enabled and -digitized enterprises leverage real-time data for situation detection and context-based event patterns (Gayathri, Easwarakumar, & Elias, 2018). Data leveraged in this way, collected through independent ICT systems, digital sensors, mobile devices and web services, is resulting in the creation of new services and opportunities for personal and commercial efficiency, productivity and the further acceleration of innovation (Mansell, 2001). Opportunities, such as real-time data acquisition, position early enterprise adopters of digitization strategy and IoT to differentiate themselves from their competitors and expand into new and lucrative commercial service-based markets.

The Emergence of the Intelligent Digital Transformation of Enterprises

Through the digitization of business processes and leveraging IoT technologies, enterprises are evolving and creating more intelligent business models, operations and services (Zhang & Tao, 2016). Intelligent digital enterprises integrate elements, such as social and mobile technologies, data analytics, machine learning and mobile communication technologies, into the core of their business processes. The concept of Intelligent Business Operations (IBO) is emerging as the evolutionary next step in Business Process Management (BPM) and Computer-Enabled Business Processes (CEBPs) (Dayal, et al., 2008).

IoT technologies and integrated digital business processes integrate real-time data analytics and decision-making technologies into the fundamental business processes of digitized enterprises (Schaffer, 2017). These integrated and intelligent processes will support routine business transaction execution, reporting and day to day business operations. The approach of integrating real-time data analytics with operational business processes contrasts with legacy approaches of separating the analytical process from transactional work. Integration empowers employees and decision makers within an enterprise to make swift and contextualized business decisions.

ISSUES, CONTROVERSIES, PROBLEMS AND CHALLENGES REGARDING DIGITAL TRANSFORMATION

This section of the chapter will present the authors' perspectives on the issues, controversies, problems, challenges, etc., as these relate to the theme of entrepreneurship, innovation, sustainability, and ICTs in the post-COVID-19 era, and arguments supporting the authors' position. It will also compare and contrast with what has been, or is currently being, done as it relates to the specific topic of the chapter with regard to an empirical study into the impact on innovation and productivity in the post-COVID-19 era by investigating the digital transformation of a global automotive enterprise, and the main theme of the book.

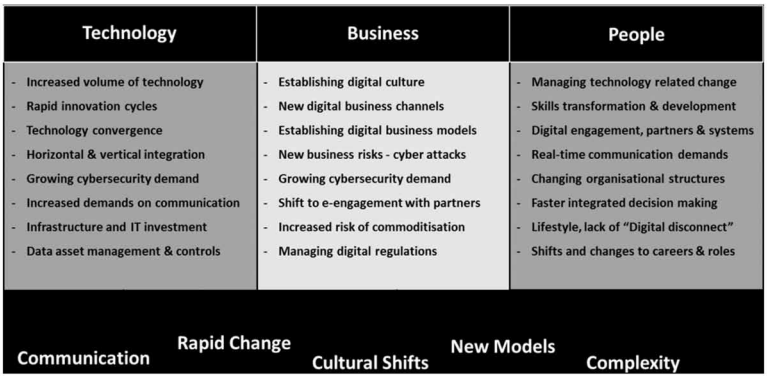
Such challenges are categorized into three distinct domains (see Figure 1): technology, business processes and people. However, some common challenges have a pervasive impact across all three of these.

Technology Challenges – Scope, Speed, Complexity, Risk

Due to its pervasive nature, digital transformation has a broad impact and introduces many challenges relating to technology strategy and deployment within the transforming enterprise. Digital technologies and tools are replacing legacy modes of operation and technology is invading the physical business and process landscape. Enterprises recognize the increasing importance of digital transformation; however, they do not have a clear route or plan to achieve it (Palmentiero, 2010). The reasons for this gap are not all technical. Digitization represents the digital transformation of non-technical elements of a business and development of new business opportunities and models through combinatorial innovation. Because of this, the entire value chain of the enterprise must be engaged.

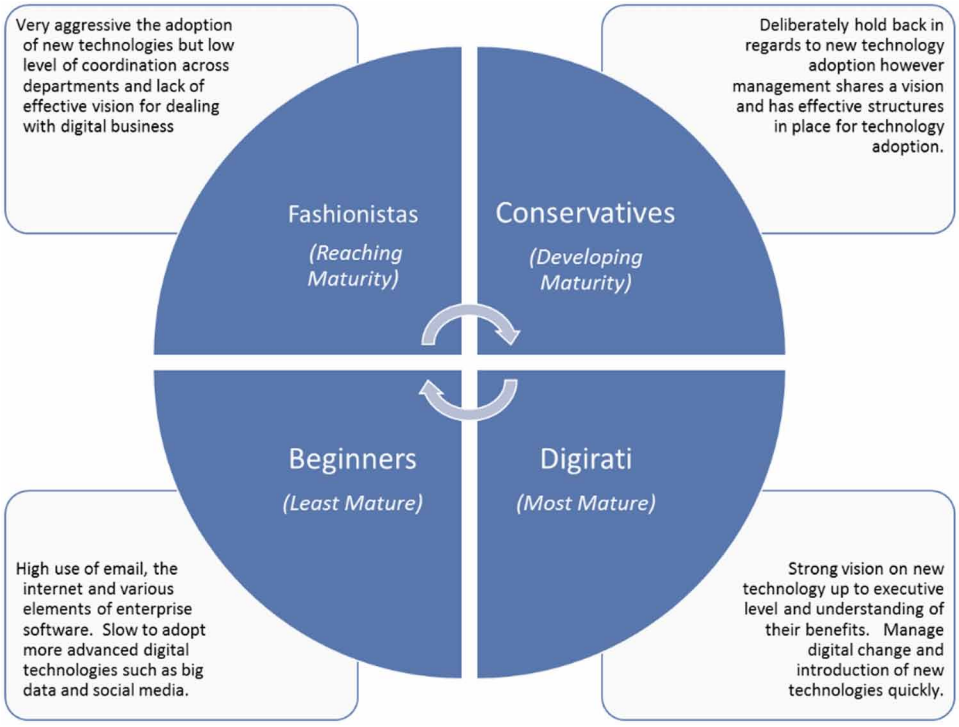
Digitization cannot occur within a technical vacuum and does not occur in isolated functional silos within an enterprise. The technical challenge is exacerbated by the necessity to frequently and innovatively ingrate a broad array of critical non-digital elements of the business. In an increasingly digital world, 'digital immaturity' is a widespread problem across businesses and enterprises (Fitzgerald, Kruschwitz,

Figure 1. Model describing business impact associated with digital transformation
Source: Bolton



Bonnet, & Welch, 2014). Figure 2 summarizes the four levels of digital maturity described in the research by Fitzgeraled et al. (2014). The model provides a visual summary of the four levels of maturity, beginners (least), fashionistas (reaching), conservatives (developing) and digirati (mature). Attributes associated with each level of maturity are summarized, characterizing the current levels of engagement and posture towards technology as it relates to its leverage within their business.

Figure 2. Model depicting states of preparedness for enterprise digital transformation
Source: Bolton



Long established enterprises and long-standing market leaders can be some of the most challenged in the face of digital transformation. As a result, for example, General Motors, Ford and Honda, within the automotive sector, are at risk of commoditization by new players, such as Telsa. From the perspective of technology, these enterprises face the challenge of transforming a portfolio of well-established and deeply rooted legacy systems. Legacy systems, such as those liked to supply chain management, are also frequently aligned with existing legacy business models, leading to reciprocal challenges and restrictions in the timing of the digital transformation of associated business models.

Through abstraction and micro-service approaches, technical systems in a digital enterprise are developed in loosely coupled parts and combined for innovation. Fowler (2017) pointed out that such abstraction and micro-service approaches allow for a more dynamic allocation of resources, supporting greater scale. This strategy enables controlled, but rapid change and progression through agile digital innovation, releasing new features and functionality in a modular fashion and simultaneously reducing the scale of risk associated with change.

Enterprises that are in the process of transforming from legacy systems have different challenges. Transforming enterprises must maintain and add functionality to large legacy systems, while simultaneously modularizing and decoupling the functionality of new digital assets that combine into new digital processes within the transformed business model. Changes associated with digital transformation occur against a backdrop of transformation objectives, driving change within the business, while simultaneously protecting the customer experience, production uptime and product quality.

Strategies to deal with these challenges can be applied as enterprises transform from legacy monolithically designed systems to an agile digital environment. Strategies include placing focus on exposing functionality within systems via rest Application Programming Interfaces (APIs) facilitating functionality, abstraction, portability and interoperability (Di-Martino, Cretella, & Esposito, 2015).

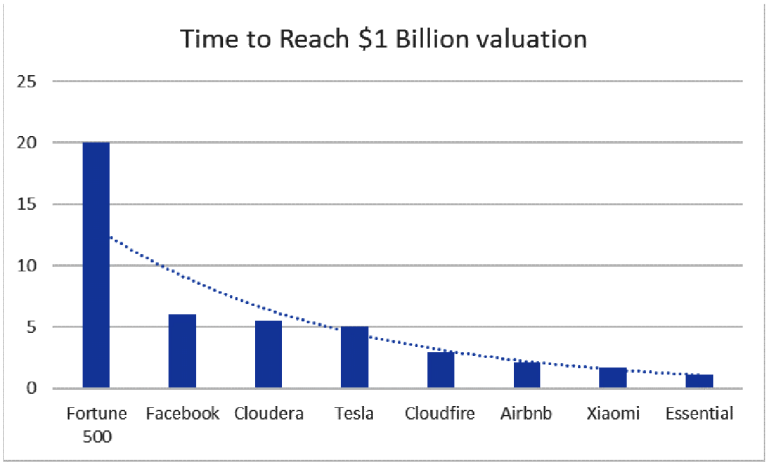
The transformation of legacy technologies in non-digital business models to modular digital components facilitates alignment to new models and the generation of new market opportunities. Research carried out by the World Economic Forum (2016) suggested that enterprises that have successfully transformed and implemented digital technologies across their business have experienced increased success in competing with digital peer competitors, displacing industry peers and enhancing revenue sources. Figure 3 depicts a graph generated utilizing data from the World Economic Forum (2016) and Kim (2015), highlighting the difference in time that established Fortune 500 enterprises took to reach a billion-dollar valuation versus modern digital start-ups, such as Google, who achieved it in under eight years and Xiaomi, who achieved in less than two.

Business Challenges – Model, Vision, Culture, Security

Transforming into a digital enterprise can require profound changes beyond the technical domain. Technology transformation, enablement and innovation within the digital enterprise must focus on enhancing the business model; not just driving operational efficiency. Achieving this transformation is a critical differentiator in terms of traditional technology enablement, focused on operational efficiency and the digital transformation of the enterprise. In many cases, business models need to be reviewed and redesigned to fit new models and digital markets.

Research published by Ernst and Young (2011) suggested that the availability of digital channels to consumers lowers the barrier of entry and increases globalization. The impact of this leads to a spiral of intensified competition, the result of which is a trend towards commoditization. Consumers are

Figure 3. Time taken (in years) to reach a company valuation of $1 billion
Source: Bolton



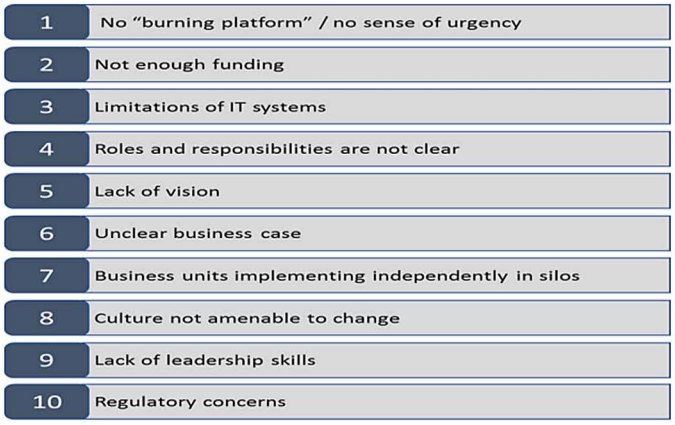
increasingly demanding more choice, with a trend towards consumers selecting and investing in fewer brands. Establishing new business models to counteract the risk posed by commoditization through digital technology and an increasingly digital savvy and digital native customer base are key challenges facing any transforming enterprise.

As there are a strong association between an organization's leadership and its digital maturity, it is important that the path to digital transformation starts with a transformative vision (Deloitte, 2020). The senior digital leadership within an enterprise should also be forward-looking and change-oriented, so that such a vision can be established and shared. Research involving a survey of 1,559 industry executives, conducted by the Massachusetts Institute of Technology (MIT) indicated that where senior management establishes and effectively shares their vision for the digital enterprise strategy, this leads to extremely high employee buy-in (Fitzgerald, et al., 2014). Employee buy-in and engagement has proven essential in successful enterprise digital transformation. A shared vision is a crucial strategy in binding efforts and focusing on digitization. Effective planning prevents underestimation of the impact on organizations and structures.

Company culture and inter-departmental communication emerge as a challenge pre- and post-digital transformation. In establishing a common digital vision across the enterprise, the focus must be placed on identifying and dealing with the reciprocal changes to business operations. Digital transformation will not always replace existing technology; however, it is very likely that it will change the way that employees work and engage.

The design of the digital strategy must consider and include changes in approach, technology, communication and business processes. Absent of broad and active engagement in this regard, the digital transformation is prone to fail, or at a minimum, slow down. Understanding the purpose structure of the digital strategy and architecting an effective communication plan is vital to ensure that employees understand their roles and the part that they need to play as the business model digitally transforms. According to a report by Dimensional Research (2016), the biggest traps encountered by transforming enterprises include a lack of urgency, lack of funding, ICT system limitations, lack of clarity in roles and responsibilities and lack of vision. Figure 4 depicts these, and other traps encountered by enterprises.

Figure 4. Business transformation gaps
Source: Bolton



As part of the security aspects related to the empirical study reported on in this chapter, Bolton, Goosen and Kritzinger (2020a) also referred to cybersecurity details in the Digital Transformation Security Survey White Paper by Dimensional Research (2016).

People Challenges – Culture, Skills, Communication

During the process of digital transformation, enterprises face many challenges, including technology, business model and organizational change. These challenges and the associated disruption have a reciprocal impact on employees, external partners and customers (Westerman, Bonnet, & McAfee, 2014). Every enterprise and business will have its unique challenges; however, it is likely that they will encounter common challenges throughout the digital transformation process. Westerman, et al. (2014) also suggested that business need to consider the requirement of absorbing impact associated with digital change, the rapid and constant cycle of technology change and transformation of employee skills.

At any level, organizational change can be challenging. The challenge of change magnifies when it is driven by the process of digital transformation. Perkin and Abraham (2017) pointed out that the change in business typically happens at a slower rate than technology and consumer behavior. Digital transformation requires a pervasive shift from legacy systems, process, business models and social thinking towards an integrated digital enterprise. Digital transformation often drives the need to reorganize traditional organizational structures, roles, processes, skills and tools within an enterprise.

Beyond the flowcharts of systems, actions, structures, goals and shared strategy that are associated with any business processes, there are often critical undocumented factors that are considered regarding impact due to the shift to digital processes. These factors align with the active culture within an organization but are often invisible when the culture and processes of an organization is reviewed at a superficial/process level. These invisible factors include things such as shared perceptions, assumptions, ad-hoc procedures, legacy attitudes, group norms, individual and group values, unwritten rules and the feelings of the individuals affected (Rick, 2016).

Figure 5 depicts a visual model expressing the factors described by Rick (2016), showing that while some of these appear overtly within the culture and operation of an organization, many factors can remain

Figure 5. Visual depiction of invisible elements of organizational culture
Source: Bolton

hidden in the form of shared perceptions, assumptions, feelings, beliefs, and tradition. Many of these factors can exist out of plain sight; however, these can weigh heavily and have a significant influence on the behaviors and norms of an organization.

The needs in terms of talent within the enterprise should be considered as new digital-savvy talent is sought and existing talent develops (Liska, 2018). Bolton, Goosen and Kritzinger (2021) therefore pointed out that people are not 'just (like) machines', but will, in fact, have the power to act as 'bosses' during digital innovation (Brush, 2012; Cognizant, 2016).

According to the Organization for Economic Co-operation and Development (OECD) (2010), due of the rapid pace of innovation associated with digitization, many of the jobs generated over the next two decades will be new and not exist today. The associated transformative growth is driving the need to prepare for upgrading to a skilled workforce for strong, sustainable and balanced growth – this will need sustainable and inclusive quality education through research informed practice on ICTs (Goosen, 2018). The facilitation of fostering ongoing digital skills development, as well as a culture of acceptance of change and embracing continuous development by individuals, is set to be an ongoing challenge to digitization within the enterprise. The benefits of digitization can only be realized within an enterprise if the employees have the appropriate digital skills and competencies (Oswald & Klienemeier, 2016).

Common Challenges – Rapid, Continuous Change and Communication

A review of the landscape in terms of the challenges facing enterprises embarking on digital transformation highlighted many common factors, such as technology, business processes and people. Arguably some of the leading challenges all enterprises will face center on the rapid, continuous change required to integrate and engage people within the enterprise with each other and with transformed digital systems and processes in real-time. The transformation of legacy and analogue systems to automated and intel-

ligent data-driven systems requires increased interfaces and communication between decision-makers at every level within the organization. The ever-increasing array of sensors and related data integrated into the digital process, from manufacturing to consumer solutions, is changing the nature of how individuals communicate within the enterprise, across enterprise partners and with customers. According to Blöbaum (2016), communication within the digital enterprise is not limited to interactions between people; there may likely also be a demand for communication between people and intelligent systems as well.

Mobile communication is increasingly important as advances in mobile technology shape consumer lifestyles and expectations of immediacy. Research conducted by the Pew Internet Project (2015) indicated that over 64% of American adults own a smartphone, 90% own a cell-phone and 34% of Internet users go online to avail themselves of online services, mostly using their phones. Horrigan (2016) suggested that as systems and processes digitize across the enterprise value chain, challenges related to digitizing the communication and collaboration between people and managing the associated demands for technology and cultural change emerge as priorities.

Digitization is changing the landscape of how people communicate in many ways. These new forms of digital communication extend beyond businesses and enterprises to permeate modern society. Employees in a digital operation face challenges associated with the transition from analogue modes of working and communication. Changes for employees take the form of the digital conversion of their traditional communication methods (voice calls, written letters, manual workflows, and physical presentations), while simultaneously having to contend with an increasing demand for converged real-time collaboration. Collaboration within a digital enterprise requires the convergence of multiple modes of digital communication and simultaneous operations by the user. Email is considered to be a mainstream method for digital communication; however, research by Ng and Kucsma (2010) on project level interaction, communication and collaboration indicated that when leveraging email as a communication medium in projects, one email is likely to result in many asynchronous follow up emails.

In the digitally transformed environment, where real-time communication and decision-making is paramount to effective operation, methods, approaches and appropriate communication tools must be applied to facilitate digital communication between teams and individuals. This shift reduces the iterative communication nature of legacy mediums, including digital forms such as email. In the digital world, decisions need to be made faster, and communication and collaboration technologies must enable ad-hoc communication, but with appropriate availability of different communication mediums (for example, voice, video, data sharing) to facilitate rapid and conclusive discourse. Lee (2017) proposed that information sharing, together with communication and collaboration technologies and applications, can enhance decision-making within an enterprise.

It is important not to underestimate the cultural impact on employees within an enterprise, due to shifts towards new modes and the increasing volume of digital communication. Digital transformation strategies and design should account for this impact. Examples of cultural shifts and an indication of the magnitude of impact is found in some of the simplest forms of pre-existing digital communication. An example of this is SMS text messaging, where the assessed impact extended beyond the rapid growth and global explosion in message volume between users. Within the cultural context, the development of a 'new' language emerged as users began shortening, adopting shared acronyms to make texting more efficient and leveraging emojis to communicate feelings and emotion (DuBravac, 2015).

In conjunction with changes to modes and approaches to communication and collaboration technologies, digitization as a process arguably demands acceptance of the concept of permanent change. As technologies develop, the fuel of combinatorial innovation increases, and in parallel, opportunities for

the development of new and improved systems. As trends towards digital systems shift to the coupling and integration of many smaller discrete abstract functions, versus large monolithic systems, the potential for constant rapid change increases. Albach, Meffert, Pinkwart and Reichwald (2014) advised that the speed of change will be relative to the speed of innovation and indications are that the process of digitization is accelerating, similar to the wave of change experienced with other technologies, such as electrification and mechanization.

Liew, et al. (2016) posited that the level of trust users have in IoT technologies, and the influence of how others within social groups feel towards IoT technologies, can influence behavioral intention towards IT adoption and use. It is vital that consideration be given to the potential impact that technological and communication changes will have on deployment strategies. Communication is a fundamental requirement of any individual working within an enterprise and care must be taken to avoid confusion and frustration, and/or overloading people as the result of new technologies' introduction and/or process change relating to communication. A balance between technologies and people within workplace strategies must be considered and developed (Estey, 2002).

Failure to recognize the potential complexity of tools, a lack of integration and alignment to frequently engaged digital processes and the buy-in of employees could place digital transformation at risk. Embedded and integrated collaboration and communication between teams and systems are essential to minimize user impact and sustain a fast pace of digital progression. Technologies may become more complex and sophisticated at a rapid pace, but it is improbable that human players, many of whom are entrenched in legacy ways of doing things, will change at a similar pace.

Figure 6 depicts what Hinchcliffe (2015) described as the digital collaboration paradox, which arose because of the rapid development of integrated, embedded and new technical functionality and software, focused on digitally enhancing the vital human processes of communication and collaboration. While demands for communication grow, new functionalities are rapidly developed; however, these are not always presented in a way that end users can easily utilize, as well as often being poorly connected to how work within enterprises is executed.

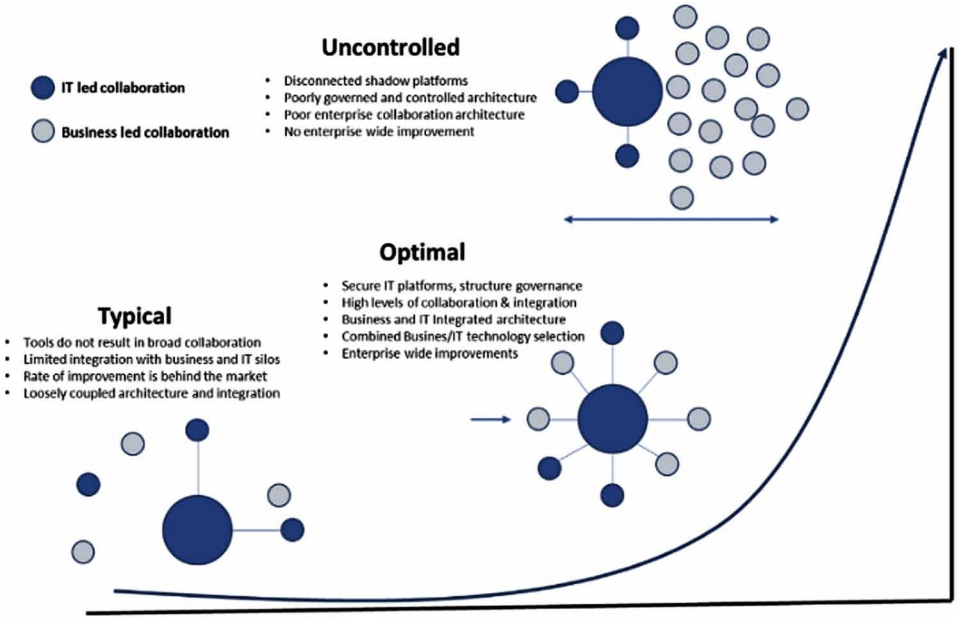
THE IMPACT OF COVID-19 ON INNOVATION AND PRODUCTIVITY

The Impact of COVID-19 on Innovation

The pandemic had "tested the agility and resilience of organizations," forcing "a deeper look at the assumptions underlying theoretical frameworks that guide managerial decisions and organizational practices. In" their commentary, George, Lakhani and Puranam (2020, p. 1754) explored the impact of the Covid pandemic on the technology and innovation management research agenda in terms of what had changed.

The purpose of the empirical study by Heinonen and Strandvik (2020, p. 1) was to investigate COVID-19 as a catalyst for reframing service innovation. The latter study drew "on a crowdsourced database of 221 innovations associated with the COVID-19 pandemic" with regard to research design, methodology and approach. "Aside from the health and humanitarian crisis, the COVID-19 pandemic has caused an acute" decrease in economic activity levels around the world (Ponkratov, et al., 2020, p. 1). The spread of the pandemic had therefore "led to a sharp decrease in the crude oil price", which provoked the outbreak of an oil 'war' "in the global energy market." This situation led to a need for

Figure 6. The digital collaboration paradox
Source: Based on the model by Hinchcliffe (2015)



predictive scenarios in the Russian oil industry, together with a discussion on macro and micro dynamics of open innovation in the COVID 19 pandemic.

"Tertiary education is vital for producing the caliber and diversity of graduates needed both for the economy that exists today and for" the "economy to which a nation aspires. It fuels competitiveness and growth by preparing professionals, like managers and engineers" (World Bank, 2020). It is therefore important that the COVID-19 crisis response is geared towards supporting tertiary education for continuity, adaptation, and innovation.

The COVID-19 pandemic had an impact "on various walks of life around the world. Because of the pandemic of this novel coronavirus in terms of COVID-19, the social life global wide has been changed a lot." In an example of tertiary education as mentioned in the previous paragraph, Chang, et al. (2020, p. 1) looked at innovation in dental education during the COVID-19 pandemic.

The essay by Mallinson (2020, p. 543) discussed "how scholarship on state politics and policy, intergovernmental relations, and federalism provides necessary context for understanding governmental responses to COVID-19. It also" highlighted how observing such responses could further cooperation, but also conflict, in state and local innovation during COVID-19.

The Impact of COVID-19 on Productivity

The COVID 19 pandemic increased national "publication productivity enormously with numerous new COVID-19-related articles appearing daily, despite" what "many health care workers in the partially overburdened national health care systems were faced with" (Müller, Mueller, Navarini, & Brandt, 2020, p. 1). The latter authors provided a preliminary exploratory analysis of the thirty countries most affected.

"Beginning in February 2020, COVID-19-related stay at home orders and workplace shutdowns worldwide have disrupted personal and professional lives, including those of aquatic scientists. Manuscript submission and" publication, as well as "peer reviewing data from journals may be" used as indicators of the impact of COVID-19 on the productivity of the aquatic science community (Hobday, Browman, & Bograd, 2020, p. 1).

The research reported on by Gorlick (2020, p. 1) "was based on a randomized control trial on 1,000 employees of Ctrip, a Chinese travel company. The experiment revealed that working from home during a nine-month period led to a 13 percent increase in performance–almost an extra day of output". However, the latter author also warned against the productivity pitfalls of working from home in the age of COVID-19.

The paper by Feng and Savani (2020, p. 1) aimed "to examine gender gaps in work-related outcomes in the context of Covid-19. The authors hypothesized that the Covid-19 pandemic would create a gender gap in perceived work productivity and job satisfaction" and explained the implications for dual-career parents working from home.

"Due to the COVID-19 pandemic, most faculty in" Science, Technology, Engineering, Mathematics and Medicine "(STEMM) began working from home, including many who were simultaneously caring for children. The objective was to assess" academic productivity differences by gender and child age during the COVID-19 pandemic (Krukowski, Jagsi, & Cardel, 2020, p. 1).

Clancy (2020, p. 857) provided "a personal reflection, as a female academic during COVID-19, on how" a "women's academic productivity seems primarily to be discussed in relation to a different kind of productivity": on motherhood, mothering and being mothered.

The research reported on by Obrenovic, et al. (2020, p. 1) explored "key factors impacting enterprise operational sustainability and" productivity, as well as "the ability to transcend adversity during different stages of a crisis, such as the COVID-19 pandemic. The" latter study drew "from the Theory of Crisis Management Teams" to develop their "Enterprise Effectiveness and Sustainability Model".

"The first known case of the novel coronavirus (COVID-19) was reported in China in November 2019; in the United States, the first reported case was on January 22" 2020. Against the background of the fact that essential "stay-at-home mandates worldwide have helped mitigate the exponential growth", Omary and Hassan (2020, p. 19612) expressed their opinion on how to restore productivity and vigor to the biomedical research workforce in the midst of COVID-19.

"The COVID-19 pandemic has forced governments worldwide to impose movement restrictions on their citizens. Although critical to reducing the virus' reproduction rate, these restrictions come with far-reaching social and economic consequences. In" their paper, Russo, Hanel, Altnickel and van Berkel (2020, p. 1) considered predictors of well-being and productivity among software professionals during the COVID-19 pandemic as part of a longitudinal study.

The study reported on by Sunarsi, Suryani and Jati (2020, p. 472) aimed "to determine the effect of" the covid-19 pandemic on productivity, given the effect of layoffs on a company in the "industrial sector around South Tangerang. The method used was explanatory research with a sample of 96 respondents."

SOLUTIONS AND RECOMMENDATIONS

This section of the chapter will discuss solutions and recommendations in dealing with the issues, controversies, problems and/or challenges presented in the preceding section.

Solutions Through Enterprise Digital Transformation

Rapid cycles of innovation and advances in technology, coupled with more immediate and direct consumer purchase availability, are increasing competition across all enterprises. The IoT and the digitization of manufacturing, design, sales, support and services through a globally connected market open many new opportunities for enterprises. At the same time, these increase the threat of commoditization (Holler, Tsiatsis, Mulligan, Karnouskos, & Boyle, 2014). Enterprises that engage in digitization now are positioned to develop a strategic advantage and differentiation from their competitors.

Industry 4.0 is considered to be the fourth industrial revolution (Manu, 2015) and promises to increase productivity and efficiency in enterprise services and manufacturing through the introduction of integrated data exchange and intelligent automation.

Figure 7. Digital transformation to create new business opportunities
Source: Bolton

Figure 7 depicts a model showing how digital transformation can be leveraged by businesses to create new business opportunities. The model highlights the areas of customer experience, operational improvements and change in business models, showing transformational opportunities and potential outcomes and benefits derived. Scholars, such as Schwertner (2017), highlighted common themes in enterprise associated with the leverage of digital transformation to drive business disruption. By empowering workforce efficiency, driving higher levels in the personalization of customer experiences and building new business models through technologies, innovative digital transformation fuels disruption. According to Schwertner (2017), without an established strategy, many enterprises focus too much on technologies transformation and do not adequately focus on transformational opportunities aligned to the customer. Figure 7 further proposes a balanced model depicting the benefits and focus for transformation across customer experience, operational improvements and change in business models. Schwertner (2017) also pointed out that digitally transformed businesses are 26 percent more profitable than their non-transformed peers.

Combinatorial Innovation Differentiation Opportunities

Varian (2011), the chief economist for Google and emeritus professor at the University of California, Berkley, developed the concept of 'combinatorial innovation'. Varian (2011) also described how the advent of the Internet resulted in the delivery of a flexible set of technologies that encourages combinatorial innovation. Enterprises drive combinatorial innovation through technology convergence and standardization. Over time, Internet technology convergence and standardization have facilitated the combination and recombination of technologies, leading to new inventions. The digitization of previously non-digital business processes and transactions enhance opportunities for combinatorial innovation, adding data and assets to the technological pool available for convergence.

An excellent example of combinatorial innovation enabled by digitization via IoT and Internet technologies is General Motors' OnStar emergency response service (Cronin, 2010). Through an innovative combination of existing technology systems (cellular communication, digital recording of telematics, Global Positioning System (GPS), Short Message Service (SMS), digital telephony) and the digitization of business processes (intelligent contact center advisor desktop, telematics monitoring and Public Safety Answering Point (PSAP) services), GM established the OnStar service. The latter is an innovative offering to drivers of GM vehicles that provides interactive concierge services, emergency response and automated vehicle functions.

Figure 8. Combinatorial innovation example: GM OnStar service offering
Source: Bolton

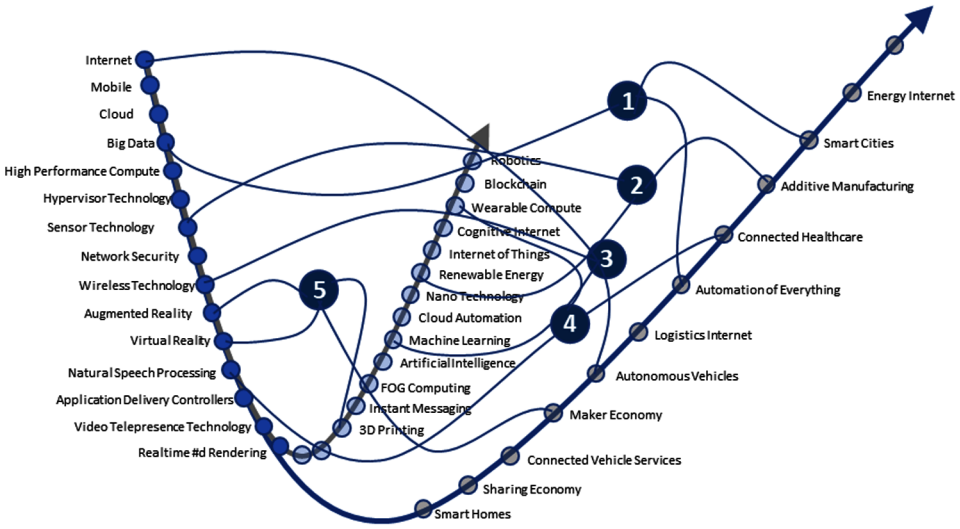
Figure 8 depicts the combinatorial innovation implemented within the scope of GM's OnStar connected vehicle service, converging business operations with telephony, connected vehicle technologies, contact center technologies, business and customer applications. Many of these technologies and innovations existed prior to OnStar in their own right, such as contact center services, location monitoring, digital telephony and global positioning systems. When combined in the unique manner presented

through OnStar, the combinatorial effect resulted in an enterprise disrupting, new digital connected vehicle service offering.

This process facilitates the amplification of real innovation through the unique convergence of business processes and technologies into a new service offering. It also serves as an example of how combinatorial innovation can lead to enterprise disruption and differentiation. General Motors (2016) was an early leader in the connected vehicle sector with OnStar, supporting over 2.5 million connected vehicles with embedded shared Wi-Fi Internet services. Digital transformation outcomes stemming from this research have further contributed to the enhancement of OnStar services within GM. The deployment of a global unified communication and collaboration platform has enhanced and expanded the integration of communication between OnStar advisors and the broader business operations and support functions across GM.

Figure 9 presents a model describing combinatorial innovation in practice.

Figure 9. Model describing combinatorial innovation in practice
Source: Bolton



Analytics Across the Value Chain

The IoT opens opportunities for the enablement of transforming and digitizing business processes across the landscape of horizontal and vertical business functions and processes. The resulting enablement franchises the digital enterprise with a deep and broad set of functional data that can be applied across the value chain and lead to the creation of new business models and sources of efficiency and innovation. The integration of a vast array of Big Data established across the business value chain is quickly becoming a prerequisite of any modern enterprise (Ryan, 2014). This array of data and associated digitally integrated processes is becoming central to the fabric of the digital business.

The prolific transformation of legacy processes, through IoT enablement, and the accelerated introduction of new digital sensors and monitors within businesses and society, are resulting in the collection

of vast amounts of data. This process of digital transformation or 'datafication' (Loebbecke & Picot, 2015) is resulting in an increased opportunity to introduce automated, real-time data-driven algorithmic decision-making (Newell & Marabelli, 2015).

Digital Transformation of Customer Engagement

The emergence of web technologies and websites in the 1990's introduced a new age of customer experience and convenience through digital customer interaction and business-to-digital customer services. While these interactions increased convenience for customers, digital channels developed in isolation from their related physical channels. As a result, it has been argued that this fundamental shift towards digital experience came at the expense of meaningful interactions with customers.

In their research on the effect of channel quality inconsistency on the association between e-service quality and customer relationships, Liao, Yen and Li (2011) cautioned that where customers perceive inconsistency between service channels (for example online vs physical), it can result in disappointment and frustration towards the service provider. This risk of digital frustration is increasingly experienced by what Prensky (2001) called 'Digital Natives'. These individuals are described as people who were born into the modern world of digital technologies spanning the last decade of the 20th century.

Digital Natives are increasingly opening opportunities to leverage combinatorial digital innovation. People, who grew up from the 1990's onwards, accept IT adoption and use to the point of considering it a digital extension and enhancement of their physical self (Prensky, 2009). This extension creates opportunities for the establishment of new markets for services, where previously user acceptance and adoption versus technology capabilities were barriers to establishment and growth.

Digital Disruption

In recent times, disruptions have been referenced in conjunction with developments in digital or connected technologies. These are also often confused with 'disruptive technologies', a term coined by Christensen, Baumann, Ruggles and Sadtler (2006) to describe new technologies that displace established technologies through catalytic innovation. Overuse of the term often arises from its frequent use in referencing any service or product innovation that has been digitally transformed or leverages digital technologies.

Gilbert (2015) presented an excellent example of digital disruption through his analysis of the shift in the publishing industry towards e-books. The latter author highlighted the impact that Amazon's leverage of combinatorial digital innovation had on the rapid adoption of e-book technologies, online publishing and content delivery via an e-commerce platform and Kindle devices. In the case of Amazon, the end-to-end leverage of digital technologies within an e-book business model and the unique combination of existing digital innovation disrupted the global publishing industry.

Embracing technologies to effect digital disruption within an enterprise requires that enterprises also embrace a level of internal disruption to support the changes necessary to effect digital transformation. Internal disruption includes a social and procedural change, in addition to technological changes. Social change in the form of change in company culture is required for all employees to understand the value of digital transformation and to embrace changes to their working environment. Traditional methods of raising finance and capital for ventures are often frameworks for establishing and maintaining business ventures and operations.

The technology landscape within a company is disrupted as new investments are made to roll out digitally enabled business channels (Sacolick, 2017). Communication will be disrupted to facilitate and enable new models of digital engagement, from automation through digital intelligence and data, displacing legacy approaches.

The level of disruption within any given enterprise will depend on the focus previously placed on digital enablement and establishment of an enterprise-wide digital strategy.

Recommendations

Gilchrist (2016) debated concepts related to Industry 4.0 benefits and the Industrial Internet of Things towards recommendations also reported in Bolton, et al. (2021). The latter chapter further pointed out how solutions can be recommended for the management challenges in the digital era by analyzing the impacts of Industry 4.0 in modern business environments (Liska, 2018), while digital transformation could be managed through talent development for Industry 4.0 (Karacay, 2018).

As Batran, Erben and Schulz (2017) recommended, people and their personalities still make a difference, even as the company digitally transforms. New approaches to communication and digital engagement among employees within the enterprise, with business partners and customers, including a shift towards social media, can result in significant cultural change.

FUTURE RESEARCH DIRECTIONS

This section of the chapter will discuss future and emerging trends and provide insight about the future of the theme of the book, with regard to entrepreneurship, innovation, sustainability, and ICTs in the post-COVID-19 era, from the perspective of the chapter focus. The viability of a paradigm, model, implementation issues of proposed programs, etc., may also be included in this section. If appropriate, the section will suggest future research opportunities within the domain of the topic_with regard to an empirical study into the impact on innovation and productivity in the post-COVID-19 era by investigating the digital transformation of a global automotive enterprise.

As part of a compilation of essays on the future of the internet and the next digital decade, Varian (2011) looked at computer mediated transactions.

Against the background of Science and Technology from global and historical perspectives, the emergence of Zero Down Time (ZDT) strategies for production equipment in manufacturing have resulted in data being remotely transmitted and monitored by service providers, who apply automated analytics to predict future hardware component failures and engage human support for proactive 'just-in-time' maintenance activities (Karagozoglu, 2017).

"The coronavirus disease 2019 (COVID-19) pandemic has had enormous effects on anatomy education. During the pandemic, students have had no access to cadavers, which has been the principal way to learn anatomy since the 17th century." Iwanaga, Loukas, Dumont and Tubbs (2020, p. 108) therefore provided a review of anatomy education during and after the COVID-19 pandemic in terms of revisiting traditional and modern methods to achieve future innovation.

Covid-19 had severely tested "public health systems. Recovering from Covid-19 will" in the near future test "economic systems. Innovation will have an important role to play in recovering from the

aftermath of the coronavirus." The article by Chesbrough (2020, p. 410) discussed "both how to manage innovation", as well as the managerial implications from an open innovation perspective.

"The new coronavirus disease (COVID-19) pandemic is changing how society operates. Environmental changes, disrupted routines, and reduced access to services and social networks will have a unique impact on autistic individuals and their families" during the COVID-19 pandemic and beyond relating to coping, fostering resilience, and driving care innovation (Ameis, Lai, Mulsant, & Szatmari, 2020, p. 1).

"In 2019, the National School Lunch Program and School Breakfast Program served approximately 15 million breakfasts and 30 million lunches daily at low or no cost to students. Access to these meals has been disrupted as a result of long-term school closures" during COVID-19 (Kinsey, et al., 2020, p. 1635). This could, however, lead to future opportunities for innovation in meal service.

CONCLUSION

This final section will provide a discussion of the overall coverage of the chapter and concluding remarks.

This chapter introduced trends and drivers influencing the digital transformation of large industrial and global enterprises.

In terms of background, the consideration of humans within the scope of enterprise digitization was defined and summarized, highlighting perspectives, such as Liska (2018) suggesting a frequent lack of consideration of the impact of people as systems and environments change. This section also focused on a review of the associated scholarly literature and influencing views associated with the challenges that enterprises face as they digitally transform global business models and operations. Perspectives, such as those expressed by Eigner (2016), with regard to the potential impact on people within the workforce when absorbing digital transformation, were also contrasted with these. Motivative drivers and perceived enterprise benefits of digitization were also encapsulated, emphasizing the views of scholars, such as Swaminathan and Meffert (2017), on the impending realities of a choice between transforming or becoming obsolete. Challenges, such as the retention of staff during transformation, were reviewed, underlining the suggestion by Grube (2017) that the maintenance and infusion of existing know-how were essential. However, the retention of key staff may be challenging during transformation. The conceptual emergence of the intelligent digital transformation of enterprises was further described by e.g. Zhang and Tao (2016) relating to the optimization of manufacturing systems using the Internet of Things.

Relating to the main focus of the chapter, the issues, controversies, problems and challenges, which could be associated with digital transformation, were evaluated, with subsections presenting technology, business, people and common challenges.

Technology challenges within the scope of this research were explored, e.g. through the concepts of digital maturity (Fitzgerald, et al., 2014), micro abstracted services (Fowler, 2017), and API modularity (Di-Martino, et al., 2015). Due to the frequent failure of enterprises to recognize the complexity of digital transformation and the active engagement of employees during the period of transition from non-digital to digital, it was necessary to provide the context related to the role of speed and risk in influencing increased system integration and the establishment of a step change across enterprise and consumer services.

With regard to business challenges, requirements for models related to a 'Digital Vision' (Batran, et al., 2017), as well as business culture and security, were investigated.

The strategic consideration of digital people challenges relating to culture and skills (Perkin & Abraham, 2017; Rick, 2016; Westerman, et al., 2014), as well as the increased demand for digital communication within the enterprise, were discussed.

Arguably two of the most common challenges all enterprises will face center on Internet-related technologies as a sources of rapid product and enterprise innovation, and the continuous change required to integrate and engage people within the enterprise with each other and with transformed digital systems and processes in real-time. These and other common challenges associated with digital transformation that could potentially impact an enterprise were deliberated through the lens of the digital collaboration paradox (Hinchcliffe, 2015).

In contrast to the challenges provided, potential solutions in terms of motivators for enterprise digital transformation were also presented. Underscoring the potential of combinatorial innovation differentiation opportunities (Varian, 2011), these were conceptually argued, drawing attention to how the digitization of legacy systems and the combination or recombination of existing technologies were leveraged as a rich source of innovation and enterprise differentiation.

A research agenda is needed, based on reflections relating to societal and business model transformation arising from digitization and Big Data analytics across the value chain (Loebbecke & Picot, 2015).

Liew, et al. (2016) reported on research with regard to leveraging psychology for the effective digital transformation of customer engagement.

The phenomenon of digital disruption was examined in the context of the argument by Christensen, et al. (2006) that new technologies were displacing established technologies through catalytic innovation.

Finally, concepts related to Industry 4.0 benefits and the Industrial Internet of Things were debated (Gilchrist, 2016) towards recommendations also reported in Bolton, et al. (2021).

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Chapter 8
Certified Invoicing Software: Boosting Entrepreneurship, Innovation, and Sustainability in the Post-COVID-19 Era

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ABSTRACT

The recent tax legislative changes created conditions for the dematerialization of documents, allowing waiving invoice printing, encouraging the adoption of an electronic invoicing and document archiving system. The consequent sustainability and cost reduction measures are allowing the optimization of invoicing and archive procedures, driving companies to invest in the development of technological instruments, incorporating a philosophy of innovation and sustainability. Entrepreneurial entities can take advantage of the increasing use of telework, due to the recent pandemic, by shifting to perform functions remotely. Thus, there is a need to optimize business processes and endeavour technological innovations, taking adequate, quick, and effective decisions. A model can be applied to systematize and simplify the decision-making process related to the Portuguese tax framework and requirements for certified invoicing software or for electronic document archiving. Understanding these requirements can speed up the development or acquisition of a proper invoicing or archiving software.

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INTRODUCTION

In recent years, the software development industry has been faced with legislative changes, which include more functional, and tax or fiscal requirements. By legal imposition, there was an expansion on the range of companies covered by the obligation to have Invoicing Software (ISW) certified by the *Autoridade Tributária e Aduaneira* (AT), the Portuguese Tax and Customs Authority.

The resulting legislative simplification created conditions for the dematerialization of documents, providing for the possibility of dismissing invoice printing, encouraging the adoption of an electronic invoicing and electronic document archiving system.

Thus, measures of sustainability and cost reduction were incorporated, namely, the reduction of file space, reduction of paper, consumables and printing hardware, allowing also to expand the optimization and automation of invoicing and archive procedures. These measures may be a stimulus for companies to invest in the development and use of new technological instruments, incorporating a philosophy of innovation and sustainability.

Most organizations are not Information and Communications Technology (ICT) companies, they are organizations that have to leverage technology at the service of their business. Technology no longer has to be a competitive advantage or the differentiating factor and organizations must, above all, focus on their business and understand how technology can be an accelerator of new business processes or customer relations. Innovation may involve using technologies from a new perspective, taking advantage of existing techniques. To innovate and have a digital transformation, it is not enough to digitize, it is necessary to use the right digital platform, the right mutation accelerators and work and use information in the right way.

Entrepreneurial entities, when starting or reformulating their commercial activity and business processes, should take into account the potential of this new legislative approach. The focus on online businesses, amplified by the increased use of telework, resulting from the measures to contain this recent pandemic, allows some management, optimization and control functions to be performed remotely. The effects are reflected in the need to optimize business processes, the time spent on activities, but above all in technological innovation that mitigates the gaps underlying this new vision of the business and digital world. This new vision will depend on the dynamization of ICT in business processes and the quick response to this desire, where there is a need to make quick and effective decisions, but with the necessary efficiency so that the change is adequate.

In this chapter, a model is formalized that systematizes the decision-making process related to the requirements underlying certified ISW, intending to mitigate the complexity of the process and present an approach that allows mitigating fiscal and financial constraints. Therefore, it is intended to add value, both for organizations that develop ISW and for the client, user of the software.

To support the construction of the model, a detailed analysis of the fiscal legislation, the invoicing framework and the AT certification of ISW was accomplished, in order to identify the main regulatory documents in the field of the thematic. The characterization of invoicing in Portugal was presented, when using ISW.

It is considered that the added value focuses on the presentation of the correct procedures and requirements involved in an electronic invoicing system and electronic document archiving, which can speed up the development or acquisition of a certified ISW.

PORTUGUESE LEGAL INVOICING FRAMEWORK

The Portuguese Value Added Tax Code (VATC) requires the issuance of an invoice for each transmission of goods or provision of services, even if the acquirer does not request its issuance, and refers to the formalities regarding the information that must appear on the invoice.

Decree-Law no. 28/2019, defines the criteria that oblige taxable persons to issue invoices, mandatorily and exclusively, through ISW, which have been subject to prior certification by AT.

In this context, Ordinance no. 363/2010, regulates the prior certification of ISW and Order no. 8632/2014, sets out technical requirements that ISW, even if already certified, must comply with. Ordinance no. 293/2017 creates the AT Validation Seal (SVAT) and defines the rules for its attribution to accounting software.

Decree-Law no. 198/2012, establishes a regime that regulates the electronic transmission of the elements of invoices and other documents with tax relevance, including the printing of transport documents. Decree-Law no. 147/2003 approves the regime of goods in circulation, referring to the mandatory nature and requirements of the accompanying transport documents.

Decree-Law No. 28/2019

The main objectives of Decree-Law no. 28/2019, of February 15, of the Presidency of the Council of Ministers, are to promote legislative simplification and harmonize divergent rules on the conservation of documents for tax purposes. In this context, Decree-Law no. 28/2019 created the conditions for the "Paperless invoice" and apposition of Quick Response (QR) code.

It provided for the possibility of waiving the printing of invoices and also strengthened the conditions for the dematerialization of documents, encouraging the adoption of an electronic invoicing system and electronic document archive, being an asset for the development of a more ecological vision, based on reducing the use of paper, inks and printing toners. The conditions created allow organizations to reduce costs with the fulfilment of tax obligations, stimulating the development and use by organizations of new technological instruments, incorporating a philosophy of innovation and debureaucratisation. For this purpose, a substantial reform of the rules applicable to the archiving of books, records, databases and supporting documents of accounting was introduced (Decree-Law no. 28, 2019).

Ordinance No. 293/2017

Ordinance no. 293/2017, of October 2, of Finances, creates the SVAT and defines the rules for its attribution to the accounting software, regarding the production of the Standard Audit File for Tax purposes - Portuguese Version (SAF- T (PT)). It created the conditions for the existence of a similar service to that provided in the certification of ISW, in order to advise procedures that result in the creation and export of quality SAF-T (PT) audit files. This ordinance states, among others, that accounting software must have mechanisms for archiving, safeguarding and restoring data that guarantee the integrity, completeness and legibility of the records during the legally period required (Ordinance no. 293, 2017).

Decree-Law No. 198/2012

The Decree-Law no. 198/2012, of 24 August, of the Ministry of Finance, starting point for the E-Fatura service, creates a regime that regulates, namely, the electronic transmission of data elements of invoices and other documents with tax relevance, including printing of transport documents, to AT. Establishes measures to control the issuance of invoices and other documents of tax relevance, defines the means for its communication to AT and creates a tax incentive when the acquirer requires for such documents (Decree-Law no. 198, 2012).

It should be noted that this communication can be made through electronic transmission in real time integrated in a certified ISW using a web service provided by AT or by sending the summary file, based on the file SAF-T (PT), exported periodically (usually monthly) by a certified ISW.

Decree-Law No. 147/2003

Decree-Law no. 147/2003, of 11 July, of the Ministry of Finance, approves the Goods in Circulation Regime (GCR) subject to transactions between Value Added Tax (VAT) taxpayers, namely as to the obligation and requirements of the accompanying transport documents. The GCR defines that all goods in circulation, in national territory, whatever their nature or type, which are the object of operations carried out by VAT taxable persons, must be accompanied by transport documents (Decree-Law no. 147, 2003), although with some exceptions. The diploma states that the processing of transport documents, before the start of transport, is done by one of the following ways:

- By electronic means;
- Through a ISW certified by AT;
- Directly on the Finance Portal;
- On paper, using pre-printed documents in authorized typography.

Issuance by Electronic Means

In addition to the printing on paper of the original and the duplicate of the invoice, Decree-Law no. 28/2019 states that invoices and other tax relevant documents may, upon acceptance by the recipient, be issued electronically. It states that taxable persons must guarantee the authenticity of the origin, the integrity of the content and legibility of the invoices and other tax relevant documents issued, from the moment of their issuance until the end of the archive period (Decree-Law no. 28, 2019).

Decree-Law no. 28/2019, allows the issuance of invoices by electronic means, considering the authenticity of the origin and the integrity of the content of documents issued electronically guaranteed if adopted, for example, one of the following procedures:

- Affixing an qualified electronic signature under the legal terms;
- Affixing an qualified electronic seal, pursuant to Regulation (EU) no. 910/2014, of the European Parliament and of the Council, of 23 July, 2014;
- Use of an Electronic Data Interchange (EDI) system, with the granting of an agreement, approved by Recommendation no. 1994/820/EC, of the Commission, of 19 October.

It should be noted that Decree-Law no. 28/2019, allows the issuance by electronic means, upon acceptance by the recipient, making it possible to waive the printing of paper invoices or their electronic transmission to the acquirer, or non-taxable person recipient, unless requested to do so.

Electronic Archive of Documents

After summarized the legal framework for the issuance of electronic invoices, it is important to present the way that organizations have to reduce the archiving of paper documents, minimizing, at least, the risk of destruction or deterioration of the invoices they have issued or received.

Decree-Law no. 28/2019 and the VATC state that taxable persons are obliged to archive and keep all books, records and supporting documents in good order for a period of 10 years, as well as the documentation related to the analysis, programming and execution of the software procedures and the backup copies of the data supporting the ISW.

When invoicing or accounting is established by computer means, secure storage of records must be ensured during the period legally established, through preservation in conditions of accessibility and legibility. This must allow their use without restrictions, at any time. Integrity controls must exist, preventing their alteration, destruction or disabling, in order to guarantee the set of data that is necessary for the complete and exhaustive reconstruction and verification of the reasoning of all the relevant tax operations (Decree-Law no. 28, 2019).

The accessibility and legibility of information must also be ensured to AT, through the provision of functions or programs for controlled access to data, regardless of the computer systems and respective versions in use at the time of processing. Must be ensured to AT, the availability of functions or programs that allow to export exact copies to supports or equipment currently on the market and also the legible documentation that allows its interpretation (Decree-Law no. 28, 2019).

The requirements regarding the location of the paper archive or archive by electronic means are also defined, which emphasizes that the backup copies of the processed information must also be archived.

Invoices and other tax relevant documents must be kept sequentially and uninterruptedly, and respect the archive plan and the individualization of each year, covering all documents. The archive plan, at least, must link the location of paper document or digital image with the number of the document.

Documents presented on paper can be scanned and archive in electronic format, by means of scanning and electronic archiving operations performed with the necessary technical rigor to obtain and reproduce perfect, legible and intelligible images of the original documents. This must be done without loss of resolution and information, in order to guarantee its consultation and reproduction on paper or other electronic support (Decree-Law no. 28, 2019).

When creating the archive, issued or received electronically, it must be assured the execution of controls that guarantee the integrity, accuracy and reliability of the archiving operations, as well as the execution of features aimed at preventing improper creation and detecting any alteration, destruction or deterioration of the archived records (Decree-Law no. 28, 2019). It must be assured the reproduction of legible and intelligible copies of the recorded data and also the data recovery in the event of an incident (Decree-Law no. 28, 2019).

For tax purposes, full paper reproductions obtained from archives in electronic format have the probative value of the original documents. However, during the mandatory period of conservation of the archive, the archiving processes must ensure that there is no loss of information or alteration of the

images contained therein, and regular, integral or sampling controls must be carried out on the legibility of the data archived in digital format.

Decree-Law no. 28/2019 requires taxable persons to have backup copies of electronic media and that the originals and backup copies are stored in different locations, in conditions of conservation and security necessary to ensure the impossibility of losing the archives.

FRAMEWORKS

In order to provide an overview, underlying the engineering and development of products, the activities that lead to the creation of value, the objectives to ensure resources optimization, it is listed some of the most relevant standards, models and frameworks in the ICT field, considered to be applicable to an organization that is implementing a invoicing or archiving solution.

ITIL V4

The *Information Technology Infrastructure Library* (ITIL) is an ICT Service Management framework that seeks to align ICT services with business needs. ITIL V4, the latest version, aims to provide a framework to manage and deliver different services. ITIL practices help to achieve good quality of service and overcome difficulties (ITIL® Em Portugal, 2018) that can arise in the development of ICT systems.

ITIL enables organizations to define and implement repetitive and documented processes, describing processes, procedures, tasks and checklists applied to ICT Service Management. These resources allow organizations to integrate ICT with the organization's strategy (ITIL, 2019), delivering value and maintaining a minimum level of competence.

The key components of the ITIL 4 framework are the Service Value System (SVS) and the four-dimensional model: Organizations and People, Information and Technology, Partners and Suppliers and, finally, Value Streams and Processes.

ITIL SVS describes how the various components and activities of the organization work together to facilitate the creation of value through services provided by ICT. These can be combined in a flexible way, which requires integration and coordination to keep the organization consistent. ITIL SVS facilitates this integration and coordination and provides strong, unified value-focused direction for the organization (ITIL, 2019), as shown in Figure 1.

The processes in ITIL 4, according to (ITIL, 2019) are now as management practices and fit into three different groups:

- **General management practices:** Group containing 14 management practices (e.g. project management, relationship management, strategy management and risk management);
- **Service management practices:** Group containing 17 management practices (e.g. business analysis, capacity and performance management, incident management, service continuity management, change control and problem management);
- **Technical management practices:** Group containing three management practices: deployment management, infrastructure and platform management, and software management and development.

Figure 1. ITIL Service value system
Source: Adapted from (ITIL, 2019)

From the perspective of revealing the importance of the requirements supported in the decision process along the development and implementation of the software system, the ITIL V4 as many key messages and concepts, summarize in this chapter section.

One of the key concepts of service management is that the co-creation of value can benefit from contributions by the stakeholders to the definition of requirements, the design of service solutions and even to the service creation (ITIL, 2019).

Therefore, one of the key messages of the ITIL SVS, referred to in *Opportunity, demand, and value*, is that opportunity and demand trigger activities within the ITIL SVS, and these activities lead to the creation of value. Opportunity represents options or possibilities to add value for stakeholders or otherwise improve the organization. Prioritize new or changed services with opportunities for improvement can ensure that resources are correctly allocated (ITIL, 2019).

Indeed, these activities come with a certain risk, like stated in *Risks*, thus the provider should manage the detailed level of risk on behalf of the consumer, balancing what matters most to the consumer and to the provider. We can consider the consumer as the stakeholder that is using the certified software system and the provider as the software developer (ITIL, 2019). Therefore, the consumer contributes to the reduction of risk by actively participating in the definition of the requirements of the service and the clarification of its required outcomes.

One of the purposes of the engage activity in the service value chain is to provide a good understanding of stakeholder needs and one of the key inputs is to detail requirements for services and products provided by customers and marketing opportunities from current and potential customers and users.

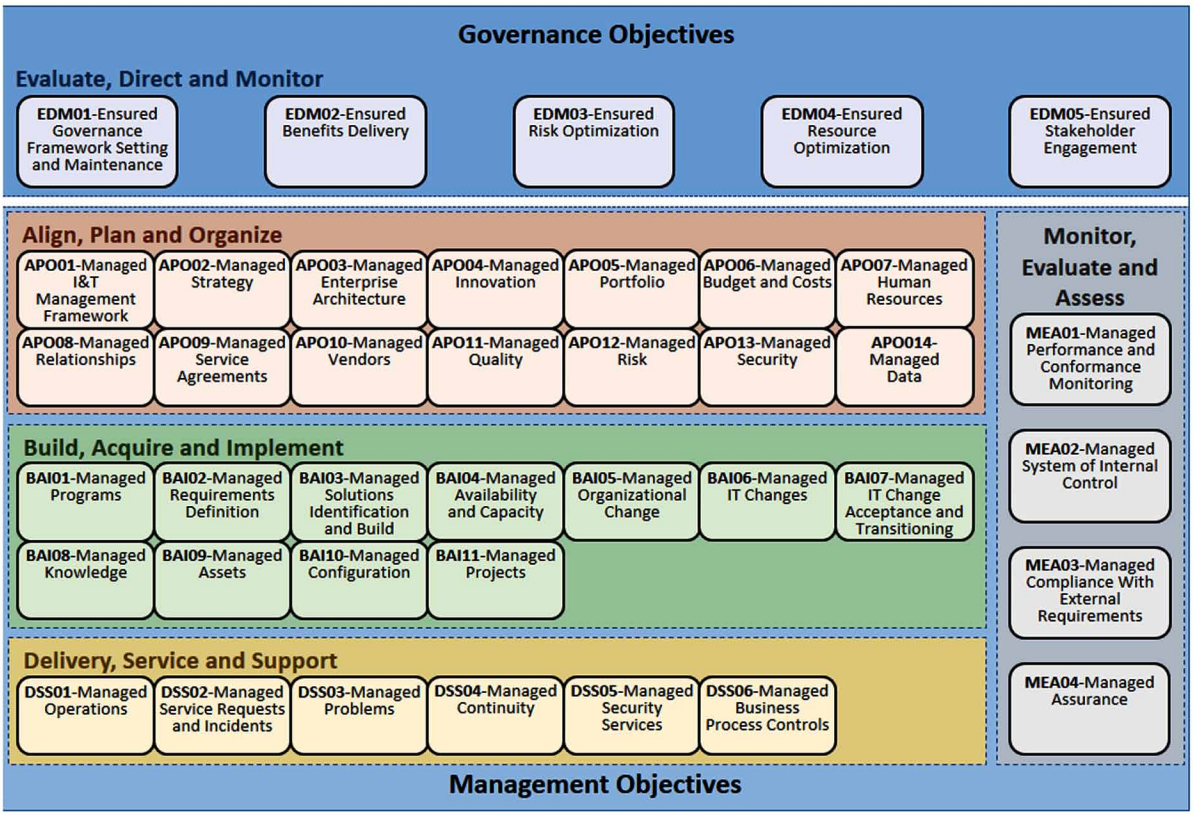
Hence, the product and service requirements provided by engage are one of the inputs to the design and transition witch are ensuring that products and services continually meet stakeholder expectations for quality, costs, and time to market (ITIL, 2019).

Ultimately, the test strategy, within the service management practices for service validation and testing, contributes to the service value chain and is based on the service acceptance criteria, and should align with the requirements of appropriate stakeholders to ensure testing matches the risk appetite and is fit for purpose (ITIL, 2019).

COBIT

The framework *Control Objectives for Information and Related Technologies* (COBIT) was developed by the Information Systems Audit and Control Association (ISACA), and is a reference guide of good

Figure 2. COBIT 2019 Core Reference Model of Governance and Management Objectives
Source: Adapted from (ISACA, 2018)



practices on the implementation of ICT Governance (ISACA, 2018), which shall be adapted to each organization.

COBIT 2019 is composed of 40 objectives in two key areas, Governance and Management, divided into 5 domains as shown in Figure 2.

Figure 2 enables identification of five Governance objectives and the other thirty-five are Management objectives. Governance ensures that the needs, conditions and options of stakeholders are evaluated in order to determine balanced, agreed-on enterprise objectives; defining direction through prioritization and decision-making; and monitored performance and compliance against agreed-on direction and objectives (ISACA, 2018). Management plans, builds, runs and monitors activities in alignment with the direction set by the governance body, to achieve the enterprise objectives.

In COBIT 2019, to satisfy governance and management objectives, each enterprise needs to establish, tailor and sustain a governance system built from a number of seven components. (ISACA, 2018), that are:

- Processes, describing a set of practices and activities;
- Organizational structures are the key decision-making entities in an enterprise;
- Principles, policies and frameworks;
- Information produced and used by the enterprise;
- Culture, ethics and behaviour of individuals and of the enterprise;

- People, skills and competencies are required for good decisions, execution of corrective action and successful completion of all activities;
- Services, infrastructure and applications that provide the enterprise with the governance system for ICT processing.

In order to reveal the importance of the investment to shift to electronic invoicing and archiving, the strategic vision must be clear and balanced with the available requirements and the organization's needs and demands.

Innovation can be managed to achieve a competitive advantage, business innovation, improved customer experience, and improved operational effectiveness and efficiency by exploiting ICT developments and emerging technologies (ISACA, 2018). The management objective *Managed Innovation* in the domain *Align, Plan and Organize*, advises the organization to maintain an awareness of ICT and related service trends and monitor emerging technology trends. It recommends to proactively identify innovation opportunities and plan how to benefit from innovation in relation to business needs and the defined ICT strategy. The analysis of what opportunities for business innovation or improvement can be created is one of the aspects of this objective. The electronic invoicing or archiving are established technologies but can bring innovation when integrating into business or ICT processes. Innovation can arise from emerging technologies, services, or ICT-enabled business innovation or through existing established technologies; and by business and ICT process innovation (ISACA, 2018).

According to the domain *Align, Plan and Organize*, the management objective *Managed Portfolio* state that the organization should execute the strategic direction set for investments in line with the enterprise architecture vision and ICT road map. One of the purposes is to optimize the performance of the overall portfolio of programs in response to changing enterprise priorities and demand. The organization should evaluate, prioritize and balance programs and services, managing demand within resource and funding constraints, based on their alignment with strategic objectives, enterprise worth and risk (ISACA, 2018). Thus, one of the alignment goals is to deliver ICT services in line with business requirements and an example metric is to obtain the percent of business stakeholders satisfied that ICT service delivery meets agreed service levels.

When in domain *Build, Acquire and Implement*, the management objective *Managed Requirements Definitio*n is described as the identification of solutions and analysis of requirements before acquisition or creation to ensure that they align with enterprise strategic requirements covering business processes, applications, information/data, infrastructure and services. The purpose is to create optimal solutions that meet enterprise needs while minimizing risk, by coordinating the review of feasible options with affected stakeholders, including relative costs and benefits, risk analysis, and approval of requirements and proposed solutions (ISACA, 2018). The decision process described in this chapter will, hopefully, assist on this endeavour.

Later, in the domain *Monitor, Evaluate and Assess*, the management objective *Managed Compliance With External Requirements* is described as the evaluation that ICT processes and ICT-supported business processes are compliant with laws, regulations and contractual requirements. It is also important to obtain assurance that the requirements have been identified and complied with (ISACA, 2018). This chapter identifies the relevant sources of requirements to comply with.

CMMI

The *Capability Maturity Model Integration* (CMMI) is an integrated model for measuring the maturity and capability of an organization's processes, by a process improvement approach (CMMI Institute, 2019b). It is a set of global best practices that addresses productivity, performance, costs, and stakeholder satisfaction, driving business performance through building and benchmarking key capabilities.

The version CMMI 2.0 (CMMI Institute, 2019a), is organized in integrated sets of good practices that improve the performance and key capabilities of organizations, such as:

- CMMI Development improves an organization's capability to develop quality products and services that meet the needs of customers and end users;
- CMMI Services improves an organization's capability to efficiently and effectively deliver quality service offerings that meet market and customer needs;
- CMMI Supplier Management improves an organization's capability to identify and manage suppliers and vendors in a way that maximizes supply chain efficiency and reduces risk.

It should be noted that CMMI category *Doing* addresses several capability areas for producing and delivering quality solutions (CMMI Institute, 2018). The capability area *Engineering and Developing Products*, aims to create products that meets or exceeds customer expectations, namely in the practice areas of "Technical Solution" and "Product Integration".

The capability area *Ensuring Quality* includes practice areas to develop and manage high-quality requirements and products. Highlighting the practice area *Requirements Development and Management*, it enables developing and keeping updated a common understanding of needs and expectations for the solution. The intent of its practices is to elicit requirements, ensure common understanding by stakeholders, and align requirements. It creates value by ensuring that customer' needs and expectations are satisfied.

Software Engineering Framework

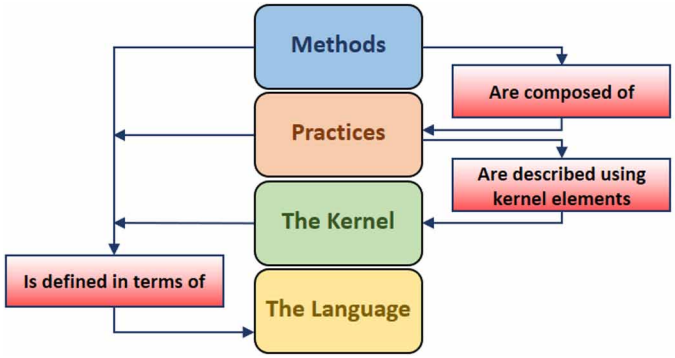
In order to comprehend an approach to the specification of a software system, it was selected the specification *Kernel and Language for Software Engineering Methods* (Essence). Essence is scalable, extensible, and easy to use (Object Management Group, 2014).

Work on the kernel, the essence of software engineering, was inspired by and is a direct response to the Software Engineering Methods and Theory (SEMAT) call for action, founded in September 2009 by Ivar Jacobson, Bertrand Meyer, and Richard Soley (Jacobson, Ng, McMahon, Spence, & Lidman, 2012). It promises to integrate all essential dimensions, necessary activities and required competencies into a compact, universal and actionable kernel (Pieper, 2015).

The Language delivers syntactic infrastructure to define essential concepts in a Kernel. Together, among others, provide a common base that is useful for software engineering endeavours of all sizes (small, medium, and large) and that can easily be extended without changing or complicating the kernel. Encourage and support incremental adoption by small and medium sized organizations by keeping the entry costs low and minimizing the barriers to adoption (Object Management Group, 2014).

It uses the simple layered architecture shown in Figure 3, where a method is a simple composition of practices, practices that are described using both the Essence Kernel and the Essence Language. It is the use of both the kernel and the language, that allows a practice to be safely merged with other rel-

Figure 3. Method Architecture
Source: Adapted from (Object Management Group, 2014)



evant practices to form a "higher-level" method (Object Management Group, 2014). Figure 3 presents the architecture of Essence method.

Has showed in Figure 3, the objective of the kernel is to be defined in terms of the Language and is not to represent every detail of each Software Engineering (SE) method (Pieper, 2015). It was designed to be as small and universal as possible and to represent the inherent essence of each SE endeavour, using the concepts of Alphas, Activity Spaces and Competencies.

The Alphas of the Essence Kernel are: stakeholder, opportunity, requirements, software system, team, work and way of working. Each Alpha owns a set of defined states - so called Alpha States. The objective of each SE endeavour is for each Alpha to progress from a starting state to its following states toward a desired end state. To keep a software project healthy, all of the Alphas have to be progressed in a balanced way (Pieper, 2015).

The Table 1 represents the things to do in activity spaces, aggregated by area of concern. This chapter explores the possibilities, with the system development, to the customer and a perspective of the stakeholders needs, mentioned in the Customer area. It also delivers an approach to the understanding of the requirements and shape the system, on the Solution area.

Therefore, as showed in Table 1, some *Competencies*, at least of assistance level, needed to carry out this work of SE, are abilities of representation and analysis to further achieve the alphas.

In order to understand better the selection of the activities presented in Table 1, especially the Alpha *Opportunity* and *Stakeholders*, it is presented, in Figure 4, the things that the practitioner always work with.

The Figure 4 shows that the Stakeholder identifies the opportunities, demands requirements, and can use and consume the software system. The SE practitioners uses these activities when they are probing for stakeholders demands and needs to understand the requirements and ensure their satisfaction. Therefore, the main objectives of the software system are to fulfil requirements and helping to address opportunities. Hence, the objectives of this chapter section are to enhance the importance of the opportunities of electronic invoicing and archiving to the customer, focusing the requirements demands through a decision process. Therefore, the software can be develop faster, fulfilling the main requirements, taking advantage of the opportunities created in terms of sustainability, stepping forward to innovation and boosting business processes.

Table 1. Essence Kernel: Areas of Concern and their associated Alphas, Activity Spaces and Competencies

Area of Concern	Alphas	Activity Spaces	Competencies
Customer	• Opportunity; • Stakeholders.	• Explore Possibilities; • Understand Stakeholders Needs; • Ensure Stakeholder Satisfaction; • Use the System.	• Stakeholder; • Representation.
Solution	• Requirements; • Software System.	• Understand the Requirements; • Shape the System; • Implement the System; • Test the System; • Deploy the System; • Operate the System.	• Analysis; • Development; • Testing.
Endeavour	• Work; • Team; • Way of Working.	• Prepare to do the Work; • Coordinate Activity; • Support the Team; • Track Progress; • Stop the Work.	• Leadership; • Management.

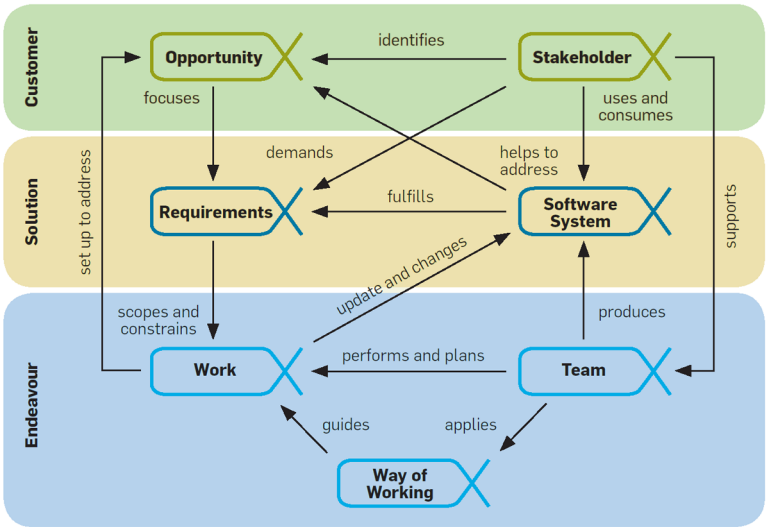
Source: Adapted from (Pieper, 2015)

INVOICING SOFTWARE CERTIFICATION LEGAL FRAMEWORK

Ordinance no. 363/2010 states that the increasing use of electronic data processing systems, particularly for invoicing transmission of goods or provision of services, has undeniable advantages in terms of the speed of information processing. However, it introduces new risks in terms of fiscal control, due to the possibility of subsequent adulteration of recorded data, enhancing situations of tax evasion.

In this perspective, Ordinance no. 363/2010 defines rules so that the ISW complies with requirements that guarantee the inviolability of the information initially registered, allowing, consequently, that only

Figure 4. Things to work with
Source: *(Jacobson, Ng, McMahon, Spence, & Lidman, 2012)*



the software that respect such requirements, validated with the execution of face-to-face compliance tests, can be used after certification by AT.

The ISW certification depends on the cumulative verification of several requirements, among them, it must have the possibility to export the SAF-T (PT) file. Another requirement mentioned is that is necessary to comply with the other technical requirements approved by Order no. 8632/2014. Thus, ISW, even if already certified, must comply with more then 100 technical requirements, for example, the process of identification (signature) of the documents and subsequent recording in the databases, the moment of printing or electronic sending of a document.

In accordance with the author (Silveira, 2013), these are fundamental aspects to consider at the beginning of the requirements gathering process. In fact, requirements are increasingly an essential element in building good software products. The inclusion of requirements engineering tasks in the software development process must be instituted and constitute a mandatory routine.

On the other hand, although the ISW certified by the AT is important to promote compliance with the law, it may be relevant for the standardization of the procedures used by the various software producers. The software that complies with tax requirements is closer to reaching high quality standards in the production of reliable, interoperable and integrable software, which use a common semantics.

SAF-T (PT)

SAF-T (PT) is a standard model file of tax audit, created by Ordinance no. 321-A/2007, of 26 March, by the Ministry of Finance and Public Administration. As of 2008, ISW had to adopt this data export standardization model. The most current data structure of this file is attached to Ordinance no. 302/2016, of 2 December.

SAF-T (PT) is a standardized file, in Extensible Markup Language (XML) format, with the objective of allowing easy export, at any time, of a predefined set of accounting, invoicing, transport documents and issued receipts, in a readable and common format, regardless of the software used, without affecting the internal structure of the software's database or its functionality (AT, 2019).

Certification Procedure

Taxable persons, whose obligation to issue an invoice is subject to the rules established in VATC, are obliged to use, exclusively, ISW that have been subject to prior certification by AT, whenever:

- Have had, in the previous calendar year, a business volume exceeding 50,000 euros;
- Invoicing software is in use;
- Are obliged, or made the option, to have organized accounting.

Thus, if organizations do not choose to use software that have already been certified and intend to use those that they have produced, they should request their certification. To start the certification process, organizations must submit, on the Finance Portal, an official model declaration called *Modelo 24*, together with the public key to validate the authenticity of the document signature.

The issuance of the certificate may be preceded by compliance tests to observe the requirements resulting from Portuguese tax legislation and a set of defined technical requirements (Order no. 363, 2010). It should be noted that the certified version of an ISW must comply with the corresponding

requirements, which is the responsibility of the software producer, even after the compliance tests and throughout the life of the software (Decree-Law no. 28, 2019).

The compliance tests are conducted by AT, being responsible for analysing, clarifying and conducting the face-to-face compliance testing meeting and for preparing the certificate proposal, an AT Inspector, with functions assigned to certification of ISW.

Since the beginning of the COVID-19 pandemic declaration, faced with the impossibility of free movement between cities and other restrictions, AT has prepared solutions that would allow supporting software producers, both to clarify doubts that are difficult to express in written words, and to allow performing compliance tests safely. In this way, the concept of "technical meeting" to check requirements was created, temporarily by videoconference, between the inspector responsible for the certification processes and the respective software producers. After all the relevant requirements have been verified by videoconference, a meeting would be scheduled to conduct compliance tests, in a face-to-face meeting.

Thus, it was possible to keep the certification process active. AT maintains, on the Finance Portal, an updated list of programs and respective certified versions, as well as the identification of the software producers, proving that during the COVID-19 confinement months, several invoicing software were certified.

The technical requirements described in Ordinance no. 363/2010 and the requirements approved in Order no. 8632/2014, or approved in Decree-Law no. 28/2019, as well as others that result from the interpretation of tax legislation, are succinct in relation to technical requirements and the controls and validations that must be observed by an ISW certified by AT.

The technical requirements, which are required to be met according to tax legislation, address several areas of knowledge of ICT. As an example, in point 3.1.1 of Order no. 8632/2014 it is stated that: "The application must have adequate access controls ..." which are restrictions and procedures on the user's password of the invoicing software (Order no. 8632, 2014).

INVOICING SOFTWARE DEVELOPMENT

The publication of Decree-Law no. 28/2019, had a great impact on the vision for the dematerialization of the relevant tax documents and their electronic archive.

In this perspective, it is considered to be a limiting factor the use of paper support, especially if made on thermal paper, as it does not guarantee the preservation of information content (Ferreira, Shimo, & D´Almeida, 2014), until the end of the archive term. Decree-Law no. 28/2019 also warns that, in the archive, it must be ensured that there is no loss of information and that the possibility of scanning and archiving in electronic format is addressed, in case the documents have not been issued by electronic means.

Implementing and maintaining the concepts that are envisaged in Decree-Law no. 28/2019 implies, at least, the development of techniques that allow the dematerialization of documents and archives, for electronic support (Russo & Reis, 2019b). Bearing in mind that, in Portugal, the issuing of an invoice is still strongly linked to the printing on paper, of the original and duplicate document. Many organizations still have their business procedures and processes based on printing and archiving in this media. Digitizing and dematerializing these business processes implies an effort by organizations to find investment solutions for their development, but also an effort to define or interpret the requirements in this area that allow the correct procedures to be applied effectively and efficiently.

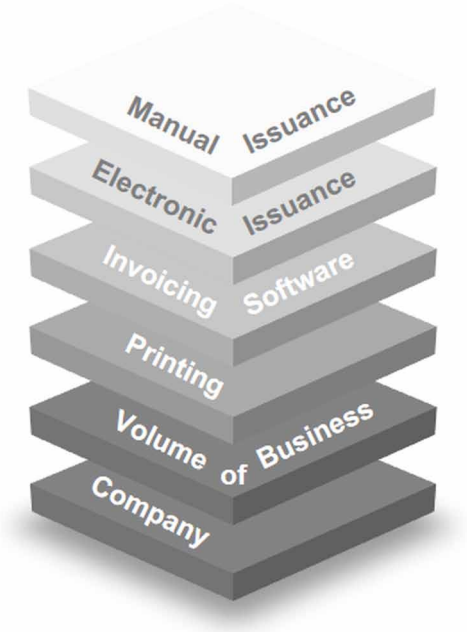
In the context of this problem, there is an urgent need to change the paradigm, in order to enhance the quality and durability of the content of the documents and, more broadly, the information in the ISW. Nevertheless, the company's investment capacity (included in the proposal sub-process shown in Figure 7) is a decisive factor in the entire decision process, as it delimits the solutions to be implemented or the evolution of the solutions in use. The technological and financial impact of any alternative, arising from any decision under consideration, should be assessed.

Decision-making Process

Figure 5 shows the decision levels organized by themes. They are the sets of information considered necessary for the preliminary analysis of the requirements of a solution, for the implementation of an ISW. Each theme contains a set of questions, which must be interpreted and answered, in order to compose the knowledge about the organization's invoicing solution, from the point of view of the requirements for certification, of the ISW to be implemented.

Figure 5 presents the themes stacked in several layers, in order to be able to perceive the top-down approach of decision levels. Each theme addresses a different area, and it is not possible to determine which is the most important. Each contributes with distinct inputs that help to have a better perception of the invoicing solution of, or for, the organization. The layered arrangement helps the decision maker to realize, for example, that questions about the Company are presented first, as they allow the creation of facts that will support the moments of decision throughout the definition of requirements. Questions on *Manual Issuance* of tax relevant documents are one of the last issues, as they already understand less derivations of the decision flow and have little impact on decisions on other issues.

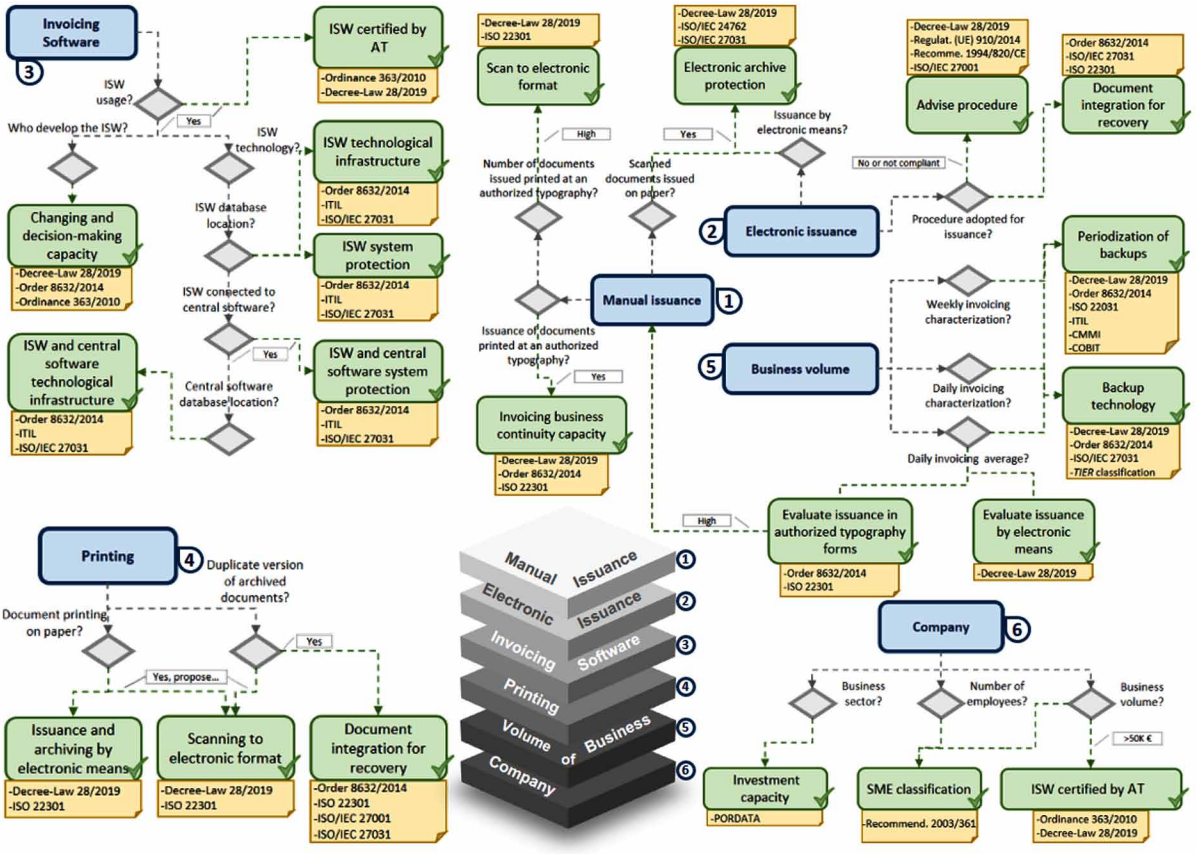
Figure 5. Decision levels
Source: Adapted from (Russo, 2019)



The use of layers in Figure 5, does not imply that the themes are disconnected, the themes are interconnected and complement each other. For each layer visited, there is a *step* of increasing knowledge about the characteristics of invoicing in the organization. Lacking knowledge about any layer, there may exist a vision of the solution, but it will be an incomplete vision (Russo & Reis, 2019a).

Figure 6 presents an overview of all decision processes. Despite hiding the complexity of the processes, offers a simplified view of the information that needs to be collected. It also represents the inferences that can be obtained and the legal basis on which they are supported, allowing a macro representation that illustrates the complexity of the Decision Process.

Figure 6. Decision Process
Source: Adapted from (Russo, 2019)



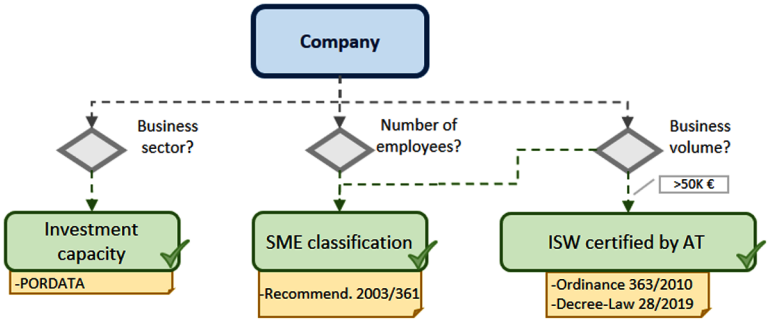
Although, in Figure 6, representations of decision support information are disconnected from each other, this does not mean that there is no relationship between them, as it is a sole decision process.

The use of the model must begin by characterizing the initial requirements of the ISW to be implemented. After this characterization, it will be possible to define other requirements in the solution, which also belong to this initial basis. Thus, the decision maker will have a solid basis to frame, for example, what type of documents will supported in the ISW, which business processes of the organization, will

be represented in the solution to implement, or even, which method will be used to communicate the elements of invoices to AT.

The company's decision sub process, shown in Figure 7, allows to verify, for example, that the business sector, related to the classification of Small and Medium-sized Enterprises (SME), is relevant in the decision process, meaning that it informs, supported by statistical data in *Base de Dados de Portugal Contemporâneo* (PORDATA), what is the average investment rate, in Portugal, of the sector.

Figure 7. Decision sub process for company
Source: Adapted from (Russo, 2019)



In the context of the analysis of the company's investment capacity, it is important to note that the operations to digitize documents on paper entails processing costs, especially because of the need to allocate human and technological resources. Digitization by own means must be evaluated, in order to understand, due to the number of documents already issued and what is still expected to be issued, if the company has the capacity, in a broad sense, to proceed with the dematerialization of the archive supported on paper or these dematerialization operations must be ensured by third parties.

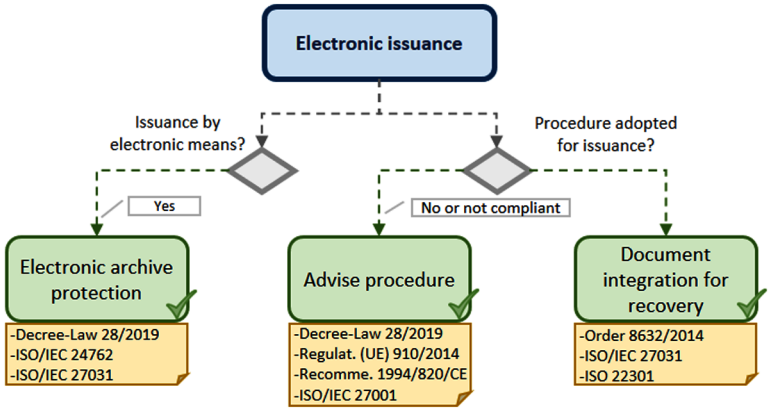
In this regard, the means in which documents are issued, has a great impact on the entire process. If the organization has a high number of documents issued on paper, it may be an alternative to issue the documents electronically, not only for the reduction of costs in the medium term, but also for the guarantee of electronic archiving. Opting for electronic issuance solutions, using electronic signing procedures or qualified electronic seal can be an alternative.

A compliant EDI system may be an option for companies wishing to exchange electronic documents between systems and/or companies. Thus, it is necessary to take into account the investment capacity, the number of documents that are expected to be issued and the number of companies with whom electronic documents can be exchanged, when using the decision sub-process, shown in Figure 8.

Another perspective, taken from the analysis of the sub process shown in Figure 8, is that in case of ISW inoperability, a pre-printed document in authorized typography should be issued. This obligation is mainly because it is mandatory to immediately issue an invoice if a payment is received. Thus, the company will not be able to continue the invoicing process if it does not have alternative means of issuing tax relevant documents.

Assessing the organization's business processes, understanding the needs of the invoicing processes and the contractual relationship with customers is, therefore, a limiting factor when deciding on the is-

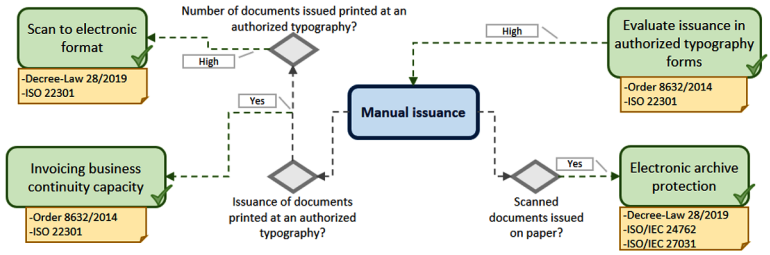
Figure 8. Decision sub process for electronic issuance
Source: Adapted from (Russo, 2019)



suance of pre-printed documents in authorized typography, the so-called "manual invoices". All of these factors must be considered when using the decision sub process for manual issuance, shown in Figure 9.

Regarding ISW, the complexity of the decision-making process increases considerably. Therefore, one of the initial questions is to understand if the ISW was developed internally, or if it was acquired. The answer will make it possible to perceive the ability to adapt the ISW to the organization, through specific developments for the organization's business processes, or if on the contrary, the ISW was acquired "as is" and only minor configurations, settings or adaptations will or can be made.

Figure 9. Decision sub process for manual issuance
Source: Adapted from (Russo, 2019)



Consequently, it is also necessary to evaluate the technological infrastructure of the ISW. Recognizing the technology on which the ISW was developed, will allow assessing the limitations and capabilities inherent to the technology, such as, for example, the ability to sign documents with the private key or to generate a QR code.

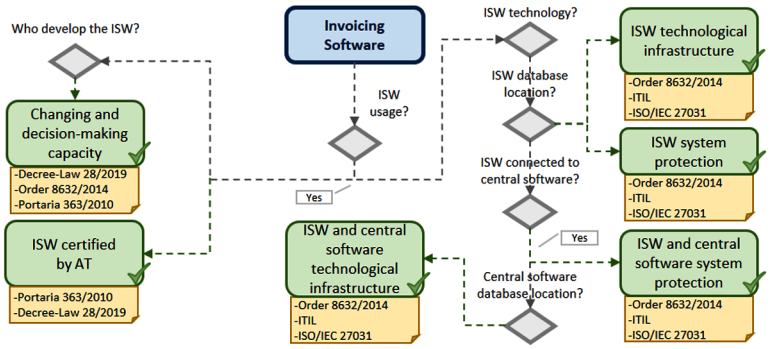
On the other hand, recognizing the environment in which the ISW is made available, allows inferring about a certain set of requirements. Thus, if the ISW is supported through a desktop application, one will have to consider underlying requirements, for example, the security of the workstation.

In case the ISW is made available on the web, another set of requirements must be evaluated, such as the use of secure communication protocols on the network. The way in which the connection to the ISW

support database is established, may be relevant to the certification process. As a local database, connection and security requirements are usually limited to the workstation. As a remote connection database, whether through a desktop or web application, other requirements must be addressed. A solution with cloud data or entirely supported in the cloud, raises other issues that must be addressed, in accordance with tax legislation, namely with the requirements of Order no. 8632/2014.

Figure 10 presents the decision sub process on the essential questions to be answered, regarding the ISW.

Figure 10. Decision sub process for software system
Source: Adapted from (Russo, 2019)



It becomes relevant to assess whether the ISW integrates an Enterprise Resource Planning (ERP) solution, whether it connects to a central system, whether it only registers sales and issues tax-relevant documents, or on the other hand, whether it is autonomous in terms of invoicing, but reports to a central program. Therefore, it is important to understand, in these various technological infrastructure scenarios, how the solutions behave, in terms of data communication with each other and which solution allows the SAF-T (PT) file to be exported. This analysis is intended to assess the completeness of the registration of all relevant tax operations performed in an ISW.

Nevertheless, evaluating the technology infrastructure of the ISW and the central program to which the ISW is linked, also allows considering alternatives on how to protect the entire technological environment. The way to protect the data represented, protect access to applications, protect the private key for signing documents, are examples of decisions that result from the analysis of the technological infrastructure.

The structuring of the understanding of the problem, through the decision process, allows to optimize disaster recovery solutions and evaluate the organization's business continuity capacity, in order to optimize instituted Information Systems Planning practices (Reis, 2001). The inferences induced in this process will be vital when defining the backup plan to the disaster recovery plan or alternative business processes for the business continuity plan.

SOLUTIONS AND RECOMMENDATIONS

In the current context of the problem, in a perspective of evolution, having in mind that digitally signed documents must remain stored for many years, the authors (Hyla & Pejaś, 2020) proposed a scheme, using blockchain, that would allow maintaining signature validity without the necessity to use timestamps from trusted third parties. According to the scheme, after inserting data into a blockchain, a user can store a signed document in his storage without the need to perform any maintenance actions in the future. The scheme meets non-repudiation requirements for digitally signed documents and allows proving that a document existed not only before a certain date, but after a certain date as well.

The critical reflection, regarding the complexity presented in the Decision Process, indicates that, as future work and considering reducing costs and contributing to the creation of conditions that increase the sustainability of its business processes, the organization should proceed according to the requirements and objectives issued by the AT, to:

- adopt procedures that allow waiving paper, when issuing an invoice;
- use of the web service provided by AT to communicate documents;
- adopt procedures that allow the issuance of electronic documents;
- paper dematerialization and definition of an electronic archiving strategy.

In this regard, it is considered that, with the implementation of the previous functionalities and procedures, it will be obtained:

- the optimization of business procedures and processes that can be converted to telework, especially due to the context of the COVID-19 pandemic;
- the reduction or elimination of the use of paper with electronic issuance of documents: it mitigates the transmission of infectious agents in handling; reduces the need for printing equipment and supplies;
- the reduction or elimination of the use of paper with electronic document archiving: mitigates the transmission of infectious agents in handling; reduces the need for physical archive space and archive consumables, improves access to archived documents.

In a perspective of sustainability and also as an aspect of optimization of the Decision Process, it is considered that the conditions are created to guarantee the use of procedures for waiving paper, in the various aspects of ISW and archive systems.

Hence, it is envisaged that the Decision Process can contribute to promoting the adoption of procedures for the issuance of electronic documents and for electronic archive. This can result in a greater capacity to respond to the new demands of the digital market, in greater proactivity for business continuity and disaster recovery (Russo & Reis, 2020), greater environmental and ICT sustainability, with alternatives for digital preservation, instead of the exclusive use of paper support.

Regarding the AT invoicing software certification process, it was necessary to readjust the time when face-to-face meetings were held, to conduct compliance tests, due to the pandemic situation COVID-19. That moment is now only when the programs meet the expected requirements, verified through videoconference meetings, between AT inspectors and software producers. Consequently, it was necessary to redesign some of the compliance tests so that they can be verified by videoconference.

Considering that there are conditions to this free certification service provided by AT to be carried out in telework and using videoconferencing meetings, there is also a set of compliance tests that cannot be accomplished, due to restrictions in videoconferencing technology, namely, clock synchronization of secure connections. Therefore, AT had to adapt and requires only that one face-to-face meeting for compliance tests be made, so that the final tests are get through and the formal aspects of the certification process are dealt with, which include the proposal to issue the certificate.

FUTURE RESEARCH DIRECTIONS

This chapter reflects on the requirements that can be develop, some frameworks that can be used to direct the endeavour, in order to contribute to the certification of an invoicing software system. The major requirements considerations are reflected in the decision process presented in this chapter.

Hence, it is considered that the assurance of the stakeholder's satisfaction is an important area for future research, gathering the requirements that the customer demand and how the system is implementing them. The usage of the system can be a future research area, to better understand how the system can integrate documents in an electronic archive in a systematic way, complying with the archive plan.

Nevertheless, some other requirements need to be addressed, especially the ones who improve the security of the software system and some other ones that enhance business continuity and disaster recovery.

For future work, it is intended to walk-through the requirements alpha state cards of Essence and represent the achievement to a fulfilment of each state: Conceived, Bounded, Coherent, Acceptable, Addressed and Fulfilled. This alpha states achievements can be complemented with the perspective of each framework identified in this chapter: ITIL V4, COBIT 2019 and CMMI V2.0.

Another research direction is to design a case study, to evaluate the business processes dynamization or optimization and obtain the return on investment achieved. The study should occur before and after the implementation of electronic invoicing and/or electronic archiving in the organization, in a set of preselected business processes. The target organization is one that intents to transform its business processes for telework, triggered for example, by the lockdown due to the COVOD-19 pandemic.

For improvement of the ISW certification process and to definitely transpose the software certification meetings to videoconference, it is advisable to research alternatives to the defined, documented and established rules and procedures for face-to-face meetings. A new approach may save time and resources for each side, fully benefitting from telework, speed up the certification process, maintain more and closer collaboration with the software producers and avoiding traveling during epidemic or pandemic outbreaks.

CONCLUSION

The tax legislation, points to the formalities of the relevant tax documents and the requirements to be met, provides for the possibility of issuing documents by electronic means, the possibility of their electronic transmission to AT and the possibility of their electronic archive. Thus, an ISW, which wishes to be certified by AT, must provide procedures in accordance with the legislation, that can guarantee the inviolability of the information initially registered and must have the possibility to export the SAF-T (PT) file.

Understanding what are the correct procedures and what are the requirements involved in the certification of an ISW in Portugal it is considered relevant for companies that develop the software, as well as for companies that decide to purchase a solution. This work aims to help the identification of the main regulatory documents in the thematic, as well as the characterization of invoicing in Portugal and to support organizations in the design or adaptation of the ISW. The implementation of electronic invoicing and electronic archiving procedures can boost the innovation that leads to new software products, digital transformation, marketing approaches or new ways of making business.

The instrument here proposed presents the legal framework, considered the necessary for organizations to find a starting point for the adoption of electronic invoicing or electronic archiving procedures and systems, in order for the ISW to be certified by AT, complying with its main legal requirements.

The Decision Process here presented will thus contribute to support organizations acquiring an ISW, by framing the necessary requirements for their activity and their business processes, helping with the task of selection of each alternative decision, dully supported in validated information.

It is concluded that the certification process, conducted by AT, allowed ISW to be certified, even in a pandemic situation, enabling certification processes continuance and guarantying the normal support of AT inspectors to software producers, for developing their products. However, the process can be optimized by using videoconferencing final certification meetings and redesigning compliance testing to better fit the context of teleworking, videoconferencing and pandemic.

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KEY TERMS AND DEFINITIONS

Decision Process: Decisions are made at different scales by different actors. Decision-making is the process of making choices by identifying a decision, gathering information, and assessing alternative resolutions. Using a decision-making process can help reduce risks and make more deliberate, thoughtful decisions by organizing relevant information and defining alternatives.

Electronic Archiving: Archive, preserve, backup and secure the electronic documents (even if digitalized) in good order. Documents must always be accessible and legible, with no loss or changes of information. Archiving system must have document integrity controls, audit trails and comply with an archive plan.

Electronic Document: In content, electronic documents are no different from paper documents, but they are stored in electronic format and can have metadata. It is a document that was issued and received in electronic format, with no transformations in the middle. To legally represent a fiscal operation, it must comply with a procedure to guarantee the authenticity of origin, content integrity and legibility.

Relevant Fiscal Document: Invoices, transport documents, receipts and any other documents issued, regardless of their designation, which are susceptible, namely, to customer presentation to enable goods checking or provision of services.

Service Delivery: Is the manner in which a corporation provides users access to ICT services, which include applications, data storage and other business resources.

Software Certification: Definition of rules so that the invoicing programs observe requirements that guarantee the inviolability of the information initially registered, allowing, consequently, that only the programs that respect these requirements can be used, after certification by the Portuguese Tax and Customs Authority.

Software Engineering Kernel: Is a stripped-down, lightweight set of definitions that captures the essence of effective, scalable software engineering in a practice independent way. The focus of the kernel is to define a common basis for the definition of software development practices, one that allows them to be defined and applied independently. The practices can then be mixed and matched to create specific software engineering methods tailored to the specific needs of a specific software engineering community, project, team, or organization (Object Management Group, 2014).

Software Requirement: What the software system must do to address the opportunity and satisfy the stakeholders (Object Management Group, 2014). The software requirements are description of features and functionalities of the target system. Requirements convey the expectations of users from the software product (tutorialspoint, 2020). The requirements can be obvious or hidden, known or unknown, expected or unexpected from client's point of view. According to (ISO/IEC/IEEE 24765, 2010), is a software capability needed by a user to solve a problem to achieve an objective. It is also a software capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.

Chapter 9
Entrepreneurship and Entrepreneurial Ecosystem:
Effects of COVID-19 and the Role of ICTs

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ABSTRACT

Businesses that cannot sustain innovation are likely to fail. The success of small businesses depends on their ability to adapt to the rapidly changing environments. Nowadays, the COVID-19 pandemic brings new challenges in adopting to the changing environment and lifestyle. In addition to the limitations that came with COVID-19, the entrepreneurship ecosystem includes a wide variety of factors that affect the entrepreneurship process and have an impact on the success or failure of entrepreneurs. In this chapter, a review of the concept of entrepreneurship, definition of an entrepreneur and its key features, motivation factors of entrepreneurship, role of ICTs in entrepreneurship, and basic entrepreneurship terms are summarized. Entrepreneurship has a significant role in increasing the welfare of societies and developing new technologies. Thus, fundamentals of entrepreneurship and the ecosystem are important for professional and candidate entrepreneurs who seek guidance in transforming their business ideas into results.

INTRODUCTION

Entrepreneurship is almost as old as the history of mankind; however, it has not found a place in economic theory for a long time until 20th century (Gümüşoğlu & Karaöz, 2014). As Gümüşoğlu and Karaöz (2014) states, Adam Smith, who defined capitalism in his study "Wealth of Nations", correlated capitalism with entrepreneurship in 1776. In the 18th century, Richard Cantillon defined the French word "entreprende" and German word "unternehmen", then the use of the English word "entrepreunership" has become a commonly accepted concept. In 1942, Schumpeter described some principles of modern

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entrepreneurship by emphasizing that capitalism can never be static due to its nature and it should be seen as an evolutionary process (Schumpeter, 1992). Such an evolutionary approach in entrepreneurship is a necessity as the societies and their economies are changing over time due to differentiation of "products" in a given period of time (Bögenhold, 2019). Today, technological revolution and advances in Information and Communication Technologies (ICTs) are re-shaping the fundamental product needs of the society (Audretsch and Chowdhury, 2011). Understanding of what entrepreneurship is and the success of an entrepreneur depend on a large variety of factors that are hosted by the entrepreneurship ecosystem. Social, economic, health and political scenarios significantly affect the success of the different settings that compose the entrepreneurship ecosystem (Guerrero, & Espinoza-Benavides, 2020). This is way it is hard for academic studies to degrade entrepreneurship to a single and inclusive model in understanding the context of entrepreneurship (Audretsch, Lehmann, & Schenkenhofer, 2020). Entrepreneurship refers to the entire processes of taking risks, pursuing opportunities, realizing these opportunities and making innovations (Polat, 2011). Today, advances of societies, emergence of new technologies and employment increase depend largely on entrepreneurship. The concept, entrepreneurship ecosystem, was first coined by B. Cohen in 2006. In order to achieve sustainability of entrepreneurship, these interacting factors should be addressed with a holistic approach. It is important for the entrepreneur to be aware of the existing risks that are inherited from the ecosystem and to plan entrepreneurial activities to avoid and mitigate entrepreneurship risks. Many entrepreneurs are often not well prepared for handling these risks when starting a new business. Without a business plan or a business model that would at least help them know what should be done in the next step, they are vulnerable to risks.

The greatest presumable risk to be encountered in the entrepreneurship adventure is the inevitable and continuous need for change. Businesses operate in a constantly changing and competitive environment. In particular, COVID-19 brings new challenges to adopt to the changing environment and life style. These changes would be tolerated with technology-based initiatives, but in order to fully meet the adaptation needs to changes, organizations should internalize a creativity and innovative culture and raise awareness regarding their competitors in the market. Especially small businesses that cannot innovate to create value are likely to fail. In order to survive and manage environmental uncertainty caused by COVID-19, businesses need to have new action plans to sustain innovation. In addition to the limitations that came with this pandemic, the entrepreneurial ecosystem includes a wide variety of factors that affect the entrepreneurship process and have an impact on the success or failure of the entrepreneurs. Therefore, it is crucial to understand context of entrepreneurship and it's ecosystem. This chapter provides a review of the concept of entrepreneurship; such as corporate and social entrepreneurships, definition of an entrepreneur and it's key features, motivation factors of entrepreneurship, place of ICTs in entrepreneurship and the basic entrepreneurship terms such as start-up, innovation, research & development, project, business model, business incubator, pitching, maker and capital investments; seed funding, angel investment, venture capital investment and series A-B-C. Entrepreneurship has an important role in increasing the welfare of societies and developing new technologies. Entrepreneurs aim to make their dreams come true and accomplish their plans, and their success depends on their talents as well as their know-how. Thus, gaining the fundamental knowledge about entrepreneurship and entrepreneurial ecosystem is a necessary step to be taken by entrepreneurs. So, fundamentals of entrepreneurship and the ecosystem is important for professional and candidate entrepreneurs who seek guidance in transforming their business ideas into results.

WHAT IS ENTREPRENEURSHIP?

The constantly changing and competitive environment, where the businesses operate in, requires adopting a creative and innovative culture within an enterprise. An enterprise is an establishment with a new and rapid growth requirement, established to meet the market need by offering an innovative product, process and service for the customer needs. On the other hand, entrepreneurship has taken its place as a very important concept today and generally includes the processes of "risk taking", "pursuing opportunities", "realizing these opportunities" and "making innovations" (Polat, 2011). Entrepreneurship can also be defined as the process of creating a different value by taking economic, psychological and social risks and spending time and effort (Hisrich & Peters, 2002). Bögenhold, Heinonen and Akola (2014) emphasized that there might be various individuals and settings under the flag of entrepreneurship, who are usually not considered core entrepreneurs. Whether it is called an entrepreneur or not, the ability of individuals to see opportunities and their sources of motivation to establish their own businesses play an important role in entrepreneurship. In this context, not only establishing a business but also the process of innovation are activities that entrepreneurship is interested in (TÜSİAD, 2002).

Entrepreneurship has a significant role in the welfare of societies and developing new technologies. So, there is a relation between the progress of societies and the effectiveness of the transformation of business ideas into enterprises. Entrepreneurial ecosystem covers a variety of factors that affect the entrepreneurial process and have an impact on the success or failure of entrepreneurs (T.R. Presidency Strategy and Budget Directorate - Small and Medium Industry Development and Support Administration, 2020). Some of these factors are "decision makers, non-governmental organizations, financial resources, clusters and networks, education, infrastructure, human and social capital". In order for entrepreneurs to be successful and to continue in the long term, these mostly interrelated factors must be handled in carefully.

Corporate Entrepreneurship

Corporate entrepreneurship is the implementation of a necessary value creation process within the institution to create a competitive advantage and, most importantly, to maintain this advantage (Fiş, 2009). According to Miller and Friesen (1978), corporate entrepreneurship is about risk taking, innovation, proactivity and aggressive competitiveness related business activities that seek business growth via pursuing opportunities in the environment. In this context, entrepreneurial institutions tend to take risks and are open to innovation, while traditional and conservative institutions are closed to innovation and follow a "wait and see" policy that avoids risk taking (Miller, 1983).

Managers have a great role in the development of corporate entrepreneurship. Managers are expected to take new initiatives in order to increase corporate entrepreneurship, create new markets, acquire new competencies and increase the activities aimed at gaining competitive advantage based on innovation (Kanter, 2006). In this context, there are two basic processes to be considered in corporate entrepreneurship (Karadal & Gülpınar, 2014; Dess, Lumpkin, & McDee, 1999). The first is to support the emergence of new businesses by innovating current processes or collaborating with other businesses. The second is to take a new venture and gain strategic advantage by using business' own resources.

Success of corporate entrepreneurship has relations with four factors: Risk Taking, Innovation, Proactivity and Competitive Aggressiveness.

Risk Taking

Bögenhold (2019) highlighted the risk-taking character of an entrepreneur as being restless person that tries finding new opportunities. Taking risks can be defined as not holding back from the initiative despite the losses recognized as a result of the process and enduring predetermined losses for superiority to be achieved (Sitkin & Pablo, 1992). Businesses increase their performance by making innovation focused strategic plans and have an entrepreneurial organizational structure that would nourish innovation. In order to ensure sustainable growth, they should learn and perform effective risk management (Hitt, Ireland, Camp, & Sexton, 2001). Avoiding risk may cause the business to lose its competitive advantage in the medium and long term and then withdraw from the market (Slater & Narver, 1995). So, businesses should take reasonable risks in order to continue their existence and to thrive in their industry, before pursuing their goals of profit and competitive advantage. The general belief among conservative managers is that, a wait-and-see policy is preferred instead of taking risks in highly competitive markets (Mintzberg, 1973). However, the success of the enterprise will depend on the tendency of the managers and employees working actively to obtain individual and corporate benefits by taking risks (Naman & Slevin, 1993). According to Kanter (2006), companies focusing only on existing customers and competitors and ignoring customers' future requirements will bring inevitable negative consequences.

In this context, managers need to adopt some common principles and practices in risk taking. Managers should be able to tolerate losses that may arise from possible unintentional mistakes (Kuratko, Montagno, & Hornsby, 1990). In addition, managers should provide working environments to their employees in which they are trusted and supported, despite the rapidly changing competitive environment and crises (Aycan & Kabasakal, 2006). Managers should also contribute to the increase of individual performance by giving employees the freedom to take initiative (Mayer, Davis, & Schoorman, 1995).

Innovation Tendency

The process of transforming a new idea or invention into a marketable product is called innovation (Sathe, 1988). In other words, innovation can be defined as the processes realized for gaining commercial value of a product, service or process (Damanpour, 1991). Innovation is an important element in entrepreneurship, and this includes elements such as production of a new product, provision of new services, use of existing resources for a new market, and finding of a new raw material and shaping global competition. The trend of innovation is regarded as the cornerstone of corporate entrepreneurship (Covin & Miles, 1999). In order for the business to survive in the long term and to maintain its competitive advantage, managers must establish an organizational culture that promotes importance of innovative thinking and projects (Zahra, 1993). Business managers' attitudes, characters and beliefs directly affect employees' innovative ideas and project development (Guth & Ginsberg, 1990). Developing new products, services and processes and creating an innovative trend within the organization will increase the performance of the enterprise.

Proactivity

The concept of proactivity is related to attitudes and behaviors to create, manage and lead activities for a new formation towards particular goals (Bulut et al., 2008). The proactivity trend refers to the ability of the business to shape the environment of the business in terms of products, services, technology,

management strategies, and restructuring by taking a leading role in the sector, as well as following the opportunities in the market (Antoncic & Hisrich, 2001). Organizations that display proactive behaviors by observing the market, revealing the needs and demands, meeting the requirements and reshaping the market are defined as the leaders of the global competitive environment (Miles & Snow, 1978).

Proactive tendencies and behaviors of an enterprise can be defined with the following factors (Lumpkin & Dess, 2001):

- Searching for opportunities,
- Shaping the competitive order and environment,
- Being able to develop strategies towards meeting the demands of the change process,
- Playing an active role in the market change process and to offer new products / services to the market first.

Competitive Aggressiveness

Aggressive competition expresses the aggressive and hostile actions between a company and its competitors in their market share contention (Bulut et al. 2008; Lumpkin & Dess, 2001). Businesses that desire to become a leader or maintain their leadership attack harshly on the market shares of their competitors to disrupt their competitors' moves (Covin & Covin, 1990). In order to maintain their competitive advantage, businesses often have to consider competitive factors such as financing, after-sales service, warranty, price, and product quality (Ferrier, 2001). In a competitive environment, businesses must obtain information about the strategies of competitors, reveal their strengths and weaknesses, and develop their internal strategies by discussing these elements among themselves in order to respond quickly to threatening moves and to direct competition (Celuch, Kasouf, & Peruvemba, 2002). Developing a culture of aggressive competition within the organization will allow employees, as well as managers, to track competitors and develop appropriate moves. So that, the company will perform the process of adapting to the environment more effectively in a competitive environment (Kohli & Jaworski, 1990).

Social Entrepreneurship

The effort to create social value by considering the benefit of society is expressed as social entrepreneurship. Also social entrepreneurship is defined as non-profit activities that can take place within all commercial and / or public sectors, creating sustainable, innovative and social value (Austin, Stevenson, & Wei-Skillern, 2006). Social entrepreneurship identifies social problems and provides solutions to these problems by utilizing the principles of entrepreneurship which brings the business world for profit and the world of philanthropy together. Making profit is not one of the main goals in social entrepreneurship, but the profits made can also be a powerful source of motivation to be used for social purposes. In other words, entrepreneurs contribute beyond economic gains and focus their attention on the social problems (Aparicio, Audretsch & Urbano, 2020).

Individuals who turn problems that arise in many social fields such as health, education, economy, culture, environment and similar social areas into opportunities are social entrepreneurs. Social entrepreneurs aim to create social value and benefit for society. Many private and public organizations take social entrepreneurship into consideration regardless of profit. Thus, creating and sustaining the necessary resources to create social value is a part of the operations of these organizations. In short, success

of a business does not always depend on monetary profits as in corporate entrepreneurship, but it also depends on how much social value is created with an organization's social entrepreneurship endeavors.

The main focus of traditional entrepreneurs is profit opportunities, whereas social entrepreneurs focus on social events. To exemplify, there are organizations such as Ashoka International Social Entrepreneurs Network and The Schwab Foundation that support social entrepreneurship. Ashoka International Network of Social Entrepreneurs works in the field of Social Entrepreneurship and is not for profit. It was founded by Bill Drayton in 1980 in Washington DC. This organization supports social entrepreneurs at international level in areas such as health, education, environment and human rights. The Schwab Foundation was established in 1998 and is headquartered in Geneva. This foundation aims to bring social entrepreneurs together.

WHO IS AN ENTREPRENEUR?

Although entrepreneurship is an innate talent, it is also a set of skills that can be developed through education. As with any skill, entrepreneurship requires knowledge and continuity. Schumpeter defines the entrepreneur as the person who destroys the current economic order by creating new combinations for the business, such as creating new products, markets, sources of supply and production methods. In addition, the entrepreneur can be defined as the person who initiates the enterprise necessary for the production of economic goods and services by bringing together the factors of production, and also finds the necessary financing resources for production and markets where production will be evaluated (Eyüboğlu, 2003). Considering these aspects, the entrepreneur is the main element that stimulates the economy and creates opportunity and prosperity. Bögenhold and Klinglmair (2016) emphasized four basic characteristics of the entrepreneur as initiative-taking, organizing and reorganizing of social and economic mechanisms, and the acceptance of risk or failure. In the theory of economics, the entrepreneur is defined with the following characteristics (Eyüboğlu, 2003):

- Continuously observing the markets and catching the demand gaps,
- Creating new demands,
- Noticing the changes in demand on time,
- Establishing production units by gathering resources,
- Not avoiding competition, on the contrary, accepting competition as one of the basic conditions of its existence,
- An aggressive and creative person who does not hesitate to take risks and take responsibility.

Schumpeter sees entrepreneurship as a mentality that emerges at the level of making decisions regarding the business world and emphasized that the most important feature of this mentality is to pursue and bring innovations (Eyüboğlu, 2003). Also, he emphasized that there are two types of entrepreneurs. The first of these is dynamic entrepreneurs, and they are the ones who bring huge dimensions to their profits by introducing new inventions into the production process in new combinations and reducing costs. The others are static entrepreneurs who are active in the orbit of the dynamic entrepreneur and are content with implementing the inventions already made. According to Eyüboğlu (2003), achieving a high level of prosperity in the economy is only possible with the participation of dynamic entrepreneurs in the

market. Besides, Bögenhold and Klinglmair (2015) pointed out the features of gendered entrepreneurship and emphasized that women-led businesses are more likely to have superior welfare.

CHARACTERISTICS OF THE ENTREPRENEUR

Entrepreneurs have some basic common characteristics. Dreaming is one of the main characteristics of the entrepreneurs. An entrepreneur enjoys daydreaming and wants to pursue his dreams. In addition, risk taking is another characteristic of entrepreneurs. Entrepreneurs do not hesitate to take risks in order to achieve their well-guided and set goals. Another characteristic of entrepreneurs is their ability to follow opportunities. Entrepreneurs are people who have the skills to see and evaluate business opportunities, to benefit from them by obtaining the necessary resources, and to organize the necessary activities to achieve success (Meredith, 1984). The ability to have own capital or access external funds is also among the characteristics of entrepreneurs. In addition, while the entrepreneur believes in his own business idea, he has the ability to make other people believe in it. In addition to all these, entrepreneurship is a difficult process that requires effective planning of many activities. For this reason, a successful organization skill is among the main characteristics of entrepreneurs. Finally, the social relationships and outward-looking character established by the entrepreneur are very important for the successful execution of activities. As Rogers (2003) states communicative activities such as participating in different networks, sharing and gaining information through different media are crucial for diffusion of innovation. So, many entrepreneurs put an emphasis on social network analysis to understand social dynamics and pursue innovation (Bögenhold, 2013).

However, no entrepreneur is alike, and their characters and personality traits are quite different from each other. Still, entrepreneurs differ from the rest of the society in terms of self-confidence, risk taking, flexibility, success and the need for independence. Accordingly, entrepreneurs are people who can take initiative and measured risk, have power of persuasion, desire to succeed, demonstrate leadership behavior, and also have the characteristics of being creative and innovative (Gibb, 1987).

ENTREPRENEURSHIP MOTIVATION FACTORS

The first few years are crucial for startups to survive. At this point, entrepreneurs have effective motivation factors as well as financial competence plays an important role in the survival of entrepreneurs.

These motivation factors are the basic variables that lead people to become and continue to be entrepreneurs. Some of these factors are the desire to introduce innovation, take risks and manage one's own risk, to be free, to be the boss of your own business and not to take orders from others (Carland, Hoy, Boulton, & Carland, 1984). In addition to these, the desire to gain recognition and prestige, gain a place in the society with what they do, realize the idea they have by establishing their own business, increase the income level and live in prosperity by earning a lot of money, find jobs that other people cannot discover are among the main motivating factors to become an entrepreneur (Polat, 2011; Tekin, 1999).

BASIC TERMS OF ENTREPRENEURSHIP

Entrepreneurship is a sophisticated and trending area within which several terms are well established. An entrepreneur shall be aware of these terms as a starting point for gaining fundamental knowledge about her profession.

StartUp

StartUp is a term used for dynamic companies that established new and small. StartUps offer products, services or processes that are usually proposed upon a new discovery or a trend in the market. As Startups are newly established, they have rapid growth requirements. A StartUp starts with a small team with speed and skills that works on a specific project and the learning process continues actively in these enterprises. Startups generally have a horizontal organizational structure and there is almost no hierarchy between team members. These enterprises have limited resources, so they need economic, physical and human resources. This is why many StartUps are in need for investments from capital holders or market leaders. There are many uncertainties in StartUps, and StartUp businesses face high risks due to these uncertainties. So their failure rates are rather high. In addition, Startups can react quickly to market changes, technological developments and competitive products due to their generally agile nature.

Innovation

The phenomenon of innovation refers to the adaptation of creative ideas, new products, services, processes or business models to the organization. Schumpeter listed exemplary innovative activities as introducing a new product, developing a new production method, opening a new market, discovering a new raw material supply or semi-finished product, and developing new industrial organization structures (Hine & Kapeleris, 2006). According to the Turkish Language Association, innovation is the use of new methods to achieve useful and marketable results in social, cultural and administrative environments by using science and technology in order to adapt to the changing conditions. Innovation can bring both innovation and improvement to an existing product, service or process.

Innovation is a phenomenon that should be constantly planned and reviewed within an organization. After the change in the business is decided, the current situation should be revealed with the current system analysis. Then, the goals of the change are determined. After the change is applied, the results should be analyzed again. The culture of change and innovation within the organization is a repetitive process that should always be maintained.

Research and Development

Research and development (R&D) is defined by the OECD (2008) as creative work carried out systematically to increase knowledge and using this knowledge to create value. R&D promotes knowledge exchange both within the organization and with the external shareholders (Audretsch & Belitski, 2020). Universities play an important role to adopt R&D practices to lead innovations. Entrepreneurial university and academic entrepreneurship terms have emerged, in which the universities focus on commercialization of knowledge and research findings (Klofsen, & JonesEvans, 2000; Hisrich, Stanco, & Wisniewski, 2020). R&D is the main element of a country's development through innovation, and universities and

enterprises engaged in R&D aim to increase their production quality and offer new products, processes and services. The activities included in R&D are specified as conducting creative work carried out on a systematic basis to increase the knowledge of culture, people and society and to use this to design new processes, systems and applications (The Law on Supporting Research, Development and Design Activities No. 5746, 2008). In principle, R&D includes Basic Research, Applied Research and Experimental Development elements.

Basic Research

According to the OECD Frascati Guidelines (2002), basic research is experimental or theoretical studies that have no apparent special application or use and are primarily carried out to obtain new information on the basis of observable phenomena.

Results obtained through basic research are generally not sold in market but published in scientific journals. Basic research is usually carried out in higher education institutions to produce knowledge.

Applied Research

Applied research is an original research undertaken with the aim of obtaining new knowledge (TÜBİTAK, 2002). Applied research is carried out with the aim of using basic research findings or determining new methods to achieve predetermined goals that would resolve practical problems. Information obtained as a result of applied research is often patented, but the findings can also be kept confidential.

Experimental Development

OECD Frascati Guidelines (2002) states that "experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed."

Project

The project consists of activities that require a team to work effectively between certain dates to find a solution to an existing problem. Each project has its own goals and objectives. The activities required to achieve these goals and objectives need to be defined and planned. The methodological steps required to carry out the project should be clearly stated and the time intervals and by whom the activities will be carried out should be detailed. In addition to bringing innovation and originality to the relevant field, the projects carried out are expected to make economic and social contributions to increase the welfare of the society. A certain amount of funding and resources are required for the execution of projects. It is necessary to make financing and resource planning for each activity to be carried out within the scope of the project to determine the risks that may be encountered during the execution of the projects and to create contingency and mitigation plans in order to avoid and resolve these risks.

Business Model

Business model is a definition of the way businesses do business. Every business needs to reveal and define its business model in order to reveal its strategy in the long term, to gain profit and to provide competitive advantage. The business model generally elaborates various elements of the business and the relationships of these elements with each other. Business models present the elements of partners, activities, resources, value proposals, customer relations, channels, customer sections, cost structure and income sources and the relations of these elements with each other (Osterwalder & Pigneur, 2010).

Business Incubator and Accelerator

Business incubator is the first stage investor that supports the definition of business models for new initiatives at the idea stage and the establishment of companies. Honig and Karlsson (2010) defined business incubator as "Organizations whose purpose is to support the creation and growth of new businesses by supplying a shared office environment and agglomeration of new and small businesses". Incubation centers guide entrepreneurs to determine their roadmaps and network, and help entrepreneurs get used to the market environment. While these centers support entrepreneurs with low financial investments, they receive low amounts of shares in return for this support. Unlike incubation centers, Accelerator programs provide support to accelerate an existing initiative. Acceleration programs guide businesses in improving the business models of existing businesses and increasing the market share of the enterprise.

Pitching / Elevator Pitching

It is an important stage for an entrepreneur to effectively communicate her idea to an investor in a short period of time. Pitching is when an entrepreneur explains his business idea to the investor in a limited time. Elevator Pitching concept, on the other hand, is a concept inspired by the shortness of the elevator journey, and it expresses the entrepreneur's idea to be expressed effectively in such a short time. The entrepreneur needs to effectively explain who she is, what her business idea is, and what the pervasive effects of this business idea will be in as short a time as the elevator ride. In order for the entrepreneur to express her business idea effectively, nine criteria must be considered for Elevator Pitching (O'Leary, 2008).

1. Concise: The business idea should be explained in a short but concise way.
2. Clear: Business idea should be expressed clearly.
3. Compelling: Business idea should be explained in an impressive way.
4. Credible: The entrepreneur should be convinced and reliable that he can solve the problem.
5. Conceptual: The business idea should be explained as a concept without going into unnecessary details.
6. Consistent: It should be consistent throughout the expression of ideas.
7. Concrete: The business idea should be concrete and feasible, not imaginary.
8. Customized: The business idea should be tailored to the person being told, that is, it should be personal.
9. Conversational: The general purpose of Elevator Pitching should be to initiate a dialogue with the person to whom the business idea is explained.

Maker

People, who have a high ability to wonder and can turn the things they wonder into tangible objects, are called makers. Maker movement is spreading rapidly today and it is a movement formed by the combination of "do it yourself" culture and technology (Smyth et al., 2018). The most important feature of the makers is that they can think and produce things themselves from scratch. Nowadays, existence and accessibility of technologies such as 3D printers and microprocessors led to number of Makers increase all around the world (Sydow, 2019).

Capital Investments

In order to realize venture ideas, money, that is, fund is needed. Entrepreneurs can bring their business ideas to a certain point and establish their businesses by using their own equity or with the support they receive from the close environment. However, as the business grows, more funds will be needed to run the business activities. In this case, the entrepreneur can benefit from external funding sources such as bank loans or capital investments. Take credit; high interest rates can be difficult for entrepreneurs due to the limitations of the collateral and repayment schedule. In this case, capital investments are a reasonable solution for entrepreneurs. In order to benefit from capital investments, the entrepreneur must convey the idea of the enterprise and the benefits it will provide to the investors. If the investor likes the venture idea and sees the profit potential, investor will become a partner of the venture and support the continuation of the business activities by providing a certain amount of funds.

Capital investments can be listed as Seed funding, Angel investment, Series A-B-C investments (Series A-B-C) in terms of the amount of funds they support (Kadiger, 2020).

Seed investment is the investment taken at the idea stage or product sample stage such as prototype (Kadiger, 2020). Entrepreneurs can find the opportunity to get their first seed investment from the incubation centers of universities or angel investors (Kadiger, 2020).

Angel investment is also a capital investment and angel investor supports the growth and development of the business idea by providing capital to entrepreneurs who are at the start of the journey (Canbaz & Öztürk, 2019). An entrepreneur can receive capital support from more than one angel investor for her business idea. In addition, angel investors can guide the entrepreneur based on their own experiences (Canbaz & Öztürk, 2019).

Risk (venture) capital can also support the entrepreneur's innovation based idea in turning the idea into a commercial product. The main difference between angel investment and venture capital is that venture capital is an institution while angel investor is an individual investor. In venture capital, the investment amount is usually higher than the angel investment, and high earnings and risks are combined in venture capital (Bayar, 2012). Due to the size of the investment made, venture capitals become rather higher shared partners in the venture.

Series A-B-C are venture capital investments received after the early stage. In order for the entrepreneur to benefit from Series A-B-C investments, it is expected that the business has reached a certain size. Sangeeta (2020) expressed Series A-B-C investment as follows. Series A investment is the first support of a venture capital after seed and angel investment. It supports an enterprise whose business idea and business model have reached a certain maturity. Series A venture capital investments are used to meet the salaries of the employees, to do more market research and to finalize the product and service to be released. In the Series B phase, it is expected that the product and service produced will now be

available in the market. After the company has established the market it addresses, they need Series B investment capital to increase their market share, face competitors and invest in assets such as intellectual property. The investment risk of this stage is lower than Series A and the funding amount is higher. Now, when a firm has proven its determination and success in the market, it can benefit from Series C venture capital investments. The firm may apply for Series C venture capital to gain more market share and to produce more products and services. This phase is the last phase in the growth cycle of the firm before its initial public offering.

MAIN FOCUS OF THE CHAPTER

Effect of Covid-19 on Entrepreneurship

The COVID-19 pandemic has resulted in serious changes in living conditions such as in people's social life, acquisition of health, education, and other services provided by public institutions. The COVID-19 pandemic, which emerged as an unexpected environmental factor, has adversely affected many businesses. In terms of several aspects such as sales, procurements, customer and supplier relations and costs, many businesses have been affected negatively. As a result, it has become inevitable for the business managers to make changes in the way they do business and how they plan their actions (Giones et. al, 2020). However, the pandemic has also brought several opportunities that entrepreneurs can exploit. Social changes such as the radical shifts in communication, meeting, socializing, shopping, and entertainment habits might inspire entrepreneurs to come up with innovations that improve the quality of life in pandemic conditions. The skills of the entrepreneurs and their ability to effectively integrate technology into business processes can also turn this epidemic into an opportunity. In other words, it can enable entrepreneurs to gain a significant competitive advantage in the market by effectively changing their way of doing business by using technology. In this period, when social relations and face-to-face communication are decreasing, entrepreneurs should be able to use the distance interaction opportunities provided by technology and direct their customers' attention to these communication methods. In this context, it is important for entrepreneurs to understand technology well and integrate it into their business plans.

Role of ICTs in Entrepreneurship

Advancement on the digital technologies provides new opportunities for entrepreneurs to establish a business and supply their products and services worldwide (Elia, Margherita & Petti, 2016). Digital technologies have an effect on idea generation and establishment of new businesses (Elia, Margherita & Passiante, 2020). "ICTs can be used for describing the ability for creating, saving and forwarding data and information, while the most important components of such technology are mechanical and software equipment, networks as well as knowledge on how to use ICT tools" (Senn, 1997; Jagodič & Dermol, 2015). Entrepreneurs' awareness on the advances in ICT and their ability to follow up these changes are important especially for the new entrepreneurs to be successful in the process of entrepreneurship. Besides, integration of new technologies, end users' ability to use these systems, and their system acceptance are crucial for the effective execution of entrepreneurial activities. As Tunio (2020a, 2020b) states the ICTs help new initiatives not only to sustain and grow but also to proceed in the market. ICT tools provide opportunities for young entrepreneurs to develop their careers (Jagodič & Dermol, 2015).

According to Jagodič and Dermol (2015), these technologies provide the following competencies for the entrepreneurs. ICTs enable an entrepreneur to test different decision making scenarios, which enhances the entrepreneurial skills. These technologies provide platforms for entrepreneurs to develop new communication and social networks. Also, entrepreneurs can gain learning opportunities and business planning solutions. Besides, fast growth, being competitive, low cost, and creation of wealth are the other benefits obtained by ICT enabled businesses (Amit & Zott, 2001; Javed et. al, in press). Being aware of the advantages provided by technology will enable entrepreneurs to adapt to the new normal that is destined to come with COVID-19 pandemic and to shape their business ideas with technology support to survive in the market.

SOLUTIONS AND RECOMMENDATIONS

The success of an entrepreneur depends on her competencies and acquired knowledge. The entrepreneurship ecosystem contains many factors that are affective in the success or failure of an endeavor. The entrepreneur should be aware of the excess of factors in this ecosystem and their interactions with each other. Entrepreneurship is a sophisticated process due to its nature. Markets contain harsh competition. In such a competitive environment, being the first to market and gaining customer satisfaction should be among the entrepreneur's goals. Even if a person has a tendency and character traits of an entrepreneur; knowing the concept and types of entrepreneurship, and the factors within the ecosystem play an important role in increasing the chance of success. It is important for an entrepreneur to take risk; however, these risks should be managed and controlled. Entrepreneurs should be aware that the risks taken will affect many people, especially families and employees, so they must handle and manage significant risks with rigor. Being inquisitive, liking research and being able to follow innovations closely are among the most expected characteristics of entrepreneurs. An entrepreneur who falls behind in innovation and cannot follow the advances can be considered doomed to lose. Entrepreneurs must follow not only innovations but also their competitors closely. They need to monitor competitors' positions in the market, their products and services, and also their relationships with their customers. Entrepreneurs, who know their competitors, can act earlier, show a proactive attitude and take the advantages of reaching customers first, and leading and shaping the market. In addition to all of these, having social responsibilities are welcomed by the customers and enables the entrepreneurs to be more respected and leads them to develop a healthy corporate identity. Therefore, it will be an important gain for entrepreneurs to know the concept of social entrepreneurship and to prepare business plans considering how they can help their communities.

Entrepreneurs shall assess and know their entrepreneurial skills. In this context, the entrepreneur will be able to evaluate which of her skills and character traits are suitable for entrepreneurship and eventually she will be able to improve her lacking skills with training and practice. An entrepreneur who knows herself will have the opportunity to evaluate the factors that motivate her on the entrepreneurship journey. It is not possible for an entrepreneur, who lacks essential motivation, to be successful. In this difficult process, the entrepreneur may experience failures, but the ability to overcome these failures depends on the existence of motivation factors that she truly relies on.

An entrepreneur needs to be aware of the terms used in the entrepreneurship ecosystem. Awareness on these terms will enable the entrepreneur to be more self-confident in her profession and to know where to position herself in the entrepreneurial adventure. An entrepreneur who is not in this consciousness

will miss out many opportunities she might have. Entrepreneur should be aware of the importance of innovation and research and development activities. The entrepreneur should know that the most basic way to reach innovation is through research and development, and should develop his business plan and business model accordingly. An entrepreneur who does not give due importance to research and development activities will unfortunately have difficulties in innovating.

Entrepreneurs create projects to develop new products and services and make improvements in the existing products and services. Entrepreneur with a good project culture can reach innovations more easily, manage research and development activities more effectively, and better organize their team work. In addition, project development enables the entrepreneurs to know the targets to be achieved within a certain budget and time frame. In order to benefit from these opportunities, it is necessary to understand very well what the project means and what should be considered while developing a project.

Entrepreneurs need to know that they must manage the entrepreneurial process with a certain systematic while transforming their business ideas into entrepreneurship. The most basic way to do this is to manage entrepreneurial activities with a business plan and business model. An entrepreneur with a business plan can foresee the difficulties likely to be experienced in the process and plan the measures accordingly.

Entrepreneurs with a business model are expected to know what they want to do and what to consider when achieving the goals. The business model will serve as a guide for the entrepreneurs. Having a business model would help in critical decisions such as deciding where to spend the limited resources, how to avoid and mitigate risks, how to handle suppliers, customers and competitors, and which pricing policy to apply.

It is essential for the entrepreneurs to have access to capital. Entrepreneurs can use their own equity to actualize their business ideas. However, it is not possible for every entrepreneur to have sufficient equity capital. At this point, entrepreneurs need to know what the funding sources can be and do their research in this direction. It is also important for the entrepreneurs to know how to express themselves to the funders to benefit from funding sources and get financial and operational support for their business ideas. In this context, importance of the effective pitching and the entrepreneur's self-improvement is critical to access adequate monetary and operational resources.

In addition to the inherent challenges of entrepreneurship, entrepreneurs should be aware of the adverse effects of the COVID-19 pandemic, which is an unexpected environmental factor, and think about how to dodge this new normal with least damage. In this period, entrepreneurs can lean on ICTs in adopting their products and processes to the new normal. In the pandemic era, entrepreneurs can also exploit the new opportunities which arise from social habit shifts. At this point, entrepreneurs should be aware of the importance of ICTs and the advantages of effective technology usage.

FUTURE RESEARCH DIRECTIONS

Considering the challenges brought by the COVID-19 pandemic, it is important for entrepreneurs to know how to manage the difficulties encountered. It is necessary to be aware of the concepts of entrepreneurship and entrepreneurial ecosystem, so that the entrepreneurs can position themselves in these difficult and strange times. In the future studies, COVID-19 era difficulties experienced by the entrepreneurs, how the pandemic process affects their way of doing business and what kind of problems it causes are among the issues that need to be examined in depth. It is necessary to reveal to what extend the entrepreneurs

benefit from technology in the problems experienced during pandemic. Moreover, the ICT tools used, the advantages and disadvantages of using these tools, and the technology adoptions of entrepreneurs during this epidemic should be identified.

CONCLUSION

Entrepreneurship has many challenges due to its nature. Considering the additional challenges that emerged with the COVID-19 pandemic, the importance of ICTs is expected to increase for enterprises whether to survive and ensure sustainability, or increase their market share. This chapter highlights entrepreneurship terms and challenges and examines the entrepreneurship ecosystem in this context. This chapter will be beneficial for the entrepreneurs to get an idea on the basic concepts in the process of transforming their business ideas into entrepreneurship during the COVID-19 pandemic period.

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KEY TERMS AND DEFINITIONS

Business Model: It is the process of revealing the key factors (stakeholders, constraints, resources, customers, etc.) and their relationships with each other to successfully transform a business idea into a business.

Entrepreneurial Ecosystem: A system containing factors affecting entrepreneurial activities.

Entrepreneurship: A process of transforming original business ideas into business.

ICT: Information and Communication Technologies including a set of tools to manage data and information in an efficient way.

Innovation: The process of revealing new product or services or improving an existing product or service, especially with the integration of technology.

Project: It is the process of conducting systematic activities defined by a team of experts in their field to achieve a goal within a certain budget and time limit.

Research and Development: Developing new products and services in the light of the findings obtained after a systematic research conducted.

Chapter 10
Management and Strategies for Digital Enterprise Transformation:
Proposal for the Utility of Neuro-Economics in the Services of ICT of the Exponential

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ABSTRACT

The chapter explores the utility of neuroeconomics in decision making and behavior. Scientific knowledge will be advanced in the need for the application of neuroeconomics focused on one of the services of the information and communication technologies (ICT) of companies, that is, e-commerce of exponential artisanal SMEs of women entrepreneurs, by developing a proposal for a business model to increase the possibility of growth of their companies at the level national and international level. The methodologies used were deductive, exploratory, descriptive, correlational, and documentary. Neuroeconomics have the potential to explain the phenomena that are considered as a deviation from the prediction or behavioral bias of decision-making models in economic theory. The study is quantitative using primary and secondary sources for research.

INTRODUCTION

Neuroeconomics is an emerging discipline that combines the findings and modeling tools of neuroscience, psychology and economics to explain the behavior of human choice (Glimcher, 2003).

The aspects in neuroeconomics that propose a new significant episode of change, according to Glimcher and Rustichini (2004) are:

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- Integration of behavioral work carried out by economists, psychologists and neuroscientists, for the development of a unified theory of the choice of behavior.
- Technological advances that allow us to look at the brain will eventually replace the simple mathematical ideas of economics with more detailed neuronal descriptions.

Within the framework of the above considerations, SMEs in Mexico constitute 95% of established companies and contribute 23% to Gross Internal Product, but they have a series of problems that cause 75% to close their operations after 2 years in the market (INEGI, 2010), and its chance of success is on average from 25% to 30% below the world average that is 40% (Fernández, 2010). It is appropriate to highlight that 47% directed by the female gender, contributing 37% of GIP, also contribute 70% of GIP and allocate 70% of their income to the community and family (González, 2016). Despite this, Latin America has the highest rate of business failure run by women. In Mexico alone, 2.2 million formal companies 17.63% are directed by the female gender, in addition, that 50% have a profit of less than $ 50,000 USD compared to 25% of the companies that operate men (Power & Magnoni, 2010).

Artisan SMEs are a major driver of the economy where 47% are run by the female gender, contributing 37% of GDP, also allocating 70% of their income to the community and the family as opposed to men who contribute only between 30% and 40% (González, 2016). Despite this, Latin America has the highest rate of business failures managed by women. In Mexico, only 2.2 million formal companies 17.63% are run by the female gender, and 50% have a profit of less than $50,000 USD against 25% of companies operating men (Power & Magnoni, 2010).

The artisanal sector is a "global creative economy", representing what can be exemplified as a country that would symbolize the fourth largest economy and workforce in the world according to the Inter-American Development Bank (IDB). It is a global sector that generates revenue of $34 billion per year, and only developing countries provide 64% of global exports. According to the United Nations organization for education, science and culture (UNESCO, 2001), it states that the artisanal sector plays a predominant role in economic development and in the fight against poverty. In addition, preferences in market consumption are changing because they care about the origin of the product, which make it and how it was manufactured, modifying their preferences of mass-produced products at hand, the only one of its kind and the independent design (INDEGO Africa, 2016). They have a long way to go to achieve their full potential in employment and income generation to achieve greater economic growth in developing countries.

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2001), it states that the artisanal sector has a predominant role in economic development and the fight against poverty, but they lack a long way to go to achieve its maximum potential in generating employment and income to achieve greater economic growth in developing countries. The artisanal sector has great untapped potential in e-commerce that can generate a greater amount of income and jobs that produce a social and economic impact on entrepreneurs worldwide and especially women (Foote, 2015).

The objective in the research is the management and strategies for digital enterprise transformation by using neuroeconomics, a model proposal focused on understanding consumer decision-making on one of the services of the information and communication technologies of companies focus in electronic commerce of exponential artisanal SMEs of women entrepreneurs will be developed.

BACKGROUND

Statement of the Problem

According to the International Telecommunication Union (2015), internet is used by 43.3% of the world's population, which corresponds to 3,200 million Internet users. Companies use ICT as a new channel for the dissemination of products and/or services, appearing a second group of ICT services formed by the electronic commerce which is a mode of remote purchases through a network of telecommunication's that has increased its potential by adapting people with new technologies. The way in which internet has increased its penetration in the online market has caused changes in the way in which business interacts with consumers, developing e-commerce causing companies to increase the total number of sales and an increase in online retail interactions of consumers (VanderMeer, et al, 2001). The number of digital buyers worldwide is rapidly expanding from 1,32 billion in 2014 to 1,66 billion in 2017 and is expected to increase to 2,14 billion in 2021 (Statista, 2018). What translates into an increase in electronic sales of retailers globally from 2014 in 1.336 billion dollars to 2,290 billion dollars in 2017 and an increase in 4,479 billion dollars is forecast for 2021 (Statistica, 2018). With a participation in retail e-commerce 2016 in the Asia and the Pacific regions with 12.1%, Eastern Europe with 8.3%, North America with 8.1%, Central and Eastern Europe with 3.4% and Latin America with 1.9% (Statista, 2018).

The increase in online shopping has transformed the internet into a powerful force, being a tool that has a great influence on consumer behavior (McGaughey & Mason, 1998), modified the way the individual acquires a product by the large amount of information that it provides, making it easier for the potential client to evaluate the products and services of different suppliers, which modifies the traditional buying behavior (Koufaris, 2003). Because it allows the purchase through crossed channels, this together with the development of technological characteristics such as the search for information, the evaluation of the different alternatives offered and the realization of the purchase (Constantinides, 2004).

In order to increase the number of consumers and their conversion rate, it is necessary to understand online consumer behavior to improve their shopping experience and satisfaction (Zhang, et al, 2011). Consumer behavior in the traditional market is different from its purchasing behavior in electronic commerce, with the information of this limited and poorly studied (Denis, et al, 2009) in terms of making the purchase decision (Brynjolfsson, et al, 2010) being the void of literature that focuses on this research. Increasing theoretical knowledge in the decision-making process in this area is crucial, and this can be explored by developing a new behavior model (Rickwood & White, 2009).

Electronic commerce offers great potential for the expansion of companes to international markets by intensifying the sales power by creating a new distribution channel to reach new customers, develop their own marketing strategies and produce new business opportunities (Colvee 2013). In addition, e-commerce is a powerful tool that allows SMEs to move faster in the development phases by positioning the company in the world market (Hussain, 2013). The proper management of electronic commerce will allow artisanal SMEs to increase their competitiveness (Aragon & Rubio, 2005) in a sector where, despite their significant participation and their annual growth rate of over 4%, they have not been able to increase it (FONART, 2009).

One of the big problems for the integration of SMEs in e-commerce is to achieve efficiency in electronic platforms due to ignorance of customer behavior in decision making (Sacristan, 2013).

In the context of the above considerations, SMEs in Mexico constitute 95% of established companies and contribute 23% to GIP, but they have a series of problems that cause 75% to close their operations

after 2 years in the market (INEGI, 2009), and its chance of success is on average from 25% to 30% below the world average which is 40% (Fernández, 2010). At the international level, the percentage of survival and the half-life of SMEs is similar in countries such as Spain, where more than 70% does not exceed 4 years of life and 80% of SMEs fail within the first 5 years, in the United States of America 30% of SMEs do not reach the third year and have an average life of 6 years and in the underdeveloped countries only the first 3 years of life survive between 50% and 75%.

Artisanal SMEs are a great engine of the economy where 47% are directed by the female gender, contributing 37% of GIP, they also allocate 70% of their income to the community and the family unlike men who contribute only between 30% and 40% (González, 2016). Despite this, Latin America has the highest rate of business failures managed by women. In Mexico, only 2,2 million formal companies 17.63% are directed by the female gender, in addition, that 50% have a profit of less than $ 50,000 USD against 25% of the companies that operate men (Power & Magnoni, 2010) .

The artisanal sector is a global creative economy, which represents what can be exemplified as a country that would symbolize the fourth largest economy and labor force in the world according to the Inter-American Development Bank (IDB). It is a global industry that generates revenues of $ 34 billion per year, and only developing countries provide 64% of global exports. According to the United Nations Organization for Education, Science and Culture (UNESCO, 2001), it states that the artisanal sector has a predominant role in economic development and in the fight against poverty. In addition, preferences in market consumption are changing because they care about the origin of the product, which they produce and how it was manufactured, changing their preferences for mass-produced products at hand, the only one of its kind and independent design (INDEGO Africa, 2016). They have a long way to go to achieve their full potential in employment and income generation to achieve greater economic growth in developing countries.

Justification

The artisanal sector has great untapped potential in electronic commerce that can generate a greater amount of income and jobs that produce a social and economic impact on entrepreneurs around the world and especially women (Foote, 2015). This can be achieved through the use of neuroeconomics, which is an emerging discipline that combines the findings and tools of modeling neuroscience, psychology and economics to explain the behavior of human choice; neuroscience provides tools to answer questions of economic models that cannot be explained; and economics contributes to neuroscience decision models to examine the mechanisms of communication between brain circuits (Glimcher, 2003).

Scientific knowledge will be advanced in the need for the application of neuroeconomics in the e-commerce of exponential artisanal SMEs of women entrepreneurs, having the potential to explain the phenomena that are considered as deviation from the prediction or behavioral bias of the models of decision making to achieve the increase of its market on a larger scale and its growth regardless of its size and location.

The study will be designed with the theme of women entrepreneurs of exponential artisanal SMEs certified internationally by the NGO “Women Owned”. First, it will conduct a survey of young millennials that are 80% of the people who buy in e-commerce. The results will allow to improve electronic commerce through neuroeconomics techniques to increase the possibility of growing their businesses nationally and internationally.

The variables of the research were formed by the review of literature based on PhD thesis and an article focused on neuro-correlation in decision-making, the online consumer decision-making process, the intention to purchase the consumer in the online purchasing environment, neuroeconomic studies in decision-making and the role of emotions in decision-making through a cognitive approach to neuroeconomics.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies and Problems

See Table 1.

Table 1. Matrix of Operationalization of the Variables

Theme	General Objective	General Research Question	Specific Objectives	Research Questions	Variables	Hypothesis	Methodological Analysis
Proposal for the utility of neuro-economics in the services of ICT of the exponential SMES of the artisanal industry of women entrepreneurs in Mexico.	Develop a proposal for a theoretical model that evaluated the behavior in the decision making of the consumer in e-commerce of exponential Mexican artisanal SMEs directed by women entrepreneurs	How can we develop a theoretical model that evaluated the behavior in the decision making of the consumer in the e -Commerce of exponential Mexican artisanal SMEs run by women entrepreneurs?	Examine the factors that expose the relationship between decision making and consumer behavior in e-commerce	What are the factors that expose the relationship between decision making and consumer behavior in e-commerce?	Characteristics of the website	The characteristics of the website have a positive relationship with the intention to purchase	Descriptive and inferential statistics
			Expose the economic context of artisanal SMEs and the challenges of gender equity in developing countries	How is the economic context of artisanal SMEs and the challenges of gender equity in developing countries?	ConsumerConsumer	characteristicscharacteristics have a positive relationship with the intention to purchase	Descriptive and inferential statistics
			Analyze from a quantitative perspective the point of view of millennial consumer, their behavior for decision-making in the e-commerce of exponential Mexican artisanal SMEs directed by enterprising women	How is a millennial consumer point of view from a quantitative perspective, their behavior for decision making in the e-commerce of exponential Mexican artisanal SMEs directed by enterprising women?	Characteristics of the brand	The characteristics of the brand have a positive relationship with the intention to purchase	Descriptive and inferential statistics
					Purchase intention		Statistics inferential

Source: Own elaboration

LITERATURE REVIEW

Artisanal SMEs in the Economic Context of the Countries

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), artisanal products have characteristics that define them as their usefulness, esthetic a, artistic, creative, link to culture, decoration, functionality, traditional, symbolic and significantly social (Etienne-Nugue, 2009).

Artisanal SMEs in Developing Countries

After agriculture, the artisanal sector is the second employer in developing countries, mostly made up of women who perform traditional handicrafts to obtain economic resources. These countries have a competitive advantage because of their cultural traditions, artisanal skills and specialized raw materials (Foote, 2015).

The artisanal sector is a global creative economy, it can be exemplified by representing it as a country that would symbolize the fourth largest economy and labor force in the world according to the Inter-American Development Bank (IDB). It is a global industry that generates revenues of $ 34 billion a year, with only developing countries providing 64% of exports worldwide. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2001), it states that the artisanal sector has a predominant role in economic development and the fight against poverty. In addition, preferences in market consumption are changing because they care about the origin of the product, who made it and how it was manufactured, changing their preferences for mass-produced products to the handmade, the only one of its kind and independent design (INDEGO AFRICA, 2016).

Handcrafts SMEs in Mexico

In Mexico, handicrafts are the main economic-cultural item in terms of production, the generation of renumbered work with 43% dedicated to the manufacture of handicrafts, and a total cultural expenditure of 37.7%, is an industry which generates 122 million pesos, which is represented in terms of a GIP 1.3 higher than that of agriculture (INEGI, 2012).

In the current economic context caused by the economic crisis and unemployment, the relevance of artisanal SMEs that produce garments, household goods and objects with various uses has increased (Sandoval & Guerra, 2010). These productions are integrated by the various fields of human, cultural, social, educational and economic development, the latter being the development of a business (Hernández-Girón, et al, 2007).

Challenges of Gender Equity in the Business World

Companies that have greater gender equity increase their results causing higher levels of growth and performance; this paradigm shift according to the report on the Principles of Empowerment of Women in Businesses published by the UN Women (2016) are:

- Women are key economic agents that produce prosperity, employment, innovation and are an engine of development. The greater the number of women belonging to the Economically Active Population (EAP) the economy increases because it leads to greater social mobility with benefit in the family, community and society.
- There is a positive correlation between business activity and GIP growth. Productivity in Latin America and the Caribbean could increase by 25% if female entrepreneurship is supported.
- The use of female talent would produce benefits for companies such as creativity, efficiency and business efficiency, and improvement of business management.

- Companies with a greater presence of women tend to develop corporate social responsibility and diversity schemes in philanthropic work, which leads to an improvement in the brand image, customer loyalty, recruitment of professional talent, and increased productivity.

In countries where there is a greater number of women entrepreneurs there is greater economic growth, in contrast to countries where it is restricted there is a stagnant economy, there is also an impact on the social environment (UNIDO, 2011). In spite of this, there are currently twice as much male as female entrepreneurship (Reynolds, et al, 2002).

The female gender decides to undertake to obtain their own income, develop an innovative idea, move up in their work careers, flexibility between work, family (Heller, 2010) and by necessity this being a factor that has a direct relationship between the level of development and the business development rate generating a correlation between the developing countries that have a higher rate as opposed to the more developed countries have a lower rate showing a concordance between the levels of low economic remuneration and the creation of a company developed by women (ECLAC, 2004).

The 6 dimensions that distinguish women entrepreneurs from developing countries to achieve the success of their businesses are:

1. Personal Characteristics

Studies related to developing a profile that influences demographic and psychological characteristics of enterprising women, state that people who match this profile tend to be more successful. One of the factors investigated is the level of education, the age at which they started their business and the type of business (Bennet & Dann, 2000), to classify them in terms of family-based values, risk prospecting, and equity between working and family life (Hisrich & Brush, 1983). Socio-demographic changes in recent decades, such as increased access to women's education, have led to an increase in the number of entrepreneurs (Bennet & Dann, 2000).

2. Motivation to Have a Business of Your Own

Another determinant for success is the motivation of its founders, it is composed of: Psychological motivation is constituted by achievement and independence (Lerner, et al, 1997). Economic motivation that includes economic need and independence (Carter, 2002). Being exposed extrinsically as labor dissatisfaction, and intrinsic as the achievement of work and family balance, and personal development, the second being one of the primary reasons for the search for women of self-employment (Brush, et al, 2006).

3. Business Profile

The type of industry and type of activity chosen is directly related to the success of the business (Bhide, 2000). Ventures that find based on innovative conflict resolution projects have a greater chance of success, that is, because they are hardly imitable and can more easily attract investors (Timmons & Bygrave, 1997). Women's ventures in developing countries have shown an evolution from the services sector to various sectors of the economy with various innovative characteristics that lead to success. (Brush, et al, 2001)

4. Resources Available to Women Entrepreneurs

Entrepreneurial women have less knowledge and are therefore employed to a lesser extent by the resources available unlike men (Coughlin, 2002). In addition, women business owners are pragmatic in terms of tangible support from those who can provide them (Nelson, 1989). They also have less access to external funding resources (Tigges & Green, 1994).

5. Problems in Entrepreneurship

There are a number of problems that impede the development of businesses created by women entrepreneurs such as lack of access to capital, lack of administrative and technical skills, high social and cultural contrast, and the difficulty of the role of having to run a home and business at the same time. Reducing these problems will contribute to the success of entrepreneurship and the development of its potential (UNIDO, 2001).

6. Interpretation of Success

The success of a business for a woman depends not entirely on finance, but on personal achievement and self-realization (Anna, et al, 2000), aimed at making a difference and being able to have a balance and flexibility between working and family life. In addition, these differ depending on the cultural and context of the country (Still & Timms, 1999).

Factors contributing to the generation of women entrepreneurs in developed countries are influenced by factors such as independence, self-realization, increased social status and power (Orhan & Scott, 2001). In contrast to women in developing countries that their entrepreneurship is driven by poverty, family separation, and self-employment to financially support their families

Entrepreneurs From Developing Countries

Research in emerging countries by the National Foundation for Women Business Owners (NFWBO) found that women who own business have common characteristics regardless of the business, its establishment, administration, operation, and goals differs from that of the male gender since they are aimed at owning small businesses, making decisions based on diverse criteria, higher priority to quality of life instead of increasing business income, investments controlled by the lack of support for part of the institutions to obtain credit, limited capital, and mainly seek to reconcile the different aspects of their life; in contrast to their counterparts that focus on financial and economic aspects oriented towards profitability. They have similar problems for the growth of their companies, having common needs to achieve this as access to information, training, technological assistance and access to national and international markets.

The contribution of women in the economy of Latin America and the Caribbean had an increase of 35% in 1980 to 53% in 2007 promoting economic growth, financial security in the family, increase in consumption capacity and reduction in poverty of the region (Pages & Piras, 2010).

Despite the increase in female labor participation, this continues to have several problems, according to the World Economic Forum (WEF) according to the report on the Global Gender Gap 2016 that gender equality in economic activity and Labor will be possible in 170 years (Hernández, 2016). Similarly, the

2009 report indicates that the gender gaps with the greatest degree of relevance in Latin America and the Caribbean are in the sub-indices of economic and political participation.

The gender gap in the business sector increases in developing countries, these being the majority of the countries in the Latin American and Caribbean region, where only 22% of women work independently (Hellen, 2010).

SMEs that are led by 51% by women entrepreneurs generate an important contribution to the economy representing 31% to 38%, which constitutes 8 to 10 million, in formal SMEs in developing countries. Female entrepreneurship is composed of micro-sized SMEs 32% to 39%, small size 30% to 36%, medium-sized 17% to 21% (Shukla, 2011).

Despite these figures, according to a study by McKinsey of the IFC (2011), women-led businesses are restricted in their growth path with a reduction in their per capita income growth rate by 0.1 - 0.3percentage points.

Entrepreneurship in Mexico

Mexico where the economic participation of women is only 43% compared to 78% of men. Despite constituting 51.2% of people enrolled in postgraduates, only 29% have leadership positions in companies, 23% in intermediate positions and 5% in board of directors. They have a salary gap with respect to the same work performed by the male gender from 15% to 20% and in leadership positions up to 40% (UN Women, 2016).

According to the 2016 State Competitiveness Index composed of a statewide survey of 32,000 people, a sum was added to the weights of each indicator at the state level, defined as the normalized values from 2001 to 2014 multiplied by the weight of each indicator. The indicator that had an increase of 160 in its weight and has remained constant until 2014 was the index of labor informality between women and men. The indicator of economically active women only increased in their weight 60 staying relatively equal until 2014. The wage equity indicator had an increase of 30 in their weight and has only increased 30 until 2014.

Also, according to the World Economic Report Forum (2017) worldwide it can be seen that there was a stagnation in the progress of the global index of gender equity, but in contrast in Mexico this had a decrease

THEORETICAL FRAMEWORK

The success of a company in e-commerce depends on various factors that are classified in 3 main categories:

1. Characteristics of the website
2. Characteristics of the consumer

CHARACTERISTICS OF THE BRAND

1. Characteristics of the Website

They are integrated by the attributes of the website that have an influence on the consumer's intention to purchase. These include:

a. Aesthetic Appearance

In the online shopping environment, visual elements can be used through the use of images, videos and other interactive features (Kim, et al, 2005). Being considered aesthetic appearance as a positive sensory experience that being the element that has a greater influence on the emotional experience of the consumer (Nasermoadeli, et al, 2013).

The aesthetic appeal on websites directly influences the internal affective state causing a sense of connection through images (Wang, et al, 2011).

b. Experience Flow

It is defined by Kim, Suh & Lee (2013) as consumer behavior in the interaction of man and computer. That is, your attention is totally focused on the activity you are doing online. This state of immersion is integrated by emotional and cognitive factors, and its interrelation with the flow components necessary to have skills and controls to interact with the website (Rose, et al, 2012).

2. Consumer Characteristics

In addition to the computer factors, the specific characteristics of the consumer also influence the decision of online purchases through the attitude towards the website (Hausman & Siekpe, 2009). Cowart & Goldsmith (2007) mention that the intention to participate in purchases through the internet is related to the styles in the decision making of consumers, where the objectives of the consumer are the drivers that allow him to experience the pleasure of acquired assets (Balaji, et al, 2007).

One of the factors that affect consumer decision-making is gender, this was demonstrated in a study conducted by Hui & Wan (2007) who evaluated the purchase of clothes online, discovering that in the female gender there is a certain degree of uncertainty due to the lack of satisfaction caused by the experience of buying the product that was generated physically by trying on clothes, generating a lower degree of cognitive and affective attitudes in the intention to buy online unlike men. For the male gender where interactivity has a positive impact, a friendly interface, and sufficient information in web design, which leads to a faster purchase decision (Ganguly, et al, 2010).

Likewise, the consumer culture has a vital role in decision-making in e-commerce, for the mitigation of its effects the design of the website must allow simple navigation, greater interactivity and have the necessary information to facilitate the purchase decision (Cowart & Goldsmith, 2007). For example, trust has a great value for the consumer in the West (Chen, et al, 2012).

a. Behavior

In consumer behavior, the emotional state related to enjoyment has a relationship similar to pleasure and excitement (Penz & Hogg, 2011). Enjoying purchases has an important impact on the flow status of buyers, generating an intention to revisit the websites (Kim, et al, 2013), exposing a direct relationship between flow and affection (Novak, et al, 2000) .

When a decision is made, the emotional and cognitive state of an individual guides him to the evaluation of the perceived risks and benefits of the decision that leads him to a final decision, later said process works as a feedback mechanism that will affect future decisions (Gutnik, et al, 2006).

Both emotional systems for decision making are integrated by:

- The analytical system is defined by Epstein (1994) as the involvement of conscious cognitive process that uses various algorithms and normative rules to generate logical behaviors that are oriented to reason.
- The experiential system being conceptualized by Slovic, Finucane, Peters & MacGregor (2004) as the use of past experiences, associations related to emotion when making decisions, taking into account to a greater extent the unconscious process than the conscious one.

Emotions have an influence on decision making, it also has indirect effects on the behavior of the individual through the implicit configuration of cognitive representations and this has positive or negative effects depending on the type of emotion such as anger, fear, happiness or the pleasure (Forgas, 2001).

3. Characteristics of the Brand

The intention to make an online purchase depends on the characteristics of the brand and the type of goods offered on the website, those that present a greater ease for sale online are the search products compared to the goods of experience (Moon, et al, 2008). The characteristics also influence the presentation in the former, which can lead to positive consumer participation in online purchases (Won Jeong, et al, 2009). In addition, offering sensory information generates pleasure and a positive perspective on consumers (Lian & Lin, 2008).

a. Products and Attributes of the Company

The purchase decision of consumers is faster when they have enough product and company information (Davidson, et al, 2000), showing a directly proportional relationship between the attitude of the buying behavior with the level of information of the good (Chiou, 2000).

In the purchase intention when a consumer acquires products via online, the predictive factor that has a greater relevance is the search for information, in addition to having an impact on the perceived risk of behavior, increasing their tendency to buy the product (Nowlis & McCabe, 2000; Phau & Poon, 2000).

b. **Perceived Utility**

Perceived utility is defined as the degree to which a person believes that using a particular system will accelerate their personal growth and improve performance in their work (Davis, 1989).

It is one of the factors with a greater degree of relevance in behavior when a decision is made and is related to convenience and ease of use (Davis, Bagozzi & Warshaw, 1989).

METHODOLOGY

Based on the needs of the study based on the information obtained from research files, the methodology used in the work was as follows:

- Documentary research. The research is documentary, depending on what was proposed by Pasteur (2013) uses documents, collects information, analyzes and presents results. It was used in the study in order to collect the documents that may be essential to understand and contextualize the study.
- Correlational Research. Allows to relate the variables of the problem in a particular context (Baptista, et al, 2010). One of its main characteristics is that it allows examining the relationship between the variables looking for their association but it is not necessary to find their causal relationships (Bernal, 2010).
- Quantitative Approach It is defined by Tamayo (2010) as the measurement of the variables and their relationship through a verification to test the hypothesis and validate their theories, offering the possibility of having a broader approach to women in developing countries.

The instrument of the present investigation is a questionnaire, it is integrated by the variable characteristics of the web page, which was carried out through the information adapted from the thesis investigations of: Anen (2007), Karimi (2003) and Cheung (2015).

The second variable characteristics of the consumer, was generated with the information adapted from the thesis research of: Anen (2007), Karimi (2003), Gutnik, Forogh, Yoskowitz & Patel (2005), and Rohan (2013).

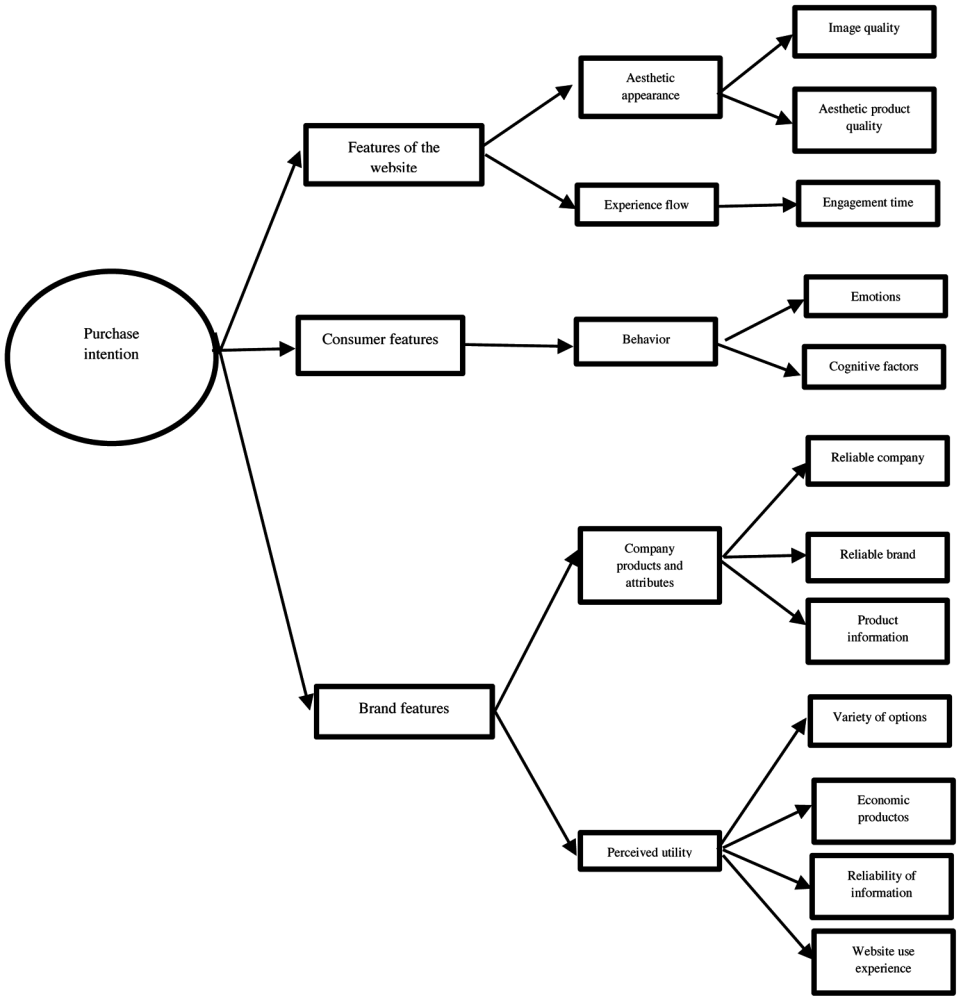
The third variable characteristics of the brand, was carried out with the information adapted from the thesis research of: Anen (2007), Karimi (2003) and Leelayouthayotin (2004). (See figure 2)

SOLUTIONS AND RECOMMENDATIONS

The reliability of the design of the data collection instrument was verified through a reliability analysis in the SPSS software calculating the Cronbach Alpha where the items measure the same construct and are highly correlated (Castañeda, at el, 2010). Of the elements analyzed, a reliability of 83.0% was obtained, which is considered high according to the classification of Anastasi & Urbina (1998) (See Annex 1).

In addition, the Kaiser-Meyer-Olkin (KMO) test was performed for the Analysis of the components with Varimax rotation that between closer to 1 has the value obtained implies that the relationship between the variables is high (Benavente, et al, 2011). The value of KMO is 0.807 which is considered remarkable. Likewise, the Bartlett sphericity test was carried out, where, if it is less than 0.05, it is accepted as a null hypothesis so that the factor analysis can be applied (ibid, 2011). Its significance is 0.000, so factor analysis can be applied. (See annex 2)

Figure 1. Proposed model
Source: Own elaboration



For the evaluation of the applicability of the questionnaire, it begins with the factor analysis with varimax rotation defined as the simplicity of a factor by the variance of the squares of its factor loads in the observable variables (Pérez, et al, 2004), this is for the interpretation of the factors in a faster way, because examining the characteristics of the variables of a group associated with a certain factor allows to find the common features that allow the identification of the factor and provide the denomination that respond to common features (Pérez, et al, 2004)

In addition, the ANOVA test was performed, this type of analysis will allow measuring the level of cause and effect that exists between an independent and a dependent variable, thus explaining which hypotheses are tested and which are rejected (Hernández, Fernández and Baptista, 2010). The F or F-test statistic is obtained from the estimation of the variation of the means between the groups of the independent variables and their division by the estimation of the variation of the means within the groups, if the means between the groups have a great variation and the average within a group varies little, that is, there is a heterogeneity between the groups and an internal similarity, the value of F will be high

and the variables will be related; in terms of the ANOVA analysis of a factor that has a higher F will indicate a greater difference and therefore there is a stronger relationship between the variables, also the more the average of the dependent variable differs between the groups of the variables The higher the independent value will be the value of F. Following the 95% confidence level when its significance is less than 0.05 the two variables will be related (Cárdenas, 2015).

Subsequently, for the evaluation of the model, linear regression was used, being defined by Pérez (2011) as the explanatory determination of the functional that relates the variables. R^2 is an index that describes whether the data fit well in a straight line; Pearson r indicates the strength and direction of the relationship between two variables, varies between -1 (a perfectly negative relationship between the two variables) and 1 (a perfectly positive relationship between the two variables), a negative relationship, indicates that as that one variable increases and the other decreases. Its descriptive interpretation according to Gilford (1954) adapted according to Mejía (2009): (See table 2)

Table 2. Pearson's descriptive interpretation r

Value	Range	Descriptive Interpretation of the Correlation
r	<20	Slightly insignificant
r	0.21 - 0.40	Low. Defined but low
r	0.41 - 0.70	Moderate, substantial
r	0.71 - 0.90	Marked, high
r	0.90 - 1.00	Very high, very significant

Source: Guilford (1954). Adaptation Mejía (2009)

In addition, the Beta coefficient (standardized) was analyzed, which indicates the explanatory hierarchy of the independent variables based on the explanatory weight in relation to the dependent variable. Having a significance of less than 0.05, it is assumed that 95% confidence of the independent variables contribute significantly to the model. The Beta coefficient (not standardized) indicates for each unit that the independent variable increases as the dependent variable increases (Santana, sf).

Finally, to analyze the relationship between the different variables for testing the hypothesis, a non-parametric analysis was carried out using the Kruskal Wallis test. It was used to test the hypotheses when exposing if there is a difference between the medians, when the value of the probability associated with the statistic is above the level of significance of 5% or 0.05 the null hypothesis is accepted when the theoretical value exceeds statistical. (Reidl, at el, 2010). (See table 3, 4 and 5)

FUTURE RESEARCH DIRECTIONS

In this article the use of any neuroscience technique was not involved, which cannot fully illustrate this particular aspect of the model regarding our current study.

Within the limitations of the thesis are that it is not a parametric statistic, because to perform a parametric analysis it must start from the following assumptions:

Table 3. Independent variable analysis

Dimension	Confidence Interval 95%	Cronbach's Alpha	KMO	Barlett Test
Web page characteristics	The intervals are represented by normal distribution. The confidence interval for the averages are quite robust and not very sensitive to the violation of the assumption	0.704	0.765	0.000
Consumer characteristics	The intervals are represented by normal distribution. The confidence interval for the averages are quite robust and not very sensitive to the violation of the assumption	0.828	0.781	0.000
Brand characteristics	The intervals are represented by normal distribution. The confidence interval for the averages are quite robust and not very sensitive to the violation of the assumption	0.753	0.803	0.000

Source: Own elaboration

Table 4. Simple

Regression Simple Regression			
	1	2	3
Tests	**Website**	**Features Consumer**	**Characteristics Brand Characteristics**
Value P e 95% Confidence	Interval 95.0% confidence intervals for the average: 0.0 +/- 0.198422 [-0.198422.0.198422		
Constant	- 1.10	- 0.01	- 8.39
B	0.599 ***	0.351 ***	0.750 ***
ANOVA (F)	17,526 ***	16,082 ***	20,842 ***
R2	71.1%	94%	85.9%
Pearson r	0.843	0.969	0.927

Source: Own elaboration

Table 5. Multiple

Regression Multiple Regression			
	1	2	3
Tests	**Website**	**Features Consumer**	**Characteristics Brand**
Constant	-1.51		
B	0.221 ***	0.154 ***	0.887 ***
ANOVA (F)	69.547 ***		
R2	77.1%		
Pearson r	0.878		
Kruskal Wallis	89.2%	90.4%	90.3%

Source: Own elaboration

1. The population distribution of the dependent variable is normal: the universe has a normal distribution.
2. The level of measurement of the dependent variable is interval or ratio.
3. When two or more populations are studied, they have a homogeneous variance: the populations in question have a similar dispersion in their distributions.

Parametric statistics need to meet four requirements to apply:

1. The dependent variable must be distributed normally or very similar.
2. The homogeneity of the variances when comparing groups should have the same dispersion with respect to the average of the dependent variable.
3. Assignment and random selection of groups (completely random sampling)
4. The dependent variable is measured at the interval or ratio level (Reidl, et al, 2010).

CONCLUSION

Neuroeconomics can provide the enrichment of specific economic models with the option of neuro-psychological penetration.

It is necessary to implement in the e-commerce consumers of the exponential SMEs of the artisanal industry the knowledge of the discipline of neuroeconomics because the brain activity represents ¾ of the decisions taken, likewise each process involves the neurons that influence a particular behavior, In addition, the network of neural connections in the brain changes as the person acquires knowledge and experience. Therefore, neuroeconomics plays an important role in achieving the objective of better operational efficiency to accelerate market reactions and increase consumer expectations

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KEY TERMS AND DEFINITIONS

Neuroeconomics: Camerer (2008) defines it as a branch of economic behavior that expands behavioral economics by using brain activity to measure biological and neural processes when a person chooses, trades and trades. In contrast, Zak (2004) points to it as an extension of studies of economic behavior and bioeconomy.

Chapter 11
Managerial Decision Support in the Post-COVID-19 Era:
Towards Information-Based Management

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ABSTRACT

The COVID-19 pandemic accelerated trends to digitalization and automation, which allow us to acquire massive datasets useful for managerial decision making. The expected increase of available data (including big data) will represent a potential for an increasing deployment of management decision support systems for more general and more complex tasks. Sophisticated decision support systems have been proposed already in the pre-pandemic times either to assist managers in specific decision-making processes or to perform the decision making fully automatically. Decision support systems are presented in this chapter as perspective artificial intelligence tools contributing to a deep transform of everyday management practices. Attention is paid here to their new development in the quickly transforming post-COVID-19 era and to their role under the post-pandemic conditions. As an original contribution, this chapter presents a vision of information-based management, which far exceed the rather limited pre-pandemic visions of evidence-based management focused primarily on critical thinking.

INTRODUCTION

The COVID-19 pandemic hit the global economy hardly and influenced various aspects of the society worldwide in a complex way. In fact, the society and the volatile economies cannot be expected to return completely to the state before the crisis. Foss (2020) claimed that the COVID-19 outbreak revealed weaknesses in current strategic managerial decision making and that organizations strong in digitalization passed through the crisis more smoothly. The world has changed greatly within the critical year 2020 and pre-COVID-19 experience of managers turns out not to be useful in certain fields. On the

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other hand, the accelerated digitalization and automation as the consequences of the pandemic represent new opportunities for management decision making and particularly for the development of management decision support systems. In fact, Verma & Gustaffson (2020) recommended to rely on artificial intelligence tools in management because of increasing uncertainty in world trade or heterogeneity of customers, who are reshaping their consumer habits.

Managerial decision making naturally takes place within a given economic environment. The economies worldwide were strongly affected by the pandemic and the recovery will be painful, even if there was no other wave of the pandemic or none other short-term disruption. Economic losses and short-term recessions with an increase of unemployment and poverty as consequencies of the pandemic are currently believed to be very heterogeneous, as different countries have different level of economic resilience. In spite of reduction of travel, tourism and hospitality, globalization of the economies will continue and companies desiring to expand will have opportunities to fill the gaps e.g. in international trade to replace a temporarily lower supply of goods or in industrial production based on quickly implemented innovations. Let us now discuss a couple of examples how managerial decision making is affected by the particular situation due to the COVID-19 outbreak in 2020.

Consumer behavior seems to be modified due to the pandemic and Donthu & Gustaffson (2020) claimed these modifications to remain forever. In fact, customers started to vary their shopping behavior quite significantly; a prominent example is their adherence to e-shops, often focusing on those with convenient forms of delivery. Software tools are able to overcome managers in marketing decisions e.g. for a deeply segmented market with customers divided to clusters (groups) according to their lifestyle, social status, opinions, interests, and activities.

Neither can strategic management much rely on pre-COVID-19 concepts, as the economies became more vulnerable (non-robust). To illustrate how managers (or investors) have to rethink basic (macro) economic concepts, let us mention the TTCI (Travel & Tourism Competitiveness Index) presented by the World Economic Forum. TTCI evaluates the tourism infrastructure every year for every country, while we believe that the role of hygiene factors demands should be much increased compared to pre-COVID-19 numbers; in tourism investments, it is thus necessary to put a great emphasis on hygiene and safety compared to pre-COVID-19 recommendations (Kalina et al., 2020).

Apart from economic transformations worldwide, technological progress represents another consequence of the COVID-19 pandemic. Various advanced technological innovations allow to solve challenges presented by the pandemic, which affected practically all areas of human activities. Of course, the pandemic accelerates the digitalization processes, which started already beforehand (Salminen et al., 2017). The novel technologies introduced after the outset of the pandemic include innovations for new working trends (platforms for work from home or team collaboration hubs), fast 5G-networks, payments by credit card, online chat apps for e-shops, mobile applications (technically very different from web apps), etc. In fact, an extensive digital transformation of managerial processes in companies will be necessary already in the near future in order to survive in the business transitions. We belive that the technology for data collection and analysis will be more accessible, and we expect in accordance with Varian (2014) that managers (rather than statisticians) will be more involved in the data analysis. On the other hand, an ongoing digitalization may put managers under even greater pressure, so that they may even face negative health consequences, as warned by Zeike et al. (2019). Apart from digitalization, automation processes will be able to replace employees. Automation is also connected to the so-called internet of things, i.e. connecting and integration of technologies (e.g. cooperation of robots within industrial production processes. Both digitalization and automation lead to a production of data, which

represent the basis for managerial decision making and the importance of management decision support systems will undoubtedly rise in the post-COVID-19 era.

The objective of this chapter is to combine a description of principles of management decision support systems with a presentation of their altered role with new opportunities in the post-COVID-19 era. The next section describes possible sources of data useful for managerial decision making; in this aspect, the COVID-19 pandemic launched permanent transforms of everyday management practices (e.g. by accelerated digitalization and automation processes). Then, the following section presents an overview of recent management decision making systems and their particular management tasks. Further, methods for analyzing big managerial data are described together with a current shift towards robust data mining (see e.g. Kalina & Vidnerová (2020)) as a consequence of the economic crisis and disruptions caused by the pandemic. We also discuss credit risk management as a specific subfield. Because we aim at a synthesis of particular effects of the pandemic on the management decision support systems, we present a vision of information-based management, which far exceeds recent attempts for promoting evidence-based management. At the same time, we also claim that managers will have to rely more intensively on their own analysis and interpretation of available (possibly big) data in the post-COVID-19 era.

DECISION SUPPORT IN MANAGEMENT

The amount of data with a potential to improve managerial decision making was rising enormously already in the pre-COVID-19 era (Taylor et al., 2014). Decision making can be characterized as the most important managerial task and the post-pandemic era brings novel challenges and complications. As the economies worldwide are undergoing transformations at the highest pace in the history, managerial decision making has been exposed to larger time pressures than in any era before.

The decision making in the post-pandemic era has to be processed quickly. At the same time, it is a great advantage to understand why a particular decision (especially if this is unpopular) is recommended. The resulting decisions have to be communicated with honesty and empathy and executed transparently and again promptly. The decision making is not made in an academic vacuum, but under complex conditions of the unpredicable socio-economic environment, which as such undergoes fundamental transforms. To a large extent, managers have to get along with limited personal contacts (due to a shorter time spent in offices) or business journeys; in fact, a remote work revolution was launched in May 2020 when Twitter as the first major company allowed their employees to work from home forever. The social distancing on online platforms however limits exchanging ideas (especially non-verbal communication) during meetings or brainstormings, because humans are not evolutionary equipped for online communication. Still, management decision making tends to involve teamwork to a larger extent than in the pre-pandemic era, just like taking the right actions.

In general, managerial decisions may be related to a variety of managerial tasks, including employee and customer safety, business strategy, or tough steps to retaining financial stability. Retaining business resilience in the risky reality of the transforming economies involves decisions, which may destroy long traditions accepted in the organizations for decades. These may be related to marketing, advertisement campaigns, personnel policies, support of individual teams within an organization, innovation management etc. Examples of decisions difficult due to the pandemic situations may include:

- In November 2020, the management of Škoda Auto, the Czech automobile manufacturer and part of Volkswagen Group, announced the production of Škoda Superb to be moved to Bratislava, Slovakia.
- Purchasing perishable food in the food service business should reflect predictions of the epidemiological situation. This is the experience in the Czech Republic in 2020, where restaurants had to remain shuttered during the first as well as the second wave of the pandemic with massive financial losses. Nevertheless, modeling the development of potential next waves of the pandemic is difficult even for experts, especially if many conspiracy theories con the topic accompanied both the first two waves of the pandemic.

Together with the recent technological progress, accelerated by the pandemic, there currently occurs a digitalization of management processes connected with an increasing availability of data from various sources and in diverse formats. Of course, the new technological solutions will remain available also after the pandemic. Analogously, significant technological progress was achieved during or shortly after World War II; there is however a remarkable difference between the clearly arranged world after the war and the world after 2020, which is fulf of uncertainty.

Big Data are currently (but slowly) beginning to establish their position in management (Bridge & Dodds, 2019), allowing to improve the multicriterial and multidisciplinary decision making processes of selecting an activity or series of activities among several alternatives. The advent of data-driven decision making continues in the post-pandemic era with an accelerated speed and thus contributes to deep transformations of everyday management practices. The main features of Big Data can be described as their uncertainty together with high complexity. Thus, more than ever, decision making in the post-pandemic era requires to integrate uncertainty and data imperfections as one of the aspects with an influence on practical managerial decisions.

DECISION SUPPORT SYSTEMS IN MANAGEMENT

Decision support systems (commonly abbreviated as DSS) can be characterized as complex software systems or artificial intelligence tools allowing to either assist humans in decision making (i.e. requiring human steps), or to perform the decision making fully automatically. The literature devoted to decision support systems is usually focused on software engineering aspects, without taking any specifics of management applications into account. Vaughn (2007) declared critical thinking to be the basis of managerial decision making; we agree that this was true at the beginnings of the digitalization era. This section presents decision support systems as tools contributing to acquiring knowledge from management data and focuses also on their new role in transformed post-pandemic conditions.

To describe the historical development of management decision support systems, their research and first management applications started already in the 1970s. However, these were essentially different from our current understanding of decision support systems. These first systems were namely rule-based systems or expert systems exploiting specialized knowledge and skills, as overviewed e.g. by McCosh (1978) or later by Turban (1995). In other words, (formalized) knowledge and skills represented the input of these systems; therefore, they were suitable only for relatively simple decision tasks.

To stress the difference, the decision support systems shortly before the COVID-19 pandemic were able to learn their knowledge from a (possibly large) training database (i.e. from data) using probabilistic

reasoning and methods of statistics or machine learning. Examples of pre-pandemic decision systems will be given below. It is however surprising that even a recent book on management decision making by Marugán & Márquez (2017) focused only on standard (and rather simple) analysis tools, such as decision trees or binary decision diagrams, but did not discuss any decision support systems learning their classification rules from given data.

Principles

As they compare different possibilities in terms of their risk, management decision support systems represent potentially powerful and helpful software tools for the decision-making process. They are capable to solve a variety of tasks, mainly to deduce conclusions from data, but also (as a by-product):

- To analyze different information components;
- To extract information of different types;
- To search references to external information sources (e.g. to browse the whole internet);
- To search for contradictions in a management strategy or to create notifications for managers;
- To prioritize decision steps if these have to be executed under time pressure, which is an ability especially desirable in the busy post-pandemic era.

They are especially suitable for (top) managers within large organizations, who spend much of their time using their management information system. They are often described as tools within the very broadly defined concept of Business Intelligence, where the latter concept corresponds (simply) to artificial intelligence tools for business applications.

Technological aspects of management decision support systems have been desribed in detail by Laudon & Laudon (2020). Their monograph is however focused on solving technological (and highly technical) aspects, such as design, implementation, evaluation, data flow and data privacy, cloud computing, or object-oriented technologies within decision support systems. From the data analysis point of view, the book by Sauter (2010) warned about dangers of having low-quality data, but did not present any particular data analysis tools. In the post-pandemic era, the main technical issue of management decision support systems seems to be their connection (interoperability) with management information systems (MIS) and at the same time with communication platforms used by managers to overcome social distances.

Prominent Examples

The overview of recent management decision support systems presented in this section aims at describing particular managerial tasks, which can be currently solved by the software tools, and at explaining how the decision support is provided. It turns out that many of the available systems use multicriterial optimization, while we consider statistical systems (i.e. learning classification rules from data) to be more perspective for the post-pandemic era and more suitable for contaminated data suffering from a large uncertainty. Some of recent systems only assist managers, such as in Yan (2018) or King et al. (2015), while other systems are able to make the decisions automatically, such as those of Yuliantini et al. (2019) or Rodríguez et al. (2020).

The system of Yan (2018) models and predicts the business success of technological innovations and relates them also to the management strategy of the given company. The modeling within the system is

performed by computer simulations of various scenarios (alternative views of the future) and presents their comparisons to the user (i.e. manager). King et al. (2015) analyzed a broad portfolio of pay-per-click advertisement campaigns, which were tailor made for specific groups (segments) of customers. The campaigns were divided to successful and failures and the authors used an ensemble (combination) of several different classification methods to predict the profitability of new campaigns. A decision support system for the closed loop supply chain management within production planning and scheduling was proposed by Rodríguez et al. (2020). It is based on simulation scenarios, while a combination of decision trees with fuzzy logic was used to learn the optimal parameters of the scenario. As an illustration, the system was applied to optimizing the circuit of laundry within a hospital. All these references evaluated the level of preparedness of the common management practice to further digitalization quite critically, while the presented systems are able to solve only specific tasks related to individual managerial decisions.

A theoretical background including a decision model for risk management was described by Yuliantini et al. (2019). Particular managerial tasks covered by the model include risk identification, risk analysis, risk evolution, and treating the risk, i.e. all components of predicting or monitoring the evolution of potential adverse events. While no real situation is presented in the paper, the authors recommended to analyze a list of alternatives for each risk situation; selecting the optimal approach is then a simple comparison of results for individual alternatives.

Agricultural and environmental management. A decision support system denoted as AgroDSS was proposed by Rupnik et al. (2019), which is tailor-made for the needs of individual farmers. Its aim was to optimize returns on inputs for an individual farm while preserving resources. The system is based on simulating scenarios e.g. for growing crops or water savings, exploiting agriculture knowledge and population dynamic models. It is also helpful for an individual farmer by recommending e.g. to purchase a proper amount of insecticide spray. A decision support system for transport management, e.g. for selecting a logistic provider (logistic and transportation company) for agricultural supply chain, was proposed by Yazdani et al. (2017). It evaluates and ranks individual logistic providers and performs the final decision in the context of multicriterial optimization, according to the costs as well as to other criteria of distribution supply chain. The system of Sadeghi-Niaraki et al. (2020) for waste management allows to include information provided by volunteers, who constantly monitor their neighborhood. The system is useful for participatory environmental monitoring and protection. It uses multicriterial optimization, allowing to combine objective data with the voluntary reports, to recommend decision for solving pollution problems. The decision support system of Santos-Clotas et al. (2019) was designed to assist in biogas upgrading in the process of improving raw biogas. It searches for a singular pollution problem in a shortened time and uses multicriterial optimization for recommending decisions for exploiting the most convenient technology for removing pollutants from biogas. Using such improved biogas as a sustainable resource also practically contributes to fighting against climate change.

Policy management. So far, decision support systems have received very little attention in policy making worldwide, although they have a potential to assist with decision made by a state organization, or a group of state organizations, at a national, regional, or local level. They can compare simulated scenarios and political models by means of tools of game theory. It seems that little progress has been achieved in evaluation and comparison of various policy approaches, and in exchanging information among policy makers or managers. Barriers preventing from developing decision support systems for policy making were reviewed by Oliver et al. (2014), and lack of managerial support was claimed there to be the main barrier. So far, the public service remains unprepared for exploiting diverse forms of evidence, and the available literature can be characterized mainly as abstract discussions of arguments,

why decision support systems for policy making would be useful at all, and if a subsequent evidence-based policy making would be possible.

Specific Subfield: Credit Risk Management

Let us now discuss credit risk management in more details as a specific practice influenced by the financial instabilities in the post-COVID-19 era. As their consequence, banks have to perform loan (e.g. mortgage) approval processes more carefully, so that it is now harder to get a loan compared to the pre-pandemic era. In addition, the process of loan approval has to put more weight on specific factors (variables) after the pandemic, which include indebtedness and liquidity, while pre-pandemic profitability is an example of a factor, which is less useful in the post-pandemic era. If the client is a company, banks should additionally know whether it is focused on one of high-risk industries or services, or whether it is located e.g. in a recently launched green zone for attracting new businesses. Wakode (2020) proposed new tools for visualizing credit risk according to a geographic (county-wise) model for credit risk. Many times, Big Data have been times applied in corporate credit scoring and prediction. The risk of a given bank is influenced by the effect of the post-pandemic economic damages on its clients (debtors) on the economic and social level, as particularly discussed by Chen et al. (2020). Burdina et al. (2020) pointed out that the uncertainty era increases also the risk of money laundering and financing terrorism by the borrowed money.

Credit scoring represents an credit risk management methodology for modeling and predicting the credit of individual bank customers. The banks must evaluate all individual clients (loan applicants) in order to decide to which of the two groups they belong:

1. Clients able to repay (redeem) the loan in time;
2. Clients likely to fail to repay the loan.

The models for the decision making are learned (trained) over a database of available data from the past, while the model must be only sometimes (e.g. once per two years) re-validated and/or updated based on more recent data; see Witzany (2017).

Specific decision support systems have been implemeneted and successfully applied to tasks of credit risk management already before the pandemic (Ignatius et al. (2018)). The system of Luo (2020), which aimed at assessing creditworthiness of companies before they lend money, was based on logistic regression modeling, which is currently the most common method in credit risk; if the two groups of clients (I and II) are imbalanced (unequal), the paper revealed that the classification suffers from such imbalanced situation and an improvement can be achieved using an oversampling strategy. This can be described as a technique for imbalanced classification based on random generation of new observations as combinations of the available ones. Big Data have been many

Upcoming Trends Towards New Sources of (Possibly Big) Data

Let us now take a closer look on sources of data in current management decision making practices, including potential sources of Big Data. The increasing level of digitalization and automation, launched by the COVID-19 pandemic, will naturally contribute to opening new original and creative ways for obtaining useful sources of (possibly big) data. However, the data in the post-pandemic era will be substantially

imprecise, as a consequence of the omnipresent uncertainty in the economies. Often, the more massive the data will be, the larger rapidity will be necessary to collect them; this is another cause of a low quality of the data, i.e. also of the subsequent decision making. Moreover, an even greater nonresponse than before can be expected in survey sampling. These tendencies open a door for using new non-traditional and more reliable methods for the analysis of the data, which will be discussed later. This section is aimed at sources of data and we believe that acquiring the managerial data in the post-pandemic era can be characterized by these trends:

1. More intensive analysis of currently available data will be performed;
2. Additional data will be acquired from current data sources;
3. Additional data will be acquired from new (non-traditional) sources, such as social networks.

We expect the dimensionality and complexity of new sources of management data to become bigger compared to the current state and we at the same time consider Big Data to represent a valuable capital with an opportunity for a dramatic change of current management practices. Big data, as repeatedly defined in the literature, are not only data with a large dimensionality, but also data in a variety of formats, with a questionable veracity, observed in a real time (with a possibly large velocity) and with other non-standard properties. Ogrean (2018) overviewed arguments that Big Data have already established as a self-standing new industry within the business and management ecosystems.

Sheng et al. (2017) recommended companies to adopt a data-driven strategy to acquire Big Data from various original sources. Finding new interesting sources of managerial Big Data often requires a large portion of creativity, which represents an investment which is worth. To give an example of finding useful data, tourist activity management may exploit data of mobile phone locations of individuals from the mobile network operator; these are helpful for decisions on tourism investments exactly on the most frequented locations (Pan & Yang, 2017). Still, it seems so far that Big Data will be more exploited in certain subfields of management (such as credit risk management) compared to others.

The data available to managers are often in diverse non-standard formats, which may also include:

- Predictions of macroeconomic time series; for example, tourism investing is naturally interested in the prediction reported in May 2020 by the World Economic Forum that global passenger traffic will not return to pre-COVID-19 levels until 2024.
- High-frequency time series or other forms of very granular (detailed) data, such as a time series of payments (incomes and expenditures) of a given bank.
- Text data, such as textual reports within a management information system (with the aim to perform their automatic analysis) or a series of tweets of customers of a given hotel (with the aim to perform an automated sentiment analysis).
- Soft data (such as opinions), such as subjective evaluations of a new product expressed in a questionnaire, are examples of data, which are unstructured, difficult to be quantified, or completely unmeasureable; in fact it remains unclear how they should be structured (formalized, quantified).
- (Anonymized) community mobility reports, which are currently presented by Google every week with the aim to model the movement trends due to COVID-19; such data are useful for decisions for tourism investments (e.g. restaurant acquisitions) or for finding an appropriate location for outdoor advertisements.

Decision support systems have the potential to perform the data analysis of data from various sources, and to yield recommendations for the decision making (especially if they contain also the most recent tools of Big Data analysis).

Analyzing Big Data

Due to the rising uncertainty in the data as a consequence of the COVID-19 crisis, we believe that there will be a tendency for management decision support systems to be based on statistical methods, especially those which are robust (resistant, non-sensitive) to the presence of outlying values (outliers) in the data (Kalina, 2014).

Management decision support systems use information (data from various sources in diverse formats) as the input; as a by-product, they extract knowledge from the given information. Let us make a clear distinction between information (in the form of available data) and knowledge (Zvárová et al., 2009). Information as such cannot be used for the particular decision making task, but only knowledge as useful (relevant) facts obtained from the (raw) information is exploitable within the decision making. We distinguish between two approaches for extracting the knowledge from the data:

1. Generating (formulating) hypotheses from data,
2. Analysis with a clear aim, i.e. verifying a certain hypothesis.

The first aim, which can be described as exploratory data analysis (EDA), is much more important for managent decision making than the second (confirmatory).

As we are convinced that the importance of management Big Data will rise in the post-COVID-19 era, we have to say that traditional statistical methods are unsuitable for any form of management Big Data (Choi et al., 2018; Laha, 2016). The whole process of Big Data analysis within a management decision support system requires to deal with difficulties due to non-standard properties of management Big Data, which were overviewed already above. While decision support systems can be characterized as successful innovative technologies, the task of transforming information from available data to knowledge is not primarily a question of technologies or software.

The crucial method for constructing the decision making rules is classification (classification analysis, supervised learning), which may exploit (exploratory) tools of multivariate statistics, machine learning (predictive data mining), information theory, or artificial intelligence including specific tools for Big Data (Athey & Imbens, 2019). Classification allows to

1. Construct (learn) a classification rule of management decision support systems over available data (training data),
2. Apply such rule to new (independent) data.

For example, fraud detection management can successfully exploit classification tools (Sheshasaayee & Thomas, 2018); particularly, the classification decides whether a particular operation represents a fraud or not. Still, methods for knowledge extraction from Big Data have obtained little attention in the literature on management decision making. Varian (2014) overviewed tools for analyzing Big Data in economic or management tasks, however without mentioning any machine learning tools. Logistic regression is the most popular statistical method for classification tasks in management, and is at the same

time reasonably robust (resistant, non-vulnerable) to the presence of outlying measurements (outliers) in the data (Kalina, 2012). Machine learning methods, such as decision trees or artificial neural networks, do not require specific probabilistic assumptions, so that they are extremely flexible. Also decision trees are very popular in management, as they are especially suitable for mixtures of continuous and categorical variables. Neural networks, which represent a generalization of logistic regression, suffer from the presence of outlying values in the data, e.g. caused by measurement errors. Therefore, the managerial data tend to be more heterogeneous, imprecise and contaminated. These may (and should) be analyzed by very recent tools of robust data mining, such as robustified neural networks, which are more robust (resistant, reliable) to data contamination or imperfections of various types. Indeed, intensive current research in statistics and machine learning has the aim to propose new robust multivariate methods tailor-made for classification of very complex data.

The analysis of managerial Big Data by traditional tools cannot be considered effective. We belive that the effectivity may be increased by exploiting either deep learning or dimensionality reduction. The same is true for data which are high-dimensional, i.e. with a large number of variables but a small number of observations (Kalina, 2017).

Dimensionality reduction (complexity reduction) is generally recommended as the initial step of the analysis of data with a large number of variables. It makes not only the cumbersome computations simpler, but trimming away some information may also (although this may seem paradoxical) improve the result of the classification analysis. The idea of dimensionality reduction (reducing the set of variables to a too small number of relevant ones) was recommended by Varian (2014); on the other hand, practitioners have the experience that dimensionality reduction methods work very well in theoretical papers, but are much weaker when applied to real data (Harrell, 2015). In the context of decision making, we recommend only supervised approaches to dimensionality reduction, searching for variables with the largest relevance for the classification task under consideration, such as the (robust) minimum redundancy maximum relevance approach of Kalina & Schlenker (2015).

VISION OF INFORMATION-BASED MANAGEMENT

Evidence-based Management

Current practices of management decision making are often confronted with principles of evidence-based management, where the latter are inspired by the evidence-based medicine (Straus et al., 2018). We hold the opinion that due to COVID-19 consequences, the visions of proponents of evidence-based management will be soon fulfilled. In fact, we believe that their visions will be soon much surpassed and we promote a new vision, which we denote as information-based management. Let us now start by comparing two concepts, which are far from being analogous: evidence-based management and evidence-based medicine. Indeed, we do perceive great conceptual differences, although they are sometimes considered as close counterparts; such incorrect interpretation is naturally supported by the fact that both concepts share the same abbreviation EBM.

Evidence-based medicine considers clinical decision support systems as its main tools. The biomedical research organized in randomized experiments allows to observe data, which are analyzed by statistical methods to obtain the biomedical knowledge (see e.g. Kalina & Zvárová (2013)). Therefore,

we understand the evidence (as a crucial concept within evidence-based medicine) as statistical evidence; in other words, the evidence is always valid only with some level of certainty.

Evidence-based management remains to promote nothing more than critical thinking, i.e. a scientific way of thinking, asking the right questions, thinking of assumptions behind available data, or being aware of limitations of the data (obtained e.g. in surveys). The aim of evidence-based management proponents is to persuade managers that they should finally start to look at evidence, as a reaction to current managerial strategies, which are narrative, subjective, difficult to be formalized, based mainly on personal judgement and disregarding available facts. Randomized experiments are hardly feasible in management decision making. Evidence-based management is motivated mainly by bad decisions, which quite often appear in the current management practice, and aims at their improvement. Numerous papers investigated whether evidence-based management practices are useful within a given organization or not, and mostly came (not surprisingly) to positive conclusions.

A detailed discussion of the concept evidence-based management is contained in the book by Barends & Rousseau (2018), which presented a praiseworthy popularization of elementary probability reasoning and descriptive statistics for managers. From the points of view of methodology, the book explained simple tools (such as variance), but also recommends hypothesis testing and mainly the Bayes formula. The book claimed that current management decision support systems are immature and insufficient to contribute to evidence-based management; still, it is surprising that the book did not mention any of such available systems. In addition, Barends & Rousseau (2018) did not (in our opinion) succeed in understanding the difference between information and knowledge.

Towards Information-based Management

As stated already above, technological innovations introduced in the post-COVID-19 era, including management decision support systems, will serve as accelerators of digitalization and automation. Organizations investing to hardware restoration or robots will have access to Big Data of various types and formats from unthinkable sources with a potential to decision making. At the same time, these organizations will have to invest to decision support systems to retain their competitive advantage. All such innovations contribute to deep transform of the whole society and decision support systems represent will play the role of catalysators of transforms of everyday management practices.

We can thus say that decision support systems contribute to transforms of management, which we describe as its informatization. The informatized management will be deeply penetrated by artificial intelligence. The core of the post-pandemic management will not be however a matter of information technologies, but will rather require to use quantitative methods allowing to transform information to managerial knowledge by using software as a tool. Already for a near future, the paradigm of evidence-based management should be replaced by deeper ideas going more beyond and we extend a development of a new form of management, which we propose to be denoted as information-based management. This is related to similar concepts, which have appeared in the literature recently, such as intelligent management (Aguilar & Garcia, 2018), intelligence-based management, artificial-intelligence-based management (Zhou et al., 2019), computational-intelligence-based management, or software-based management.

We believe that management decision making in the post-pandemic era will combine software analysis procedures with the intuition of human experts (and their tacit knowledge) and thus will always remain much subjective and non-scientific; the tacit knowledge represents a context-dependent practical

managerial knowledge (domain knowledge, expert knowledge) within the given management context. Particularly, we namely these main reasons for the irreplaceability of managers:

1. Management data as such are soft (opinions, feelings, subjective predictions), i.e. less objective and thus rather difficult to be formalized for artificial intelligence.
2. Human decision making as such combines two very different mental systems, namely analytical and intuitive thinking, as formulated again by Daniel Kahneman and popularized by an interesting book by Tetlock & Gardner (2016).
3. Software is purely utilitaristic, while managers do not have to blindly follow a focus on maximizing the profit and are able to consider also humanistic aspects, such as social responsibility or employee and customer safety.

Especially the third aspect is important due to the COVID-19 pandemic. Naturally, new trends of education of (future) managers will be necessary within information-based management as well, as we will now discuss.

Educating Managers

To keep up with the technological progress and with the transform of management practices after the COVID-19 pandemic, it will be necessary to reform the education of future managers, as well as life-long education of current managers. At any case, the post-pandemic era can be expected to put more trust in younger managers, who will be more often enabled to lead larger teams. Managers in the post-pandemic era will have to be equiped with important skills and competencies for their digital future (Iivari et al., 2020).

Particularly, we believe that in addition to computer literacy (sufficient at least to operate the decision system), managers should improve their statistical literacy, so that they can understand basic principles data-driven models and interpret the results reported by artificial intelligence. In addition to operations research, game theory or statistical quality control, which are currently known to well-educated managers, other fields will be necessary for managers as well, such as classification, Big Data analysis, time series prediction, or Monte Carlo simulations of management scenarios. We hold the opinion that considering and investigating the managerial potential of knowledge requires to understand the way how the particular knowledge is acquired. Thus, we agree with Stonebraker & Howard (2018); they described their experience with their own managerial university courses of evidence-based decision making, and mainly stressed that management students should learn methods for information gathering and analysis. Managers need to learn that they should perceive data as their allies or even collaborators in decision making tasks; this is true in spite of the fact that the same data complicate their lives (which in fact colleagues often do as well).

While the training of managers within MBA courses is very heterogeneous worldwide, they are often not trained for their important task of decision making. The Prague University of Economics and Business, where the author of this chapter collaborates, is currently offering an MBA program entitled Data & Analytics for Business Management. However, in its curriculum, there is no specialized course devoted to managerial decision making, although such courses are common for example within analogous programs in the United States. In our opinion, MBA programs in the post-pandemic era (naturally with e-learning elements) should also cover management case studies, theoretical models for decision making,

and also psychology, particularly the cognitive basis of (human) decision making. As investigated by the psychologist Daniel Kahneman, the Nobel Prize winner in economic sciences in 2002, human thinking is severely biased; especially in the post-pandemic era, fake news and cyber propaganda spread on social media and managers need to combat them to retain a realistic understanding of socio-economic processes.

CONCLUSION

The COVID-19 pandemic accelerated trends to digitalization and automation, which as their consequence allow to acquire massive datasets useful (not only) for managerial decision making. The expected increase of available data (including Big Data) will represent a potential for an increasing deployment of management decision support systems for more general (and thus more difficult) tasks. At the same time, the pandemic era reshaped behavioral habits of individuals and many of the pre-pandemic socio-economic habits will not return any more (Foss, 2020). This chapter presents decision support systems as tools contributing to acquiring knowledge from management data, focused on their new role, adaptations to the post-pandemic conditions, and opportunities for a new development in the quickly transforming era after COVID-19.

As an original contribution, a vision of information-based management together with informatization of management practices is formulated in this chapter. Such visions far exceed the (rather limited) visions of evidence-based management focused almost entirely on critical thinking. We expect a deeper penetration of tools of artificial intelligence and Big Data analytics to management, so the informatization does not consist primarily in using software tools, but mainly leans on a deep understanding of quantitative methods.

From the practical point of view, managers in the post-pandemic era have to face a situation which none of them has experienced before. They will need additional training to be able to combine analytical thinking with their tacit (expert) knowledge, to interpret software recommendations, to critically evaluate their assumptions, and to take into account that the results are valid always only with some uncertainty. Organizations need to invest to decision support systems, which will allow to obtain relevant knowledge from Big Data. In fact, organizations which remained weaker in digitalization are likely not even to have sufficient time to reorient themselves to new opportunities. It is the economic reality of the post-pandemic era that large organizations will obtain advantages over small and medium-sized ones by acquiring and deploying decision support systems and other efficient artificial intelligence tools.

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KEY TERMS AND DEFINITIONS

Automation: A transformation of any processes replacing human activities by computers (software or robots). It may take place e.g. in industrial production or complex business processes.

Big Data: Datasets of various types and formats with various non-standard properties, such as large volume, enormous complexity, or diverse quality, usually obtained in real time.

Decision Making: A multicriterial and multidisciplinary process of selecting an activity or series of activities among several alternatives.

Decision Support System: A complex software system allowing either to assist humans in decision making (i.e., requiring human steps), or to perform the decision making fully automatically.

Digitalization: A transformation (including improvement and possibly optimization) of business activities by means of digital and information technologies.

Evidence-Based Management: A management framework promoting transforms of current management practices, which should be based on critical thinking and elementary statistical analysis of available data.

Information-Based Management: A vision describing expected future management practices in the post-pandemic era, exploiting advanced tools of artificial intelligence to acquire managerial knowledge from available data (including big data).

Robust Data Mining: A quickly developing trend within machine learning aimed at a reliable analysis of complex data contaminated by outlying values.

Tacit Knowledge: In management, it represents any context-dependent practical managerial knowledge (domain knowledge, expert knowledge) available within the given management context.

Uncertainty: A key concept in information theory and statistics corresponding to a lack of full (deterministic) knowledge.

Section 3

Worldwide Practical Examples and Good Practices in the Context of the COVID-19 Pandemic

Chapter 12
Integrated Management Platform for Homeless People

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ABSTRACT

Some social phenomena affect sustainable development in the long term, and in this panorama, some solutions provided by organizations are labeled as social innovations and use more information and communication technologies as tools. The characterization of homeless people has implied the analysis of a vast legislated framework covering several areas, in particular about the National Strategy and the European Federation of National Organizations (FEANTSA). FEANTSA's objective is to prevent and/or alleviate homeless person poverty and social exclusion or are at risk of falling into this situation, encouraging, and facilitating the cooperation of all relevant European actors in this fight. The chapter describes the conceptualization of a technology platform to support the integrated management of homeless people in two social organizations. Some functional aspects of the prototypes are presented considering the main objectives of the project. In addition, some physical and technical details relating to the development of the data model are also shown.

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INTRODUCTION

Currently, the majority of organizations enhance the sharing of information using Information and Communication Technologies (ICT). Thus, the role of ICT in transforming a more sustainable society can provide added value in enabling information systems (IS) to be optimized in support of different types of business.

In this context, and in view of the pressing issue, the study of Y-Foundation (2019) mentions the prospects for eradicating HP by 2030 in order to boost services, housing and employment based on good practice. Thus, it is intended to describe the activities of survey and analysis of requirements that included the understanding of the application domain, the identification of the needs of stakeholders and to ascertain what should be built, the establishment of priorities in the requirements, as well as the verification and validation of requirements. Modeling notations were used to improve the structure and better understand the problem and its solution. In this phase, we proceeded to the selection of notations that are relatively easy to understand by stakeholders, thus opting for models of use cases in the notation Unified Modeling Language.

In the context, Digital Business Models gain popularity mainly in Pandemic times, with the importance of digitalization comes as transversal in all society. Social innovation is not an exception, and the trend verified in pre-pandemic period increase during 2020, ICTs appears to capture and create value for social sector and their stakeholders.

Unfortunately, the number Homeless Person (HP) has become an increasing problem, overcoming 150 million of such people worldwide. The global community has prioritized this problem, with the eradication of homelessness as one of the United Nations' sustainability goals for 2030.

This study is focused on the social sustainability, given the existing opportunity to develop new processes and technological capabilities, through the construction of networks of trust and of technological support, with the aim of achieving equality, cohesion and social inclusion regarding HP (Reis *et al.*, 2020).

The chapter aims to present the problem of aggregation and systematization of the information underlying HP, graphically presenting the functionalities and actors involved in the process. The chapter presents a contribution in the field of the characterization of Homeless Person (HP), promoting the social inclusion of people in situations of social vulnerability, (FEANTSA, 2019). It is expected to record the various valences of HP, namely professional experiences, families, personal interests, health situation, etc. allowing the identification of possibilities for social inclusion.

The chapter is organized into four sections. After this introduction, the most important topics of the literature review on the subject as well as the Design Science Research (DSR), adopted for the development of research are presented. Requirements engineering allows you to model a solution to the problem. Finally, the results and the main conclusions are presented.

STATE OF THE ART

The state of the art is based on a multidisciplinary vision in the context of the problem proposed in this chapter. Thus, themes are addressed in the field attending to the main topics, such as social innovation, sustainability, requirements analysis and the Sustainable Development Goals (SDGs).

Digital Business Models With Social Impact

The concept of the business model firstly is applied just in the business fields, nevertheless, recently expands and includes the social area. On the one hand, within the projects we understand as social entrepreneurship, an extensive set of authors appears to define the business model, including social impacts (Zott & Amit 2010; Zott, Amit & Massa 2010; Casadesus-Masanell & Ricart 2011; Osterwalder & Pigneur 2010; Carvalho et al, 2021). On the other hand, digitalization is a constant and is directly related to the societal challenges that are associated with the proliferation of ICT and the internet (Isaías et al, 2019). Nowadays, organizations and people in general are interconnected through digital devices connected to the internet, in contexts ranging from social networks, industry 4.0, internet of things, big data etc. This panorama comes more popular in the Pandemic times.

These Business Models reinforce the process of social innovation and are also referred on the literature as digital social innovation. This kind of innovation enables people to collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs, and at a scale that was unimaginable before the rise of internet-enabled platforms (Bria, 2015, p. 6).

Digitalization of the Business Models, could be driver for some realities (Zott and Amit, 2017):

- **Novelty captures** the degree of business model innovation (Example: Airnb);
- **Lock-in** refers to switching costs or enhanced incentives for business model participants to stay and transact within the activity system (Example: iTunes, iCloud);
- **Complementarities** refer to the value-enhancing effect of the interdependencies among business model elements (Example: eBay+PayPal);
- **Efficiency** is related to cost savings through the interconnections of the activity system (Example: Cross-docking /Wal-Mart).

In this context, digital business models can be understood as a possibility to take advantage or create value through digitalization, these models allow interaction between business partners, producers, consumers and even with the community. In other words, digital Business Models use digital technology to create, distribute or capture value (Rai and Tang 2014; Weill and Woerner 2013). In the global context we have several examples of digital business models, such as Apple or Uber has been changing the landscape of many traditional business models (Veit et al. 2014; Weill and Woerner 2013). In the same time, many business models that were born ‘offline’ are beginning the digitalization process and in Pandemic times this process were rapid and disruptive for a lot of businesses around world, because otherwise they lose profits and close.

The digitalization of global society, bringing technology and its impact to the sphere of social innovation. Thus, the concept of social innovation appears, which allows us to support the innovative process supported in digital tools, creating new online instruments (new ICT services). “Digitalize” social innovation can be seen as a set of socially impactful solutions involving ICT.

The European Union in 2012, identified a set of projects that facilitate social innovation through ICTs, this program has the acronym of Collective Awareness Platforms for Sustainability and Social Innovation (CAPS). These projects according to Bund et al. (2013), can be categorized as:

- Energy and environment;
- Social inclusion;

- Participation, democracy and human rights;
- Economy, production and consumption;
- Knowledge, science and information;
- Human Rights;
- Finance;
- Culture and art;
- Community;
- Work and employment;
- Recovery of neighborhood and family.

In this context, a social impact index was created that encompasses six categories that interconnect with the presented practical case:

- Impact on the community: improvement of social conditions;
- Impact on information: aggregate information in order to provide a better service;
- Impact on ways of thinking, values and behaviors: develop activities that promote the involvement of people in the community;
- Impact on education and human capital: promoting awareness-raising actions such a financial education;
- Impact on science and academia: involvement of teachers and students in the development of activities;
- Impact on employment: involve partners in order to create conditions to promote employability at the level of people in the community.

In addition, transversal indicators were created, which aim to measure the effectiveness, sustainability of the impacts of digital social innovation, namely: efficiency, effectiveness, sustainability, equity (European Commission, 2013).

In fact, digital social innovation is often supported in Digital Platforms. And in social panorama these platforms allow innovative proposals to solve social problems, allows the engagement of stakeholders, let society contribute with ideas and funding for social projects (e.g. crowdfunding), etc. Smith el al (2014) argued that the digital platforms have several parallels with grassroots innovations which are novelties considered and established by local communities in a bottom-up mode through the participation of various stakeholders, so as to solve problems they face in their local environment (Seyfang and Smith, 2007). To concludes digital social innovation is supported on digital platforms that is not a normal ICT tool, can be seem as platform that address the solution for a social problem. Next section approaches these topics attending to the sustainable development and SDGs.

Sustainable Development

The Brundtland Commission coined the term Sustainable Development in 1987 as the flagship to preserve the capacity of future generations to meet their own needs if the present necessities are covered (Brundtland, 1987).

According to Elkington (2001), sustainability must be analyzed following three dimensions: economic, environmental, and social (Triple Bottom Line). This means that in order to achieve sustainability, each

society must take proactive stances aiming this triple goal: economic efficiency, environmental preservation and social equity.

For Barbier and Burgess (2017), the aim of sustainable economic development consists in maximizing these three goals through an adaptive process of trade-offs that correspond to the intersection of the economic, environmental and social systems.

In September 25, 2015, the Sustainable Development Goals (SDGs) were formally adopted by the General Assembly of the United Nations (UN) as well as its Agenda 2030 for Sustainable Development (UN, 2015). The 17 SDGs are further decomposed into 169 targets, currently with about 230 indicators. The SDGs fundamentally target at "5P" (see Figure 1), which include: People, Prosperity, Partnership, Peace and Planet.

Figure 1. Five P's of SDG
Source:(Wu et al, 2018)

As part of the HP study, we highlight the following SDGs. We intend to link the goals of the SDGs to the problem under study, since we consider that this multidisciplinary and aggregator framework by the essence of shared information, can contribute to:

1 - No Poverty: poverty is a condition that affects the access to worthy housing, adequate food, health care, proper education and access to work, allowing the personal development, i.e. it is interconnected with several as SDG 2 – No Hunger, SDG 3 – Good Health, SDG 4 – Quality Education and SDG 8 – Decent Work and Economic Growth.

9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation: Develop quality, reliable, sustainable and resilient infrastructures, including regional and cross-border infrastructures, to support economic development and human well-being. Research and development comprise all creative work carried out in a systematic way, with the goal of broadening the range of knowledge, including societal knowledge, as well as the use of this pool of knowledge in new applications.

10 - Reduced Inequalities: social inequalities result from multiple conditions, such as territorial inequalities, gender or age, social class, resources, educational, among others. In this sense, this SDG seeks to combat socio-economic inequalities and regional disparities by developing strategies to promote social justice, coupled with equal opportunities. It thus aims to combat poverty (SDG 1) and social exclusion, covering areas such as health (SDG 3), education (SDG 4), a fairer and more

inclusive labor market (SGD 8), more balanced income sharing, ensuring social minimums for the most vulnerable citizens (PR, 2017).

11 - Sustainable Cities and Communities: this aims to promote cities and communities that are inclusive, acting as incubators of innovation and growth and drivers for sustainable development.

17 - Partnerships for the Goals: to achieve this sustainable development, the establishment of partnerships between government, private sector and civil society are crucial, grounded in common perspectives and centered on the people and the planet.

Sharing and exchanging knowledge allows the understanding between policymakers and people from action spheres. A knowledge platform with shared interactions is a useful tool to potentiate such collaborations, between policy local communities, private sector and other stakeholders. As highlighted by SDG 17, such well-targeted partnerships for change are important to induce improvements in development.

It should be noted that SDGs cannot be separately analyzed. They are fully interconnected, as an improvement in one of the SDG always causes a positive and/or negative impact(s) on other(s) SDG. SDG implementation is concerned with synergies, complementarities, and potential trade-offs between each of the SDG (OECD, 2015). For example, the industry, innovation and infrastructure (SDG 9) together with sustainable cities and communities (SDG 11) can guarantee the provision of essential needs while maintaining stable economic growth, which is the foundation of social stability.

As referred, interactions can be either positive or negative. A better grip on positive interactions allows the identification of co-benefits that enable achieving better outcomes at lower costs or with enhanced impact with the coordination of management. The importance of such interactions is one of the "policy coherence" SGD targets.

METHODOLOGY

In the context of IS research, the selection and use of a project support methodology is of complex choice. In this sense, and in view of the nature, complexity and specificity of the problem under study, it is proposed the adoption of a methodology that allows to include several valences thus contributing to the design of the artifact.

Based on the specificity of the organization under study, a methodology was selected that would allow conducting the analysis of the characterization of the target audience. The Design Science Research methodology was adopted as a theoretical basis for supporting scientific validity for the elaboration of this work (Peffers et al., 2007). Because it is a research methodology indicated for research projects in technologies and IS, systems architectures (Ferreira et al., 2012) inherent to the activity of art design ensures this way, discipline, rigor and transparency (Pedro, 2015), cited by (Lacerda et al., 2013).

The DSR methodology (Roquete, 2018) is a research method that fits the IS area with links to issues from organizations, contributing to the resolution of specific and complex problems (Bianchi & Dinis de Sousa, 2015; Hevner et al., 2004). The scheme of this methodology is presented in Figure 2.

The scheme of this methodology is shown in Figure 2 allows the current characterization of the organization as well as to develop and validate the artifact – multidisciplinary approach and integrator of support to HP. Table 1 presents the criteria of DSR methodology.

Figure 2. Design Science Research
Source: adapted from (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007)

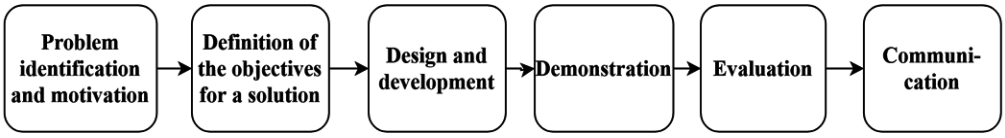


Table 1. DSR Criteria

DSR Criteria	Summary
Pragmatism	Try to improve practice and theory. The theory is valued to the same extent that it positively influences the practice.
Design Evaluation	The evaluation of the artefact must be rigorous in order to prove its usefulness, quality and efficacy.
Contextualization	The whole process must be documented, from research to research results, to changes to what was originally planned.
Flexibility and Interactivity	Those who carry out the research must be involved in all project processes. Research can be done flexibly, and various techniques can be used for data collection and analysis.
Design as Search Process	The means at our disposal must be used to find an artifact that is indicated, provided that these means satisfy the laws existing in the problem environment.
Rigor of Research	The research should apply rigorous methods to build and evaluate the artifact.
Relevance of the Problem	The problem must be solved by developing technological solutions that may be relevant and/or important.
Design Contribution	This criterion should have as one of the objectives to contribute clearly in the specific areas of the developed artifacts, the grounds and the design methodologies.
Research Communication	The communication of the research should be done in such a way as to be understood both by the public with more background in the area of technologies and for the public in the area of management.

In view of the specificity of the theme under study, it is considered that the DSR methodology allows, in the context of research in IS, the conduction of the study from the identification of the problem, the survey of requirements to the presentation of the integrative and multidisciplinary solution of support to HP (artifact). Table 2 describes the main aspects of the application of the DSR methodology to the present work.

The DSR methodology allows conducting the study in the various phases of p in order to enhance the creation of an integrative and multidisciplinary solution in the context of the problem.

Organizations are currently dependent on IS and ICT. It is considered that this dependence should be enhanced in order to provide integrated and optimized services to the population. ICT could provide added value in a social context in order to speed up the processing and sharing of information and contribute to the increase of sustainability factors, (Reis, Silveira, Carvalho & Mata, 2020).

Table 2. Steps of the DSR methodology

Step	Description
1. Problem identification and motivation	Identify the needs for effective support to HP. The main challenges are to provide support to HP in different areas.
2. Definition of the objectives for a solution	Define the objectives centered on the solution related to the module. Present an integrated and multidisciplinary solution for HP signaling in face of the risks of contagion in the context of a pandemic, considering the SDGs.
3. Design and development	Requirements analysis and artifact development, incorporating the dimensions of sustainability.
4. Demonstration	Demonstrate and validate the suitability of the artifact at the partner institution.
5. Evaluation	Observation of the effective suitability and feasibility of the artifact with professionals from the social organization.
6. Communication	Dissemination of the artifact to professionals, publication of the results in the scientific community.

REQUIREMENTS ENGINEERING

Requirements engineering corresponds to the process of discovering, analyzing, documenting and verifying the requirements of a system and its constraints (Sommerville, 2016). The requirements describe the composition of the system (Pfleeger, 2000), express the needs of stakeholders and document the external view of the system. In this sense, the better the requirements describe the observed characteristics, the better the definition of requirements engineering activities (Silveira, 2006). In this section, we present the process of discovering, analyzing, documenting requirements for the case study - HP Caritas de Setúbal and NPISSA Barreiro.

Characterization

The characterization of the current situation, in the case under study, and in view of the specificity of the problem will characterize the organization as well as the various types of frameworks underlying the theme: Cáritas Setúbal and NPISSA Barreiro.

Cáritas Setúbal

The Mission of the Institution (Cáritas, 2019a), mentions that through the 20 Diocesan Cáritas, which cover the entire national territory, the institution has several projects in place in order to build a jouster and more balanced society. One of the foundations of the Cáritas Act is "the Church's preferential choice for the poor". The poorest of the poor are all those who have social exclusion associated with their poverty. In this sense, responses are made available for individuals with disabilities, homeless people and vagrants, drug addicts, alcoholics, women at risk, HIV-positive people and AIDS patients.

In the city of Setúbal (Cáritas, 2019a), it ensures the provision of services to children, the elderly, homeless people, HIV-positive people and AIDS patients. The different activities are carried out by many employees, who are provided with the necessary training.

Regarding Identity (Cáritas, 2019b), Cáritas de Setúbal states that it is a service of the Diocesan Church for the promotion of its social action. Its primary activity is the implementation of social pasto-

ral care aimed at the creation and functioning of parish services for better knowledge of problems. It is from this knowledge that it seeks to act directly in the prevention and solution of problems. Given the complexity of contemporary social phenomena resulting from their multidimensional characteristics, other key concerns are the possible contribution to social transformation, particularly in the fields of social relations and values in order to develop solidarity.

NPISSA Barreiro

The Municipality of Barreiro (CMB, 2019), signed the Partnership Protocol for the implementation of NPISSA - Barreiro's Homeless Planning and Intervention Center. The Protocol is established among the following partners within the Social Network of Barreiro, which constitute NPISSA do Barreiro: Municipality of Barreiro, Social Security Institute, I.P./Centro Distrital de Setúbal do ISS, I.P, Regional Health Administration of Lisbon and Tagus Valley, Barreiro Montijo EPE Hospital Center, Public Security Police - District Command of Setúbal, Rumo - Cooperative of Social Solidarity, Crl, Brotherhood of the Holy House of Mercy of Barreiro, Social and Parish Center of Santo André, CATICA - Community Center of Coina, NÓS - Association of Parents and Technicians for the Integration of the Disabled, Persona - Association for the Promotion of Mental Health and CRIVA - Center for Pensioners and Elderly of The Valley of Amoreira. The local representatives of the member entities are NPISSA Barreiro and the representatives of GIMAE (Implementation Group, Monitoring and Evaluation of the National Strategy for the Integration of Homeless People - ENIHP).

The problem of HP addressed in the study has underlined the cases in the scope of Caritas de Setúbal and NPISSA Barreiro. The project is being developed in partnership with both institutions, but we have found that in the face of reality they have specific characteristics. In this article, the requirements and diagrams of the two realities are presented.

In the field under study, Caritas de Setúbal has been active for some years in the scope of support to HP, supporting the information inherent to the theme a spreadsheet, word processor and paper documentation. With regard to NPISSA Barreiro, HP's support activity is recent and its characteristic is based on paper. The newly created nucleus is associated with the Barreiro Town Hall.

Incorporation of the Dimensions of Sustainability

In view of the theme under study and the constant concerns of sustainability, namely the need to develop sustainable software, the following are the recommendations of the Karlskrona Manifesto (Becker et al., 2015) for the inclusion of five dimensions of sustainability, (Silveira & Reis, 2021) by adding the technical and human dimensions to the three dimensions: economic, social and environmental.

The five dimensions of sustainability to be incorporated in requirements engineering are as follows (Becker et al., 2015; Oyedeji, Seffah, & Penzenstadler, 2018):

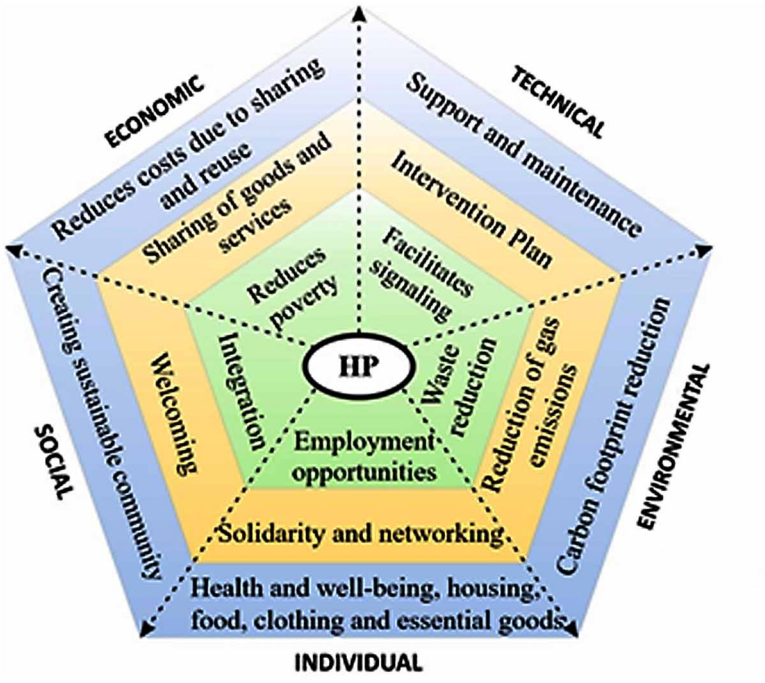
- **Technical** sustainability addresses the long-term use of software-intensive systems and their appropriate evolution in a continuously changing execution environment;
- **Economic** sustainability focuses on preserving capital and value;
- **Social** sustainability focuses on supporting current and future generations to have the same or greater access to social resources, considering generational equity. This dimension covers the di-

rect support of social communities in any domain, as well as the support of activities or processes that indirectly create benefits for social communities;

- **Environmental** sustainability aims to improve human well-being by protecting natural resources. Addresses ecological concerns, including energy efficiency and the creation of ecological awareness;
- **Individual/human** sustainability refers to the maintenance of human capital (e.g. health, education, skills, knowledge, leadership and access to services).

The incorporation of sustainability concerns in the dimensions: individual/human, economic, environmental, technical and social (Becker et al., 2015), allowed the elaboration of Figure 3 with the analysis to support HP. The impacts described in Figure 3 are taken into account during the requirements gathering phase so that they can be implemented. Thus, when designing the HP's intervention plan will be considered: the donation of goods, the support provided in the various areas, such as the orientation of a place to stay (housing), food, daily life, help to domestic violence, health, access to education, relearning the basic tasks of everyday life, be it cooking or cleaning, and also dealing with bureaucracies and job search.

Figure 3. Analysis of sustainability dimensions to support HP



The information of the sustainability analysis (Figure 3) allows to communicate and guide different stakeholders (HP Manager, Requirements Engineer and Users) on the benefits of incorporating sustainability factors.

In view of the problem, it is considered pressing to elaborate a set of diagrams in order to model the information underlying the problem under study. Diagrams are important for graphically showing the models that represent the system and its stakeholders. In this sense, the activity diagrams are presented.

Activity Diagrams

The activity diagrams presented in Figures 4 and 5 are used to represent the path of a process for the realization of HP signaling actions. The actors are:

- **Manager**: is an end user of the system that will use to consult existing processes, create new processes, edit processes, insert diagnostic evaluation sheets and intervention plans in the processes;
- **Coordinator**: is an end user of the system, who can interact in order to send emergency teams that confirm the signaling, create users (HP Manager s) and assign them user profiles, assign a new case to a HP Manager and consult the processes created by them;
- **Emergency team**: is an end user of the system that goes to the place where the HP was signaled, whose profile allows to perform the task of entering the data that HP provides to start its intervention process;
- **Mediator/Interlocutor:** is an end user of the system. The Mediator/Interlocutor profile is a unique profile, which allows anyone, through a quick validation (provide the NIF and the CC number), to access the system to signal. When encountering a new HP in the city, uses the system to give the alert to the competent authorities;
- **Homeless Person**: HP is someone who may have direct contact with the system, including receiving useful information.

Figure 4 shows the activity diagram of the HP Signaling process - NPISSA Barreiro, showing the interconnection between the various actors in the system.

Figure 4. Activity diagram of the HP Signaling process - NPISSA Barreiro

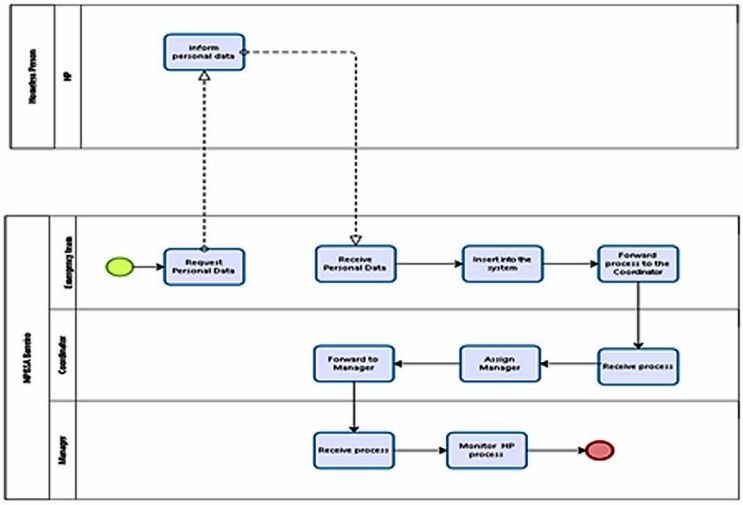


Figure 5. Description of the HP Signaling process– NPISSA Barreiro

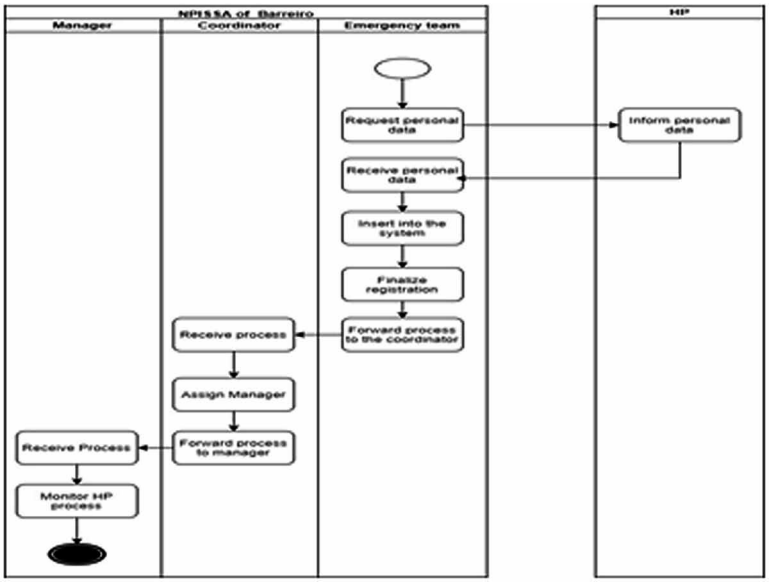


Figure 5 shows the description of the HP Signaling process - NPISSA Barreiro, showing the role of the Manager, Coordinator and Emergency Team in supporting HP. The signaling process is of the utmost importance since it contributes in this way to the possibility of locating PH in order to make the signaling of people in situations of social vulnerability efficient.

In view of the signaling alert, the emergency team initiates the data collection process and enters into the System as many data as possible to create conditions for the mediator to delineate the intervention plan.

The activity diagram of Caritas Setúbal is similar to that in Figure 5, as it presents perspective for the Mediator/Interlocutor, the Coordinator, the Emergency Team and the HP Manager in the sense of an integrated management of the HP.

Table 3. Actors objectives - NPISSA Barreiro and Cáritas Setúbal

Actor	Objective
Mediator/Interlocutor	- HP Signaling
Emergency Team	- Create Individual Process
Coordinator	- Send Emergency Team to confirm signaling. - Create Users - Assign the case to a HP Manager - Consult the processes
HP Manager	- Consult the processes - Edit processes - Create Diagnostic Evaluation Sheet - Create Intervention Plan
Homeless Person	- Benefit of the Intervention Plan defined

Use Case Descriptions

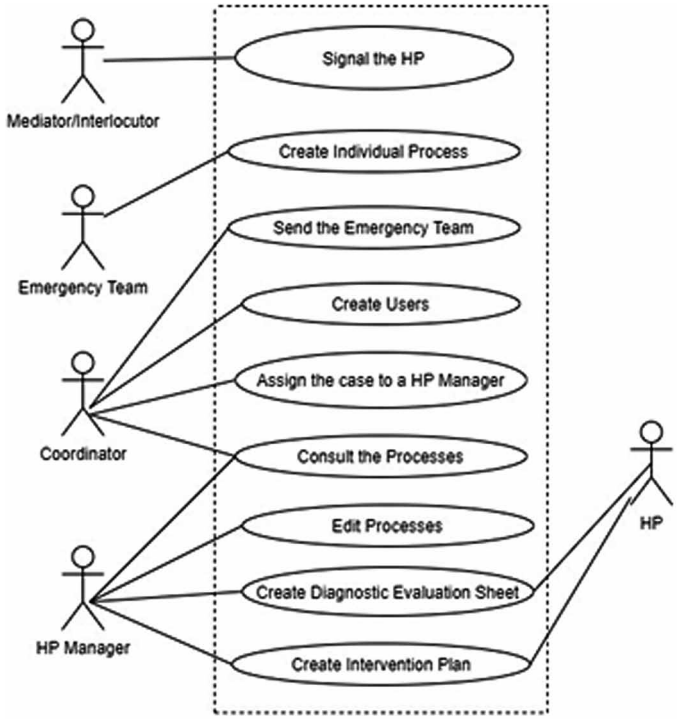
The use cases describe the interactions between the system and its actors. Table 3 presents the actors of the system and the underlying objectives that assemble the vision of both institutions (NPISSA Barreiro and Cáritas Setúbal).

Os diagramas de casos de uso são uma ferramenta importante para explicitar as funcionalidades a que cada ator tem acesso e a forma como poderá intervir no sistema. Nesse sentido, identificaram-se os atores intervenientes nas duas instituições, bem como o papel que desempenham. Cada caso de uso representa uma funcionalidade no Sistema que se pretende agregador e multidisciplinar.

Table 3 presents the actors (Mediator/Interlocutor, Emergency Team, Coordinator, HP Manager and HP), as well as their role in the system, identifying their goals.

Figure 6 presents the Use of Case Diagram, which aggregate the vision of both institutions (NPISSA Barreiro and Cáritas Setúbal).

Figure 6. Use Case Diagram - NPISSA Barreiro and Cáritas Setúbal



The documentation of each use case has the function of recording the interaction that is made between the actors and the system. This record is pointed through the events flux, which follows the pattern from the actor's point of view. For the Stakeholders to being able to understand the documentation, the language used should be easy to understand, in order to comprehend the functions that the system will offer after the actor execute.

When the actor "Mediator/Interlocutor" interacts with the system, it will unleash a sequence of events that allow to develop this use of case. Table 4 describes the process that the Mediator/Interlocutor unleash when signaling a HP according to the institutions vision (NPISSA Barreiro and Cáritas Setúbal).

Table 4. Description of the use case "HP Signaling"

Name	HP Signaling
Brief Description	This case of use aims to describe the process of signaling the HP, inserting on the system the localization of a new person on this situation.
Actors	Mediator/Interlocutor
Pre-Condition	Valid Login.
Success Scenario	1. The actor selects the option "HP Signaling"; 2. The system presents a map (Can be done using Google Maps, for example); 3. The actor selects a point on the map where the people to signal is; 4. The system presents a window with the address of that point and the option to cancel or save; 5. The actor selects the option save; 6. The system sends a notification "Signaling done with success".
Secondary Flows	3. a) System doesn't recognizes that point; 4. a) System doesn't have an address for the indicated point; 5. a) The actor choses to cancel the action.
Post-Condition	System sends automatically a message to the Coordinator, informing that a new signal was done.

The intervention of the Emergency Team can make added value on the problem-solving area. After being signalized in the system a new case of homeless person, the coordinator sends Emergency Team to the local to confirm this signal. System sends automatic message and email to the team informing that a new signal was assigned to them.

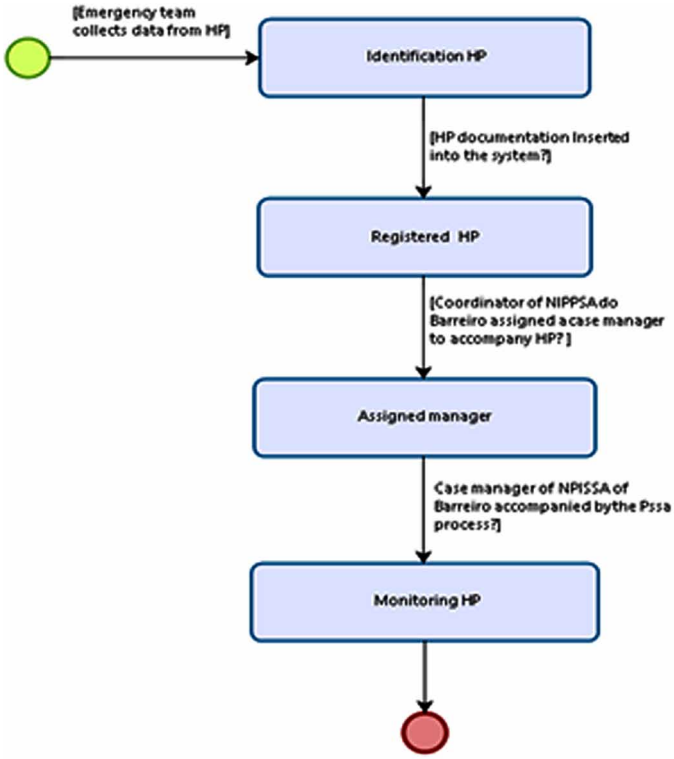
The use case "Assign the case to a Manager", describes the actor "Coordinator" may assign the new processes, resulting from the signs made, to the HP Manager that he has created on the system. System sends automatic message and email to the HP Manager informing that a new case was assigned to them on the system. The process of assign the case to a Manager will allow the optimization of the follow-up process.

The Intervention Plan will allow to create a personalized plan to the hp after the diagnostic being made, having as support the data survey of their needs. The "HP Manager", after performed the diagnostic to the person who is going to be intervened and by that get to know his necessities, makes an intervention plan to that person. System sends automatic message and email to the HP Manager informing that an intervention plan was created to the process.

Figure 7 shows the emergency team can collect essential information for the process. Identify HP ("HP Identification" status), collect the data and insert it into the system, you are transferred to the "Registered HP" status, sending a message to the Coordinator to inform you that there is a new process. After the Coordinator accesses the process and assigns a manager, it will transition to the status "Assigned Manager". In order to complete the system, the HP process transits for the manager to follow up.

The Intervention Plan according to ENIHP, aims to make a new life project to HP, through the support that is provided to reverse this situation.

Figure 7. State Diagram Relating to HP Signaling Process



SOLUTIONS AND RECOMENDATIONS

The solution that is advocated incorporates the various sustainability concerns, namely economic, technical, environmental, social and individual. In this sense, it is considered that the information of the sustainability analysis allows to communicate and guide different stakeholders (HP Manager, Requirements Engineer and Users) on the benefits of incorporating sustainability factors.

We consider the interconnection of the objectives of the SDGs to the problem under study, since we consider that this multidisciplinary and aggregating framework by the essence of shared information, can be a fundamental tool in the sharing of information, thus enhancing a faster intervention thus contributing to the improvement of the services provided to HP.

This platform is an innovative and essential element that enables digital transformation in the organizations involved. In this sense, the practices instituted in two organizations that provide integrated services to HP are listed. The Platform integrates several valences in the field of HP characterization intending to constitute itself as an information management tool that helps and promotes the social inclusion of HP and situation of social vulnerability (Reis, *et al.*, 2020). Thus, it is considered that it may constitute added value enhancing the possibilities of social inclusion keep in the Platform the various valences underlying HP namely professional experiences, family ties, information regarding the regional framework where it currently stands and with regard to its naturalness, personal tastes, personal interests and information regarding its state of health and well-being.

FUTURE RESEARCH DIRECTIONS

Social organizations are often faced with financial and technical constraints in the field of information and communication technologies. In view of this perception/finding, programming solutions are currently being studied by analyzing the various open source platforms in order to create a solution incorporating sustainability concerns and thus allowing institutions to maintain over time.

Future research intendeds to complete the development of the artifact in order to demonstrate and validate in partner institutions, Caritas and NPISSA Barreiro, its suitability with the professionals of the organizations.

CONCLUSION

This chapter consider the perspective of sustainable development as a multidimensional perspective (Reis & Silveira, 2020), as it leads to the economic, social, environmental, technical and individual dimensions.

In this sense, an integrative and multidisciplinary solution was presented to support HP (Reis *et al.*, 2020), considering the five dimensions of sustainability, the SDGs (1, 2, 3, 10 and 11) and circular economy action.

It is intended, therefore, (Reis, Silveira, Carvalho & Mata, 2020), to keep information about the various aspects of HP, namely the professional experiences they had, family ties, the regional framework in the current area and with regard to naturalness, personal tastes, personal interests, health situation, etc., allowing the identification of possibilities for social inclusion and could be seem as a social innovation insight (Carvalho and Viana, 2019).

This exploratory research allows to discuss a set of concerns related to the incorporations of sustainability in the requirements gathering and development of the artifact (multidisciplinary and integrative approach to support HP), as well as actions aligned with circular economy principles (Carvalho et al., 2020). These actions increase the use of physical assets, prolong the life cycles, and use resources from finite sources for renewable sources.

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KEY TERMS AND DEFINITIONS

Business Model: Describe the strategies and methods that organizations adopt to capture or create value.

Digital Business Model: Is a business model that use digital tools and/or digital technologies to capture or creature value.

Homeless People: Homelessness is defined as living in housing that is below the minimum standard or lacks secure tenure. People can be categorized as homeless if they are: living on the streets (primary homelessness); moving between temporary shelters, including houses of friends, family and emergency accommodation (secondary homelessness); living in private boarding houses without a private bathroom or security of tenure (tertiary homelessness).

Information and Communication Technologies: A technological resource set used to process information and ensure communication. When used in an integrated way it enhances information transmission and communication processes.

Information Systems: Is the organized set of components such as people, processes of collection and transmission of data and material resources, automated or manual. The interaction of components enhances the processing and dissemination of information.

Requirements Analysis: An iterative process to identify features and restrictions with a view to developing or adapting/customizing a software product.

Social Innovation: Respect new or improved products or services that meet social needs comparing to the existent solutions.

Software Systems Development: Set of activities involved in the production of software. These activities are related to each other in an iterative and incremental process.

Sustainability: Ability to sustain life on the planet, considering the five dimensions: individual, social, economic, technical, and environmental.

Chapter 13
Corporate Social Responsibility (CSR) in Hotels in Austria, Pakistan, and Indonesia:
Small and Medium Enterprise Spillover of COVID-19

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ABSTRACT

The purpose of this study was to contribute to the recent realm of research on COVID-19 to understand how the pandemic affected the business of SME hotels in Austria, Pakistan, and Indonesia, and what strategies and corporate social responsibility (CSR) were implemented by these while working in this crisis time. With reference to the existing situation, talking about the CSR leads to the broad concept of sustainability. It is a wide field focus on academia as well as industry alike. It was observed that scholars and managers are involved in the debate about the responsibilities of trade towards society. Across such debates, CSR of the business in dealing with social problems has been pondered. CSR is associated with the business organizations in order to find their economic, social, political, and educational involvement towards the improvement and development of the staff of the organization, community, and society.

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INTRODUCTION

The purpose of this study was to contribute to the recent realm of research on COVID-19 to understand how the pandemic affected the business of SME hotels in Austria, Pakistan and Indonesia, and what strategies and Corporate Social Responsibility (CSR) were implemented by these while working in this crisis time. While talking about the CSR leads to the broad concept of sustainability. It is a wide field focus on academia as well as industry alike. For many years, it has been observed that scholars and managers are involved in the debate about the responsibilities of trade towards society. Across such debates, CSR of the business in dealing with social problems has been pointed to ponder (Wong & Kim, 2020; Maines da Silva & Maines da Silva, 2020). CSR is associated with the business organizations in order to find their economic, social, political, and educational involvement towards the improvement and development of the staff of the organization, community, and society by large. It is a sense of realization and morals of the company for which they cannot be compelled to do so. CSR is assumed as an obligation of the larger organizations where Small and Medium Enterprises (SMEs) are liberated from such liability (Asante Boadi, He, Bosompem, Opata & Boadi, 2020; da Silva, & da Silva, 2020). It is deemed that SMEs are engines of economic growth (Bögenhold, 2019). Along with commercial activity, CSR adopted by SMEs, mostly in the hotel sector, can cause sound prosperity and a healthy environment. Despite this, due to social, economic, and financial constraints, SMEs are sometimes not able to reciprocate to society in the form of CSR (Bögenhold, 2019). Due to these redundancies, there is a lack of research on the role of SMEs in CSR (Naz, & Bögenhold, 2020, pp. 75-95).

SMEs are distinguished by their features like flexibility, a propensity for entrepreneurial ventures (Bögenhold, 2020; pp. 19-35), smaller production volumes, simple organizational structure, and informally internal communication (Lazarevic-Moravcevic, 2019, 104-112. However, SMEs is supposed as more in times of economic crisis. The early evidence indicates that the impact of the COVID-19 pandemic on SMEs is worse than the 2008 financial crisis (; Chowdhury, 2011). Given that SMEs are the engines of economies around the world, their collapse could significantly impact the growth of national economies (Bartik, et al., 2020).

SMEs is badly affected by the ongoing crisis of COVID-19 more severely than the large enterprises and large industries (Manuel & Herron, 2020). According to Narjoko and Hill (2007), the effects of the economic crisis on firms are profound, however they are uneven between firms. SMEs is in general more vulnerable to the crisis for many factors, such as economic recession, refugee crises, inflation, heavy tax system, etc.

The commercial activities of the SMEs may expose them to difficulties in maintaining their business and activity in the face of the crisis (Bourletidis & Triantafyllopoulos, 2014). According to the organisation for Economic Co-operation and Development (OECD, 2009), it is very challenging for them to downsize as they are already small in size; they are less diversified in their economic activities; they have a fragile financial structure; they mostly rely on credit and they have fewer financing options. SMEs is usually associated with risk-taking and findings show (Soininen, Puumalainen, Sjögrén & Syrja, 2012, 927–944) that risk-taking firms tend to be in more trouble especially in operations related both to short and long-term financing since they may already be highly-leveraged before the recession and when the recession begins, rising interest rates along with decreasing sales can cause them financial distress.

However, SMEs are not free from performing responsibly and sustainably. This study is an attempt to explore the CSR observed amid COVID-19 by SME hotels in developed and developing countries like Austria, Indonesia and Pakistan where SMEs specifies the major chunk in the economy. The COVID-19

has an adverse impact on the small business and low income people which increases an inequality. However, during the COVID-10 crises, business should understand the changing conditions and changing environment regarding the risk of losing customers, producers, suppliers and associated stakeholders. Thus, failure to address them may cause hazards in terms of the social, legal and environmental. Thus, amid COVID-19, demand of CSR in the business has increased because, showing a moral responsibility, CSR activities can extend volunteerism in socially desirable causes for the employee, customers, the environment and to engaging in philanthropy to reduce the harm. Thus, this study contributes to the literature of the hotel SMEs and their survival through unexpected crises. It is not predictable about any unfavorable condition or any incidence to happen, because everyone plans for the growth and progress in the business. Thus, this study is useful for the entrepreneurs, individuals and government agencies set new strategies to deal with the crises like COVID-19 and survival with a new normal.

An important objective of this study is to explore the roles and responsibilities of SME hotels and the challenges faced by these in the pandemic situation in Austria, Pakistan and Indonesia. In order to complete this study, semi-structured interviews were carried out from staff members at the SME hotels in the said countries. The findings emerged from the interviews and transcriptions in the form of themes, which are presented in the earlier section of the chapter. Few latest research work also emphasized and endorsed the challenges face by the SME hotels and their role played in this challenging situation (Jiang & Wen, 2020; Gursoy & Chi, 2020; Baum & Hai, N.2020; Alonso, et al., 2020).

BACKGROUND

Provide broad definitions and discussions of the topic and incorporate views of others (literature review) into the discussion to support, refute, or demonstrate your position on the topic.

The crises of the COVID-19 have caused detrimental effects to the hotel sector world wide (Jiang and Wen, 2020). This sudden outbreak has disturbed entire business of the hotels, in case of the financial as well as social matters. However, lockdown by the government endangered all kinds of SME Hotels, it slashed revenues and disintegrated the supply chain.(Hall et al., 2020). The lockdown has reduced the customer demand and thus, the decline in the hospitality has taken place widely (Nicola et al., 2020). Social distance has adversely affected the operational capacity of the hotels as well as profitability (Dube et al., 2020). Hence, it is speculated that SME hotels may shrink in response to the pandemic, thus, this miserable condition, prospects for existing and upcoming entrepreneurs, investors and hotels (Taylor, 2020). An important implication may be for the SME hotels that it may decline the attraction in the career choices also in the field of hospitality (Baum and Hai, 2020). It may change working conditions, work pattern, change the working contract hours of the work, and may cause low pay. Therefore, competitive and qualified employee of the SME hotels may seek jobs in other economic sectors (Mao et al., 2020). Hence, hotels may declare scheme for the employee in the developed as well as developing countries to feel employee secure during pandemic (Sogno, 2020). By this way, hotels can retain their skilled and experienced staff (Mao et al., 2020). Pandemic COVID-19 posed several threats to the hotels regarding CSR. These crises have put hotels under test for their commitments to ethical business conduct and CSR in the short term and long term (Butler, 2020).

It is observed that hotels prevailed ethical business practices as well as conducted different CSR activities during COVID-19. CSR activities adopted were those activities were proactive in which hotels offer immediate assistance and help to fight against the pandemic. This pandemic COVID-19 proposed

wide opportunities for the mindful to approach to CSR (Katper, et al., 2020). Such as, many companies transformed their companies to produce ventilators, preventive equipments, sanitizer and those related products which were donated rather than sold. Besides this, Many supermarkets opened doors for the old age people and workers and donated them eggs, food for free. Telecommunication companies offered free calls and mobile data to those who were in vulnerable conditions (Lindsay, 2020).

There is also a growing degree of knowledge of the essential roles of small and medium-sized businesses in industrialized and emerging countries (Tunio, 2020; Abram & Jarzabek, 2016). With reference to the following description, a company is profitable if it measures economic growth, environmental sustainability and social justice. Accordingly, the notion underlines few key facets financial, economic and social programs of the CSR (Ettinger, Grabner-Kräuter & Terlutter, 2018; Ali, Kim & Ryu, 2016)). Sustainability and CSR conceptualization appear to have similar features. The authors often claim that companies should take different actions about the sustainability in different ways. Ultimately, it is indicated to facilitate sustainability principles may target scientific frameworks, such as stakeholder theory (Ghaderi, Mirzapour, Henderson & Richardson, 2019; Ali, Kim & Ryu, 2016).

Although behaving in a socially conscious manner has gained enhanced interest from the hospitality and tourism firms, The best environmentally conscious activities preferred by lodges be inclined to appeal to the issues (Gürlek & Tuna, 2019). Given the above-mentioned difficulties and restrictions confronted by SMEs, it is rising proof to companies raise CSR initiatives. In orde to participate in CSR literature, important two sources of contexts strongly linked with high encouragement and it has gained significant exposure (Gürlek & Tuna, 2019; Gilal, et al., 2020).

Recently, CSR is considered as a method of development in tourism-related industries. Ensuring this Low labor standards, support for environmental protection and support for local communities are critical Aspects of the International Hotel Industry (Ali, Hussain, Nair & Nair, 2017). A variety of study findings have discovered hotel SMEs encourage CSR practices and claiming the CSR programs in the hotels. In accordance with other market industries, being more important (Appiah, 2019). Researchers find that many major multinational hospitality businesses are incorporating social and environmental goals into their activities and utilizing them as a foundation for creating new strategic advantages, such as Hilton, Intercontinental and Marriott (Supanti & Butcher, 2019). Many research concentrate on human concerns and connect group events with employee-focused events, as well as activities (Ferguson, 2016).

Bohdanowisz and Zientara (2008) mentioned about CSR programs in the hotel sector, which contain a direct effect the social and economic status of the host group. With reference to the, report of major global hotel chains, major CSR practices voluntary contribute, partner with local groups and to purchase products. By the way, a report suggests that programs involving significant participation on the part of hotel workers are more likely to succeed in more advantage (Valdivieso, J. C. (2019). Likewise, Franklin (2008) mentioned CSR concerned an approach about companies, clients, workers and the community. Report on CSR in the hotels in Singapore by Chung and Parker (2010) frequently reports about individual and customer oriented CSR programs.

Originally, the assumption was that only in China will the COVID-19 pandemic be concentrated. This subsequently expanded across the nation, by people's movement (Ozili & Arun, 2020). The economic pressure was extreme when there were suggestions for individuals to be at their residence and consequences occurred across country with constraint from frequent movement and mobilization of the people, barriers in the business and public gatherings (Horowit, 2020; Elliot, 2020). The crisis caused by the COVID-19 reflects to incidents of 2007-2008 which were taken for granted and were treated as

issue of small scale (Elliot, 2020). Financial unstability triggered by COVID-19 caused spillover on the supply and demand in all social and economic activities (El-Erian, 2020).

The analysis shows that the stabilization approaches and procedures for battling COVID-19 have come at high economic and human costs and have badly sullied Sri Lankan SMEs. It involves supply shortages, decreases in global and local demand for their goods and services, difficulties in repaying loans and interest, cancelation of orders, desperate cash shortfall (inflows) and loss of savings (including issues with payroll and energy bills), limitations in recalling workers back to work, high costs in stopping COVID-19 tactics in the workforce, lack of new incentives. The COVID-19 pandemic poses emotionally challenging challenges for both SME employees and operators. State aid and appropriate strategies and recommendations to help SMEs are also key to dealing with the crisis. However, the present analysis ensures the paramount value of formulating economic recovery policies COVID-19 aftereffects. Needless to mention, SMEs' durability is gray (Robinson & Kengatharan, 2020).

CSR literature on SME shows scant research in combination of specified countries. Thus, this study advances knowledge and provides implications for the tourism and hospitality sector. The significant implications of the study for the hospitality and tourism sector include the appropriate strategies to respond to the demands and pressure of customers and the general public to be socially responsible and sustainable at the same time (Zdravković & Peković, 2020).

RESEARCH METHODOLOGY

Data is marshalled with the aid of qualitative method in which Semi-structured interviews are conducted from the 12 SME hotels from the different geographic location which include Austria, Pakistan and Indonesia. Interviews are tapped record with the protocols and following guidelines. After completing the interviews, transcription is generated, then the thematic analysis is conducted. .

The qualitative research method is used in this study because it is suitable approach to investigate the phenomenon in depth and to ascertain the CSR activities performed by the SME hotels in different economies and different geographies. Here, in this study, qualitative method provides an in depth and extensive understanding of the issues by means of their textual interpretation through interviews, the most common type of qualitative method. The interview is the common tool of data collection in qualitative research. Qualitative interview is a type of framework in which the practices and standards be not only recorded, but also achievable, challenged and as well as reinforced (Jamshed, 2014).

In this study, semi structured interviews are used because semi-structured interviews are very in-depth interviews in which respondents respond to the open-ended questions. Semic-structured interviews are conducted once only and duration of the interview depends on the context of the interview (Im, & Chee, 2006). Thus, semi-structured interviews are conducted from managers of SME Hotels from Austria, Pakistan and Indonesia. The interview guide was designed with a focus group discussion with experts in entrepreneurship. COVID-19 has transformed physical learning to online learning process in order to avoid spread of the coronavirus. Considering this situation, online interviews are conducted. The interviews took 30 to 40 minutes and were recorded with interviewees consent. The English language was used for the interviews. The interviews were transcribed, reviewed, and then thematic analysis was used to analyze the interviews.

The profile of individual cases is given in Table 1.

Table 1. SMEs Hotel

Case	SMEs Hotel	Country	City	Total Employees
1.	SMEs Hotel - 1 SMEs Hotel - 2	Austria	Klagenfurt	15-20
			Graz	15-18
2.	SMEs Hotel - 1 SMEs Hotel - 2	Pakistan	Sukkur	10-15
			Hyderabad	10-15
3.	SMEs Hotel - 1 SMEs Hotel - 2	Indonesia	Jakarta	10-15
			Depok	10-15

(Source: Created by author)

DATA ANALYSIS AND RESULTS

Thematic analysis approach is used to analyze the data because thematic analysis is supportive in the emerging themes from the codes generated from the transcription (Gioia, et al., 2013). Researchers of the qualitative methods have endorsed that thematic analysis conducted manually is more specific, relevent and informative with gives translation and interpretation of the terminologies, words, and expressions (Braun and Clarke, 2006).

In the analysis, every case was written down as a story format to observe and analyze female entrepreneur views and experiences during COVID-19, which led us to derive the themes. Therefore, to extract themes, we repeatedly read the interview text to familiarize and develop understanding. Next step was to create a manual coding (Seale and Kelly, 3014) to label and code text patterns. Finally, repeated patterns gave rise to themes. This procedure resulted in four main themes. After emerging of the themes, these are presented in the tabular presentation for the interpretation of the data (Alhojailan, 2012). The first codes, categories and themese are presented in Table 2.

THEMES

In the thematic analysis, codes, categories and themes are generated. Through thematic analysis, four themes are emerging in the form for major findings here, which are CSR for employees, CSR for customers, Challenges for SME hotels, and Challenges for the staff. CSR for employees indicates the CSR practices of the SME Hotels

CSR for Employees

This study has tried to explore the CSR performed by the SME hotels (Donthu & Gustafsson, 2020). In the emergency situation of the Covid-10 pandemic, SME in the hospitality sector has played very responsible role by considering the needs, issues and their concerns. Addressing the issues of the staff varies from the country to country depending the strength of the economy status of the country.

Case 1 Austria: "Announcement of the government of the relief to the hotel as well as staff of the hotel, however, responsibilities performed by the hotel management gave us a feelings of safety by all means."

Table 2. Thematic Analysis

No.	Codes	Categories	Themes
1.	Salary was not stoped during COVID-19	Continue salaries	CSR for employees
2.	Continue support for the families of staff	Family support	
3.	Extra logistic support like dressing, pick and drop	Logistic support	
4.	Daily counseling and meetings to discuss issues and ideas	Counseling	
5.	Proper cleaning, disinfecting and ventilating of rooms, and public spaces	Preventive measures	
6.	Medical staff available, connected, and medical aid	Medical facility	CSR for customers
7.	Proper produces, patterns, and behaviors	New norm	
8.	Medical staff available, connected, and medical aid	Coordination	
9.	We were very much concerned about the clients and customers safety	Concerns and care	
10.	Cancellation of the bookings	Decline in demand	Challenges for SME hotels
11.	Drop of bookings		
12.	Quick price reduction	Decline in income	
13.	Heavy discounts		
14.	Revenues are droping	Restrictions	
15.	Decline in occupation		
16.	Collapse in travel market		
17.	Travel restrictions		
18.	Health risks	Risk involved	
19.	Extra cost on preventive measures		
20.	Loss of demand		
21.	Not travel to certain regions		
22.	Cancellation of policies		
23.	Sales loss		
24.	Maintain liquidity		
25.	Avoild insolvence		
26.	No bank loans	Lack of support	Challenges for the staff
27.	Uncertain payments		
28.	Pause to luxuries		
29.	Three monthds hit hard		
30.	Victime of unemployment	Job insecurity	
31.	Layoff huge workers		
32.	Stay at home	Restrictions	

(Source: Created by author)

In this condition, it is a very responsible role of the SME hotels to contribute in the supporting, co-operating, and development of the their staff in the developed countries because, the most of European countries including Austria, respective governments declared incentives and financial support to the workers in the different organizations including the SMEs Hotel.

Case 2 Pakistan: "It was very terrible to perform our duties during the pandemic situation, but we appreciate the hotel management to take care of us along with playing social responsibilities."

In case of the European countries, the management of the SME hotels ensured to extend and continue support for the families of staff in the COVID-19 situation, because there were several uncertainties and threats to everyone. But, the situation in the developing countries like Pakistan and Indonesia, where the respective governments did not declare any scheme of support, but they were exposed to the several challenges. For the safety of the staff, proper Extra logistic support like dressing, pick and drop

Case 3 Indonesia: "Initially, the situation of COVID-19 was taken very non-serious, but people started to believe when it became very serious and sever issues. Thus, in this situation, governmet announced support for the affected people only, however, hotel management was not relying on such support but provided some marginal support to the staff for the survival and safety of the staff and their families."

Daily counseling and meetings to discuss issues and ideas and educating them about the Covid-19 situation, consequences and preventive measures in the work routine was delivered to the staff in order to keep them informed about the changed situation. Proper cleaning, disinfecting and ventilating of rooms, and public spaces

CSR for Customers

This theme focuses on the facilities and support provided by the SME hotels. It is mentioned here that the hotel management provided the medical aid and medical consultation to the customers whenever required. This theme indicates that SME hotels were very much concerned about the clients and customers safety.

Case 1 Austria: "It was our priority to provide all the facilities and the basic immediate aid to the customers and tourists. During the their stay, all the customers were provided with the proper orientation and guidance. They were instructed to abide by the rules and preventive measures to follow social distance, use of the marks outside the rooms and hotels and use the sanitizers frequently and wash their hands again and again when they are exposed to the external environment."

This shows that the SME hotels in the developed countries are well equipped with the sound infrastructure, environment, and facilities. Therefore, these are in the position to support their customers and consumers. Therefore, these hotels go out of the way to support their customers and make them safe and secure. They provide all medical facilities when required in the COVID-19, and offer them all preventive measures.

Case 2 Pakistan: "We tried out best to facilitate our customers with available facilities and services. However, due to small enterprises with limited resources, we could not do everything possible and provide the standard protocols as compared to internationals. ".

On reflection of the above case of the Pakistan, it seems developing countries are not in the position to support their customers in the way customers are supported in the developed countries. It means developing countries want to offer all facilities and provide satisfaction to the customers but their income is not sufficient enough to develop a support system.

Case 3 Indonesia: "During the COVID-19 conditions, there was a lockdown and due to this, all hotels were closed from the functions. Hence, there was no chance to offer or perform CSR practices for the customers".

However, in contracts to the case 1 and 2, case 3 Indosia, indicates that there was no any practice of the CSR for the customers during the COVID-19 situation as there everything was close, travel and transport was stopped and thus, mobility of the people was paused.

Challenges for SME Hotels

This theme focuses on the spillover effects of the COVID-19 on the performance of the SME hotels in Austria, Pakistan and Indonesia. Hence, This theme determines the challenges faced by the SME hotels. The challenges were in different forms and in different ways. Theme indicates that the travel restrictions caused a collapse in the hospitality market and caused the cancellation of policies for the advance booking in certain regions. People avoided the unnecessary travel to avoid the health risks, loss of the health and lose of the life.

Case 1 Austria: "Due to the ban on the travel and transportation, mobility of people was limited. Limited travel either for tourism or for business was given a short pause. "

However, further, it is indicated that SME hotels experienced the spillover effects of the COVID-19 on the financial condition in the different forms and different ways. It was mentioned that revenue was dropping, sale was decreasing and expenses were increasing

Case 2 Pakistan: "In the situation of the COVID-19, income was decreasing due to to the cancellation of the bookings, extra cost needed on the proper protocols, preventive measures and heavy discounts to the customers"

This shows that COVID-19 created challenges for the SME hotels in both ways, one, by reducing the customers demand and rapid flow of the people and second, one by offering heaving discount and extra care to attract and satisfy the customers.

Case 3 Indonesia: "We need to close the services because it was getting very expensive to earn less and expense high than income. Thereof, being a small enterprise, we can not not bear the cost of CSR"

In this regard, it is mentioned under this theme that SME hotels were losing their revenue, sales bookings and prices in the emergency situation of the COVID-19. The extra cost of preventive measures increased the economic burden for the SME hotels. Besides this, quick price reduction and heavy discounts created serious challenges.

Challenges for the Staff

This theme mentions the challenges faced by the employee of the SME hotels during the COVID-19 situation.

Case 1 Austria: "It was a stressful situation for me and my colleagues to work and manage, we were worried for the our safety as well as performing duties. In the such situation of fear, we were afraid of losing jobs, and there was the refusal of the banks as well for any loan."

This shows that the employee of the SME hotels was highly afraid of losing health, jobs and even life. In this condition, it was very challenging for them to manage work and life balance during hard hit of the three months.

Case 2 Pakistan: "Fear of losing a job was high and there was stress that who will be refused from the employment by the hotel management. However, it also was also very stressing to navigate between hotel and home and most of the time we needed to stay at either home or hotel in order to avoid being affected"

In the above mentioned statement, it shows that the employees were in the double stress of the job and fear of being affected. Job fears kept them in the active position to prove their best in the performance so that management may not feel something low regarding their performance, and satisfaction from the service in the developing country of case 2.

Case 3 Indonesia: "Tension was high due to the shutdown of the hotels and half salary was given which was not sufficient to run home and maintain home expenses. In this situation, we were unable to find any other kind of work as well as market was sinking already from the work or employment opportunities."

Above statement indicates that there were serious challenges faced by the employee of the hotels in developing countries like Indonesia. COVID-19 created issues for the staff in getting low salary or half salary from the hotel where they were working and due to the lockdown situation they were helpless to find any other kind of work for their servivial. Hence, it created big challenge for the employee of the SME hotels in th developing country.

DISCUSSION

Results from the thematic analysis shows that there is wider difference beteen the developed and developing countries. Results show that the CSR practices of the hotel vary from country to country in developed as well developing countries. Developed country, Austria mentioned the suitable practice of the CSR by all means and in every possible way but the CSP practice is not similar in the developing

countries. Hotel show very responsible behavior in the CSR for employees in the Austria, but in case of the Pakistan and Indonesia and Pakistan, there were problem in the proper implementation of the CSR practice and impeleentation.

CSR for the customers, it shows that hotel in the Austria were proactive and well equipped with the necessary facilities who took proper care for the the customers and provided satisfaction during the pandemic situation. However, it is noticed from the developing country like Pakistan and Indonia that according to conditions, they also gave their best to satisfy the customers and take their care but it was bit expensive for them to pay for the CSR practices. Challenges for SME Hotels in the developed country were less than the developing counries like Pakistan and Indoneia where there was lack of the government to support small business. However, the challenges for the staff of the hotels were also very sever and serious in the developing countries than a developed country. Employee were afraid of the losing job, they were less paid and were not able to find any other job or work in the lockdown situation.

Hence, this study contributes to the limited studies on the impact of COVID-19 on the activities, role, responsibilities of the SME hotels. Recently, CSR is supposed and treated as a tool of the development in the SME hotels and in the hotel industry to play multidimentional role by different ways (Farmaki, 2019). Several studies have focused on the hotel SMEs and encouraging them for adopt CSR practices and programs by the hotels in the hotels. It is mentioned and emphasized that multinational hospitality business are following and using CSR in their routine work and activities to create value (Yang, Ren & Lau, 2020; Abaeian, Khong, Yeoh & McCabe, 2020; Lo, 2020).

The research discusses some factors for CSR activities; methodological concerns, as well as concerns pertaining to the environment (Sheldon & Park 2011). The research examines the subject matter tourism in the USA. Pushing questionnaire to 231 SMEs hotels seeking related events, attitudes, passengers, barriers and obstacles. The most significant activities recorded are linked to natural resource restoration and protection and the development of ecotourism and responsible travel. However, a report indicates CSR as a significant issue in the US tour sector, but there is a shortage of adoption. The explanations highlighted the implementation of CSR are not at the state level, as specific funding should be available. Scholars further summarize that SME hotel anticipate the government should take the initiative to implement the protocols (Dewi, Mataram & Siwantara, 2017).

Throughout the pandemic, restaurant companies were impacted largely by the government's declared 'stay-at-home scheme' and government-imposed 'financial distancing' restriction of travel in many nations (Baum & Hai, 2020). It has contributed to accelerated shutdowns to monitor the spread in cities and states COVID situation that caused big shock to several MSE hotels across the glob. Hotels worldwide experienced cancellation of the reservations, which costed very heavily, and the hotel sector requested $150 billion in rescue. Executives of restaurants lay off employees when they wound down their temporary corporation. Most clients remained at home, opting to consume freshly prepared meals (Noel, 2020). Several restaurant owners have blamed the government for enforcing the strategy of lockdown ruined several local hotel establishments in different towns. Critics claimed that the declaration by policy makers of initiatives and measures were attempted to warn the population to forbid from the different places, and an attempt to secretly kill the leisure sector after the pandemic. Many hotels in the United States, the United Kingdom and several European countries have declared a partial cessation of regular activities, taking the increasing unemployment globally because of the downfall of the hotels amid such critical situation. The adverse influence caused by the pandemic was more sever on the SMEs than the economic fluctuations occurred during 9/11 and 2008 (Robinson, & Kengatharan, 2020; Hadi & Supardi, 2020; Gaffney, & Eeckels, 2020).

SOLUTIONS AND RECOMMENDATIONS

This study provides implications for the hotels, employees, visitors, travelers, governments and other associated stakeholders. Travelers and visitors always seeks low cost accommodation but in case, if the find a quality accommodation with required facilities should not ask for the discount. However, individual should behave very responsibly so that hotel management, and the staff of the hotel may not find you very demanding. Hotels should provide their best services according to their income and eexpenses, however, basic preventive measures must be ensured to offer for the customers, employees and other stakeholders. Government should reduce the tax from the small business like SME hotels so that they can overcome this financial barrier, besides, the government make bound the banks and other financial institutations to provide smart laon to the hotels to maintain their function.

FUTURE RESEARCH DIRECTIONS

This study is very specific in context Austria, Pakistan and Indonesia, and limitations of this study offers new avenue for research to extend study in different geographical perspectives. First, interviews were conducted from few SME hotels of the three countries only, but this study can be extended to diverse way which can expose new dimensions. Secondly, this study is conducted in the sub-urban areas of the mentioned countries, which can be extended to other areas of the most tourist places of the countries which can indicate different factors in the case of the Covid-19 situation. By this way, study can provide a new flavor of knowledge.

CONCLUSION

The purpose of this study was to contribute to the recent realm of research on COVID-19 to understand how the pandemic affected the business of SME hotels in Austria, Pakistan and Indonesia, and what strategies and CSR were implemented by these while working in this crisis time. The results of the study provide an understanding of the CSR for employees and customers, as well as the challenges for SME hotels and their staff from Covid-19 incidents.

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KEY TERMS AND DEFINITIONS

Commercial Activities: These are business activities conducted in the market for the trade of goods and services.

Corporate Social Responsibility (CSR): It is the responsibility of business towards society in the different forms and different ways.

CSR for Customers: These are the roles and responsibilities of the SME hotels performed for the customers of the organization.

CSR for Employees: These are the roles and responsibilities of the SME hotels performed for the staff of the organization.

Challenges for SME Hotels: It indicates the problems faced by the hotels during pandemic situation.

Challenges for the Staff: It indicates the problems faced by the staff of the hotel during pandemic condition.

Small and Medium Enterprises (SME): It is distinguished by their features like flexibility, a propensity for entrepreneurial ventures, smaller production volumes, simple organizational structure, and informally internal communication.

SME Hotel: SMEs Hotel is the small size of hotels with a small number of the employees and functions.

Chapter 14
Students' Perceptions About E-Learning Within the Context of the COVID-19 Pandemic:
A Study in Brazil and Portugal

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ABSTRACT

The current COVID-19 pandemic has imposed a rapid and abrupt transition from presential to online learning in higher education institutions (HEI) around the world. However, the majority of these HEI are not prepared to handle the challenges of this new disruptive digital environment. Students, teachers, and the entire organizational structure of these institutions must learn how to adapt to these new challenges such as teleworking, the use of technology to access and develop virtual classrooms, personal constraints at home, etc. This chapter aims to study this swift transition process and its impact according to the students´ perspective on this matter. Based on an exploratory study and by drawing on the data collected through a questionnaire applied to 1079 Brazilian and Portuguese students, the chapter provides an interesting view on the student's perceptions, their conditions to study at home, the relation with technology, and their expectations regarding the permanent use of online learning (e-learning or b-learning).

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INTRODUCTION

The COVID-19 outbreak has had a profound and disruptive social and economic impact worldwide. Every sector and human activity have been somehow affected by this unexpected outbreak. As a result of it, governments, organizations, and other key players are staggering to mitigate its unpredicted consequences during and after the outbreak. The education sector is no exception, as 1.5 billion learners were affected by the school or university closures in 195 countries, according to UNESCO´s mid-April estimates (UNESCO,2020a). The majority of Higher Education Institutions (HEI) and their student population face various challenges amid the global crisis inflicted by the COVID-19 pandemic. Undergraduate and graduate university education are being strongly impacted. Given what is known today, these impacts will perhaps be long-lasting and bound to introduce radical changes to the traditional teaching and learning methods in place and the way we perceive curriculum design and development. Within this context, Darwin´s theory has never proven to be so right and wrong simultaneously, as these institutions now realize that the ability to adapt without a collaborative approach is not, per se, enough to thrive in this challenging and complex new environment. Therefore, HEI and faculty are currently swiftly replacing the traditional classroom face-to-face teaching and learning process by virtual classrooms, sharing notes in digital format (i.e., PPT and PDF), videos, and recorded class sessions, amongst others. For many of those who questioned, or who perhaps continue to question, the pedagogical soundness and validity of online learning, it is essential to realize that the transition to this method is the only viable alternative as an anti-risk measure and a means to ensure the continuity of the learning process abruptly interrupted by the COVID-19 outbreak. This new paradigm shift is only possible due to new technologies such as digital and other collaborative and learning management platforms, including, amongst other examples, Zoom, Moodle, BBLearning, Google, Teams, and Youtube. However, despite the technology being a key facilitator of online learning and having enabled the swift transition to this new learning environment, the fact is that due to the speed in which the change took place, and as it becomes a routine, several challenges need assessment.

First of all, one may assume that in many cases, the transition process was abrupt, and perhaps, many faculty and students may not have adapted rapidly to the transition, either for cultural reasons or technological unpreparedness. For example, in the case of faculty who feel that they have mastered teaching by seeing the students' faces in a class (Mohapatra, 2020), this is a cultural and experiential issue that needs a certain maturation period and more experience for the transition to online learning to be fully sunk in. Secondly, some of the measures taken might have been hasty and perhaps only a few in line with an appropriate curriculum design, tailored specifically for an online environment. While some institutions already had a robust online presence that facilitated the transition and their faculty accustomed to integrating technology in the course design, others have been forced into uncharted terrain. For many institutions, the transition was justified as a way to provide academic continuity and a temporary solution to their inability to teach face-to-face as the risk of infection and transmission was high. In these cases, and perhaps in most HEI, what occurred was the transition to a so called "emergency remote teaching" (DeVaney, Shimshon, Rascoff & Maggioncalda, 2020, p.3.) rather than online learning as a method envisioned and sustained by a long-term-strategy and strategic planning. Navigating through the complexities of teaching in a nontraditional format without a clear strategic direction and timely formal preparation is challenging for both faculty and students (Niemotko & Tolan, 2020). Another non less critical aspect, and a challenge, is that the COVID-19 pandemic has showcased profound inequities in higher education, namely the digital divide (Pasquerella, 2020) emphasized in the transition to an

online learning environment. It is also important to mention that faculty and students' learning experience are traditionally grounded in a physical classroom environment, and this environment has fueled the relationship and interaction crucial to ensure the learning process. Moving from this environment, rapidly, to one that is not yet fully understood and mastered, without disrupting this relationship and interaction, is vital and challenging. Finally, reconciling the different expectations among faculty and students generated in the transition from a presential to an online environment is also a challenge to be taken into account. Since "there is a good likelihood that virtual learning, in some capacity, will need to be a part of education for the foreseeable future" (Devaney et al., 2020, p.3) due to COVID-19, it is of prime importance to study how the HEI communities perceive its various challenges and multidimensional impact. Therefore, this chapter aims to provide academic evidence based on a quantitative study on the impact of the rapid transition from presential to online learning during the COVID-19 outbreak on Portuguese and Brazilian higher education students' perception. The study herein depicted is based on an exploratory study using a data collecting instrument, a survey applied to 1079 higher education students from Brazil and Portugal. Descriptive statistical analysis of the data was undertaken, with the results providing an interesting view of the impact of the transition according to the students' perceptions, namely their conditions to study at home, relation with technology, and their expectations and acceptance regarding the continual use of online learning (e-learning or b-learning).

THEORETICAL LITERATURE REVIEW

Higher Education and ICT

According to Guri-Rosenblit (2001), the democratization of higher education and the emergence of the Information and Communication Technologies (ICT) represents a central argument for change traditional education. This tendency becomes more real in the last decade (Carvalho, 2015). ICT are implanted in several countries' economic and social structures and have become increasingly relevant with the Pandemic. ICT is also an important tool in education. Furthermore, ICT has encouraged higher education institutions to enter the "business of distance education" at various levels of experimentation and application (Littleton & Light, 1999; Selinger & Pearson, 1999; Trow, 1999). ICT has contributed to the change in the status of distance education within the academic world. Traditionally, distance teaching was regarded as operating on the margin of higher education systems (Guri-Rosenblit, 1999). Traditionally, distance teaching was regarded as operating on the margin of higher education systems (Guri-Rosenblit, 1999). Distance learning can be defined as a mode of delivering education and training in a classroom where it is not possible to carry out in-class activities due to the limited traditional teaching-learning methods and, therefore, the interaction and communication between the planners of educational activities, practitioners and students, are provided from a specific centre via especially prepared teaching units and various means (Alkan, 1987: cited by Gurbuz, 2014). Distance learning is the most modern education system independent of time and distance. It enables individualized education opportunities and is implemented via information technologies, especially via Internet (Baturay & Bay, 2009: cited by Gurbuz, 2014). Nevertheless, there are still under development new and more efficient ways to operate and carry out pedagogical and organizational innovation (Ossiannilsson, 2011) in a global sustainable environment (Bates, 2010; Conole, 2010).

Other authors (Ehlers & Svhneckenberg, 2010; Johnson et al., 2011; O'Reilly & Batelle, 2009) argue that there is no longer a need for a definition of e-learning due to its role and implications on a vast number of fields. Bonk (2009) provided a new inside into this topic with the concept of ubiquitous learning (u-learning). This perspective focused on personalization and learners' rights and responsibilities. Several institutions offer distance learning nowadays or use ICT, though with differences influenced by different academic cultures dominant in various higher education systems (Rothblatt, 1997). These cultural differences influence the adoption of new traditions and teaching innovations (Guri-Rosenblit, 2001). It is possible to identify important differences in attitudes towards distance education or online learning among different higher education systems.

Lameras et al. (2008) showed the outcomes of a study about the conceptions of teaching through a virtual learning environment held by a group of five university teachers from the area of computer science. Three categories and six subcategories emerged from the study as shown in Box 1.

Box 1. Conceptions of teaching in virtual environments

Information transfer, which had the subcategories:	Understanding concepts, which has two subcategories:	Developing the concept, which has one subcategory:
° Providing information: emphasizes the use of information created to be used off-line first as a medium to support face-to-face activities; ° Extending information: the focus is on provision of further information by means of links to websites or other relevant online material; ° Clarifying information: clarifying small points in the content being taught by using, for example, bulletin boards.	° Understanding the topic: emphasizes the understanding of content by explaining content through eLearning tools and monitoring progress through online tests or quizzes; ° Rethinking the topic: students' reflection on the topic encouraged through participation in online tasks.	° Developing the topic: eLearning is used to contribute and share ideas. Participation in online discussions is encouraged.

Source: Lameras et al, 2008

The Students Perception About e-Learning Experience

The student's perception and experience about e-learning/distance education can be summarized in the follow dimensions (Carvalho, 2015):

1. Empathy – Refers to personal feelings, such as euphoria, pleasure, depression, distaste, discontentment, or hatred related to a particular behavior (Triandis, 1979). Empathic feelings towards technology allow gaining experience, knowledge, and self-efficacy. Oppositely, a negative feeling towards technology implies avoiding it with negative impacts on the learning process (Arkkelin, 2003);
2. Perception about the course – Studies about students' perceptions in e-learning are not consensual (Picciano, 2002). Some of them reveal discomfort, mainly due to the constructivist pedagogical theory that considers students as the center of the learning process. Lowell (2001) also states that e-learning requires that students answer to frequent computer-based instruction demands that reduce student engagement in the course and could influence negatively student's success. Students less

familiarized with technology and with learning tools used can reveal negative perceptions that can affect their outcome results;

3. Perceived learning outcome – Associated with learning results and connected with learning tools. According to Saadé et. al (2007), perceived learning outcome can be measured according to three items: (1) performance improvement, (2) Results, and (3) achievement of the learning objectives. Some studies reveal the importance of the instructor/professor/tutor in this process as a facilitator and moderator in the e-learning environments (Faigley, 1990);
4. Attitude - literature highlights the importance of student and tutor attitudes towards online learning (Sunal et al., 2003), and their impact on learning achievements (Marzano & Pickering, 1997);
5. Intrinsic motivation - motivational perspectives are also relevant to understand behavior (Venkatesh, 1999). Intrinsic motivation applied to learning theories is also used as a construct to measure user perceptions concerning game/multimedia technologies (Venkatesh, et al., 2002);
6. Extrinsic motivation - Deci & Ryan (1985) consider that extrinsic motivation involves the behavior to achieve a specific reward, such as higher grade in the exams, awards, prizes, etc.

Furthermore, other studies refer to several factors that influence creating a successful e-learning model for higher education and have grouped these factors into four main aspects: human deliberation factor, instructional design factor, technology development factor, and social delivery factor (Vate-U-Lan, 2008).

Higher Education Institutions – Virtualization?

Before COVID 19, some studies have pointed out that the virtualization of Higher Education has some advantages (Carvalho et al, 2020):

- It expands student catchment far beyond their traditional geography limited boundaries. This possibility allows us to improve university productivity and achieve a cost structure more flexible and lighter during the improvement of cost-effectiveness in educational courses;
- Technology enables the interaction between students and teachers, i.e., learn and teach in different places;
- Provides open access to learning and training in an equative manner, including disabled students who can attend the same courses;
- Grants opportunities for updating the skills of the workforce;
- Improves the quality of existing educational structures;
- Enhances the educational system´s capacity;
- Balances inequalities between age groups;
- Delivers educational campaigns to specific targets audiences;
- Provides emergency training to key target groups;
- Expands the capacity to combine education with work and family life;
- Adds international dimension to educational experience;
- The quality tends to increase; virtual universities are open to public scrutiny (Moore & Kearsley, 2012).

Nevertheless, this global and competitive context implies challenges to higher education institutions mainly for the HEI that are more familiar with face-to-face learning, such as:

- Students have to learn how to study using technology and communicate when learning, which is not always the same as what they do socially.
- Virtual learning expands the student population and subsequently increases their heterogeneity. Consequently, students could present different profiles and styles of learning with effects on learning results and limiting the use of methodologies tailored to each profile;
- Different technology, different teaching techniques, and different types of students involved allow the best ways to manage and administer the programs provided;
- Virtual universities include the concept of distance learning. Distance learning is a multidimensional concept that implies special pedagogy different from the traditional pedagogy used in a classroom. Teachers and facilitators of e-learning must be aligned with this pedagogical virtual model;
- Guarantee of an active rather than a passive learning environment;
- Development of global courses adapted to different students' profiles and from different geographic origins;
- Development of online collaboration and assessment criteria's fair for all students, attending to the culture and geographical heritages;
- Design courses that enable experiences and environments based on interactive and collaborative learning and reduce student dropout.
- With the purpose of giving students more opportunities to participate, some teachers' applied Web 2.0 tools (blogs, wikis) and services (Flickr, YouTube) in the institution, however, some problems occur because of the difficulty to manage external people and services within the institution (Yang, 2006). In this case, students do not have the notion of a classroom or groups of students where learning services can be delivered and executed. To the services, it is complex for learners to discover and access different web services, and it is not evident for the teacher to track all the services students have used to assess their learning outcomes (Oskar et al, 2010).

THE CONTEXT

The COVID19 Pandemic is having an impact in various contexts of economic and social activity worldwide, including education. Within this particular context, Higher Education Institutions (HEIs) have also needed to adapt and scurry to distance learning. In most cases, this rapid transition without the preparation of teachers, students, and the very structure of these organizations, has brought a set of challenges to the educational community and students in particular (Carvalho 2015; Carvalho et al., 2019).

According to United Nations (2020) the disruptions caused by COVID-19 to everyday life represent that as many as 40 million children worldwide have missed out on early childhood education in their critical pre-school year. In technical and vocational education and training systems, vulnerabilities such as low levels of digitalization and long-standing structural weaknesses, have been highlighted with pandemic. In the higher education online learning has mostly taken place through recorded lectures and online platforms, some universities have postponed learning and teaching until further notice, due to the lack of information technology (IT) infrastructure for both students and teachers semesters and academic calendars, as some programmes have been successfully implemented online, while others could not be. The studies about this period still in the earlier phase however, some remarks suggest that pandemic influence differently students, and social and economic aspects influence these dynamics. The report

also referred that an estimated 40 per cent of the poorest countries failed to help learners at risk during the COVID-19 crisis, and past experiences indicate that both education and gender inequalities tend to be neglected in responses to disease outbreaks. Specially in some vulnerable communities such as marginalized communities and refugees. In the fact the most vulnerable learners are also among those who have poor digital skills and the least access to the hardware and connectivity required for distance learning solutions implemented during school closures. This scenario justifies the development of empirical studies to provide a better understanding of this complex phenomena.

This exploratory study aims to study students' perceptions from Higher Education Institutions in Portugal and Brazil regarding the impact of the transition to distance learning.

METHODS

The current study was carried out using a quantitative research design approach, and due to the lack of access to the target population's list, a non-probability sampling technique was used, namely convenience sampling. The data was collected using a closed-ended survey applied online through the Lime Survey platform. A total of 1079 responses from HEIs in Portugal and Brazil were collected in April 2020.

The statistical analysis involved descriptive statistical measures (absolute and relative frequencies, means, and respective standard deviations) and inferential statistics. The level of significance to reject the null hypothesis was set at $\alpha \leq .05$. The relationship between qualitative variables was analyzed by using the Chi-square test, assuming as a criterion that no more than 20% of cells with expected frequencies below 5 were analyzed. However, in situations where this criterion was not met, the Chi-square test by Monte Carlo simulation was used instead. The differences were analyzed with the support of standardized adjusted waste. The statistical analysis was performed using SPSS (Statistical Package for the Social Sciences) version 25.0 for Windows.

As depicted in Table 1, of the 1079 students who were surveyed, the majority were female (71.1%), Portuguese (95.9%) and aged between 10 to 25 years (74%). Most of these individuals were non-working students (71.8%) enrolled in both undergraduate and graduate programs (89%) at Polytechnic Institutes (97.5%). The programs in which most of these students were enrolled were Accounting (22.3%) and Management (16.1%).

RESULTS AND DISCUSSION

The results obtained are interesting, showing that students attend virtual classes mostly at home, and commonly from their bedroom. To access these classes, most of the students use a computer which they generally do not share with other people in the household. Equally impressive is the fact that the overwhelming majority did not have any previous experience of distance learning and considered the use of digital technologies and collaborative virtual environments to be a practice little encouraged before by their teachers. According to these students´ perceptions, the biggest challenge is the lack of face-to-face classes. Although the relationship between the unsuitable nature of online classes and the lack of previous experience, as perceived by the students, has not been established in this study, perhaps it should not be entirely overruled as a plausible justification. The results also suggest that for almost half of the students, their teachers' orientation towards digital technologies and virtual collaborative environments

Table 1. Sample Characterization (N = 1079)

	N	%
Gender		
Female	767	71,1
Male	312	28,9
Age		
10 - 25 years	798	74,0
26 - 40	192	17,8
41 - 55	76	7,0
> 55 years	13	1,2
Status		
Student	775	71,8
Working Student	304	28,2
Courses/Programs attended		
Undergraduate (bachelors)	960	89,0
Graduate (Masters)	109	10,1
Other (specify)	10	,9
Institution attended		
Faculty	15	1,4
Polytechnic Institute	1052	97,5
University	12	1,1

Source: Own elaboration

is mostly centered on the teacher and the student's role. Another interesting finding is the tendency for students who also have a professional activity to show a higher acceptance of distance learning when compared to their counterparts who are full time students. This group of students generally belongs to a higher age group and seems to be more willing to continue with these classes after the pandemic.

Brief Characterization of the Conditions of Access to Digital Technologies by Students

A little more than half of the sample used a Laptop to attend classes at a distance, and 39.2% used a Desktop Personal Computer (PC) (Table 2). A very high percentage of these individuals tend not to share their devices with others (81.8%).

Around ¾ of the individuals mentioned that they attended classes in a particular space of their home (75.4%), namely the bedroom (48%) or the living room (29.9%) and that most of this space was used exclusively by them for this particular purpose (55.2%).

Table 2. How do you usually attend distance classes?

	N	%
Personal Computer /Desktop (PC)	423	39,2
Laptop (Notebook)	593	55,0
Tablet	14	1,3
Mobile Phone	49	4,5
Total	1079	100,0

Source: Own elaboration

Brief Characterization of the Contact With Digital Technologies by Students Prior to Covid-19

As depicted in Table 3, a very high proportion of students had no previous experience in distance learning before the Covid-19 pandemic (91.7%)

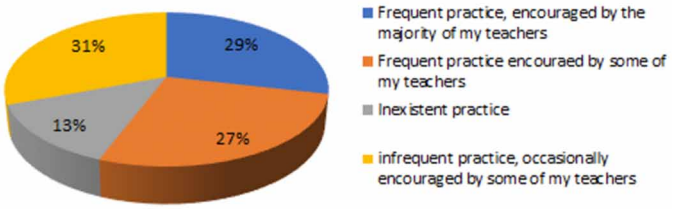
Table 3. Previous distance learning experience

	N	%
No.	989	91,7
Yes.	90	8,3
Total	1079	100,0

Source: Own elaboration

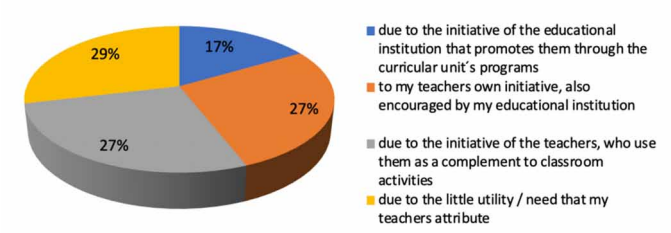
For most of the respondents the use of digital technologies and collaborative virtual environments, such as videoconferencing, e-mails and collaborative knowledge-sharing platforms, is either an infrequent practice, occasionally encouraged by some teachers (30.8%), or a frequent practice encouraged by most of their teachers (28.5%), (Figure 1).

Figure 1. Use of digital technologies in education before Covid-19
Source: Own elaboration



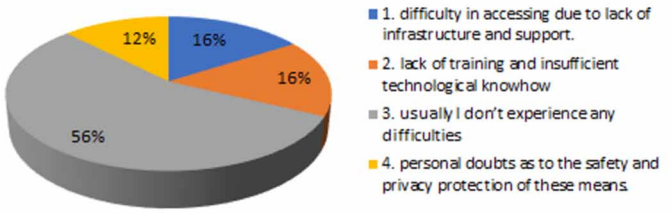
According to the results shown in Figure 2, for most students, the intention to use, or not, these technologies and collaborative virtual environments in their curriculum units, before the COVID-19 pandemic, were mainly determined by the little utility/need attributed to them by their teachers (28.7%) or the initiative and encouragement of both faculty and the teaching institution (27.4%).

Figure 2. Justification for the use of digital technologies by teachers prior to Covid-19
Source: Own elaboration



The majority of students (56%) reveal that they did not experience difficulties or constraints in using these technologies and collaborative virtual environments (Figure 3).

Figure 3. Difficulties in students' access to digital technology
Source: Own elaboration



In pedagogical terms and concerning collaborative environments, Table 4 shows that most students consider the importance of teacher and student role through the development of group dynamics and the creation of a collaborative learning environment.

Brief Characterization of the Contact With Digital Technologies by Students After/ During the Covid-19

With the transition to distance learning, there are some interesting results. More than half of the students (60.3%) mention that the main challenge they face as a student is "the lack of face-to-face lessons, and the fact that the alternatives available, namely online teaching or other means of online contact, are not adjusted and appropriate to my needs and learning style" (Table 5).

Table 4. I feel that my teachers' orientation towards digital technologies and virtual collaborative environments is essentially focused

	N	%
on the role of the teacher and the student, through the development of group dynamics and the creation of a collaborative learning environment.	498	46,2
the role of the teacher and the availability of content and information.	347	32,2
an alternative or complement to traditional means of teaching that is not intuitive and flexible	234	21,7
Total	1079	100,0

Source: Own elaboration

Table 5. In the presence of the pandemic outbreak of Covid-19 I feel that the main challenge I face as a student is now

	N	%
the lack of face-to-face classes and the absence of alternative solutions to compensate for this lack	134	12,4
the lack of face-to-face classes and the fact that the available alternatives, namely, online teaching or other means of online contact are not adjusted and adapted to my needs and learning style	651	60,3
I do not foresee any challenges or difficulties because I feel prepared and with appropriate alternatives to the situation.	294	27,2
Total	1079	100,0

Source: Own elaboration

Although over half (54%) of the students consider the use of virtual lessons through videoconferencing platforms (e.g., Zoom/Teams), in the context of COVID-19, to be "a valid alternative to ensure the teaching of content, to be "a valid alternative to ensure the teaching of content, but still does not dispense with other means of contact such as the e-learning platform" (Table 6).

Table 6. I understand that the use of virtual lessons through videoconferencing platforms (e.g. Zoom/ Teams) represent in the context of the Covid-19 pandemic outbreak

	N	%
an alternative to face-to-face classes that I do not like because it is not very effective in teaching contents.	289	26,8
a valid alternative to face-to-face classes that I like and that I consider sufficient to guarantee the teaching of the contents.	207	19,2
a valid alternative to guarantee the teaching of the contents, but still does not dispense other means of contact such as a e-learning platform	583	54,0
Total	1079	100,0

Source: Own elaboration

A high proportion of respondents (49.5%) mention that what they value most in virtual classes, held through videoconferencing platforms (e.g. Zoom/Teams) in the context of the pandemic outbreak is: "the fact that these classes allow greater "proximity", even if virtual, with my teacher and seeing the physical and temporal barrier overcome in clearing up doubts about the content" (Table 7)

Table 7. What I value most in virtual classes held through videoconferencing platforms (e.g. Zoom/ Teams) in the context of the pandemic outbreak is

	N	%
I do not value them because I consider that face-to-face classes are irreplaceable, even in exceptional situations such as COVID-19.	156	14,5
the collaborative learning environment they help create in the classroom.	75	7,0
the fact that they allow a greater "proximity", even if virtual, with my teacher and to see the physical and temporal barrier overcome when clarifying doubts about the contents.	534	49,5
the fact that they are a means to create a learning environment similar to that of a traditional classroom.	314	29,1
Total	1079	100,0

Source: Own elaboration

When asked about their experience with virtual classes, just over half (54.6%) of the students consider that in the future these classes should be held only in exceptional situations, and that face-to-face classes should be given priority (Table 8).

Table 8. In view of the experience I am having with the virtual classes, I consider that in the future these classes should be held

	N	%
only in exceptional situations, and face-to-face classes should be given priority	589	54,6
more often and complementary to face-to-face classes.	241	22,3
more often and whenever possible as an alternative to face-to-face classes.	192	17,8
they should never be held.	57	5,3
Total	1079	100,0

Source: Own elaboration

Around 55% of the students say that since they started to have online classes through videoconference, they have realized that: "online classes do not allow to follow the content easily and are a focus of greater distraction" (Figure 4).

Not less interesting is the fact that almost half of the sample (44.4%) think that in the future collaborative teaching methods, such as e-learning platforms, should have a more intensive level of use by their teachers, namely " as a complement to face-to-face lessons and a means of exploring other potentialities in collaborative learning and knowledge sharing" (Figure 5).

Figure 4. Perceptions about personal experience
Source: Own elaboration

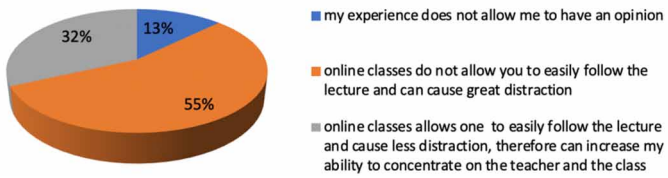
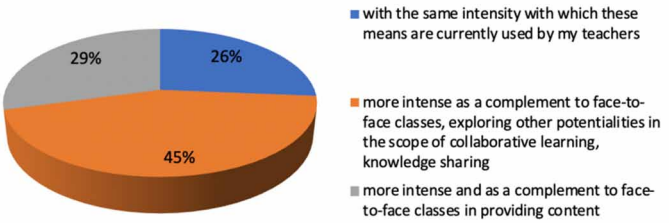


Figure 5. Perception about the future of the classes after COVID-19
Source: Own elaboration



Most of the students (60.3%) consider that the main challenge they face as a student is the lack of face-to-face lessons and the fact that the available alternatives, namely online teaching or other means of online contact, are not adjusted and appropriate to their learning needs and learning style". This view is relatively similar regardless of gender (c^2 (2) = 3.479, p = .176), age (c^2 (6) = 10.993, p = .086) and student status (c^2 (2) = 1.980, p = .372). The majority of these students (55.4%) did not experience difficulties or constraints in using these technologies and collaborative virtual environments. This opinion is relatively similar regardless of gender (c^2 (3) = 1.353, p = .717), age (c^2 (9) = 12.048, p = .211) and status of students (c^2 (3) = 1.433, p = .698).

The general opinion of the students is that in the future the virtual classes should only be carried out in exceptional situations, and that face-to-face classes should also be previliged (54.6%). This opinion is shared relatively similarly by both genders (c^2 (3) = 5.233, p = .156).

However, when we analyze the results according to age (c^2 (9) = 27.789, p = .001) and status (c^2 (3) = 24.744, p = .001), statistically significant differences can be found. The opinion that classes should be held only in exceptional situations, and that face-to-face classes should be preferred, is significantly higher in students aged 10-25, while the opinion that classes should be held "more frequently and whenever possible as an alternative to face-to-face classes" is found to be higher in students aged between 26 to 40 (Figure 6).

Figure 7 shows that individuals enrolled as students there is a significantly higher proportion of students who share the view that "online classes should be held only in exceptional situations, with the emphasis always being placed on face-to-face": In contrast, working students show a significantly higher proportion of individuals who share the view that online classes should be held "more frequently and, whenever possible, as an alternative to face-to-face classes."

Figure 6. Perception of distance learning by age
Source: Own elaboration

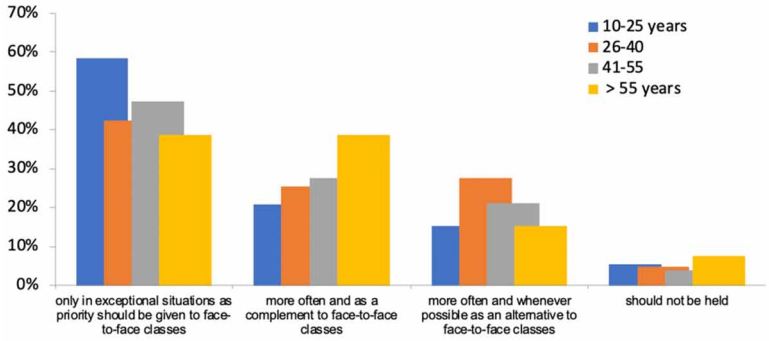
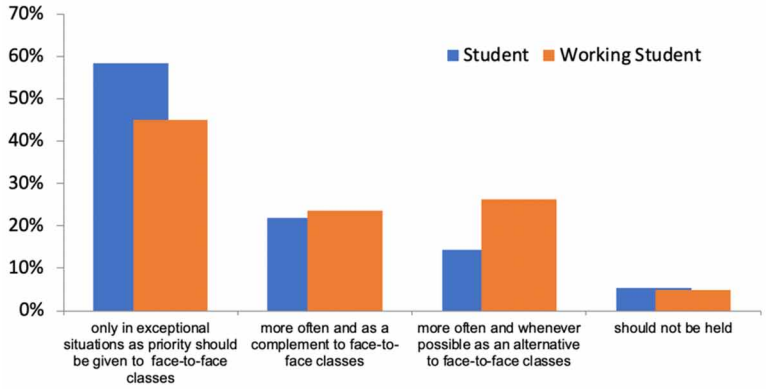


Figure 7. Comparison between full-time versus working students profile
Source: Own elaboration



FINAL CONSIDERATIONS

The COVID-19 pandemic takes on the shape of a perfect storm with severe effects on a global scale. The world has been shaken by an unprecedented economic and social crisis caused by this pandemic. Its global effects are transversal to all societies and sectors of activity. Education is undoubtedly one of the sectors where COVID-19 has had significant repercussions, mainly due to its unpredictable effect on the educational system's normal functioning, which is traditionally oriented to a face-to-face instructional method.

In response to the pandemic outbreak, higher education institutions turned to distance learning (online education), replacing the physical classroom with a digital one. Many have considered online education as a complement to the traditional classroom, and rarely as its substitute. The view of distance learning as a compliment, rather than a replacement to face-to-face learning, may have contributed to the difficulties encountered during the transition to an online learning environment in the awakening and response to the COVID-19 pandemic. In fact, the emphasis on the fundamental role of face-to-face learning and the long-term experience and practice grounded on this traditional instructional method may have shaded

the potential of online learning in other non-emergency related contexts, and by doing so, has probably hindered the consensual transition to the latter form of delivering course content and learning material.

Assuming the academic community might have accepted the importance of distance as a natural trend and the future teaching model, a perspective that has been perhaps reinforced by the pandemic. The scientific value and the applicability of this chapter is to provide a landscape based on an empirical research about distance learning in HEI traditionally presential. As stated previously, these communities' long-term experience has always been based primarily on face-to-face. Contrary to the latter online learning requires a skill set that many teachers do not possess and need additional support and training to develop (Baran, Correia, & Thompson, 2011; Lowentahl, Gooding, Shreaves & Kepka, 2019). The teachers' experience in designing and teaching classroom courses tends to be a different reality in online education. They frequently lack experience with technologies, educational strategies, communication processes, and the organizational structure required for teaching online (Baran et al., 2011; Lowenthal et al., 2019). Faculty must receive adequate training and development in online teaching as this is to be critical foundation for quality online education (Meyer, K.A.& Murrell, V.S., 2014).

An important issue standing out from this swift transition to online education that needs an answer in future studies is whether such a transition occurred or not in many cases. The point for debate is if what has been witnessed so far is not merely the transition to what Tarín and Aragay (2020) refer to as Remote Emergency Teaching, an alternative to ensure the delivery of a curricular design conceived primarily for face-to-face teaching. According to these authors, online education goes beyond the simple discovery of the multiple possibilities of Information and Communication Technologies for learning, implying instead capitalizing on these technologies under a new learning proposition and doing differently than what was done before them.

As asserted before, online learning and digital or virtual classrooms require a different mindset and attitude from those directly implicated in the educational process, together with an individual and collective readiness. Consequently, one of the key issues and good practices for the success of an online learning strategy is whether there is a state of readiness, or more precisely, e-readiness, in the academic communities where this strategy is implemented. For clarity, e-readiness in this specific context refers to the degree to which a community may be eager and prepared to avail itself of using Information and Communication Technologies (Firat & Bozkurt, 2020, Dada, 2006). The effectiveness of distance learning strategies can be conditioned by readiness at a technological level, the availability of means of access to technology, and suitable curricular content (UNESCO, 2020b). Therefore, it is the author´s understanding that a full and consequent transition to online or distance learning implies an educational practice internalized adequately by all stakeholders, an appropriate teaching philosophy, methodology, and an adjusted curriculum design.

The main findings and the results of this research may suggest that it is unlikely that, in most cases, there was indeed a full transition to an online or distance learning model due to a lack of readiness. In these cases, the problem has been perhaps not so much the will to change, but rather the timing to perform this change in a consistent and consensual manner. This assertion is based on two key facts observed in the study, being the first the significant proportion of students who, regardless of gender, claimed that the main challenges they faced as students are the lack of face-to-face lessons and that online teaching and other means of online contact are not adjusted and appropriate to their learning needs. The fact that this perception among students is higher among those aged between 15 to 25 is perhaps an even more compelling argument, as, in normal circumstances, this group is usually more comfortable with technology. This means that maybe the problem was not the ability to use technology as an essential

step towards the transition, but the lack of eagerness and preparedness to use it due to insufficient time for planning and adapting to the change in methods. On the other hand, this argument tends to be less compelling in individuals enrolled as working students. The higher flexibility in terms of space and time provided by online classes may explain this difference in working students' perceptions. Besides, working students sometimes tend to experience more difficulty attending face-to-face classes, making them perhaps less sensitive to differences in class environments, curriculum design and teaching methods. The second fact, and equally impressive, is that most of the respondents did not seem to have any previous experience of distance learning and considered the use of digital technologies and collaborative virtual environments to be a practice little encouraged before by their teachers. The authors believe that the transition to an online teaching environment requires both a structural and cultural change that simply cannot be hastened by the graveness of an unpredicted and sporadic context alone. Conceiving distance education or online learning as a mere response to a specific problem or educational context is dooming this instructional method to failure. Therefore, the academic community and all those that are directly or indirectly implicated in the process must have an extended view of distance learning, a view that embraces its full potential and benefits.

Finally, in general, the academic community and policymakers must withdraw from the Covid-19 pandemic the idea that a new educational model is required. A model that can accommodate technology as a critical element for learning through new instructional methods and thought out as an opportunity to improve the educational system by providing a proactive rather than reactive response to the future challenges of education. In this model's development, the debate is not whether there should be more or less online teaching or if the latter should be a substitute, or not, to the traditional learning method that has historically endured. Far from this debate, what truly matters is the need to envision an education model capable of accommodating technology and, in particular, the underlying potential of digital technology to confront inequality in the access to education and improve how faculty teach and students learn. The critical point is then not what is to be replaced in the process of learning, but how to potentiate and innovate this process.

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KEY TERMS AND DEFINITIONS

COVID-19 Pandemic: Worldwide outbreak of a recent high-risk contagious coronavirus capable of causing infectious disease or severe illness.

Distance Learning: An instructional method of delivering content and learning material without the teacher's physical presence in the classroom. The content delivery process and interaction between teacher and student is mediated by technology, namely the Internet and other digital technologies.

E-Learning: A learning system based on formalized teaching supported by technology, namely electronic resources (i.e., digital resources, mobile, computers) to deliver remotely content and other educational materials to distance learners or as a complementary tool to face-to-face learning (i.e., blended learning). E-Learning platforms allow students to work online at home or in the classroom, digitally assigned learning tasks.

E-Readiness: The degree to which a community may be eager and prepared to accept and take advantage of using Information and Communication Technologies.

Online Learning: Referred to sometimes as e-learning, is the instructional method of delivering course content remotely outside the physical classroom through the Internet and other digital technologies. The concept is used alternately in the context of this study as distance learning.

Remote Emergency Teaching: An alternative to ensure the delivery of a curricular design conceived primarily for face-to-face teaching through Information and Communication Technologies (ICT).

Chapter 15
Surviving COVID-19 Crisis by New Business Models:
A Case Study of the Indian Restaurant Industry

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ABSTRACT

The foodservice sector is one of the three leading sectors in India, with a market size of 152 billion USD. There are over 500,000 organized and unorganized restaurants in India, and the sector has seen exceptional growth during the past decade. A high percentage of the young and working population is driving the India foodservice market, which is further fuelled by organized retail space that is encouraging the growth of local and international brands across different formats. This study explores how the crisis caused by the COVID-19 pandemic has led to adapting to the new business model by the food service sector in India.

INTRODUCTION

The information technology has transformed every sector, including the food services sector. Since the last few decades, the use of technology has increased significantly in the food services industry, leading to increased operational productivity and efficiency. The foodservice sector adopted EPOS (Electronic Point of Sales) a system used for recording information of goods sold by a retailer) in the form of ECR(Electronic Cash Register- an electronic device for calculating and recording sales transactions and printing receipt for the customer) in the 1970s. The ECR devices helped the restaurant industry in tracking customer transactions, speeding checkout time and generating the daily transaction reports. A revolutionary concept, EPOS provide the customer with a clean, error-free customer receipt including tax charged, what customers ordered and the total cost of the meal ("The History of POS", 2020).

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Apart from the EPOS system, MIS (Management Information System) – an information system used for decision-making, coordination, control, analysis, and visualization of information in an organization was also introduced. The MIS system offered a solution to the complex systems of buying, storing, preparing and selling food by coordinating everything from scheduling staff to customer service.

The subsequent introduction of the back of the house management technology also (procurement, production etc.) in the 1990s brought greater efficiency in the industry. The food services sector witnessed large scale innovation in the 1990s in the form of the introduction of the review of restaurants by customers on different websites, especially on social media sites. Such reviews had a significant impact on restaurant businesses (EHL, 2020). The sector also invested in technologies aimed at enhancing productivity and profitability. However, the technology for food delivery was largely ignored as the concept was disapproved by most of the high-end restaurants. The opportunity of food delivery available in a huge Indian market however was utilized by the leading food aggregators of India like "Zomato" and 'Swiggy". The food aggregator business model is an e-commerce business model where a firm, known as an "Aggregator" collects (or aggregates) data on restaurants, pastry shops, coffee shops and other types of catering establishments display it on its website or application software from where the customers can order the food.

Back in 2008, founders of Zomato had a vision of enabling customers to have digital access to thousands of restaurant menus and enjoy the meals wherever they want. The Zomato website explains the vision of its founders beautifully *"Three passionate foodies, who hated waiting in lines, drove around Delhi to collect menus from restaurants, scan them and put them online. Their idea has now grown into the vision that drives our team of 5000+ people every day"* ("Our Journey", 2020). The idea of providing digital access to menus and delivering food to customers in their comfort zone is saving the Indian restaurant industry from the devastation caused by COVID-19 pandemic.

In the backdrop of the impact of COVID-19 pandemic on Indian restaurant Industry, this case study explores the role of food aggregators like Zomato and Swiggy in helping the Indian restaurant industry to survive the crisis caused by Covid-19. The study further explores the role of cloud kitchens in the resurrection of the restaurant industry to mitigate the devastation caused by Covid 19 pandemic. The use of Artificial Intelligence and Machine learning by food aggregators are discussed to make readers understand the benefits such companies enjoy by the relentless pursuit of such technology.

BACKGROUND

The Indian restaurant industry is among the top three service sector (after retail and insurance). The sector is 20 times larger than the film industry, 4.7 times of hotels and 1.5 times of the pharmaceutical industry in India. The Indian restaurant offered jobs to 7.3 million people in 2018-19. India's food service industry is innovative and provides an exciting opportunity to expand due to an average of 6.6 eating out frequency per month in the country ("NRAI", 2020). Indian restaurants had a market value of about 152 billion U.S. dollars in 2014. The foodservice market in India is divided into two segments, the organized and unorganized segments. The significant chunk of businesses (86%) is unorganized, and in comparison, the organized restaurant businesses contribute to 14% only.

The unorganized segment deals mainly with the sale of ready to eat food through vendors, "Dhabas" (roadside eateries), food carts and street stalls(Jaganmohan, 2020). The organized restaurant segment, however, is growing at 16% annually and in the organized restaurant segment-the "quick-service restau-

rants" leads the Industry with 21% annual growth rate("Indian Restaurant Industry", 2020). The other types of restaurants in the organized restaurant sector include casual dining restaurants, cafes, fine dining restaurants, and pubs including (bars, clubs and lounges).

New Business Models

It is a well-known fact that competition in the world of business is no longer based on new products, services or technologies only- but enterprises are competing through innovative business models as well. The rise of the new business models is disrupting the existing business models by making them obsolete by offering greater value to the products and services provided. Such new models are the result of challenges and opportunities provided by new technologies (Tongur and Engwall, 2014). Several studies have confirmed the positive impact of new technologies for their contribution in expanding the boundaries of organizations and generating the new business models(Zott *et al.*, 2011).

Across all the industries, incorporating internet-based digitalization strategies to start, expand or improve the business is one of the striking features of new business models. The new ventures are recommended by experts to be supported by a value capture strategy "a business's ability to create profit from its transactions" to avoid being more than a fad (Thiel, 2014). The hallmark of a good business model is that it should be able to explain how and why customers, suppliers, and complementors interact with the company through the digital interface (Teece & Linden, 2017). A company selling such product or service that complements the products or services of another company and hence are called as complementors.

Even though there are several types of business models listed by business websites ranging from four to fifty-four in number, one of the popular business models is the aggregator business models which is also labeled as "platform business model". The rise of digital technology has fuelled the growth of the aggregator model. The technology improves the way an organization interacts with customers and partners apart from transforming internal processes(Peric, Durkin & Vitezic, 2017). Leveraging the full power of technology, the aggregator acts as a middleman monetizing the customers, visitors, advertisers etc. on the aggregator platform. The aggregator maintains a tight control on the whole experience of users. The aggregator business model has transformed industries and is dominantly shadowing businesses like food services, taxi services, hotels, groceries, insurance, travel etc.

The leading food aggregator "Zomato" came up with a unique business model revolutionizing the foodservice industry by listing various restaurants and other types of catering establishments and making it convenient for people to order their favorite food from the restaurant of their choice. Zomato business model follows the saying "Never put all your eggs in one basket", and the revenue flows into the company from various sources that include advertising of restaurants, food delivery, paid membership services, sale of event tickets, consultancy etc. However, most of the revenue (70%) comes from advertising of restaurants ("Annual Report FY19", 2020). The Zomato business model is an example of what is recommended by (Thiel, 2014) and (Teece & Linden, 2017).

The Rise of Food Delivery Business

India has one of the ancient food delivery systems dating back to 1890 when the "Dabbawala" services were introduced which is a unique system of delivering lunchboxes collected from homes and restaurants to working-class people in Mumbai city. An incredibly complex system, an estimated 80 million lunches a year is ferried (Baindur and Macário, 2013). The system maintains a record of committing

only a single mistake in every six million deliveries. The flawless delivery system of "Dabbawala" has been studied by Harvard Business School and FedEx(Henderson, 2020). The internet and mobile technology, however, introduced a string of innovations in the world of business, including the foodservice sector. The introduction of E-Commerce led to the several changes in the society and customer lifestyles, including ordering food online, the concept popularly known as "OFD -Online Food delivery". There has been a landslide increase in the number of customers ordering food from local restaurants or food delivery companies through websites or Smartphone applications or "apps" (Ray, Dhir, Bala and Kaur, 2019). In 2016, the "OFD" market in India increased by 150 per cent (Kapoor &Vij, 2018). The popularity of "OFD" has led to the establishment of internet-based startups like Food Panda, Zomato, Swiggy and many others. Such companies operate through smartphone ordering apps (MFOAs), also known as (FDA) food delivery apps (Shah, 2019).

The online food delivery services (OFD's) whether through websites or mobile applications allow customers search favourite restaurants, choose preferred food and finally delivers the same- are trending in e-commerce space (Pigatto, Machado, Negreti& Machado, 2017). The online food delivery business popularity soared due to the growing popularity of food delivery applications (Biswas, 2019).

The online food delivery system in India was started by "Zomato" in 2010. Subsequently, other players like Swiggy, Food Panda and Dominos forayed into the market as well (Ray, Dhir, Bala& Kaur, 2019). There are 1047 food tech start-ups in India as of now and the top five in terms of funding include Swiggy(USD 1.47B), Zomato(USD 673M), Curefit(170M), Faasos(USD 80M) and Magic Pin(USD30M) ("FoodTechStartups", 2019). Like all other businesses, investment in technology has benefitted such startups immensely- also called as the "food tech startups" as such companies are internet-based (Melville, Kraemer and Gurbahani, 2004). The technology adopted by food tech companies covers all the aspects of business operations -whether it is the simple procedure of generating the receipt or initiating complicated procedures like the building of loyalty programs. Such CRM and loyalty programs help food tech companies in ensuring the customer willingness to repeat orders. However, the Food Service Industry has moved beyond the need for operational efficiency and repeat orders. The Industry has taken a giant leap by embracing advanced technology like Machine Learning (ML) and Artificial intelligence (AI) for minimizing errors, enhancing customer satisfaction by delivering personalized services. Other applications include catalogue intelligence, customer intelligence and real-time signal (customer location distance from the restaurant).

"Swiggy" uses AI for "time series based demand prediction models" for planning and in delivering the food on time (Agarwal, 2019). Swiggy recently acquired an artificial intelligence startup that applies deep learning and computer vision to identify the objects in the video. The aim of computer vision technology is harnessing technology for the evaluation of quality attributes of raw and prepared foods for quality control purposes (Gunasekaran, 1996). Swiggy has hired world-class AI team from prestigious organizations like IBM and GE Research as senior scientists. The company has massive data – about 40 billion messages per day from customers, drivers and restaurants. The machine learning models are used to analyze such data. To enhance the data analysis capabilities, Swiggy is partnering with universities by offering them with the research grants. The company promotes the use of AI across the organization under the program" *AI for All*". This initiative involves providing training to all the teams, analysts and business leaders (Poojary, 2020). The application of AI is helping the food aggregators in critical areas like food delivery also. When the customer orders the food, drivers are already travelling, and restaurants are busy with their orders, the AI helps in choosing the nearest delivery agent. The technology further allows in determining whether the driver who has been assigned for delivering food has a positive track

record for delivering on time. The AI models assist in building the intelligence models around the customers- for example, their food preferences at a particular time.

"Time and space" is yet another dimension where AI is applied. As the customer food demand changes during the day, the platform automatically switches over to such restaurants that serve breakfast items. However, such decisions are made in such a way that so that most cost-effective restaurant offering excellent customer experience is chosen. The AI system compares the time taken for preparation of the different menu items by another restaurant against the standard time such menu items take to cook. Such decision making helps in choosing the restaurants from where the food can be delivered in the optimum duration. To minimize the errors of delivering the right food item ordered by the customer, Swiggy introduced deep learning computer vision model. The rig like a box with a camera takes a picture of the food that helps in identification of the food item, especially distinguishing vegetarian and non-vegetarian foods(Sudra, 2020).

On the International level as well, there is evidence how the technology is shaping food delivery businesses. One of the most successful food delivery company "Deliveroo" has revolutionized the way people order the food by enabling customers to enjoy food from the restaurants that will not normally deliver food. The company uses big data and machine learning in three ways. It helps the employees in understanding the trends in the changes made in the products through graphs and charts. The machine learning models support decisions and make recommendations. The technology also provides real-time operational monitoring(Sen, 2020).

Cloud Kitchens

The "Cloud Kitchens" are referred to the catering units that sell food directly to customers without an attached dining facility. Such kitchens were the result of the failure of a large number of food delivery startups in India. The customers of these failed startups are catered through cloud kitchens established by big aggregators like Zomato and Swiggy (SH, 2019). The cloud kitchens provide quick access to the customers located at the far distances with the help of "Cloud kitchen software system" that offers centralized order taking, inventory management, live data analysis, sales management and instant assigning of order. Such kitchens offer flexibility for operating multiple brands within the same infrastructure. For example, apart from a branded Chinese cuisine, Pizza brand can also be launched from the same kitchen without customer coming to know that both menus are offered from the same kitchens (Posist, 2020).

The food tech companies have disrupted the way customers consume food. The "cloud-kitchens" located in different cities are allowing even train passengers to order home-cooked food during the journey(Apurva, 2019). However, considering the challenge of lack of dining facility accessible to customers, the marketing of cloud kitchens is challenging. Such kitchens, therefore, rely on online marketing for which 30% commission is paid to the food aggregators and an additional 10-20% for branding and advertising. Massive Restaurants, operating fine-dining restaurants like Pa Pa Ya, Farzi Café and Made in Punjab is planning to build cloud kitchens over the next few years. Such kitchens are cost-effective and scalable and pose lesser risks to restaurant owners, especially during the times of COVID 19 crisis. The available kitchen can handle multiple brands and boost revenues.

Impact of Covid-19 Pandemic on Indian Foodservice Sector

The Covid-19 pandemic has given a deadly blow to Indian hospitality Industry. While as the value chain linked to the sector is likely to lose around $65.57 billion, the industry organized alone has lost close to $25 billion. The devastation caused by Covid 19 has created an alarming situation for the hospitality industry, and immediate measures for survival are required. The predictions indicate that hotels occupancy shall continue to be less than 30 per cent till the start of next year and shall encounter 80 per cent decline in revenues (Travel and tourism sector, 2020).

COVID-19 pandemic has devastated service industries around the world. The dining-out culture has taken a beating due to which around 500,000 Indian restaurants have gone into hibernation. There is a massive diversity of Indian restaurants – that include roadside stalls to high end and lavish eateries. The employees in the restaurant industry cannot work from home due to which the losses are staggering. The losses in this sector are up to $10.5 billion in 2020, with more than 2 million people facing the loss of their jobs and one in four restaurants unlikely to reopen. The problems of the Industry are further aggravated by a lack of support from the Government, even though many other countries have treated restaurants as small businesses eligible for government emergency funds ("ET Government", 2020). The problems are further complicated by the insurance company's refusal to cover the losses due to pandemic.

METHODOLOGY

This case study explores how the Indian restaurant industry is recovering from the devastation of Covid-19 pandemic. For the purpose, the information about thirty-three companies that include five high-end restaurant chains, four fast-food brands(three International and one local brand), eleven five star hotels, one international retail company, two food aggregator companies, two food service technology companies and one international social network site(Listed in table 1).

The data about these companies – the strategies they pursued to recover from Covid-19 pandemic was collected from reputed business publications and company reports which is presented in table 2.

Table 1. The breakup of thirty companies analyzed

Category	Number
Restaurant Brands	7
Fastfood Companies	5
Hotels	11
Online retail	1
Social Media site	1
Food aggregators	2
Tech companies	3
Total	30

Table 2. Summary of strategies adopted by the Foodservice sector in India for survival

S.No	Name of Hotel	Category	Delivery Partner	Business Model for COVID-19
1	Lite Bite Foods	India's largest food retail company, with 22 owned and nine managed brands.	Own Delivery system	• Launched cloud kitchens Introduced platforms for deliveries • Introduced food delivery app FoodGo.
2	ThickShake Factory	Cloud kitchen operating 200 stores across 12 Indian cities.	Zomato and Swiggy	• Hybrid Model Delivery (Self delivery and delivery by food aggregators as well) along with dine in the facility.
3	Massive Restaurants	Premium restaurant company owning fine-dining restaurants brands like Pa Pa Ya, Farzi Café and Made in Punjab.	Zomato and Swiggy	• Food delivery plus dine-in options. • Started cloud kitchen services.
4	Specialty Restaurants Limited	Restaurant company owning a chain of fine and casual dining restaurants in India, Bangladesh and Tanzania.	Zomato and Swiggy	• Switching to cloud kitchen mode. • Introduced home delivery. • Offering takeaway service from its outlets.
5	Azure Hospitality	Manages restaurant brands like Mamagoto, Sly Granny, Foxtrot	Zomato and Swiggy	• Introduced home delivery
6	Impresario Handmade Restaurants	Premier restaurant chain with 23 outlets that include Smoke House Deli and Social.	Zomato, Swiggy and own food delivery platform	• Launched cloud kitchens and introduced platforms for deliveries. • Established a tech-enabled (WhatsApp-enabled link) platform for the online ordering of food.
8	KFC India	International Fast food operator	Zomato and Swiggy	• Introduced contactless delivery and takeaway approach wherein one can walk-in to pick the order at a pre-decided time
9	Dominos	International Fast food operator	Zomato, Swiggy and own delivery	• The upgraded Domino's app allows customers to receive their orders without coming into contact with the delivery staff.
10	McDonald's	International Fast food operator	online restaurant guide and Zomato	• Introduced zero contact' food delivery services whereby the delivery partner leaves the food outside the door and call the customer to confirm the pickup.
11	Burger King	International Fast food operator	Wefast, Zomato and Swiggy	• Introducing combos that can be home-delivered.
12	InstaPizza	Pizza startup with 14 micro-kitchens across north India	hired its delivery fleet, #TrustBrigade	• Live-streaming of kitchens (on Instapizza website), where chefs can be seen preparing food under hygienic conditions. Launched combo meals for families.
13	Hyatt Hotels	International hotel chain	Zomato and Swiggy	• Self food delivery by ordering food directly from the hotel website. • Delivering food through aggregator services.
	Hilton Hotels	International hotel chain	Zomato and Swiggy	• Self food delivery by ordering food directly from the hotel website. • Delivering food through aggregator services.
14	Treehouse Hotels	Indian boutique hotel chain	NA	• Chang in the menu to ensure fewer people come in contact with the food while it is being prepared. • Any dish which requires more than one chef has been removed. • Banquet halls converted into restaurants for distancing between tables. • Introduced eco-friendly disposable cutlery and crockery.
15	Lalit	Five-star hotel chain	Zomato, Swiggy and own food delivery platform	• The hotel has started "Chef on Call" and "Bartender on Call" where customers get food and drinks prepared where they want.
16	Oberoi Hotels	Five-star hotel chain	Zomato, Swiggy and own food delivery platform	• Launch of the mobile application for home delivery of food.
17	JW Marriott	Five-star hotel chain(Premium Marriott Hotels)	Zomato, Swiggy, MakeMyTrip	• Introduced self-delivery of foods by under " Marriott on Wheels" initiative.
18	Taj Hotels	Five-star hotel chain	Zomato, Swiggy and own food delivery platform(QMIN)	• Introduced home delivery of foods.
19	Marriott International	Five-star hotel chain	Marriott on Wheels, Zomato, Swiggy	• Introduced deliveries from 20-plus hotels in various cities by hotel executives under stringent hygiene standards.
20	ITC Hotels	Five-star hotel chain	Zomato and Swiggy	• Home Delivery and Take Away.
21	Pullman & Novotel	Five-star hotel chain	Zomato and Swiggy and own food vans	• Self delivery plus aggregator services. • Introduced set menus for house parties.

continued on following page

Table 2. Continued

S.No	Name of Hotel	Category	Delivery Partner	Business Model for COVID-19
22	Crowne Plaza, Greater Noida	Five-star hotel	Own Delivery	• Own Delivery
23	Amazon	International online retail company	Own Delivery	• Launched its online food delivery service called Amazon Food
24	Swiggy	Food Aggregator	Own Delivery	• Introduced 'BrandWorks' to co-create delivery-only brands with restaurant partners by leveraging existing kitchen space at their dine-in facilities. • Raised fund for restaurant staff in association with Pepsi and NRAI(National Restaurant Association of India). • Pepsi contributes from the sale of soft drinks ordered from a restaurant listed on Swiggy to NRAI's employee relief corpus.
25	Zomato	Food Aggregator	Own Delivery	• Raised consumer awareness about food safety measures through TV ads to motivate people to order food from restaurants through its platform. • Launched "Zomato Gold Support Fund" for helping the restaurant staff.
26	Fastor	AI-Enabled company for providing contactless self-checkout in restaurants.	NA	• Helping restaurants to execute their regular operations with zero contact and 100% safety. Launched "offline to online technology" to eliminate physical menu cards. Instead, customers can scan the "QR code" placed on the table for ordering food.
27	EazyDiner	Eating out platform	NA	• Launched "Safe+ Dining", a safety programme for restaurants and diners for real-time feedback on hygiene standards.
28	Dineout	Restaurant reservation application	NA	• Collaborated with India's largest video AI implementation firm, Staqu, to assist partner restaurants in maintaining social distancing norms. • The technology supervises the safety regulations and notifies the violations to the management. Helps to track suspects.
29	Instagram	American photo and video sharing social networking service owned by Facebook	NA	• Launched a food order sticker to allow restaurants to share on Instagram. Tapping onto the sticker will redirect users to Zomato or Swiggy from where customer can order the food. The sticker aids engagement between customers restaurant, which increases restaurant business volumes.
30	Fassos	Cloud Kitchen	Zomato and Swiggy	• Collaborated with many other restaurant chains that serve a variety of cuisines to increase their business.

RESULTS AND DISCUSSION

The data presented in Table 2 indicate how the foodservice sector is reviving after Industry was hit hard by Covid 19 pandemic. This section explains the findings on how the different category of the foodservice sector is restoring the devastation caused by Covid-19. The discussion on how foodservice sector is reviving with the help of food aggregators, cloud kitchens and food tech software companies is presented.

Restaurant Brands

In the backdrop of the lack of customer trust in dining out, the hotel and restaurant industry is focusing on adopting the cloud kitchen model(whereby food is delivered directly to customers where they want to be delivered). The data collected from six restaurant brands indicate that all such restaurant brands are have started a partnership with Zomato and Swiggy. The tie-up with the aggregators by restaurant chains shows a significant change in the operational strategy of these restaurant brands. Just six months

before Covid 19 pandemic hit the world (August 2019), the restaurant industry in India launched a "log-out campaign". Such campaign was aimed at protesting against the policy of offering deep discounting (discounting on goods and services offered by large online retailers). The National Restaurant Association of India (NRAI) claimed that such a policy hurt the profit of the restaurant Industry resulting from the "lop-sided" agreements designed by aggregators.

The Vice President of apex hotel body FHRAI(Federation of Hotel and Restaurant Association of India) Gurbaxish Singh Kohli said that "Aggregators cannot dominate the Industry or conduct business in a manner that is detrimental to Industry's growth" (Kondalamahanty, 2020). However, the devastation caused by Covid-19 has made the Restaurant Association forget the conflict, and Industry looks forward to a better relationship with the aggregators for its survival. The food aggregator in returns has forged a better relationship with partner restaurants due to which the food delivery business in India reached pre-Covid-19 peaks.

The food aggregator also claims zero cases of COVID transmission through food delivery during the pandemic ("Indian Restaurant", 2020). The food safety has been a matter of prime importance for customers during the pandemic. As a response, the restaurant industry launched a series of safety-related initiatives for the safety of customers, delivery partners, merchants, and employees. The food aggregators guide restaurants for maintaining the best safety practices while cooking, handling and packaging of food items. Zomato has introduced a "hygiene rating" filter option for customers to check restaurants that maintain maximum hygiene. The food aggregators offer special recognition to restaurants maintaining the best safety standards. Such recognition has increased the business of the restaurants to maintain the highest safety measures. Some of the safety measures used for evaluation include "contact-less" delivery, temperature control, sanitation every four hours, use of masks, and safe packing(Shrivastava, 2020).

However, two restaurant chains- Lite Bite Foods and Impresario Handmade Restaurants pursued a strategy of having its delivery system. Lite Bite Foods went a step ahead and has developed its food delivery app "FoodGo". Having its delivery system saves the restaurant chains from paying the commission to the food aggregators. Launching of Cloud Kitchens is yet another strategy that restaurant chains like Lite Bite Foods, Massive Restaurants, Speciality Restaurants Limited and Impresario Handmade Restaurants adopted. Launching of cloud kitchens shall breathe new life into unused kitchens.

As discussed in the literature, such kitchens provide multiple benefits to the foodservice operators and offer a solution to the fear of dining out during the pandemic. Another strategy of operating under a hybrid model that involves the launching of Cloud Kitchens along with dining in by restaurant chains like ThickShake Factory and Massive Restaurants is aimed at improving the sales from both categories of customers. Such customers prefer visiting the restaurants after strict lockdown and also the ones who still lack confidence in venturing out for meals.

Fast Food Chains

The fast-food is the fastest-growing category of foodservice among the foodservice sector in India, indicating the popularity among the customers in India. Four international fast-food chains have tied up with the food aggregators Zomato and Swiggy for the food delivery while as "Insta Pizza" is delivering food with its fleet. Another strategy has been of adopting the highest degree of safety measures- that include zero contact food delivery and zero contact food "takeout" from its outlets. To support the zero contact delivery system, Dominos Pizza has upgraded its mobile application that allows customers to

collect the food without coming in contact with the delivery staff. Burger King has restructured its menu by introducing the "combo meals" that can be home delivered to customers.

Considering the challenge of safety during the pandemic and winning customer trust, the local pizza chain "Insta Pizza" which has twelve outlets across north India has introduced "CrustFlix" by which customers can watch the live streaming of its kitchens for customer assurance of safety practices. The customers can access vital information like daily symptom check, handwash routine, cleaning procedures and full protection kitchen gear. The company has decided to make it a permanent practise (Singh, 2020).

Hotel Restaurants

The Covid-19 had a devastating effect on hotel restaurants like another category of the restaurants. The Indian hotel industry suffered losses in the range of US$1.3 to 1.55 billion ("Indian hotels", 2020). 80% job losses and salary a deduction of 50% of employees in Indian hotels is reported (Tripathy, 2020). To make up the losses hotels adopted several recovery strategies for covering up the losses and preventing laying off of the staff.

The restaurants affiliated with big brands like Marriott has announced "Marriott On Wheels" program by partnering with Zomato and Swiggy for delivering the best of its cuisine to the customers. The safety aspects are addressed by taking all the precautionary measures in consideration that include hotel sanitization, zero touchings of food during food preparation, wearing masks and gloves at all times and hand washing. The hotels are being sanitized, and temperature of employees is noted regularly. The food is being prepared and packed under most safe conditions (Courtyard by Marriott, 2020).

The tie-up with major food aggregators Zomato and Swigg is an effective strategy perused by hotels. Only a few hotels have chosen self food delivery option. Two of the best-known hotel brands of India- Taj hotels and Oberoi hotel have gone a step ahead and developed the mobile application for direct customer contact and own delivery of food. Pullman & Novotel hotel chain has started catering to home parties through special food vans. They are considering the challenge of safety measures in the in house dining- Treehouse hotels have changed the menu to ensure that only those dishes are served to customers that involve the contact by one chef only. For enforcing the social distancing- the hotel has converted the banquet into a restaurant for allowing increased space between guest tables.

Food Tech Software Companies

The technology is playing a prominent role in helping the restaurant industry to kick start the catering activities by introducing the digital menus, QR code scanners, development of mobile applications and ensuring contactless dining experience. The use of Artificial Intelligence for providing the contactless self-checkout by restaurants is introduced by "Fastor" an AI company. The company is offering AI-based solutions to restaurants for zero contact delivery and safety in operations. The customers have now an option of scanning the QR codes placed on the restaurant tables without even downloading the mobile app. The customers can place the orders directly from their mobile devices. Another technology-based restaurant reservations company "Dineout" collaborated with India's most extensive video AI implementation firm, "Staqu", to assist partner restaurants in maintaining social distancing norms. Violations are notified to the management for action by tracking the suspects.

Instagram

Instagram, an American photo and video sharing social networking service owned by Facebook launched food order sticker in India to help small businesses in the restaurant sector leverage the platform's user base in India by allowing restaurants to share the food order sticker on the Stories. Tapping onto the sticker redirects users to Zomato or Swiggy. The sticker leads to engagement between customers restaurant, which increases restaurant business volumes.

SOLUTIONS AND RECOMMENDATIONS

The restaurant industry in India has undergone a tremendous transformation due to COVID-19 pandemic. The magnitude of devastation in terms of financial losses to the businesses and job losses led the Industry to near collapse. However, the change in the business models initiated by the food aggregators who are at the forefront of the innovations saved the restaurant Industry by lending marketing support. The restaurant industry is back on tracks now gradually. It has started recovering from the losses, which is evident from the fact that food aggregators have reported touching pre-Covid-19 order levels. The restaurant industry has to learn several lessons from the predicament. First of all, the Industry has to be flexible in adapting to the changing circumstances by making modification in the business models or adapting to the new ones. Second, the Industry must not limit the use of adopting the ICT(Information and Communication Technology) for few operational areas like MIS, Accounts etc.- but look forward to such technologies that bridge the gap with the customers where ever they are. In the backdrop of the fact that the restaurant industry has suffered most due to pandemic- especially the massive job losses it suffered from, the Industry must come up with a plan to help the employees during the difficult times in future.

FUTURE RESEARCH DIRECTIONS

This chapter has established how the pandemic has caused the restaurant Industry to accept the new business model for survival. The future studies can explore the needs of the customer and come up with the proposal for the even better business model that is more effective for the Industry and beneficial to the customers. The future studies need to recommend which technologies the restaurant Industry should invest in to ensure hygiene and sanitation of kitchens to win customer trust. Food safety shall have great importance from a business point of view, and its importance is going to increase further. From the Human Resources point of view- rigorous studies are required to establish ideal staffing levels required in foodservice establishments. Given the fact that the use of technology for handling and processing of the food is going to increase post-Covid-19 in Food Service sector- better Human Resources planning is the critical need of the Industry.

CONCLUSION

The restaurant industry in India is showing slow signs of recovery from the losses due to Covid-19 pandemic. The food aggregators are playing a significant part in leading the restaurant Industry towards

the path of recovery, clearing all doubts and apprehensions about their role in the foodservice sector. The well-established food delivery system of the food aggregators along with their media campaign for restoring customer trust is undoubtedly playing a prominent role in re-establishing the restaurant industry in India.

Technologies are also playing a significant role by offering solutions like the introduction of mobile applications, scanning of menus with QR codes, zero contact delivery, implementing safety measures like maintaining social distancing of workers and live streaming. All such measures boost customer confidence in ordering food. The Covid 19 pandemic also enhanced the reputation of "Cloud Kitchens" because of their contribution to the recovery of the restaurant sector. The fear of dining out among customers forced the restaurant operators to switch to cloud kitchen mode whereby the food prepared in such kitchens is sold directly to customers with the help of mobile applications or listing such kitchens on food aggregator platforms.

The Indian restaurant may not be the same again the post-Covid 19. The first challenge is ensuring customer safety through rigorous hygiene and sanitation initiatives to overcome customer fear. Second, the Industry needs to adopt the technology to earn customer trust by switching to digital menus, app-based food ordering system, live streaming and digital payments. The introduction of social distancing norms, self-service and technology shall change the organizational structure of these establishments, which can result in a decrease in the workforce. The restricting of the menu has already taken place whereby menu items that require preparation at multiple stages by different chefs are eliminated. The future menus are expected to be shorter and fully digitalized. The business format shall witness new forms of partnerships in the form of introduction of DIY cooking kits, the unique style of services at offices, homes, parties and other community events. Considering the potential of cloud kitchens, the investment in real estate considering optimum use of restaurant and parking is expected.

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KEY TERMS AND DEFINITIONS

Aggregator Business Models: Aggregator Business Model is a network model where the aggregator firm collects the information about particular offering providers, sign contracts with such providers, and sell their services under its brand e:g Amazon, Uber, etc.

Artificial Intelligence: A branch of computer science dealing with the simulation of intelligent behaviour in computers.

Business Models: A business model describes the rationale of how an organization creates, delivers, and captures value, in economic, social, cultural or other contexts.

Cloud Kitchens: Kitchens or catering units that sell food directly to customers without an attached dining facility. The food demand from customers is generated through mobile applications or websites.

Complementors: Company selling such product or service that complements the products or services of another company and hence are called as complementors.

CRM: Customer Relationship Management (CRM). An approach that helps businesses improve existing customer relationships and acquire new customers faster.

Dabbawala: A unique system of delivering lunchboxes collected from homes and restaurants to working-class people in Mumbai city manually.

Digitalization Strategies: Strategies focusing on using technology to improve business performance, whether that means creating new products or reimagining current processes.

ECR: Electronic Cash Register, an electronic device for calculating and recording sales transactions and printing receipt for the customer.

EPOS: Electronic Point of Sales (a system used for recording information of goods sold by a retailer).

Food Aggregator: Food aggregators facilitate orders and provide customer support. They act as mediators between customers and local restaurants, offering access to various cuisines through a single website or Smartphone application.

Food-Tech Startups: Companies that sell food using the internet and Smartphone applications.

Hybrid Model Delivery: The system of restaurant business whereby the restaurant has its food delivery system and also accepts food orders which get delivered through the aggregator.

Machine Learning: The process by which a computer can improve its performance (as in analyzing image files) by continuously incorporating new data into an existing statistical model.

MIS: Management Information System, an information system used for decision-making, coordination, control, analysis, and visualization of information.

NRAI: National Restaurant Association of India. A voice of the Indian restaurant industry representing over fifty thousand restaurants of India.

OFD: Online food delivery whereby customers order food from local restaurants or food delivery companies through websites or Smartphone applications or "apps".

Organized Restaurants: Different types of restaurants that include cafes, fine dining restaurants and other catering establishments.

Platform Business Model: Aggregator business models defined above is also labelled as the platform business model.

Restaurants Own Delivery System: Restaurants taking orders directly from customers and delivering the same through restaurants own fleet of vehicles.

Time and Space: Changes in the food aggregator website reflecting the meals served at a particular time. For example, the web site shall display breakfast in morning hours and move to lunch menus in the afternoon.

Unorganized Restaurant: Vendors selling ready to eat food on carts, roadside eateries and street stalls.

Chapter 16
Exploring the Nexus Among the Business Coping Strategy: Entrepreneurial Orientation and Crisis Readiness – A Post-COVID-19 Analysis of Pakistani SMEs

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ABSTRACT

The recession due to COVID- 19 causes uncertainties in the industry's immediate operating landscape as well as other unprecedented impacts. Due to the immense magnitude of impacts posed by recessionary events, this present study proposes the significance of understanding the phenomena while examining the subject of crisis readiness of SMEs during COVID-19 era. The main objective of the study is to examine the impact of business coping strategy and entrepreneurial orientation on the crisis readiness of Pakistani-based SMEs. The study emphasized the necessity of delineating the effects of extremely disastrous and unforeseen events. This is because the understanding of the effects of such cataclysmic event is more important than the prediction of the event's occurrence. The study has employed a Suraya-based method, and data is collected with the aid of a questionnaire. The response rate was 78%, which qualifies the minimum response rate criteria. The SEM-PLS is used to analyse the data. The results of the study have provided support to hypothesized results.

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1.0. BACKGROUND

With recession making up the key context of this study, the previous discussions had shown that the effects of recession on the daily performance of SMEs is rather substantial compared to the effects of common or minute disruptions that occur on typical business days. The effects during recession have been found to disrupt not only the operations and performance of the manufacturing industry, but also the economy of the nation as a whole. Therefore, while emphasizing that "performance during recessionary period is a crucial dependent variable worthy of investigation in its own right" (Sarnovics & Iesalnieks, 2018), this current study also aims to inject the essence of recessionary events into the examination of firm performance. Predominantly, this study highlights the necessity of determining the most suitable measure for performance. Recessionary events are deemed as a rare phenomenon (Scholten, Scott, & Fynes, 2019) with diverse impacts and diverse levels of ambiguity and uncertainty created afterwards (Lau, Lee, & Jung, 2018). Its rare occurrence renders this phenomenon as unique, exceptional, and un-definable (Kuipers, 2019) on top of being fast-paced and typically with sensitive time limits (Kyrychok, 2017).

Due to the abovementioned features, firms usually do not have enough chances to learn more about recessionary events which resultantly limit their capability of safeguarding their performance during such periods. It is especially difficult to measure and draw comparisons between firm performances against such milieu, as the ambiguous recessionary period poses different effects with different magnitudes on the firms. This present study believes that the performance measurement of a firm should be quantifiable and comparable across all firms. Hence, this study asserts that the financial or accounting-based performance measures utilized in previous inquiries are not suitable for capturing firm performance during recessions. This is because such measures are short-term performance indicators that only capture portions of past and current activities and do not integrate the future aspects of firm performance which makes up a significant element for firms in periods of disruption. It has also been indicated that the ultimate measure of financial performance is mainly determined by industry-driven factors; therefore, using such objective measures to compare the performances of firms could lead to distorted findings (Saebi, Lien, & Foss, 2017). Similarly, accounting-based performance measures such as return on investment (ROI) has also been deemed as "sensitive to changes in times and strategy" (Yong, 2016). Biasness can occur with ROI due to accounting manipulations linked to tax minimization (Masuya & Yoshida, 2020; Yong, 2016) and variances in the accounting procedures employed (Yong, 2016).

The failure process model introduced by Amoah (2018) also credited organizational success and failure during recessionary periods to remedial actions. The significance of remedial strategies in affecting firm performance has in fact been theoretically and empirically proven. Theoretically, the relation between strategy and performance has been addressed by prominent strategists including Stead and Stead (2019) and, Ung, Brahmana, and Puah (2018). Despite certain differences in their conceptualization of strategy particularly in terms of specificity and focus, the scholars basically agree that proper strategy adoption can lead to the improvement or attainment of anticipated performance. For example, the generic competitive strategy by Stead and Stead (2019) emphasizes on the creation of competitive advantage via cost leadership, distinction, and focus strategy. Firms that employ such strategies are projected to foster competitive advantage thus resulting in enhanced performance (Stead & Stead, 2019). The positive effect of proper strategy on firm performance has been empirically proven by several studies (Hansen, Nybakk, & Panwar, 2015; Mehralian, Nazari, & Nooriparto, 2017; Njuguna & Bett, 2018). Njuguna and Bett (2018) studied the effect of competitive strategies on the performance of mobile telecommunication companies in Kenya. Using Porter's theory, the study revealed that strategies made for competitive land-

scapes including cost leadership, differentiation, market-focus, and strategic alliances pose substantial positive effects on firm performance. The study also revealed that most firms operating in a competitive environment implement product differentiation and cost leadership strategies.

2.0. LITERATURE REVIEW

Most past studies had investigated recessionary disruptions from three standpoints i.e. the causes, the repercussions, and the predictions (Mukhtar, 2020). Nevertheless, to comprehend the phenomenon better, this present study followed the suggestion of Yang and Cheng (2020) to concentrate solely on the repercussions of recession. Yang and Cheng (2020) had empirically investigated the effect of disastrous events in building organizational resilience. A recession entails the deterioration in gross national product for two or more successive quarters (Schweizer & Nienhaus, 2017). Pfister (2019) defined it as "a state in which demand for a product is less than its former level" and consequently denoting a contraction phase in the business cycle (Schweizer & Nienhaus, 2017). Recession is also termed as economic crisis, economic downturn, financial crisis and economic recession in past studies (Maria, 2016; Voutsina, Papagiannakis, & Lioukas, 2018).

Since its independence, Pakistan has experienced a number of recessions including the 2008 Global Recession, the 2001 Recession, and the 1997 Asian Financial Crisis. Although caused by different factors, the recessionary events had brought similar impacts to businesses in the country and its economy in general. The COVID-19 Crisis which started due to the collapse of the PKR following the government's decision to float the currency had spread quickly to Asian countries including Pakistan and caused a massive impact in the form of a global economic downturn. In Pakistan, the country's stock and currency market almost collapsed. Meanwhile, the COVID-19 recession was caused by Pakistan's impaired manufacturing growth as a result of a contraction in the global demand for manufactured goods.

The COVID-19 Global Recession had caused a global rise in oil prices and interest rates, deterioration in the US current account deficit, weakness of the US dollar, and slowdown in the high-tech market. The recessionary impacts spread to Pakistan primarily via financial and trade channels. Recessionary events generally affect households and industrial firms. The recessionary periods had a major impact on Pakistan's economic sectors, slowing down its economy in general . Retrenchments in all economic sectors occurred due to the sharp decline in production activity and bankruptcies, thus leading to higher unemployment rates, greater inflations, and contracted economic growth. With lower availability of credit and higher competition, firms had to reduce their expenses to conserve cash particularly for deferrable investments on top of cutting prices to generate sales.

Meanwhile, on the household front, the rise in unemployment rate and job losses had impaired the purchasing power of consumers, rendering them unwilling to spend. Consumers became highly price-sensitive and more cautious in their spending (Liew et al., 2018; Schweizer & Nienhaus, 2017). Most past literatures had highlighted the prevalence of cash flow struggle (Singh, 2018;; Yong, 2016). Cash flow is often linked to credit (Yong, 2016), liquidity (Zeldea, 2020), or working capital (Zeldea, 2020). However, all those terms ultimately refer to the cash status of a firm necessary for operating a business. About 60% of the businesses that failed during the 2008 recession had attributed their failure to issues related to cash flow. Meanwhile, Handley, Evans, and Wright (2019) reported that 60% of the businesses claimed to have faced difficulties in accessing funds for their business endeavors. Similarly in the context

of Pakistan, issues with working capital and cash flow struggle had also been identified as the major causes (Jores & Hook, 2016).

2.1. Firm Performance in Recessionary Context (Crisis Readiness)

Firm performance basically refers to the overall health of an organization. In social science studies, this metrics is used for measuring organizational efficiency and effectiveness (Ha, Lo, & Wang, 2016). The significance of firm performance is reflected by the magnitude of attention given to it in academic research. It is a particularly important dependent variable in entrepreneurship studies (Gupta & Dutta, 2016; Zbierowski, 2020). Nevertheless, firm performance is a rather difficult construct to measure mainly because it refers to numerous aspects of organizational efficiency and effectiveness (Pang & Lu, 2018). Despite difficulties in reaching a consensus on the general definition of firm performance, there exist measures of performance available in academic research. In describing the phenomenon, Pang and Lu (2018) asserted that "the treatment for performance in research settings is perhaps one of the thorniest issues confronting the academic researcher". Other scholars have highlighted the lack of performance measurements particularly in entrepreneurship studies due to the vague definition of firm performance in relevant literatures (Bahri, Aslam, & Hasan, 2019).

This present study proposes the usage of crisis readiness (CR) as a proper measure of firm performance as it captures an organization's capability to perform during a recession. CR is also a fitting measure for capturing performance during rare, uncertain, and fast-moving conditions. Firstly, this study puts together several empirical perspectives that state the need for proper performance measures. The need for a proxy measure for firm performance is based on the suggestion of several scholars. Nunfam, Etten, and Oosthuizen (2019) asserted that although some constructs can be measured directly and yield accurate numerical values, others need a proxy measure to be able to estimate a variable indirectly. Similarly, Ung et al. (2018) contended that different fields of study require different performance measures due to their distinct research questions and objectives. However, Bendell, Bendell, and Boulter (2017) stated that not all performance can be directly measured in terms of monetary value. Secondly, this study uses the suggestion of Alvarez and Torres-Barreto (2018) that effectiveness is a more suitable dependent variable when resource-based logic is applied. The authors proposed that the selection of the dependent variable must be done carefully when RBV is applied as the underlying theory or when the main concern is resources.

2.2. Business Coping Strategy (BCS)

This study re-conceptualizes the BCS as a strategy construct. Past studies had used various terms to refer to corrective strategies in recessionary conditions. This current study uses the term business coping strategy (BCS) which is based on the term "coping strategy" used in previous studies and of which offers a more versatile definition for the current context (Maria, 2016; Voutsina et al., 2018). The first step in developing a comprehensive definition is by conceptualizing the phenomenon under study. Extreme cash flow issues have been anecdotally and empirically presented as the forewarning of performance decline during recessionary conditions (Yong, 2016; Zeldea, 2020) while positive cash flow as the sought after outcome;(Yong, 2016; Zeldea, 2020).

Based on the above, this study conceptually suggests that the corrective strategy for addressing recessionary disruptions should be aimed at maintaining a positive cash flow. Hence, the BCS for smaller

firms facing recessionary disruptions should be aimed at safeguarding their positive cash flow in a rapid manner, while taking into consideration their unique characteristics, poor financial status, and inability to borrow from banks and financial institutions. In short, positive cash flow refers to a firm's liquidity during times when cash inflow is higher than the outflow (Ekström, Ahmadi, & Bornefalk, 2016). Hence, cash inflow and cash outflow are important elements of the underlying positive cash flow which guides the definition of BCS in this study. This study follows the most basic rule of thumb for the most accurate definition of cash inflow i.e. revenue and cash outflow i.e. all expenses related to a business' operations (Ekström et al., 2016).

Hence, the safeguarding of positive cash flow simply means the increase or generation of revenue and reduction of expenses. This bilateral relationship between the two constituents had been anecdotally proven in several studies on recession (Yong, 2016; Zeldea, 2020). Zeldea (2020) stated that there is a need to control expenses up to an extent to which a firm can generate positive cash flow from its operations. Yong (2016) also emphasized the importance of "conserving cash and ensuring that the cash going out does not out-pace cash coming in" during times of recession. Schweizer and Nienhaus (2017) obtained a similar finding when they recognized that the mismatch between forecasted sales and projected spending is the primary factor that causes business failures during recessions. Additionally, due to the limited window of time during recessionary periods (Kyrychok, 2017), positive cash flows should be attained in a timely manner or within short-term. Hence, the general definition for BCS in the context of recessions should include the concepts of positive cash flow and sensitive time window.

The need for immediacy is in line with the argument put forth by Yong (2016) that "the best decision reflects the need to survive in the short term while coming out better in the long time". Several other studies on efficiency and recessionary disruption also agreed with the notion of a short-term focus. In actual fact, long-term focus has been revealed as the number one action in a list of ten that should be avoided during recessions. Hence, the notion of "immediacy" is linked to the definition of BCS specifically in conjunction with recessionary periods to signify that coping strategies during such events should be short termed instead of long termed. In terms of cash in-flow, the key focus is on revenue generation. Past studies had examined revenue generation extensively and revealed a positive effect of marketing-oriented variables (e.g. marketing approaches, tactics, orientations, capabilities, strategies, market performances) on firm performance (Eneizan, Abdulrahman, & Alabboodi, 2018).

Interestingly, cost cutting has been indicated to create a swifter effect due to its ease of execution in comparison to other strategies such as revenue generation (Domi & Krasniqi, 2019). This is in line with the argument put forth by Ung et al. (2018) that the most apt strategy for overcoming short-term cash flow is by cutting costs. This idea is also supported by Kumaraswamy, Ebrahim, and Nasser (2019) who asserted that the short term strategy of cutting costs is more suitable for firms that are currently facing financial troubles. Generally, the strategy of cost cutting has been mostly noted in empirical studies on retrenchment (Mazurkiewicz & Bukalska, 2016), downsizing (Kwamboka & Nassiuma, 2017), turnaround (Schweizer & Nienhaus, 2017; TenBrink, Keller, & Gelb, 2017; Ung et al., 2018) and efficiency-oriented strategies (Yong, 2016). Cost cutting in the context of recessions has also been extensively studied (Kumaraswamy et al., 2019). The significance of cost cutting strategies is in line with the management theory posited by Stead and Stead (2019) which claims that the lowering of cost is one of the most prominent competitive strategies often adopted by firms. In the context of recessionary periods, past studies had suggested cost cutting strategies as a remedial action against cash flow struggles which include tactics such as retrenchment, turnaround, downsizing, and other efficiency-related strategies that are often taken

by cash strapped firms or those that are financially-distressed or operating in crisis-laden conditions such as recessions (Domi & Krasniqi, 2019).

Based on the discussions above, the key principle of BCS in the context of this study lies in firm-level remedial strategies aimed at easing immediate cash flow problems via the preservation of positive cash flow in the short term specifically by increasing cash inflow and reducing cash outflow. The former entails revenue generation via numerous marketing-oriented tactics that lead to higher demands, whilst the latter entails cost cutting tactics associated with operating efficiency and cost control (bricolage and financial bootstrapping tactics).

2.3. Entrepreneurial Orientation (EO)

Past studies had defined EO along the same lines of entrepreneurial behavior, entrepreneurship, strategic posture or entrepreneurial posture (Lee, Zhuang, & Joo, 2019) as well as entrepreneurial strategy making. However, Entrepreneurial Orientation appears to be the most widely used term compared to the others. In general, EO is delineated as the strategic orientation of a firm, with certain entrepreneurial elements including decision styles, practices and methods (Hossain & Asheq, 2019). Instead of describing 'what' a firm does, it describes 'how' the firm operates (Hossain & Asheq, 2019). It entails the extent to which the firm identifies and exploits raw opportunities as part of its organizing principle (Hossain & Asheq, 2019). Other studies defined EO as an entrepreneurial firm's strategic management processes and styles. In simpler terms, EO entails the strategies taken by the top management to boost innovativeness, proactiveness, and risk-taking (Hossain & Asheq, 2019; Lee et al., 2019). Zbierowski (2020) defined EO as the entrepreneurial management of processes, practices, methods, operating philosophies, and decision-making styles by the management.

3.0. HYPOTHESIS DEVELOPMENT

3.1. Business Coping Strategy and Crisis Readiness

As firm performance was operationalized using the proxy variable of crisis readiness (CR) in this study, the proposed BCS-CR relationship can be theoretically and empirically proven by reviewing literatures on the correlation between strategy and performance. Firstly, the significance of firm strategy in affecting improved firm performance can be traced back to prominent theoretical models such as the generic competitive strategy introduced by Stead and Stead (2019), the marketing differentiation strategy by Devece, Marqués, and Martín (2017), the turnaround strategy by Ung et al. (2018) and many others. Although each of those proposed strategies have different focuses and levels of specificity, they all agree on the idea that firm performance can be achieved by adopting suitable strategies. A majority of the studies on the relationship between strategy and firm performance found a positive correlation between the two variables. For example, Njuguna and Bett (2018) examined the effect of competitive strategies on the performance of mobile telecommunication firms in Kenya using Porter's theoretical view as the main justification in attaining and maintaining competitive advantage, and revealed that competitive strategies such as cost leadership, differentiation, market-focus, and strategic alliances positively and significantly affect the performance of the firms. In particular, the study revealed that the firms had extensively implemented the strategies of product differentiation and cost leadership. In another study

investigated the effect of Porter's competitive strategies namely cost leadership, differentiation and focus strategy on firm performance using 116 samples and found that the three strategies pose a positive and significant effect on firm performance. This adds support to similar findings in past studies which strongly advocate the theoretical perspective that firm strategies significantly drive positive organizational performance outcomes (Devece et al., 2017; Stead & Stead, 2019).

On top of the theoretical and empirical proof of the positive relationship between firm strategies and firm performance, the literature review also demonstrated that changes in the business landscape can drive firms to change their strategies accordingly. In short, environmental changes can cause strategy changes, and the effectiveness of a strategy mainly depends on the firm's environmental characteristics. Chi (2015) studied the strategy development and business performance of Chinese apparel SMEs in various business landscape characteristics. Using a questionnaire survey, Chi studied the environment-strategy-performance model whereby the business landscape was characterized by diversity, complexity, dynamism and hostility, whilst the competitive strategies were measured by low cost, quality, delivery performance and flexibility. The study found that no one-fits-all strategy exists for all the circumstantial conditions; hence, it remains unclear about which types of strategies can aptly affect firm performance. In a more detailed examination, Chi discovered that the differentiation strategy is a more popular choice among high performers operating in turbulent business landscapes, whilst the low cost strategy is more prominent among the low performers.

Further evidence points to the significant shift from cost reduction to differentiation i.e. a firm strategy to stand out against competitors. Hence, the strategy's content should be carefully examined when studying the relationship between strategy and performance particularly in unique conditions such as recessions. As mentioned in Chapter One, the changes that take place during recessions are substantially different than the smaller gradual changes that occur during normal business days. Hence, this current study sets out to review literatures on the relationship between strategy and performance in specific recessionary settings. Unfortunately, such literatures are found to be lacking (Ngatno, 2019; Saebi et al., 2017). Saebi et al. (2017) examined the effect of business strategies on firm performance specifically during the 2008 global economic downturn using the theoretical notion that competitive advantage is a strategy for creating value (Stead & Stead, 2019) and employing Porter's competitive strategies for conceptualizing and operationalizing competitive advantage.

The study supported the widespread empirical proof that strategy has a positive effect on performance. The work by Saebi et al. (2017) is one of the most prominent and cited studies concentrating on the relationship between organizational strategies and performance specifically during recessions. Yet, despite operationalizing business strategies as a competitive advantage, the study failed to justify why the generic strategies introduced by Stead and Stead (2019) i.e. differentiation, cost leadership and focus were selected as appropriate proxy variables for competitive advantage instead of other firm strategies.

Furthermore, the literature review showed that many of the studies on firm strategies during recessions are exploratory in nature. Some of the studies are descriptive with a focus on identifying the most favored strategies (Ajide, Ajisafe, & Adedokun, 2017; Charalambous, Mitosis, & Talias, 2018). Similarly, some other studies were more concentrated on determining the most useful strategies during recessions, yet failed to provide empirical proof of the effects of such strategies on firm performance (Mawoli, 2017).

There are also past studies that investigated firm performance during recessions by focusing on the wrong remedial strategies and thus operationalizing the wrong strategies. Such studies showed a lack of rigor in integrating the nature of the disruptive event with the distinct characteristics of small firms. One example is the study of Guergoson and Vichit (2019) which investigated the performance of Thai-based

SMEs over the course of the 1997 Asian Economic Crisis; the study had used the managerial-functional strategy as a business adaptation strategy proxy although the topic under study is the performance of SMEs during crisis. Such move is considered as reckless because it not only had failed to address the actual survivability-threatening limitations caused by the crisis (i.e. time and financial constraints), but also had foolishly disregarded several significant facts including the flat organizational structure of SMEs (Yong, 2016), the prominently generalist roles of entrepreneur-managers over numerous functions or aspects (SASSETTI, 2018), the informal SME practices (Chaudhary, 2019) and the presumption that smaller firms are tightly-integrated entities whereby both business and functional strategies are typically codependent and inseparable irrespective of their sizes and managerial practice complexities (Yong, 2016). Hence, based on the discussions above, this present study asserts the capability of the BCS to optimize the positive effect of a given strategy on firm performance during a recession, having been re-conceptualized to suit the distinct criteria of the recessionary setting and the distinct characteristics of the SMEs. In conditions where resources are limited, the BCS as a dynamic capability according to the earlier theorization and conceptualization could deliver a promising effect on firm performance during recessions. Where resource limitation is prevalent, this dynamic capability allows for the resource base of the firms to be reconfigured leading to the creation of value. Consequently, the BCS entailing the strategies of revenue-generation (RG), cost-cutting (CC), financial bootstrapping (FB) and bricolage (Bri) can form a self-dynamic capability. Based on the presented discussions, this study proposes the hypothesis below:

H1: Business coping strategy (BCS) has a positive and significant effect on CR.
H1a: Business Coping strategy has positive and significant impact on the Present Crisis Readiness
H1b: Business Coping strategy has positive and significant impact on the Prospective Crisis Readiness.

2.3.2. Entrepreneurial Orientation and Crisis Readiness

Firstly, many previous studies had indicated the attainment of positive firm performance when organizational resources are used to carry out business-related actions that are risk-oriented, innovative, proactive, combative, and future-based (Batra & Gupta, 2015; Hossain & Asheq, 2019; Issa, 2020; Mohamed, 2018; Mostafiz et al., 2019; Neneh & Van, 2017; Nwachukwu, Chládková, & Žufan, 2017). Several studies had examined EO as a multidimensional construct in determining its relationship with organizational outcomes. For instance, Mohamed (2018) studied the effect of a multidimensional EO on the performance of manufacturing SMEs in Iran using data collected from 150 manufacturing companies. They found that the dimensions of risk taking and proactiveness pose a positive and significant effect on firm performance, thus corroborating the empirical evidence of the same presented in other past studies. Similarly, Issa (2020) revealed that firm performance is positively and significantly affected by the EO dimensions of risk taking, innovation, autonomy, and competitive aggressiveness in the context of SMEs in the Sri Lankan hotel industry.

Secondly, previous studies had demonstrated that the positive effect of EO on performance is affected by the prevailing conditions of the current business landscape specifically volatility, hostility, dynamism, complexity, turbulence, competitive intensity, and lower environmental munificence (Gras & Krause, 2020). Such outcomes are found in past researches that examined the relationship between EO and performance during events of unforeseen changes in the business environment. For example, Turulja and Bajgoric (2019) found that the positive relationship between innovativeness and the per-

formance of 452 manufacturing firms in Taiwan is heightened during conditions of greater market and technological instability.

The findings of the abovementioned studies are consistent with the findings of other prominent academic works on entrepreneurship. Lee et al. (2019) revealed that EO demonstrated a greater effect on the profitability of small manufacturing firms that are operating in turbulent business conditions as opposed to those that are operating in stable environments. Likewise, . Khan, Hassan, and Arshad (2020) revealed that firms operating in dynamic environments enjoy a stronger and more positive business performance as opposed to those that are operating in static environments. Khan et al. (2020) also came to the same conclusion, asserting the greater positive effect of EO on firm performance in more hostile business environments as compared to stable conditions. Even more recent studies in the 2000s corroborated the findings of the earlier works. . Khan et al. (2020) demonstrated the positive moderating role of hostile business environments in the international context in the correlation between entrepreneurship and firm performance. In the same Karami (2020) indicated that firms with solid entrepreneurial orientations are more able to take advantage of environmental uncertainties. Evers, Gliga, and Criado (2019) also found the positive moderating effect of uncertain and volatile international business environments in the relationship between EO and organizational performance. Likewise, Akgül and Tunca (2019) revealed the positive and significant effect of EO on the financial performance of firms during conditions of high market turbulence which was characterized by the degree of changes that transpired within the prevailing business condition.

Thirdly, several past studies had indicated the capacity of EO in facilitating firms to address the issues of resource scarcity (Hossain & Asheq, 2019), timeliness (Ogunnaike, Ekaette, & Adegbuyi, 2018; Yunus, Razak, & Rahman, 2018) and significant changes (Ogunnaike et al., 2018; Wardi, Susanto, & Abror, 2018). In this study, such capacity is tailored to the recessionary context which is prevalent with the issues of resource scarcity and sensitive time window. Based on the above, EO had been studied in conjunction with the performance of small firms revolving around substantial environmental changes involving transitional economies (Ogunnaike et al., 2018; Wardi et al., 2018), economic reforms and highly volatile environments such as those in the international arena.

EO had also been studied in terms of its relationship with resource-oriented variables (Choi & Williams, 2016; Gupta & Dutta, 2016), resource procurement (Ismail & Zakaria, 2018) and financially poor performing firms (Hossain & Asheq, 2019). Some other studies had examined EO in relation to events that are time sensitive, novel, and highly uncertain including those related to the development of new products (Ogunnaike et al., 2018; Yunus et al., 2018). The responsiveness of EO during turbulent business environments was also studied in the context of large corporate enterprises. One example is the study by Garrett and Welcher (2018) on corporate entrepreneurship specifically on the issue of privatization that is mainly linked to highly competitive business environments. The study revealed a positive relationship between corporate entrepreneurship and competitive landscapes. Through the segmentation of the study samples into groups based on competition, the study revealed that substantial increases in corporate performance only occurred in firms operating in competitive industries that were only recently privatized and those that were already highly competitive before undergoing privatization. Over half of the firms were demonstrated to be innovation-oriented, focusing more on introducing new products and processes and carrying out research and development (R&D). Meanwhile, unstable business environments carry the elements of risks and opportunities (Moeuf, Lamouri, & Pellerin, 2020). Empirically, entrepreneurial measures that are aptly balanced in terms of risk-taking, innovativeness, proactiveness, competitive-aggressiveness and futurity are expected to positively affect firm performance during reces-

sions. This notion had been empirically proven in past researches which found the standalone positive effect of EO dimensions including risk-taking, innovativeness, proactiveness, competitive-aggressiveness and futurity on firm performance. Hence, this current study chooses to employ a multidimensional EO for measurement purposes based on the notion that: i) the EO dimensions do not necessarily pose equal effects in boosting firm performance due to the distinct contextual conditions (Hossain & Asheq, 2019), ii) the dimensions have positive correlations with each other (Hossain & Asheq, 2019), and iii) since EO has been extensively tested and is a well-established construct in entrepreneurial studies, it is believed that each EO dimension is adequately robust in establishing an individual effect on the proxy for performance. In terms of measurement, the current investigation on the relationship between EO and CR is considered to be relatively novel, as the proposed proxy for performance i.e. CR is newly introduced. As past studies had indicated the possibly varied effects of EO on performance depending on the indicators employed for measuring firm performance (Hossain & Asheq, 2019), the investigation on the EO dimensions using this newly introduced performance proxy may provide new theoretical and empirical outcomes.

H2: Entrepreneurial Orientation (BCS) has a positive and significant effect on CR.
H2a: Entrepreneurial orientation (ENTRO) has positive and significant impact on the Present Crisis Readiness
H2b: Entrepreneurial orientation (ENTRO) has positive and significant impact on the Prospective Crisis Readiness.

4.0. METHODOLOGY

For data analysis in this research, descriptive and inferential tools were employed. The SPSS v.22.0 was used to perform descriptive analysis, and the Partial Least Square Structural Equation Modeling was chosen for performing the inferential statistical analysis. Therefore, the Smart PLS 3.0. was used in this research. From the data collection process, 266 questionnaires were received from a total 340 distributed questionnaires. The response rate was 78% which qualifies the minimum response rate criteria proposed by Asada, Basheerb, and Irfanc (2020), i.e. 30%. Majority of the social science research uses this method for carrying out multivariate analysis. Besides, education sector has also frequently employed this technique in recent years. Various data analysis techniques are also available other than the structural equation modeling approach, which help in analyzing how latent and observed variables are related. However, PLS-SEM develops a clear understanding concerning those features which are hard to observe when measured using other techniques, such as, characteristics, attitude, intentions abilities and perception.

The structural equation modeling (SEM) performs linear regression and the factor analysis. With SEM framework, the statistical analysis is generally performed using two different approaches, the one is the covariance-based SEM, and the other is the partial least square structural equation modeling (PLS-SEM). For CB-SEM, LISREL, MPLUS, and AMOS are the frequently employed software. Thus, different techniques are used for each type of SEM because each SEM has different assumptions and objectives.

Nevertheless, this study used PLS for number of reasons, 1) this technique is effective and works well with the complex modeling. 2) No specific criteria are required in PLS-SEM for residual distribution and error term. This technique is suitable for both formative and reflective measurement models (Henseler, Hubona, & Ray, 2016). 3) The mediation and moderation effects can easily be observed through PLS-SE

(Ong & Puteh, 2017). Other methods are required to perform data analysis in various steps, whereas PLS simultaneously achieve all the steps and provide the results at once (Hatamifar, Darban, & Rezvani, 2018; Nuseir, Basheer, & Aljumah, 2020). Thus, PLS-SEM is much better than the CB-SEM for data analysis.

5.0. RESULTS

In the first step of PLS analysis, we attempted to estimate the outer model, in which indicator loadings were primarily observed for all the constructs. Afterwards, the construct reliability and internal consistency reliability of the items are measured. Therefore, once the reliability for all the constructs are ascertained, the validity tests were performed involving, discriminant and convergent validity. According to (Basheer, KhorramI, & Hassan, 2018; Henseler et al., 2016), the validity test measures that whether a particular instrument can measure its respective construct. All these criteria together help in estimating the measurement or outer model, which describes that what type of relationship exist between the latent and the observed variables. Hair, Hult, and Ringle (2016) argue that validity of a particular construct is determined by analyzing the content validity, discriminant validity and convergent validity of the instruments.

Thus, for all the constructs in the model, item reliability for all the items was assessed to calculate outer loadings. Item loadings are acceptable if the values fall within 0.40-0.70 (Hair et al., 2016), but is even more suitable when 0.70 or above item loadings are achieved (Henseler et al., 2016;). Furthermore, 0.81-1.00 range shows strong item loadings (Richter, Cepeda, & Roldán, 2016), while 0.50-0.80 shows moderate item loadings (Adeleke, Bahaudin, & Kamaruddeen, 2015; Hair, Matthews, Matthews, & Sarstedt, 2017; Henseler et al., 2016). Thus, 0.30 or above item loadings must essentially be obtained to achieve mutual relations (Hameed, Waseem, & Dahri, 2020; Naala, Nordin, & Omar, 2017). In our case the items with loadings below 0.70 are excluded from the analysis.

According to a definition, convergent validity refers to the extent to which two different measures are theoretically linked even after the statistical testing. Therefore, to estimate convergent validity, we calculated the composite reliability, factor loadings and the average variance extracted (AVE) values (Hair et al., 2017; Hameed, Nawaz, Basheer, & Waseem, 2019). Item loadings and factor loadings were turned out to be in line with the Ong and Puteh (2017) recommended threshold level i.e. greater than 0.50. The composite reliability refers to the level that a particular scale's items are internally consistent and reliable. Therefore, we calculated the composite reliability for each construct and found values ranging from 0.872 to 0.968. Moreover, we also computed the level of common variance or average variance extracted (AVE) among the indicators. For adequate convergent validity, AVE values are required to be above or equal to 0.50 (Hair et al., 2017; Hameed, Basheer, & Anwar, 2018; Ong & Puteh, 2017), and the obtained AVE values for the items in this research were ranged between 0.512- 0.834, which are consistent with the cut-off value. The results of the reliability analysis for proposed framework are shown in the table 2.

Discriminant validity is another criterion which determines the uniqueness of a particular measure. This study used this measure to assess the construct validity as both convergent and discriminant validities determined the validity of a construct. The square roots were taken for all the computed AVEs which were then compared to the correlations among the constructs. AVE square roots are required to be greater in comparison to the computed correlations for establishing discriminant validity. The results of validity analysis are shown in the table 3 below. The results indicate that the diagonal value is greater than the lower value, thereby following Fornell-Larcker Criterion the proposed framework is valid.

Table 1. Outer Loadings

	Business Coping Strategies	Entrepreneurial Orientation	Present Crisis Readiness	Prospective Crisis Readiness
BCST2	**0.888**			
BCST3	**0.891**			
BCST4	**0.879**			
BCST6	**0.877**			
BSCT5	**0.917**			
BSCT7	**0.879**			
ENTRO1		**0.817**		
ENTRO2		**0.765**		
ENTRO3		**0.845**		
ENTRO4		**0.868**		
ENTRO5		**0.805**		
ENTRO7		**0.829**		
ENTRO8		**0.822**		
ENTRO9		**0.821**		
PRCR1			**0.873**	
PRCR2			**0.852**	
PRCR4			**0.916**	
PRCR5			**0.914**	
PRCR6			**0.924**	
PRCR8			**0.868**	
PROSCR1				**0.879**
PROSCR2				**0.825**
PROSCR3				**0.908**
PROSCR4				**0.916**
PROSCR5				**0.847**
BCST1	**0.886**			

Table 2. Reliability

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Business Coping Strategies	**0.955**	**0.957**	**0.963**	**0.789**
Entrepreneurial Orientation	**0.932**	**0.937**	**0.943**	**0.676**
Present Crisis Readiness	**0.948**	**0.949**	**0.959**	**0.795**
Prospective Crisis Readiness	**0.924**	**0.925**	**0.943**	**0.767**

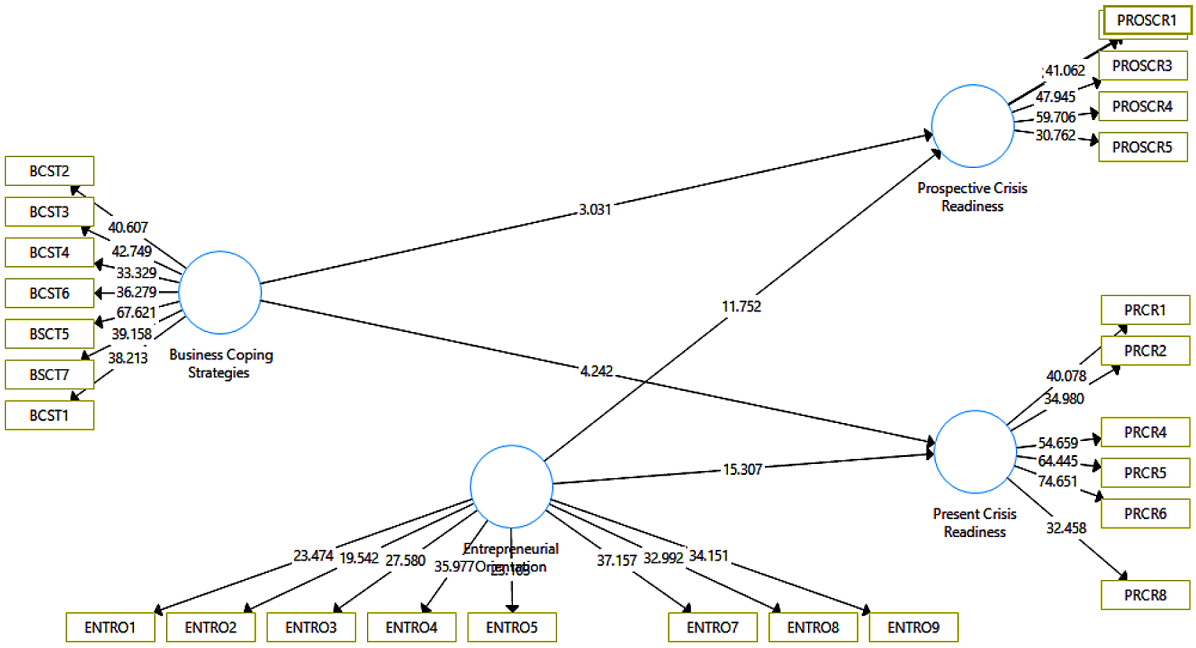
Afterwards, the inner model is estimated in the second step which involves calculating t-values, path coefficients and testing of proposed hypotheses. To compute t-statistics, and path coefficients a bootstrap

Table 3. Discriminant validity

	Business Coping Strategies	Entrepreneurial Orientation	Present Crisis Readiness	Prospective Crisis Readiness
Business Coping Strategies	**0.898**			
Entrepreneurial Orientation	0.889	**0.892**		
Present Crisis Readiness	0.695	0.890	**0.892**	
Prospective Crisis Readiness	0.688	0.862	0.836	**0.876**

technique is employed by taking 500 bootstrap samples. This procedure will also help in determining the structural association among the variables and in checking the path coefficients significance (Hafeez, Basheer, & Rafique, 2018; Hatamifar et al., 2018). For the hypotheses in this study, significant t as well as p values were obtained resulting from a bootstrap method. The structural model of the current study is shown in figure 1.

Figure 1. Structural Model



The structural relationships between and among the variables of the study are shown in the table 4 below. The results indicate that all the paths namely Business Coping Strategies -> Present Crisis Readiness, Business Coping Strategies -> Prospective Crisis Readiness, Entrepreneurial Orientation -> Present Crisis Readiness, and Entrepreneurial Orientation -> Prospective Crisis Readiness.

Table 4. Regression results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Business Coping Strategies -> Present Crisis Readiness	0.456	0.441	0.107	4.242	**0.000**
Business Coping Strategies -> Prospective Crisis Readiness	0.371	0.362	0.123	3.031	**0.003**
Entrepreneurial Orientation -> Present Crisis Readiness	1.295	1.282	0.085	15.307	**0.000**
Entrepreneurial Orientation -> Prospective Crisis Readiness	1.192	1.184	0.101	11.752	**0.000**

Other measures like coefficient of determination (R^2), effect size, and predictive relevance (Q^2) are also used for estimating the structural model. One of the appropriate techniques for structural model estimation is R-square (Hair et al., 2016; Hair, Sarstedt, & Ringle, 2019), which shows the model strength. It demonstrates how much change in endogenous variables is occurred because of the exogenous variables. If R^2=0.67 it shows that 67% variability in endogenous constructs is explained by the exogenous constructs, whereas R^2=0.19 and R^2= 0.33 show small and medium variability, respectively (Basheer, Siam, Awn, & Hassan, 2019; Ringle, Sarstedt, & Mitchell, 2018).

Table 5. R-Square

	R Square
Present Crisis Readiness	0.836
Prospective Crisis Readiness	0.773

Finally, predictive relevance test was performed for measuring the model quality (Basheer, Hameed, Rashid, & Nadim, 2019; Hair et al., 2019). For this purpose, a cross-validated redundancy measure i.e. Q^2 is used and is commonly known as the Stone-Geisser criterion. Empirical reconstruction of samples is done in this method. It requires that Q^2 must exhibit non-zero value to show predictive relevance of the model. In PLS software, blindfolding method was performed for the computation of Q^2 values. However, during the process, a few cases were intentionally omitted for measuring the parameters (Basheer, Hafeez, Hassan, & Haroon, 2018; Hair et al., 2016; Ringle et al., 2018).

Table 6. Q-Sqaure

	SSO	SSE	Q^2 (=1-SSE/SSO)
Present Crisis Readiness	1736.000	961.414	0.446
Prospective Crisis Readiness	1736.000	839.606	0.516

6.0. CONCLUSION

This current study offers theoretical supports to the proposed relationship between EO and CR in the recessionary context. The first is on the long-term positive correlation between EO and firm performance, the second is on the greater effect of EO on the crisis readiness during greater recessionary conditions, and the third is on the ingenuity of EO in facilitating firms during recessionary conditions. On top of the significance of decision making during times of uncertainty, entrepreneurial orientation (EO) which entails decision making styles and practices [REMOVED 599007995PUB-179ANCHORED FIELD] is also suggested to have a major effect on firm performance. This present study demonstrates that EO is not only attractive for entrepreneurial firms, but also serves as a prominent resource-based predictor of recessions. Past studies have repeatedly shown the positive performance outcomes of firms that are risk-oriented, innovative, proactive, competitive, aggressive, and future-oriented. Past studies have also shown the positive effect of EO on the performance of firms that have experienced a greater magnitude of volatility, hostility, dynamism, complexity, turbulence and competitive intensity, as well as less environmental munificence. In the context of SMEs in the current study has discovered a strong positive relationship between EO dimensions and the performance of firms that were operating in highly turbulent market conditions. Likewise, the study also found a strong positive relations between CR and the performance of manufacturing firms operating in highly turbulent market and technological conditions. Other than that, the effect of EO on firm performance had also been studied in relation to environmental changes such as transitioning economies, economic reforms and highly volatile conditions including internationalization. Past studies had also highlighted the significance of EO as a firm's internal resource and dynamic capability. In complex recessionary conditions, a multidimensional EO is projected to affect firm performance during COVID-19.

RECOMMENDATION

This study addresses several limitations which is subject for future studies. It would be value to investigate members of the cooperative towards social capital from their perspective. Moreover, future study could perhaps examine which of the cooperative sector independently benefit more on social capital, EO and cost leadership strategy.

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KEY TERMS AND DEFINITIONS

Business Coping Strategy: The process of solving business and organizational issue with the aim of reducing stress which may cause due to unpleasant and. stressful situations.

Crisis: An unpleasant event or happening that causes or may cause dangerous situation affecting an individual, group, or all of society

Entrepreneurship: The term 'entrepreneurship' was coined by France economist Richard Cantillon Literally the term means 'to undertake' or 'go between' denoting to the situation person presumed when chasing an opportunity However, entrepreneurship is understood as the essential behavioral patterns that are subjected by economic, social and psychodynamic factors.

Small and Medium Enterprises (SMEs): The small and medium enterprises (SMEs) in Pakistan are defined as non-auxiliary, autonomous firms with net worth up to 250 million Pakistani Rupees and employing maximum 250 employees.

Chapter 17
Ascertaining the Interest of Women to Drive Innovation Through Entrepreneurship Post-Pandemic:
A Research Study in the United Arab Emirates (UAE)

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ABSTRACT

Our prosperity and sustainability in the future depends on the ability to innovate. Therefore, innovation needs to be embedded in all sections of an economy. A research study took place in a higher education setting of the United Arab Emirates (UAE) on offering an entrepreneurship major to local women students. The aim was to explore the interest and views of these Generation Z students on driving innovation and entrepreneurship in the country through building homegrown companies. This research is highly relevant as the society re-imagines itself post pandemic. The findings from the research may be useful to members of academia, professionals related to this sector, and policy makers of nations. They may use the information to design suitable academic programs for women that may help drive entrepreneurship, innovation, and sustainability for every strata of the society in the post-COVID-19 era.

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INTRODUCTION AND MAIN FOCUS OF THE CHAPTER

The United Arab Emirates (UAE) is as an icon for innovation and creativity. Believing that innovation is the future of human investment, the strategic decision makers in the government emphasize on its importance through embedding it across all sectors of the economy.

Education plays an important role in improving the confidence and ability in entrepreneurial perceptions. Higher education may promote this by creating a culture of entrepreneurship, offering courses and support new ventures to increase self – employment and risk-taking among graduates (Jabeen et al., 2017). Furthermore, an entrepreneurial future generation may aid towards the development and sustenance of the country and its economic growth (Saji & Nair, 2018).

Therefore, the researcher conducted a study on the feasibility of offering an entrepreneurship and innovation major at a federal education institution in the United Arab Emirates (UAE). The research inquiry ascertained interest of women students in the field of entrepreneurship, identify opportunities that may be available to graduates of this major and validate the industry appetite for such graduates in the Emirate of Dubai, which has its own valley of entrepreneurs and homegrown companies.

This research is timely and relevant as the society re-imagines the new normal and work order, post pandemic. The purpose of this chapter is to present the findings of the research conducted in a Higher Education setting to achieve innovation, sustainability in education and employment of graduates through the establishment of the entrepreneurship and innovation major in a post pandemic era. The objectives of the research were as follows:

- To identify the feasibility of offering a Bachelor of Entrpreneurship and Innovation Program at Dubai Women's College.
- To guage the perception of women students on opting for the field of Entrepreneurship as a business major.
- To collect industry data on Entrepreneurship opportunities
- To highlight other key attributes relevant to the study.

This research may be useful to members of academia, and professionals related to this sector. They may use the research to design suitable programs for women that may help drive entrepreneurship, innovation and sustainability for every strata of the society in the post pandemic era.

BACKGROUND ON THE ISSUE

The United Arab Emirates (UAE) a "supporter of capitalism through the supply of oil" is a high-income Islamic nation. It is a powerful country in the Middle East due to its growing role in the region (Burden – Leahy, 2009). The people of the country have great affinity towards their government and leadership because of the rapid growth and development the country has experienced under their guidance in the recent decades (Chakravarti, 2017).

The nation today stands as a beacon of hope and holds a new vision for the Middle East region that "supports moderate Islam, empowers women, embraces diversity, and encourages innovation and welcomes global engagement". For these reasons, United Arab Emirates (UAE) is a home, not only to the Emiratis but also to the expatriates from around the world. There are close to 200 nationalities working and liv-

ing in the country. It is a pioneer in the region for gender equality. The Constitution of the United Arab Emirates (UAE) guarantees equal rights for both men and women. Seventy percent of the women hold graduate degrees in the United Arab Emirates (UAE) and over half the jobs in the government sector and twenty percent of the diplomatic corps positions (Embassy of the United Arab Emirates (UAE), 2020).

Much of the nation's opulence is because of the oil reserves found on its territory nearly sixty years ago. Since then the small desert country has transformed into a modern state with a high standard of living. In order to continuously raise national standards, improve its international ranking and competitive advantage - the United Arab Emirates (UAE) is focusing on entrepreneurship, economic diversification, development of industries and an improved education system. Due to these reasons, the United Arab Emirates (UAE) is a jewel of innovation and creativity in the Middle East. Entrepreneurship and innovation are the key to a prosperous, sustainable future and the country recognizes its importance thoroughly (Minhas, 2018).

Therefore, in 2014 the Ruler of Dubai and the Vice President of United Arab Emirates (UAE) His Highness Sheikh Mohammed bin Rashid Al Maktoum launched the National Innovation Strategy with the aim of making the United Arab Emirates (UAE) one of the most innovative nations in the world within a period of seven years. The plan aimed to stimulate innovation in areas of education, health, technology, renewable energy, space and water (National Innovation Strategy, n.d).

United Arab Emirates (UAE) National Innovation Strategy, recognizes "innovation as a cornerstone of social and economic development." Innovation is "the aspiration of individuals, private institutions and governments to … [develop] creative ideas and introduce new products, services and operations that improve the overall quality of life" (National Innovation Strategy, n.d). In line with the above strategy, and aligning with the federal education policy of graduating student led companies, technical leaders and no Emirati left behind, Dubai Women's College, a division of the Higher Colleges of Technology decided to offer an Entrepreneurship and Innovation major in the Business program to the local women students to promote sustainability and growth of the economy, creation of jobs and flexible career options.

Issues, Controversies, Problems

In light of the global pandemic - COVID 19, uncertainty is high and as a result, there are big disruptions in consumer spending, offline commerce, supply chains, travel, and hospitality. The "new normal" indicates a need for a mindset that can respond to challenges and achieve growth. Due to this reason, an atmosphere of innovation and entrepreneurship has taken center stage, not only in the United Arab Emirates (UAE) but also in the rest of the world (Maritz et al., 2020). Companies like Uber, Dropbox and Airbnb started during the financial crisis of 2008. Therefore, uncertain times are a bedrock or fertile ground for entrepreneurship and innovation.

Over a long period, the United Arab Emirates (UAE) government is providing positive incentives to attract professionals from all over the world to support small and medium enterprises (Minhas, 2018). Some of these incentives include 100% ownership of business, no personal tax, corporation tax exemptions and issuing five to ten year visas for entrepreneurs. Furthermore, the government announced the creation of a new technology space called Hub 71 and granted AED 500 million in funds for the initiative. This technology space will be in Abu Dhabi and the work in partnership with Microsoft. This further indicates the country's commitment to attracting international technical talent. For these reasons, from a commercial standpoint, the country is ranked 11th in the world for overall ease of doing business (Sagar, 2020).

United Arab Emirates (UAE) as a nation has proven to be a test bed for entrepreneurs for a while now and hence despite the market carnage, venture capitalists are proceeding with their investment plans in the nation. In addition, a survey conducted by a non-profit education organization Injaz-Al Arab confirms that the youth in the Arab world show a healthy inclination towards entrepreneurship in the nation (D'Mello, 2020).

Due to the above policies and strategies by the government - Today, the United Arab Emirates (UAE) is a global center for entrepreneurship, knowledge transfer, and innovation. Early-stage startups make up nearly 50% of all companies registered in Dubai and contribute over 47% to the annual GDP of the country, per report from Dubai Statistics Center (MarketLine Country Profile: the United Arab Emirates (UAE), 2020). Therefore, to capitalize on the above opportunity and having support from the United Arab Emirates (UAE) government, Dubai Women's College, a division of the Higher Colleges of Technology decided to offer an entrepreneurship and innovation major in the business program at the Dubai Women's College for local women of the United Arab Emirates (UAE).

Dubai Women's College currently has a Business Program that offers four different majors in the college: Accounting, Human Resources, Finance and Quality. However, number of students opting for certain majors is declining due to the limited number of job offerings in the said industries. Hence, the college wanted to offer a new major in the entrepreneurship and innovation program because it is considered an "indemand major" by students and industry representatives. It seemed to be a sensible choice, as it caters to the current market demands, aligns with the country's national strategy and promotes the idea of sustainable growth for Dubai and the United Arab Emirates (UAE) in years to come.

Entrepreneurship is touted as a force that can bring growth, development and social progress through innovation and employment generation (Naguib & Jamali, 2014). Due to the technological revolution and globalization, entrepreneurship education is now a vital skill that helps graduates with their livelihood by establishing their own business. It continues to remain the solution to answer challenges that our world faces now, and in the post pandemic times. Therefore, entrepreneurship education becomes an important platform through which students can be prepared to identify opportunities and explore their potential.

Entrepreneurship education develops various skills that help to plan and manage businesses. Business startups based on innovative ideas lead to sustainable growth. Therefore, entrepreneurship education must become a mandatory part of university education. Research further indicates that formal entrepreneurial education reduces unemployment and boosts the economy of the region (Hameed et al., 2016). Hence, it made perfect sense to offer the entrepreneurship and innovation major in the business program at the Dubai Women's College. Following is a Strength, Weakness, Opportunity and Threat (SWOT) analysis conducted on offering an entrepreneurship and innovation major in the business program at the Dubai Women's College:

At the Dubai Women's College, the entrepreneurship and innovation major courses offer problem based and interdisciplinary learning, constructive learning opportunities and self- directed learning. The program is well linked to the Industry for joint research opportunities and knowledge exchange networks. It is also in alignment with the United Arab Emirates (UAE) Innovation Strategy and the Dubai Fifty-Year Charter. A market scan for job opportunities indicates that there are plenty of opportunities for all types of graduates in the program. The risk averse graduates can undertake various exciting opportunities offered in both Public and Private sector. E.g. Masdar, DEWA, Google, Du, Etisalat, HSBC, Dubai e-Government etc. Since, most organizations these days are looking for an innovation officer or an intrapreneur and the starting salary range for these graduates begin from AED 7,000 to 20,000. While the risk embracing graduates, may open their own enterprises with a potential of unlimited opportunity

Table 1. SWOT Analysis

STRENGTHS • Support from government through policies, strategies and funds. • Offered program is in alignment with the National Innovation Strategy, Higher Colleges Technology 4.0 and Entrepreneurship Focal Strategy. • Dubai is considered a hub of knowledge sharing and innovation. Therefore, it makes sense to have the program at Higher Colleges Technology – Dubai Women's College. • Per Dubai Statistics Centre, Small and Medium Enterprises contribute 47% to the GDP of the country and serve as a platform for job creation and innovation.	**WEAKNESSES** • Development of an entrepreneurial mindset • Lack of confidence • Fear of failure • The costs, legal paperwork and ongoing finances, related to startup growth and performance.
OPPORTUNITIES • Collaborations with other colleges and universities that have a similar vision. • Joint ventures between expatriate students and local students to start innovative businesses. • Upcoming Expo may introduce novel ideas that can take shape of thriving companies in the future.	**THREATS** • Low number of applicants to the program. • Budget pressures • Complex and ever changing environment.

and growth. E.g. Careem.com, Souq.com, Huda Beauty.com etc. The Higher Colleges of Technology as an organization has set aside AED 100 Million to fund the field of Entrepreneurship. This fund is to provide seed capital to startups established by students (HCT Institutional Strategy, n.d).

Therefore, this research study was undertaken to ascertain student interest in the new major, determine types of opportunities that may be available to graduates specailizing in this major and validate the industry appetite for such graduates in the Emirate of Dubai, which has its own valley of entrepreneurs and home grown companies like Careem, Souq.com, Huda Beauty etc. The hope for starting this major is to support the United Arab Emirates (UAE) Vision 2021, which focuses on [building] innovative Emiratis that can create a competitive economy.

The next section of the study explains the impact of entrepreneurship on education and women, support given to the field of entrepreneurship through national policies and strategies of the United Arab Emirates (UAE).

IMPACT OF ENTREPRENEURSHIP ON EDUCATION AND WOMEN IN UNITED ARAB EMIRATES (UAE)

The educational systems in the Middle East region are in their development stages. The United Arab Emirates (UAE) formed in 1971 has many educational structures, which are currently under revision to adapt to the needs of the changing world order. However, since the formation of the nation, education has been an instrumental element in the development plans of the country for a "new national identity and coherent social framework" (Kirk, 2010).

The United Arab Emirates (UAE) commitment to education has given hope to many. "In 2019, young people surveyed throughout the Arab world identified the United Arab Emirates (UAE) as the top country to live in and to emulate for the eighth year running, reflecting the opportunities available to youth entering the workforce"((Embassy of the United Arab Emirates (UAE), 2020).

With a prosperous economy, the government focused on empowerment of their women with higher education and job placements. Local women today outnumber men in attaining higher education. These women have made monumental strides in attainting education due to the strong support for education from the rulers of the Emirates (Sowmya et al., 2010).

Despite the initiatives of the government to empower and educate women, entrepreneurship in the local women is the lowest when compared to developed countries with a similar Gross Domestic Product (GDP) per capita. The national government has introduced several initiatives to empower women and promote female entrepreneurship. Tanmia, Business Women Councils, General Women's Union, Department of Economic Development and the Chambers of Commerce and Industry provide guidance and organizations such as the Mohammed bin Rashid Establishment for Young Business Leaders and the Khalifa Fund offer finances for small and medium sector entrepreneurs. Unfortunately, the country's female entrepreneurial activities remain low (Sowmya et al., 2010). Some challenges experienced by female entrepreneurs are lack of role models and poor access to capital (Kargwell, 2012). Fear of failure, lack of self-confidence, gender stereotypes, family life pressure, physical exhaustion, lack of ability to manage multiple roles are other reasons that inhibit or limit individual entrepreneurial activities in women of the United Arab Emirates (UAE) (Naguib & Jamali, 2014).

Although the nation ranks high in entrepreneurial motivation, it has the lowest intention to start businesses. This is because of cultural influences, as the nation has a collectivist culture where local people live and work in a loyal united family. Therefore, students do not readily accept entrepreneurship due to their collectivist culture and lack of formal entrepreneurial education provided to them. Moreover, entrepreneurial research suggests that individualist cultures produce more entrepreneurs than collectivist cultures (Hameed et al., 2016).

In the current context of the world, disruptions due to technology and globalization, the significance and importance of individual entrepreneurial activity becomes extremely crucial in an economy like the United Arab Emirates (UAE), especially among the new generation of local females graduates. Furthermore, entrepreneurial attitudes significantly contribute to the entrepreneurial intentions of active entrepreneurs (Fenech et al., 2019). Therefore, this study addresses an extremely relevant issue by aiming to investigate the attitudes of female students towards opening an entrepreneurship and innovation major in the business program for local women of this region. This research is relevant because not only does it ascertain views of local women on entrepreneurship and innovation but also explores the potential of these women to drive innovation in the country through creating small and medium enterprises.

STRATEGIES IN SUPPORT OF ENTREPRENEURSHIP

The United Arab Emirates (UAE) National Innovation Strategy, Vision 2021 and the Dubai 50 Year Charter were reviewed for this research. Below is a brief explanation of how each strategy supports innovation and entrepreneurship in its entirety. The United Arab Emirates (UAE) National Innovation Strategy desires development of innovative individuals, companies and institutions to promote and commercialize innovations with emphasis on research and development in the United Arab Emirates (UAE) (National Innovation Strategy, n.d.). So - that the country can shift from an oil based economy to a knowledge economy.

Vision 2021 expects to harness the full potential of the national human capital. It strives to instill an entrepreneurial culture in the education system to foster the current and future generation of the country

with leadership, creativity, responsibility and ambition. All Emiratis are supposed to make a valuable contribution to the nation's growth by building their knowledge and applying their talent with innovation and drive. This will help the "United Arab Emirates (UAE) to be among the best in the world in ease of doing business, innovation, entrepreneurship and Research and Development indicators" (Vision 2021, n.d).

Dubai's foundation is rooted in trade. Article six states of the Dubai 50 Year Charter states setting up of "Free Economic and Creative Zones in Universities." This setup of free zones will allow students to "carry out business and creative activities, making these activities part of the education and graduation system, and shaping integrated economic and creative zones around the universities." These zones in the education system will support students with education, research and funding during the launch of their entrepreneurial projects. The charter hopes that educational institutions "not only graduate students, but also create companies and employers" (The Fifty -Year Charter, n.d).

The information presented above is evidence that highlights government support through policies and strategies for opening an entrepreneurship and innovation major in business programs of educational institutions like the Dubai Women's College.

RESEARCH METHOD

This study targeted young Generation Z female business students who have entered the arena of entrepreneurship by taking an innovation and entrepreneurship course in the business program. Through this study, the researcher tried to investigate the interest and attitudes of these students towards opening a new major in entrepreneurship at the Dubai Women's College. In addition, an online form asking exploratory research questions was sent to industry experts to validate industry appetite for this program and identify opportunities that may be available to graduates specailizing in this major.

A standardized questionnaire was developed in order to investigate the research topic. The semi-final questionnaire was sent to subject matter and industry experts, as well as key contacts in the field of entrepreneurship to gain feedback. After reviewing and integrating the comments, the questionnaire was tested by a set of students in order to detect and eliminate weaknesses in functionality and comprehensibility. An online survey using Google forms was used as a research instrument. It was identified to be the most appropriate research tool because it is user friendly, can capture and compute data efficiently, reach remote participants who have internet access. The objectives of the research were as follows:

- To identify the feasibility of offering a Bachelor of Entrpreneurship Program at Dubai Women's College.
- To guage the perception of students on opting for the field of Entrepreneurship as a business major.
- To collect industry data on Entrepreneurship opportunities
- To highlight other key attributes relevant to the study.

DATA PRESENTATION AND ANALYSIS

The research study data was collected from primary sources and analysed based on the following:

- A survey questionnaire circulated and opinion obtained from
  - Current business students of Dubai Women's College (See Appendix 1)
  - Industry experts of Dubai (See Appendix 2)
- Insights of the Industry Advisory Committee

Results of the Student Survey

The survey (Appendix 1) was circulated and conducted among the Business Program students at Dubai Women's College. The questionnaire was distributed among 100 students, out of which 96 student responses were received. Below are the analyzed student responses:

For question 1, when the respondents were asked if they could imagine themselves as a famous business-woman, 83.3% of the respondents' were affirmative and a small 16.7% said no. This indicates a new entrepreneurial spirit in the students of the Dubai Women's College.

For question 2, when students were asked if they want flexible timing, develop their own rules at work and earn lots of money, 94.8% of the respondents said yes. This indicates that majority of the participants envision to work in a place that provides them with freedom, flexibility and high earning potential. This data points out that students have similar traits of innovators, creative thinkers and entrepreneurs.

For question 3, when the respondents were asked if innovation and entrepreneurship can be taught in a class setting, 66.7% said it can be learned, where as 33.3% believed that you had to be born with these skills. This data shows lack of knowledge and awareness about the potential of the field of entrepreneurship and innovation.

For question 4, when participants were asked if the innovation and entrepreneurship business major will open many opportunities for female Emirati nationals to start profitable businesses, 90.6% of the respondents felt positive about the statement and strongly agreed with it. This demonstrates that students have started warming up to the idea of being empowered and entrepreneurial. This can be counted as a positive sign towards opening a new program.

For question 5, when the participants of the survey were asked about the increase of entrepreneurs and entrepreneurial activity in the United Arab Emirates (UAE) industry, 87.5% agreed with the statement, saying that there will be a definite increase in the number of entrepreneurs and small businesses in the upcoming five years. This indicates that the students are aware about the growing number of local entrepreneurs in the field of entrepreneurship.

For question 6, 94.8% of the respondents agreed that innovation most definitely improves the quality of life in the United Arab Emirates (UAE). This shows that students understand the link between entrepreneurship and innovation. They also understand the importance of innovation in our world today and how these skills can help students in staying ahead of the competition.

For question 7, 27.1% of the respondents stated that if the innovation and entrepreneurship major was started at the Dubai Women's College, they would major in it. This is the second highest major requested in the program and can be considered a positive sign to start the entrepreneurship and innovation major at the college.

Result of Industry Experts' Survey

The industry experts were asked five exploratory-based questions through the online survey form. Following is a presentation and analysis of their responses:

1. Do you think there is a need/potential for a Business Program in innovation and entrepreneurship at Dubai Women's College? If yes, what are the possible reasons?

All participants of the survey agreed that there is a definite need for innovation and entrepreneurship program in all colleges of Dubai to promote an innovative attitude in 21st century learners and help shape the youth of the country. They also indicated a huge potential of opportunities that may be available to students upon graduation. A participant said, "Sheikh Mohammad encourages innovators and innovative initiatives." Therefore, it can be safely assumed that introduction of the entrepreneurship major at the Dubai Women's College is a step in the right direction to promote and encourage innovators through teaching.

2. What are the employment opportunities for an Emirati graduating with an innovation & entrepreneurship degree in Dubai?

Industry experts said that there are plenty of opportunities in the field of entrepreneurship and innovation, in both private and public sector of the United Arab Emirates (UAE) economy. Students can start their own company and test their idea during the period of study at their college/ university. Furthermore, they said that any company that wants a business candidate would hire an innovation and entrepreneurship major graduate.

3. Where is the field of entrepreneurship and innovation heading in Dubai and how do you think it can contribute towards the program at Dubai Women's College?

Respondents of the survey unanimously agreed that there are many entrepreneurial opportunities and innovation jobs in the United Arab Emirates (UAE) (See Appendix 3, 4). Industry experts commented, "Dubai is encouraging more investment in new smaller companies and making legislation and support mechanisms that are more favorable for start-ups." They further stated, "There are also a number of entrepreneurs who are breaking past the startup phase, achieving strong product-market fit, and focus on scaling up their businesses." Favorable government policies and strategies are further strengthening the spirit of innovation and is enabling it become an important aspect in every entity serving in Dubai. One industry practitioner said, "There are specialized departments of innovation in every government and private institution. In fact, there is a huge gap to fill, as there are not enough graduates available with specialization in innovation."

Contributors also said that since "Dubai is always focusing on specialty in everything and they look forward to be one of the most advanced and best places to live in the whole universe", therefore development of innovation and entrepreneurship in all, is a desired goal in United Arab Emirates (UAE). The above comments indicate that the industry experts feel positive about the introduction of the entrepreneurship program at Dubai Women's College.

4. Please provide us with any other insights you wish to make for a business program in Innovation and Entrepreneurship at Dubai Women's College.

Most experts were satisfied with the number of majors offered at the Dubai Women's College. Some experts asked to emphasize on technology and practical learning, which is a key strength and focus of the college. One industry specialist asked to "Engage with entrepreneurs to share their experiences and

expose more about their reality." AstroLabs is one such platform that the college can work with in the future. Another expert said, "Students must work on project based learning, work with actual startups during their internship and must know how to sell their idea." A third participant said, "The course is to be aimed at individuals with an entrepreneurial mindset, entrepreneurs already running their own businesses or employees in large organizations wishing to foster a culture of innovation and creativity." This data demonstrates that the industry experts want the new program to be 100% practical and well linked with the industry.

5. Finally, looking at the current world scenario, the experts were asked if starting the new entrepreneurship and innovation major in the business program is an excellent idea. The industry members responded positively to the recommendation of introducing the entrepreneurship program as a viable business major at the Dubai Women's College.

The next section of the study presents the Industry Advisory Committee insights on starting the new entrepreneurship and innovation program at the Dubai Women's College.

Insights of the Industry Advisory Committee

Interactive discussions were held with eminent Industry Guests at the Industry Advisory Committee (IAC) Day Meeting, *"Closing the gap between business education and industry*." The industry participants included the following eminent resource personnel.

The key takeaways supporting the opening of an Entrepreneurship program were as follows:

Table 2. Industry Participants

Name of Attendee	Organization
Participant 1	Industry Manager 1
Participant 2	Industry Manager 2
Participant 3	Industry Manager 3
Participant 4	Industry Manager 4
Participant 5	Executive Director 1
Participant 6	Business Division Chair 1
Participant 8	Business Faculty and Program Coordinator Set 1
Participant 9	Business Faculty and Program Coordinator Set 2
Participant 10	Business Faculty and Program Coordinator Set 3
Participant 11	Business Faculty and Program Coordinator Set 4
Participant 12	Manager of Student Careers
Participant 13	Specialist in Work Placement
Participant 14	Assistant, Business Division

- The Industry Advisory Committee (IAC) members had no academic opinion on the Business program matrices. However, they were impressed with the variety of academic subjects covered. They appreciated the fact that innovation and entrepreneurship is a mandatory subject for all students.
- Graduating companies is a new component of the organization strategy. Since, this is a fresh idea presented to the Industry Advisory Committee (IAC) members, they preferred to think about it further and report on how they can help accomplish it in the future.

Below are the key findings and recommendations of the analyzed data collected on the research topic from the students and industry experts.

FINDINGS

- Innovation is viewed as a key pillar for economic success and progress by United Arab Emirates (UAE) leadership. There is government support in the form of strategies, policies and funds. This is a positive indicator for Dubai Women's College to start an entrepreneurship major in the business program.
- 100% of the Industry Representatives responded positively to starting the entrepreneurship and innovation major for students. Therefore, Dubai Women's College can seriously consider offering an entrepreneurship major in the business program to our students.
- Since most of the Industry Representatives are in favour of starting the major, Dubai Women's College can expect to get good Industry support-in terms of internship opportunities and guest lecture sessions from eminent industries in and around Dubai. Optimistic Industry feedback on the availability of entrepreneurial opportunities and innovation jobs in private and public sector gives the required assurance to implement the plan and offer the entrepreneurship and innovation major at Dubai Women's College.
- 94.8% of the students positively responded to the term innovation. They are aware about how innovation may further improve the quality of life in United Arab Emirates (UAE). This shows that students understand the importance of innovation in our world today. Furthermore, how this skill will help 21st century learners in years to come to promote growth and stay ahead of the competition. This is yet another green signal for Dubai Women's College to open the entrepreneurship major.
- Since 90.6% of the surveyed students said that "Innovation and Entrepreneurship business major will open many opportunities for female Emirati nationals to start profitable businesses" and that they are open to evaluate a new major, in addition to the traditional offerings, is an encouraging indicator for Dubai Women's College to start a new major in business. There is a change in the mindset, as previously women students only wanted to work in salaried government jobs.
- 27.1% of the surveyed students want to major in the field of entrepreneurship and innovation is a positive indicator for opening the major at the college. In addition, it raises a point to generate awareness about the major, when launched at the college.

RECOMMENDATIONS

Based on the above data analysis, the research study confirms a change in the mindset and attitudes of the Generation Z women students towards the field of entrepreneurship. This may be due to the current world dynamics, global frenzy, disruptive technology, and other social media influences. Furthermore, positive views on the entrepreneurship opportunities available in the market by the industry experts are key indicators that help in recommending an entrepreneurship and innovation major at the Dubai Women's College to help graduate women led companies for sustainability and development of the United Arab Emirates (UAE).

The entrepreneurship and innovation program should aim at expanding the program to expatriates with an entrepreneurial mindset and employees in large organizations wishing to foster a culture of innovation and creativity or starting up a new venture.

Since Dubai is a global hub of practicing latest trends in innovation, there is rapid progress and development in the entrepreneurship sector. Therefore, there are and will be several entrepreneurial opportunities and innovation jobs in the private and public sector that are available for entrepreneurship and innovation graduates of the program.

FUTURE RESEARCH DIRECTIONS

This research could explore the following direction in the future:

- Studying the impact of entrepreneurship education on local women led companies after a year of graduation
- Studying the challenges in development of a local woman led company for a one to five-year period.

CONCLUSION

Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates (UAE), and Ruler of Dubai issued a powerful challenge to the whole country of the United Arab Emirates (UAE) – "innovate or perish." In the spirit of that message, Small and Medium Enterprises have to be placed at center stage as the main driver of innovation for a sustainable and prosperous future. So that we have more success stories like Huda Beauty, Souq.com, Careem.com, Fatema Fardan etc (See Appendix 5 for further details).

Furthermore, local entrepreneurs who display the tenacity to grow a business from scratch here in the United Arab Emirates (UAE) are poised to benefit considerably. Local entrepreneurs who are able to tap into these government-led initiatives, programs, and resources will have many options available to them. The growing support network provided by the initiatives, and the communities they foster, will strengthen the startup culture in the United Arab Emirates (UAE) and continue to attract local and expatriate entrepreneurs here for years to come.

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KEY TERMS AND DEFINITIONS

Capitalism: An economic system in which people and companies make most decisions and the government plays a secondary role. E.g., American economy is capitalistic in nature, whereas Indian economy is mixed.

Collectivist Culture: Group approval is priority over individual likings and beliefs. Here people work in harmony. Group cohesion is extremely valued in such types of cultures. E.g. Middle Eastern, Indian Cultures

Competitive Advantage: It allows a company to create a unique selling point, produce goods or services efficiently in a cost-effective manner to gain customer admiration and stay ahead of its rivals.

Disruptive Technology: Disruptive technology is an innovation that changes the method of customer interaction and business processes. It replaces these habits because it has attributes that superior. E.g. e-commerce

Generation Z Students: Students born in the mid-to-late 1990s.

Gross Domestic Product (GDP) per Capita: Calculates a country's economic output per person by dividing the GDP of a country by its population.

Individualistic Culture: Individualistic cultures allow the development of the whole self, which is self-sustaining over a group or family (e.g., American culture).

New Normal: New normal means to reimagine life after crisis.

Pandemic: An epidemic of an infectious disease that has spread across the world (e.g., Corona Virus, Spanish Flu).

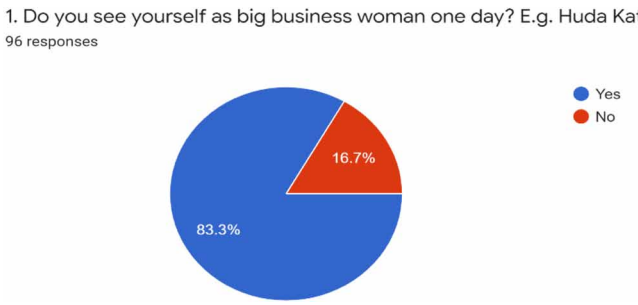
APPENDIX 1

Student Survey Questionnaire| Entrepreneurship Program at Dubai Women's College

UAE National Innovation Strategy recognizes "innovation as a cornerstone of social and economic development." Innovation is "the aspiration of individuals, private institutions and governments to … [develop] creative ideas and introduce new products, services and operations that improve the overall quality of life." For the reasons listed above, HCT-DBW intends to open an Innovation and Entrepreneurship major in the Business program. Please answer the following questions below:

1. Do you see yourself as big business woman one day? E.g. Huda Kattan
   a. Yes
   b. No
2. Do you want to be your own boss? Flexible timing, take decisions, develop rules and earn lots of money.
   a. Yes
   b. No
3. Innovation and Entrepreneurship can be taught:
   a. In class
   b. You are born with it and cannot learn it
4. IE Major, if opened at HCT-DBW, will open many opportunities for Emirati nationals to start profitable businesses, especially for UAE females.
   a. Strongly Agree
   b. Strongly Disagree
5. In the next five years, do you think there will be an increase in the number of entrepreneurs and small businesses in the UAE industry?
   a. Yes
   b. No
6. Innovation will promote economic growth, increasing competitiveness, providing new job opportunities and further improve the quality of life in UAE.
   a. I agree
   b. I disagree
7. Select your preferred major at HCT-DBW:
   a. Innovation and Entrepreneurship
   b. Human Resources
   c. Accounting
   d. Finance
   e. Quality

Figure 1.



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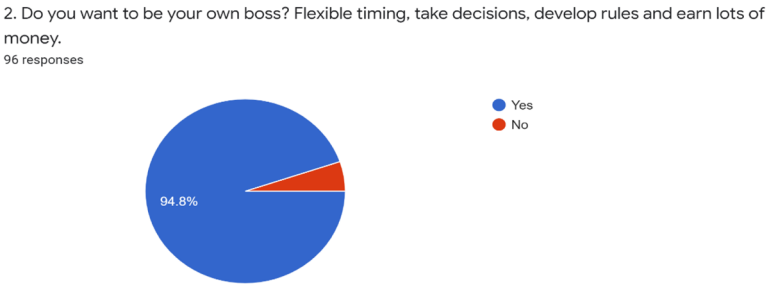

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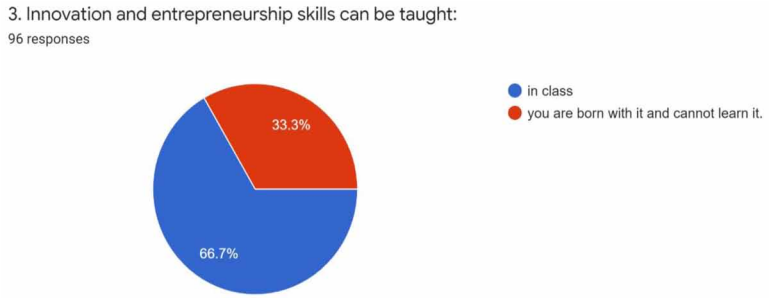

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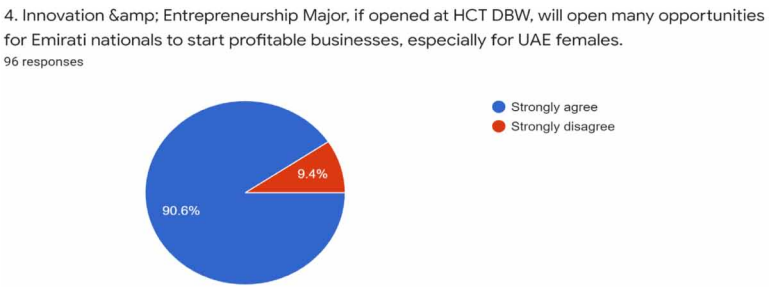

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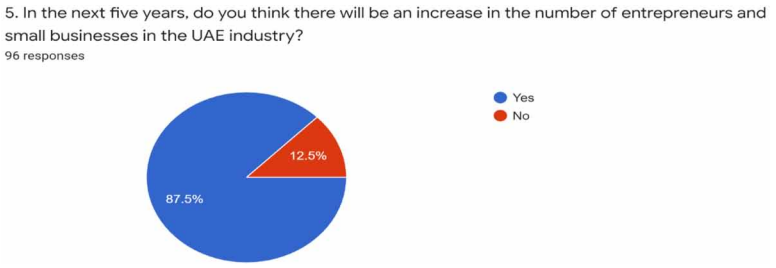

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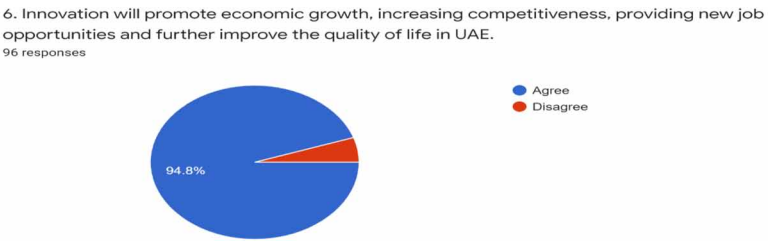

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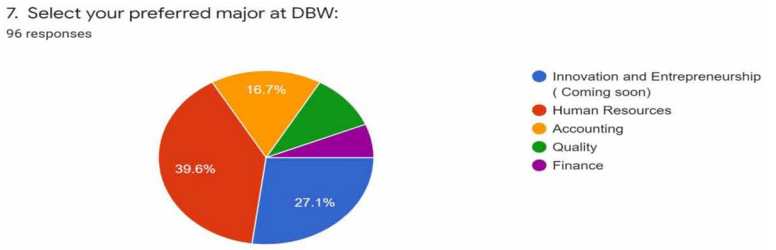


APPENDIX 2

Industry Alliance Survey| Entrepreneurship Program at Dubai Women's College

Dear Mr/ Ms.

Greetings!

UAE National Innovation Strategy recognizes "innovation as a cornerstone of social and economic development." Innovation is "the aspiration of individuals, private institutions and governments to … [develop] creative ideas and introduce new products, services and operations that improve the overall quality of life."

For the reasons listed above, HCT - Dubai Women's College (DBW) intends to open an Innovation and Entrepreneurship major in the Business program.

Per discussion, on behalf of (DBW) – HCT, I request you to share your thoughts on the feasibility of a program in Innovation and Entrepreneurship (IE). Therefore, may I please request you to answer the following questions, on the basis of your rich industry experience?

1. Do you think there is a need/potential for a Business Program in Innovation and Entrepreneurship (IE) at Dubai Women's College? If yes, what are the possible reasons?
2. What are the employment opportunities for an Emirati (IE) graduate in Dubai?
3. Where is the field of entrepreneurship and innovation heading in Dubai and how do you think it can contribute towards the (IE) program at Dubai Women's College?
4. Please provide us with any other insights you wish to make for a business program in (IE) at Dubai Women's College.

Your inputs is valuable to us. I would like to thank you in advance for prompt response, and being a great knowledge ambassador/ industry expert for Dubai Women's College.

Kind regards,
Dr. Sriya Chakravarti

APPENDIX 3

Funds and Associations to support Entrepreneurship

Graduates of the Innovation and Entrepreneurship program can find their niche in product, process of business model innovation.

- **HCT InnCuvation Spaces** can also be a useful space to fine tune innovative ideas.
- **HCT Venture Capital** of 20 million per year may provide seed capital to startups that have a promising future.
- **Dubai SME**, a division of Dubai's Department of Economic Development, includes a business incubation center for local entrepreneurs to develop their small and medium-sized projects or businesses.
- **Emirati Entrepreneurs Association** is a national association aiming generally to support and promote Entrepreneurship between Emiratis. The Emirati Entrepreneurs Association is an important initiative that helps stimulate and boost the links between entrepreneurs in small and medium-sized enterprises (SMEs).
- **Mohammed Bin Rashid Establishment for Young Business Leaders** SME: A 10,000 square foot facility of offices, administration, incubation, fund, and training to develop small businesses, primarily Emirati-owned businesses, but the center is also considering developing incubation services and support for expats. Located in Deira.
- UAE entrepreneurs can turn to the **Khalifa Fund for Enterprise Development**, an independent agency of the Abu Dhabi Government, which offers a range of training and funding programs for Emirati entrepreneurs and small businesses.

- **Other Incubators & Accelerators**
  - Dubai Enterprise Center (DEC): a business incubation center based on international best practice, providing entrepreneurs with a range of targeted resources and services.
  - SeedStartup: A Dubai-based accelerator program that focuses on digital media web, mobile, software startups, typically investing $20,000 for a 20% equity stake. It's open to startups from around the globe, and puts them through a three month mentorship-focused accelerator program.
  - StartAppz: A mobile-app accelerator from Saudi venture capital firm N2V that focuses on bringing early and idea stage mobile applications to market. Startups may be located anywhere in the Gulf region, and mentors will travel to the startup. For startups that want to be based in Riyadh, StartAppz offers physical incubation facilities.
  - Dubai Silicon Oasis: A technology incubator which opened in April 2012 and focuses on companies in the web and ICT sector.
  - Oasis500: A Jordan-based startup accelerator, currently the biggest in the region that offers a startup bootcamp and 3 month accelerator program that offers mentorship, training, and seed stage investment.
- **Mentorship and Training**
  - The Mowgli Foundation: A mentoring program designed to create sustainable opportunity in some of the world's poorest communities.
  - Potential: A corporate sales training and startup support and advisory firm that tends to grant startups visibility to investors, and has good linkages to GCC governments. It also runs the SME Evolution program.
  - Tandem: A startup consultancy that provides support on strategy, operations and finance, offering services in business planning, market research, financial modeling, business valuations, investment readiness and guidance and mentorship. Tandem also offers to connect entrepreneurs to investors and manage the negotiation process.
  - The Referral Institute: A Dubai franchise in a larger global network that trains entrepreneurs to maximize referral marketing.
  - Webpreneur Academy: offers webinars and training for starting and growing an online business. The company was started by Dubai-based entrepreneur Amir Anzur and runs as a franchise model outside the GCC.

APPENDIX 4

Small Business Ideas| Internship Opportunities and Potential Employment

Following are a few ideas for small businesses that never go out of style:

Restaurants:

A small scale restaurant or a café targeted to a specific or a combination of various cuisines can prove to be a good return on investment.

Recruitment Agency:

Thousands of business in UAE need skilled workers. This is where they need the help of recruitment agencies.

Day care/ Child care services:

Working couples are in majority in Dubai specifically and Child Care business can be quite a rewarding and fruitful opportunity.

Cleaning company:

Cleaning business is a profitable one. You need to acquaint yourself with the various technical equipment and cleaning chemicals. The next step is to decide your zone, either one-time house cleaning or hotel and restaurant cleaning.

Event Management Company:

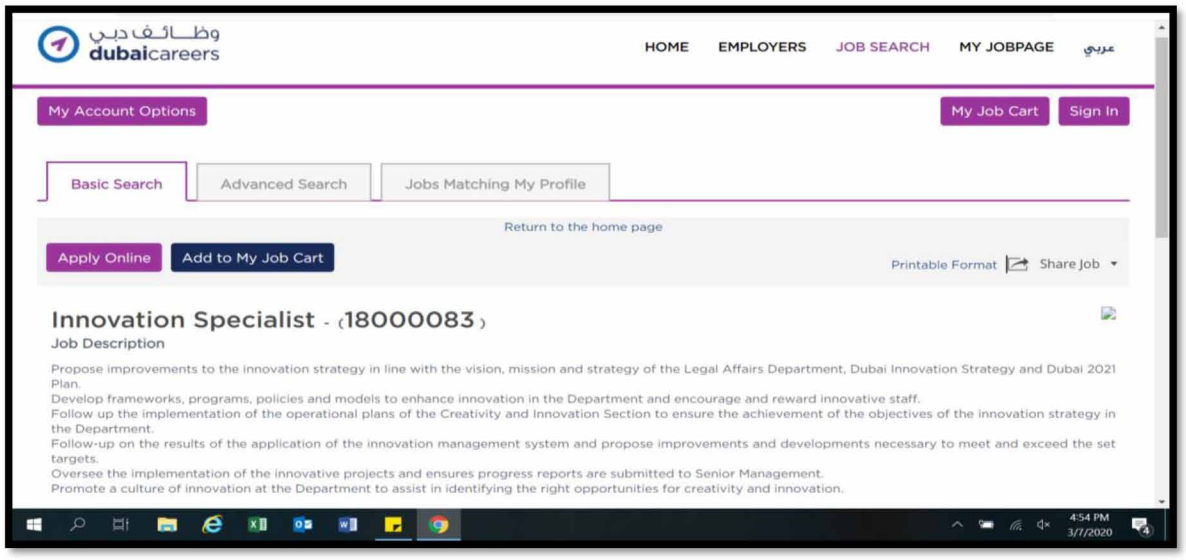
Event Management would require to have creative, accounting, risk management, computer, marketing, control, and selling skills. This is necessary because handling events is a huge deal where you must be seen to be able to handle things and emergencies that might crop up.

Internship opportunities may be available with Dubai accelerators listed below:

- Dubai Smart City Accelerator: https://dubaismartcity.org/
- Turn8: https://turn8.co/
- Impact Hub: http://impacthub.ae/
- In5: https://infive.ae/
- Astrolabs: https://astrolabs.com/
- Flat6Labs: https://www.flat6labs.com/

Other job opportunities may be available as listed below:

Figure 8.



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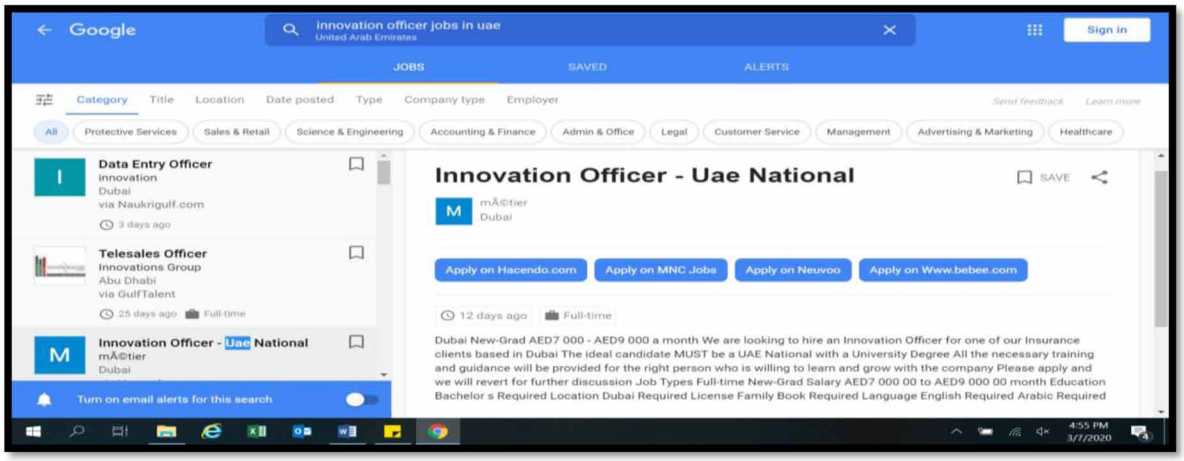

APPENDIX 5

List of Successful Female Entrepreneurs in UAE

- **Nayla Al Khaja:** UAE's first female film director, Nayla Al Khaja founded and owns a production company called D-SEVEN. Through her filmmaking she works tirelessly to showcase social issues, women's rights, and other humanitarian themes in her films and continues to win awards for her groundbreaking work in the film and production industry
- **Huda Kattan**: Huda Kattan made her breakthrough in Dubai and continues to live in the city to expand her business, Huda Beauty. Known throughout the social media, she continues to grow her make-up and beauty business into one of the highest grossing companies in the world.
- **Alanoud Badr:** The founder and designer behind the fashion brand Lady Fozaza, Alanoud Badr continues to grow in popularity internationally with her striking fashion sense and groundbreaking designs, as well as working as a consultant and stylist for the rich and famous.
- **Rania & Zaina Kanaan:** Sisters based in Dubai who founded a successful bike business called Chari Cycles, they are uniquely popular because of the fact that their business largely focuses on upgrading old bicycles and then donating them to refugee children across the Middle East. Without having any mechanical experience, the sisters learned how to renovate bicycles from YouTube videos and now have a successful business and donation center that is gaining recognition across the region and world.
- **Kelly Lundberg:** Kelly Lundberg launched her StyleMeDivine.com website that has since gained international popularity and has propelled her to become a keynote and guest speaker in web and technology events across the world.
- **Nadine du Toit:** She is the founder of GloryGirl Fitness business, which is a personal fitness and training program in the UAE, Nadine du Toit offers a groundbreaking wide variety of programs for women, such as horseback riding, snowboarding and beach exercises. She famously started her business after moving to Dubai and gaining weight from all the delicious food in the country.

- **Ambareen Musa:** The founder and CEO of Souqalmal.com, Ambareen Musa is originally from Mauritius but started her business in Dubai and has since enjoyed seeing her business grow into an internationally recognized digital portal for comparing financial services across the region.
- **Negin Fattahi-Dasmal:** Negin is the creator and founder of the ever popular beauty salons, N.Bar nail salons, 1847 male beauty salons and the JetSet wash and blow-dry hair salons.

Chapter 18
The Impact of Virtual Learning in the Indian Education System

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ABSTRACT

India has a rich tradition of learning and education right from antiquity. Education in India is on its journey undergoing diverse stages (e.g., Gurukul system of ancient times, Vedic schools, madrasas, and classroom teaching). Now it has reached the level of virtual learning or eLearning. It is a technology-driven learning method. This chapter focusses on the impact of virtual learning in the Indian education system and analyses various factors affecting the tutors, students, and organizations. It also proposes few techniques to deal with special children too. Various suggestions to handle different issues faced in virtual learning also forms the background of the study.

INTRODUCTION

Virtual learning (VL) is a kind of a learning system based on formalised teaching but with the help of electronic resources. This has now become an integral part of a course teaching. Whether it is a full-fledged one or as an assistance tool or an opportunity or a threat is quite a debatable question. Virtual learning has become a crucial aspect of the educational system nowadays. It is developing day by day. VL can be considered as a revolutionary approach to enable a workforce with the knowledge and skills needed to turn change into benefit especially in higher education. VL has become quite popular and well appreciated among students all over the world in this existing COVID period. It has almost become a necessity of the present time. This chapter focusses on the debate and discuss the impact of VL in Indian Education system due to COVID.

People have already entered the new educational era of VL knowingly or unknowingly. It has slowly emerged to become the most important tool for learning today. VL at this time has become the need of the hour to spread education quickly any time anywhere. Acquisition of knowledge and exchange of information, which takes place through virtual medium like video, audio, videoconference, e-mail,

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chats etc. comprises VL. If one considers VL a process then e-content can be acting as a product. VL is a method that involves analysis of learners, content, planning, designing and delivery of content. It provides a wonderful opportunity as well as fills the lacuna to the regular classes and ensures / monitors the study hours for the learners beyond the class hours.

FUTURE IS FULL OF VIRTUAL?

VL has become the new norm of the future; it is a convenient and flexible option while equally promoting active and independent learning. It is a very flexible learning process irrespective of particular timings, age, place, and course with only condition being the learner must be equipped with a laptop/ desktop with good internet facility. VL is a very good method of learning in situations like the current pandemic. It cannot be denied that it has its own pros and cons. It provides a huge platform to interact easily with very good courses and education on a global scale. Thus, many factors influence the usage of VL directly and indirectly.

In this VL mode, teaching can be based in or out of the classroom using just the computer/laptop and the Internet. This has become the major component of VL. Nowadays smartphones and tablets too have become good competitors to computers, but cannot act as a substitute. VL is a kind of de-multiplexer where one teacher can educate "n" number of students. It is a platform that motivates students of all kinds to freely interact overcoming their fear and shyness. Until before COVID 19 situation, students and teachers of most institutions have least participated in VL platforms. Nevertheless, as everyone knows, in the current scenario, people are getting adapted to technology so fast and VL is no exception. .

Dheva Rajan, S. (2020) mentioned in his book chapter "COVID-19 and lockdown in the world" about the many advantages of VL like flexibility, time saving, easy to interact any time etc. along with various disadvantages like practical learning especially in life science where the solution is still not found. All these pros and cons are discussed in this chapter for students and the teachers separately. Many suggestions too for the development of VL industry have been given in the chapter. One can effectively manage the teaching-learning process through VL. It will cover maximum of the well-maintained population. However, it can never be accessed by poor countries, states or villages unless positive steps are taken by the respective state or central governments.

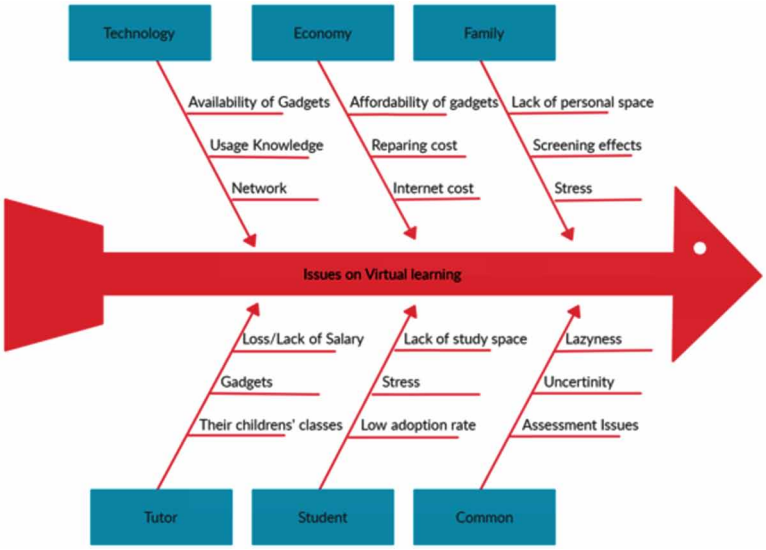
The quantity of learning varies from person to person according to their passion in learning. In such a technology- driven scenario, it has become a challenge for the teachers to accommodate this quality in their teaching and learning process. Online teaching poses different set of challenges for educators (teachers) and students (learners), but collaboration and communication make it easier to stay connected and engaged. VL is an excellent method of educating even the remotest areas of the world. As the distance between the tutor and student is significantly reduced, a lot of time and money is being saved that is spent mainly for transportation and other means. Anyhow, readers can get idea of the future scenario or trend when going through this chapter fully.

BACKGROUND

P.M., Binu (2011, 2015) performed an analysis to assess the efficacy of strategy-based instruction to improve the acquisition of English in slow learners. P.M., Binu (2016) identified self-learning strategies

that could help slow learners reduce their overdependence on teachers and encourage them to become lifelong independent learners. This is given special emphasis and also the many difficulties faced by the learners and tutors. The factors proposed by Madhan Narayanan (2020) in his book chapter is modified and enhanced further for VL. He has made a not on the factors, but has not explicitly shown the usage of technology and its availability. In the proposed model, the factors of family economy, background and cost of education are inscribed. The newly framed diagram, figure 1 with modified factors affecting VL in India is given below.

Figure 1. Issues on virtual learning



VL is flexible, when issues of time and place are taken into consideration. Every student has the chance of choosing the place and time that suits him/her. It is able to provide opportunities for relationship between learners through the use of discussion forums. With many advantages in place, this VL helps eliminate barriers that have the potential of hindering participation including the fear of talking to other learners. It helps compensate for scarcities of academic staff, including instructors, teachers, facilitators, lab technicians etc. VL is cost effective in the sense that there is no need for students or learners to travel to various places to attend their classes. It is also cost effective in the sense that it offers opportunities for learning for maximum number of learners without the need for many buildings.

A BOON OR CURSE?

VL is an innovative approach for delivering electronically mediated, learner centred and interactive VL environment to all, at any place, any time by utilizing digital technology. India is a multi-linguistic country, and most of the populace originate on or after non-urban regions. The present online courses

typically emphasize on English oriented content, due to vast area of marketing. Therefore, non-English language learners may tussle with the obtainability of particular language content.

One has to consider that it is the best time to learn new things through online, which connects all globally, and technology development is at its full swing. If everyone has good knowledge of technology and good access to internet then VL is matchless. Through discussion boards and chats, the learners can interact with the mentors and experts online; they can also clear their doubts. VL helps both teachers and learners apropos edification. Through various E-tools, teaching learning process can be carried effortlessly especially in the pandemic situation. A learning system based on formalised teaching with the help of electronic resources can be considered as a good indicator of learning environment. There are many factors to be considered which are described in the forthcoming sections.

Free from classroom, vast number of sources for developing knowledge and many teachers are available for large number of students wherein learners are motivated. The learners can get the needed resources for their course from the internet, the force for the study is more in VL as it has well-organized content structure of particular courses. If a learner explores the courses, apart from the curriculum of his degree, there are no boundaries of particular college or university to learn; learners can learn from any part of the world. VL is an easier access to information. It can be taken up by office goers and homemakers too, at the time that suits them.

One can attend the lectures whenever and wherever with ease. VL is a way to provide quick delivery of lessons. It helps in creating and communicating new training, policies, concepts, and ideas. As there is no age limit for learning and anyone can learn 24 x 7, remote VL is possible. One may love it as it offers plenty of opportunities to learn at one's own comfort zone. Self-learning skills and tremendous opportunities for interdisciplinary studies can also be developed hand in hand.

VL as a method of education makes the learners undergo contemplation, remoteness, as well as lack of interaction or relation. It therefore requires a very strong motivation and time management skills in order to reduce such effects. VL may also be subject to piracy, plagiarism, cheating, inadequate selection skills, and inappropriate use of copy and paste. VL may negatively impact socialization skills and limit the role of instructors as directors of the educational process. VL is truly awesome. On the other hand, one has to consider the other side of the VL too. One should note that, the learners need to devote more time on this, but need more energy than physical class. VL has been helpful in terms of easiness in accessibility to study material and going back to the lectures when learners need. VL is a good way of gaining knowledge. One can enhance skills by utilizing various digital platforms. Democratic learning through E-techniques is available. VL is also referred to as a process of the internal development caused by acquiring new information and elaborating one's own understanding of using it.

This Covid-19 pandemic situation has made teachers and students explore more on different learning platforms and implement ideas that they have never tried before. On the other hand, online VL is inexpensive. If a platform could cater content and interaction around the individual user their speed, their interests, their location then VL could give them the ability to learn whatever they want, from wherever they want. Moreover, having experienced VL in both the roles (as a teacher and learner), the researcher is of strong opinion that, face-to-face learning has its own merits which can never be replaced with VL especially teacher-student bonding, live class environment, discussions and interactions. It is preferred that, for school education system, it is unfair to implement online education entirely, whereas it can be as an aid with classical system. VL is an added advantage to facilitate teaching and learning process, but it is not possible to replace that in India in near future. Staying up-to- date with modern technology is a major challenge that one faces for VL and teaching process. No prior instructional design knowledge or

the training can yet be another challenge though one may be expert at his/her subject matter. Students cannot work in close synchronicity i.e. student-student and student teacher interaction is entirely missing in this mode.

The learners heavily miss their quality time. The knowledge of students becomes shallow due to marks orientated study. If the course is entirely through online, then assessment is really a difficult task and the grades obtained by the student may not reflect the knowledge what they possess on that subject. It is very problematic condition to connect them with subject matter as the communication tools become either VL or the Emails. This creates a huge problem among the poor and the rich economy class of students, as access of technological assets is not always available for everyone and the quality and techniques are also varying.

The access of internet is also not equally distributed and with equal quality at each area. Hence, whoever has money, they can learn more and who lack the facility, cannot. In this connection, here, one needs to think that such equality may not be applicable for education field. If it is wrong to deny education to poor students for lack of money, it is also wrong to blame those who do not have money and facilities and block those who have money and facilities. If it is correct to say that being born into a poor family has no end and no mistake, does the same argument apply to a family with money?

One has to agree that it will take time to be comfortable with online teaching both for teachers as well as for students. Due to the pandemic situation, if the entire world needs to change to digital world, it cannot be done overnight.

At the episode before corona, no one thought of such a rapid change in technology and even one can say, the entire world itself was not ready for such a sudden change. After the occurrence of covid-19, it became compulsory to adapt to technology overnight rather than by choice. However, as days roll on either, it may become choice and online teaching will become an integral part of the educational sector. The other side of VL is that the teachers need to work more and more in terms of lecture organisation and delivery, to keep students glued or interested.

If one considers the countries like India, which has the low salary for the teachers, it creates less interest and innovation with the teaching staff. One important reason is that the countries like US are getting best out in VL due to the strict labour law especially towards the teaching field. VL is another word for learning at the safety of our homes. However, laziness and misusing the time can be problem. However, there are some advantages and disadvantages in VL.

If one can overcome such challenges by self-discipline of VL, then it is too good for everyone. The other side of the coin also must not be ignored or else the society may suffer in the end. It is the need of an hour. It is a continuous process and everyone is a part of it. In fact, one can say VL already replaced the face to face teaching learning at many places; it has happened already. It might be a bitter fact, but one should have a thick skin to accept. Replacing VL with face-to-face VL is not the right way to put. If the educational institutions plan to change their entire learning mode to VL, there would be no work for humans.

In many fields, machines have started to replace humans from work. If the machines start to replace humans in almost all the fields, what is the need of humans? What will the human community do? If the machines start to teach humans, who will teach the ethics? Soon, the humans would become like machines without any feelings. It can work better, if it can be used as a hybrid technique. Surely blended learning will soon be an integral part of teaching-learning programme at different levels starting from primary to higher education. However, the easy access to information technologies leads to more de-

manding academic requirements among students. This then becomes an industry, not a service sector. In countries like India, education is not a business, but a service.

Definitely, it will take time to replace the online teaching fully with conventional one. Nevertheless, most challenges is with remote/rural location students, where it is very hard to get because of lack of basic good speed internet facility. It needs a lot of process optimization so that the experience to the learners can be unique, easy to use, and fulfil the aim of learning with least compromise with the quality education. It becomes more challenging in a country like India, where internet speed is a major challenge. VL is flooded with lakhs of online material and finding the quality is very difficult. As per current UGC regulation of India, the classroom teaching will not be replaced completely and it can be a maximum of 60 percent through classroom 40 percent online teaching (UGC doubles credit limit, India today, August 4, 2020). Even at the developed countries, they have not changed the entire system to Online. However, the question now, is it the time to review that rule? VL has the potential to replace face-to-face VL. However, VL is not going to take over the other one very soon. There are still some domains in science that necessitate hands-on learning. Nevertheless, if technologies like augmented reality can develop and become accessible to everyone, one might tend to witness a huge revolution in the education industry.

VL cannot replace face to face VL anytime soon in India due to diversity in facilities provided to the students depending upon their economic background. Even at present, many students do not have the basic digital facilities. It cannot replace face-to-face teaching- learning as it is heavily dependent on electricity, network, speed, connectivity, devices, awareness, and huge population to cater too. It will be a better option to blend it with classroom learning. It would have a lack of social interaction between the instructor and the students.

Soon, artificial intelligence will take place and speech recognition will rule the world. The assessment would become robot based and the students would be are expected to tell the answer orally to be assessed by robots. Initially it will be like an additional certification and slowly that will be taking place as the integral part of the teaching profession. The learners will have a "smart assessment card" which consists of their progress from their play school till the end of their life. When changing or applying for jobs, a robot is placed in the entrance of the organisation which assesses the preliminary entrance qualification of a candidate. There will not be any screening interviews, everything will be done only by robots in future with the smart educational progress cards. This global scenario change will yield by the eLearning impact in the education system.

There were lot of challenges and constraints like infrastructure, human capabilities, change in mind-set, regulatory changes, resistance from learners, parents, teachers and other stakeholders and list is long. In face-to-face teaching- learning process, there is mutual acknowledgement of teacher and students' presence and interaction which makes learning better, which is not possible in online VL. Misunderstanding and other issues create new challenges to the teacher and focus is, if not in full, at least partially diverted towards checking student's involvement in the class. The student loses the opportunity to discuss about the topic/subject along with his peers of his class, which is possible and far manageable in a classroom setup. It removes the geographical obstacles associated with traditional classrooms. Educators should promote blended and flipped learning for effective teaching learning environment. Continuous power supply, high-speed internet and the hardware (laptop/big screen mobile phones) are the basic infrastructure required by students for VL. These are yet to reach the not-so-fortunate sections of Indian society. Along with these, they must have enough financial resources or sufficient money to buy the huge data packs required during VL. In addition, this is why; face-to-face VL is still going to remain a very important

part of the education system in the near future. Classroom environment learning is more suitable for young children, teenagers, and young adolescents who are yet to join the workforce.

Attending classes regularly helps students to interact with other individuals of their own age, be better disciplined, follow a regular schedule, and improve their physical fitness and mental alertness. As it creates open class environment, students are free to behave according to their will. Even if they are forced to pay attention, technological glitches, disturbance from surroundings, physical and mental effect of electronic rays produced from the LCD/other screen etc. will definitely be a hindrance and this would turn tables to create offline classroom environment. No system is fool proof.

There are a number of loopholes in the old system i.e. conventional and in the VL method of teaching and learning. But in order to compete globally, to achieve the goal of quality education usage of ICT based pedagogy becomes essential nowadays which could contribute well to achieve all these goals. This technique can achieve an earnest goal of imparting education. Though it has been discussed of the general pros and cons of VL system of education, the following illustrates the constraints for VL system. It is divided in to two parts; viz (i) educators (ii) learners.

EDUCATORS

Lack of soft skills is one of the major issues among the teachers of various places. There are very few exemptions for the proverb, "Teacher and Poverty" in India. The internet is not that much easily attainable for all the citizens of India. Hence, the internet connectivity is the biggest barrier for many teachers, even other citizens too. Teachers are new to this technology and usually still chalk duster method is preferred by teachers as it makes them feel connected to students in face to face lecture method. However, with new normal norms and present circumstances, it is mandatory for teachers to know and practice virtual-learning methods. The pedagogy what India is using at many institutions is the classical chalk and talk still today. Whereas, the new era teaching through VL especially has become the opposite pole of the said ancient method. Before this pandemic covid-19, the teachers were not used to the platform what they are using at present, hence it becomes a challenging task to learn technology first, then to teach their students. It is the most appreciable quality of the teachers that many took the help from various experts, and then started teaching their students too in easiest methods. Beard, C., & Wilson, J. P. (2002) published a wonderful research in the power of experiential learning on a handbook for trainers and educators, in which it is proposed of many challenges faced by the educators in a lucid method. It is proposed to adopt experimental methods wherever possible for the betterment of learning.

It is observed that there are enough sources for subject matter experts but with no prior Instructional design knowledge. In fact, there is no proper training for the teachers in using these technologies. Hence, a user-friendly platform is highly required for them. There are many Learning management system (LMS) available, like google classroom, canvas, Moodle, etc., but the percentage of institutions using LMS in India is quite less. Finding the perfect VL authoring tool or LMS platform is a most difficult task, as it is the matter of priority and choice.

Various government and private organisations are providing training for the teachers in creating services to support ICT infrastructure. Earlier the teachers were practiced to prepare the classes in a different method, whereas in the present scenario, teachers are forced to prepare the handouts and many study materials in the form of softcopies. They need to invest most of their time in preparing materials for their students. At many places, teachers are unaware of different online tools to be utilized for their

teaching. Moreover, such an immediate changeover in the habituated system shakes the entire educational field and one has to accept this bitter fact. In countries like India, still parents are against their children using mobile phones and other electronic gadgets.

Nevertheless, here, it is forced on the children to use the gadgets for their studies, but still such a changeover lets the children in a most confused state. At this junction, one should understand that, only self-discipline allows the learner to learn the lessons fully through online. It is difficult for the teachers to know whether learning happens through the expressions of the students. It is obvious that, there no substitute for the face-to-face classes, but these VL and other online resource can act as a supplementary for student centred learning. Gaining the students attention in the class can be obtained through various ways by a teacher.

The teacher's gestures, mannerism, way of speech, kindness, talking with students, counselling students in various ways, etc., attracting and maintaining students' attention throughout the session is another challenging task. Hence, once again the teachers are trying to create an environment as in offline teaching to their level best. Monitoring the students during assignments/tests/quizzes is also a part of the teachers' task, but they need to be patient and critical too to handle such situations with students. Adopting and learning various technology related factors needed for VL and various teaching tools is most necessary for teachers. To be honest, many private teachers fear of loss of their job and usual life. Many teachers are faced with the difficulty in handling practical sessions. Hallahan, D. P., Kauffman, J. M., & Pullen, P. C. (2012) have published a wonderful article in special education for students.

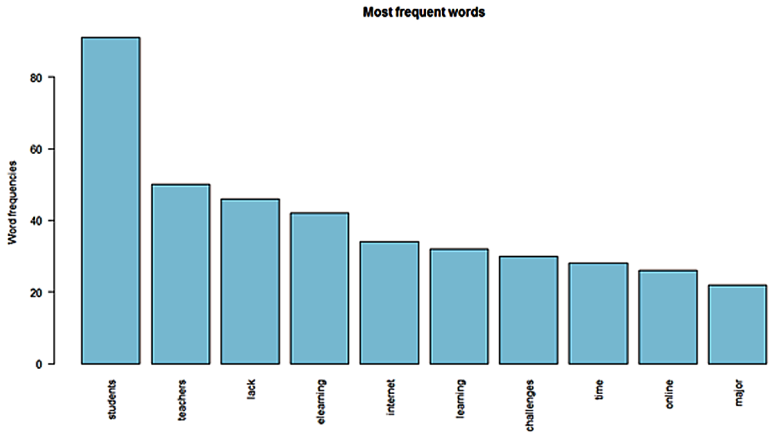
As the name itself is practical, teachers are taking enormous effort to teach that through online, but the objective of having practical classes again vanished. Teachers are faced with much data entry works, comparatively than the earlier times. In fact one should appreciate the teaching community in this pandemic situation, as they are always thinking on moving further with better performance with their students with all the mentioned challenges. This scenario has considerably changed the qualification of the teachers. Teacher should be multi-talented in the subject, VL, content creation, and technological tools, if not they are outdated and for a long survival, it is difficult. It is an art of the teacher actually to transform dull subject matter in to amazing VL experiences, but that becomes a primary task for all the teachers now.

The teachers should understand that, they are designing the VL courses for future generation. It has also been observed that, the teachers are giving unrealistic deadlines to their students in completing the tasks, which should be strictly avoided. Language is one of the barriers for both students and teachers, in this regard; the educational institutions should let the trainers to use bi or multi lingual method of delivery wherever possible. Of course, one should accept that by not looking at students but through a camera fixed in front of them, which is not habituated to them usually, is a very unnerving experience for everyone. It is suspected that, in future, the requirement of necessary degrees may fade away for teaching positions and the talent and subject knowledge alone might take the upper hand and be the requirement for the selection criteria. It is evident that, nowadays, colleges and universities are expecting industry professionals too to collaborate and work with them. At university teaching position selections, industrial experience may become major criteria. Due to that, there might be some restrictions on the recruitment of teaching positions; the degree holders may take up few years of industry working experience too before getting in to universities for teaching.

Figure 2 describes about the major factors affecting VL; the threat. On the other hand, one has to think of the opportunities also. An elaborate chapter on the opportunistic view of COVID 19 is given

by Dheva Rajan (2020) in a book chapter titled the positives during COVID 19 pandemic in India. The following diagram shows the opportunities of VL for the tutors and the students.

Figure 2. Factors affecting equality



STUDENTS

The challenges for students are uncountable, and a few are mentioned here. It is really a challenging task to be in front of an electronic devise and listen to the classes throughout a day. Many students in their school and college days, imitate, mimic their teachers, as they are with the students for quite a long period. The grasping power becomes quite less when sitting for a long period in front of a gadget. Hence, such one to one interaction between the student and teacher is entirely washed out when using these channels. The way what people considered as an ethical way of teaching is vanished now due to this pandemic situation. The objective of the education is not just being excellent with the subject, but also to know various other behaviours like, how to deal with the teachers, various mentality students, collaboration, teamwork, etc., simply put, the peer group interaction is quite less in online mode. Many students complain that their eyes are burning due to long time activity in seeing the gadgets, hence many started to release small videos too to listen after the classes. The new generation is always faster than the old generation, especially at OER searches, students become more familiar than the teacher, but it is due to lack of delivery that the student misunderstands the capacity of the teacher. Without the learner's motivation and engagement, no system can work fine. Aiken Jr, L. R. (1971) has done a huge review in the verbal factors and its mathematics learning, in which many proposed the difficulties in mathematics learning among the students, even at direct teaching. None can deny that the technology can assist the learners for better understanding, but it leads to more slow learners if adopted fully. Graham, S., & Weiner, B. (1996) have published their works in the theories and principles of motivation at the handbook of educational psychology, in which it is highly recommended to promote rewarding system, and the necessity of motivation for the learners.

However, teachers are instructing and teaching them to use the VL tools and at many places, students have launched a complaint that, they are not familiar with the system. The teachers are at wit's end to

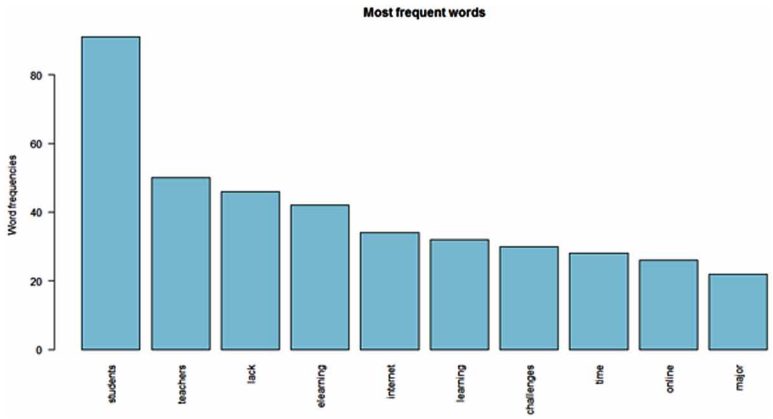
should face the common and simple excuses as "system failure/internet / don't know", that may lead to plagiarism at assessment, become an extra burden for teachers. In case a student encounters technical difficulties, it is difficult to resolve immediately. Emails, discussion board posts, and chats may be misunderstood because there is no visual person. Internal discussion between student's post lectures do not take place mostly, which is an important component of offline classes. Feeling of isolation will be more among the young generation for the full-fledged online classes, which is not a good sign for the future generation. It is our duty to provide healthy youngsters both physically and mentally, hence one should concentrate in the strengthening the young minds too. There are some suspects that, this may provide a large gap of digital divide.

The words teachers and students are the frequently used ones, which may suffer the objective of the text analysis; hence, it is checked after removing the words students and the teachers. On asking for the failure in the VL system, it is obtained from the following word cloud and the bar chart of top 10 frequently used words. Dheva Rajan et.al (2020) published a book chapter on Mathematical modelling of Nipah virus using the tool R programming for visualization. The said programming is used to create the following charts using the following code. Though it seems to be a coding to generate visualization, high mathematical ideas are behind this like how Dheva Rajan et.al (2014, 2019) Srinivasan et al (2014) have done for the modelling for the spread of Dengue virus. The objective of this program is to create a bar chart and a diagram of frequently used words when collecting the data. Kalpana (2019) used cartogram in her work on statistical visualization, and it is proposed to use the cartogram package of R programming for the implementation of finding interrelationships between the variables. Figure 3 and 4 explains the bar chart of the frequently used words and word cloud created.

```
library("tm")
library("SnowballC")
library("wordcloud")
library("RColorBrewer")
text <- readLines(file.choose())
# Read the text file from internet
#filePath <- "http://www.sthda.com/sthda/RDoc/example-files/martin-luther-
king-i-have-a-dream-speech.txt"
#text <- readLines(filePath)
docs <- Corpus(VectorSource(text))
inspect(docs)
toSpace <- content_transformer(function (x, pattern) gsub(pattern, " ", x))
docs <- tm_map(docs, toSpace, "/"); docs <- tm_map(docs, toSpace, "@")
docs <- tm_map(docs, toSpace, "\\|")
# Convert the text to lower case
docs <- tm_map(docs, content_transformer(tolower))
# Remove numbers
docs <- tm_map(docs, removeNumbers)
# Remove english common stopwords
docs <- tm_map(docs, removeWords, stopwords("english"))
# Remove your own stop word
# specify your stopwords as a character vector
```

```
docs <- tm_map(docs, removeWords, c("blabla1", "blabla2"))
# Remove punctuations
docs <- tm_map(docs, removePunctuation)
# Eliminate extra white spaces
docs <- tm_map(docs, stripWhitespace)
# Text stemming # docs <- tm_map(docs, stemDocument)
dtm <- TermDocumentMatrix(docs)
m <- as.matrix(dtm); v <- sort(rowSums(m),decreasing=TRUE)
d <- data.frame(word = names(v),freq=v)
head(d, 10);set.seed(1234)
wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words=200, random.
order=FALSE, rot.per=0.35, colors=brewer.pal(8, "Dark2"))
findFreqTerms(dtm, lowfreq = 4)
findAssocs(dtm, terms = "freedom", corlimit = 0.3)
head(d, 10)
barplot(d[1:10,]$freq, las = 2, names.arg = d[1:10,]$word, col ="lightblue",
main ="Most frequent words", ylab = "Word frequencies")
```

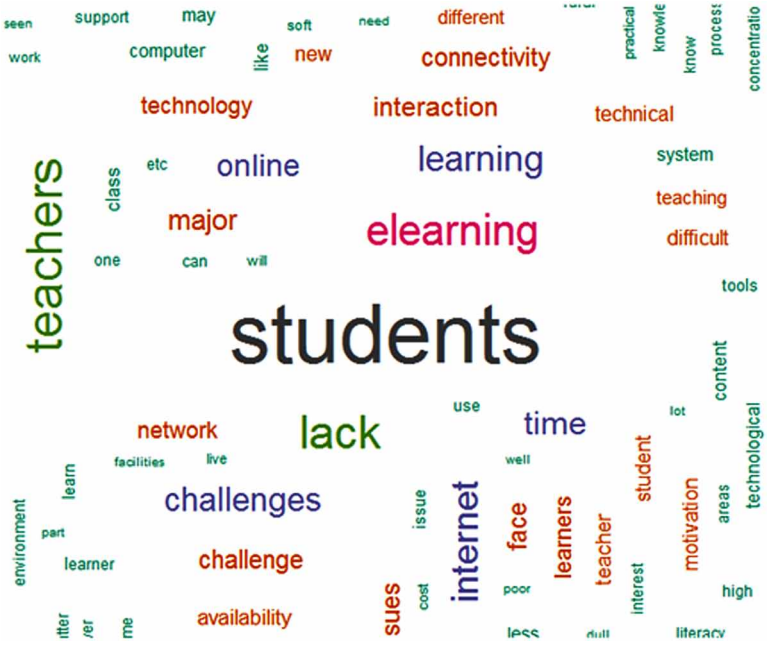
Figure 3. Bar graph of the frequent words in categorical data collection



The Exigency

Around two semesters announced as a 'zero semester' in several nations, including India. In response to that, this has sparked a range of local initiatives. Individual teachers made occasional attempts to reach out to their students and keep them interested. Some universities have made hasty plans for teachers to continue to basically conduct their classes through video conferencing services such as Zoom, google meet, etc. For those organizations that had, long before the lockdown, implemented learning management system platforms such as Blackboard or Moodle, the transition to virtual modes was comparatively less complicated. The earlier framework should, however, have certain resources and facilities. All the above

Figure 4. Word cloud in categorical data collection



were well-meaning attempts to keep the core educational processes going during this time, although somewhat impromptu. (Shyam Menon,2020)

CONCLUSION AND RECOMMENDATIONS

Few experts feel that, the online teaching platforms assume the uniform distribution of learning levels, but everyone has different levels of understanding and serious thoughts have to go through its thinking level. Unless the learners have the fullest enthusiasm towards learning and interest in studying, the system become useless. The educationalists and psychological experts should work shoulder to shoulder to enhance and propose better learning environments and get out of the issue. Experts also feel that, such platforms are not at the level of school level and entry-level college students, but may work wonderfully for the learners of final years of college, those pursuing masters, research level, etc., and it can be a temporary solution and not a permanent one. Anderson, R., Manoogian, S. T., & Reznick, J. S. (1976) have published their research results in the undermining and enhancing of intrinsic motivation in preschool children, in which preschool children psychology in learning was analysed in an excellent way. In continuation to that, in this pandemic, almost all educational institutions even at preschool have moved their entire system to online and the psychology of the children has been affected entirely. This online teaching is not the perfect way to train preschool children, and it is not a preferred method for a full-fledged teaching of preschool let alone middle school students.

VL is very much useful when one is teaching abstract topics with the help of animations etc. and this should not exceed 1/3 rd of the course. VL is a platform to equip oneself in his own pace and understanding. A wide variety of courses available on the platform caters to knowledge sharing and effective

understanding even in the unexplored domains. Lack of accessible technology in rural areas is the most addressed issue in this scenario. The teachers who are keen on learning new technology have started to learn through colleagues who know the technique, but systematic learning is required. There always a slogan that the rich is getting richer and poor is getting poor. It is not the study's objective to discuss about the correctness of the said statement, but as it becomes more convenient to teachers and students, to teach and learn at their place, those who have the necessary gadgets get the education easily by using technology and those who have no access to such means are unlucky. . It is to be understood that, such online education reduces the transportation cost and is a time saving one. It is utilizing time in a more meaningful way.

Teachers prepare E-content by various modes like power point presentation, PDF, videos, animation, etc. In a country like India, still many people do not have the houses of their own, even if they own, there is no individual room for everyone. Hence, searching for a peaceful place without disturbances from the surroundings during the online session is not possible for both students and teachers too. In this connection, one should understand that, teachers also have children and if they use their electronic gadgets for teaching, it becomes quite difficult for their wards. The common people cannot afford to buy the necessary electronic gadgets immediately as required. The issue of slow learners also should be addressed and resolved. Similar to direct classes, slow learners will also have remedial classes.

The matter may have different points of view as the personal competency in using the technology itself matters a lot. Among all the mentioned points, the most important one is the poor quality of the content. If the content quality is poor, it leads to lack of interest among learners. People are afraid that the digital divide and Device Diversity may happen due to the technological challenges in adoption of virtual learning by teachers and students. Bridging rural-urban gap is the most difficult challenge for the government, but it is a need to be addressed immediately. Due to this, the descriptive examination and evaluation processes become difficult. Hence, educational institutions need to come up with different assessment techniques as per government regulations.

The evaluation of effectiveness of teaching needs a different kind of assessment; to be modified apart from the classical one. Not just that, the effectiveness from the student's side should also be evaluated. The future education assessment system may move towards open book tests instead of closed book tests at higher education level. Students may be permitted to use the text and references and write an answer in an hour's time that should to be submitted by email or through LMS. For activity related works, the best answers may be shared via email to all the students. Exams and Evaluation become a critical problem due to lack of efficient proctoring systems and availability of resources at students' side. However, many government examinations now are of closed book tests, hence a conceptual gap will arise.

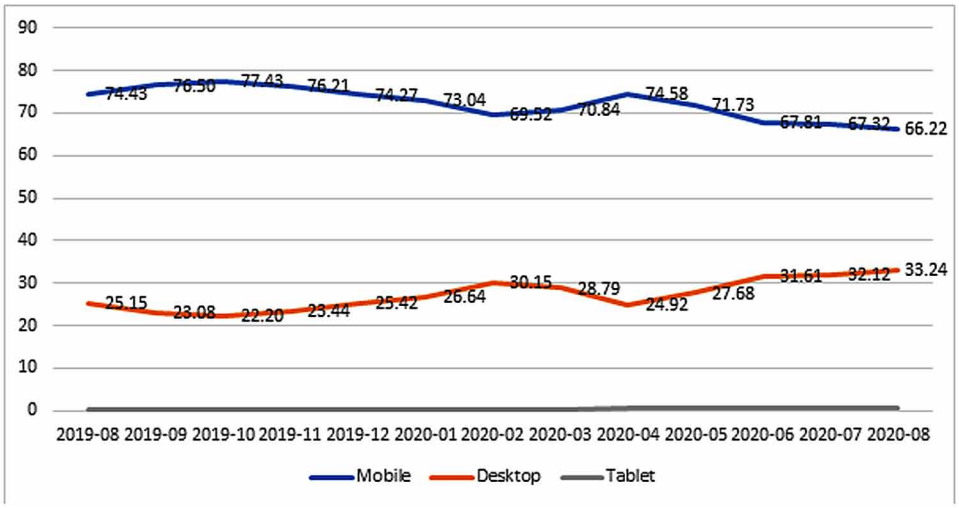
So, one must consider a stable network, device availability and free or the cheapest internet all over the country especially for the students' community. It should become mandatory that, free high bandwidth wifi connection should be made available for all at every educational institution especially. The day is not far away to reach; the internet connection though a definite and easily communicable device will be added in the necessities lists of humans though the law enforcement too and the government will take the responsibility of providing that to their citizens.

Earlier to that, educational sector should consider the online education as an experimental medium of teaching and continue with it. It will help to develop our technological familiarity also. What the researches considered related to the study hour online or class time is proven right might be proven wrong in few years as because of familiarity with the system. The jobs for the content creator may arise. Due to that, many educationalists may be supposed to take such tasks as a part time job.

Audio-visual feedback may solve the issue of giving feedback on students. The content will remain same forever irrespective of number, interest and mood of the students in online mode; the adjustment of content cannot happen. Head nodes, yawns, eye contact and other aspects of body language provide cues to the teacher. There may arise some strict attendance policies for online mode too in future. The student collaborative activity based learning will fade away, which is not the objective of education. Conducting NKN classroom, telling short stories, 2 lectures for 30 or 15 mints teaching, asking students to read the pages, usage of PPT, etc. may eliminate the inactive issues of learners.

As per Sandhya Keelery (Jul 7, 2020), the internet penetration rate in the country stood at around 50 percent in 2020.

Figure 5. Word cloud in categorical data collection



From figure 5 one can observe that, between Aug 2019 to Aug 2020, the percentage of desktop users was 33.24; mobile users was 66.22 and tablet users was 0.54%. The economic times in 2016 published that the internet users in India by 2020 will be approximately 730 million, which comes almost true now. The revenue generation of such online platforms become content sharing, upgrades, course subscription, pay per module, and their advertisement commission. Not only educationalists but whoever has knowledge towards a particular area, may have a huge opportunity to earn through such online portals via teaching. Because of this one cannot think that, the classical educational system will go away from us, even in so called developed countries the classical educational system still exists this virtual learning would become a hybrid system.

There is undoubtedly a promising future for online education in India, but the passage is packed with many obstacles. The insufficient digital infrastructure in the country may create digital divide among people. However, because of such digitalization, the sale of electronic equipment has soared. It is true that, still the world does not have a proper mechanism to handle the digital wastages, but this digitalization, will grant enormous knowledge and may provide a pathway to think over the said issue too. Around 2010's for effective communication, people had one telephone or mobile for their family

communication. Now, mobile phones have become third hand for communication and a huge necessity among people. Likewise, the desktops too have been replaced by laptops and for the present generation it is tablet. Hence, with all such necessities, the sale / repair of all those equipment and the related gadgets will increase. It is not just such gadgets, the subjects like mathematics or ones that involve mathematics, need digital tools like digital pad and pen to write or a pen type mouse, etc., so, the sale and production of such educational gadgets, smart boards have become more and there are likely chances for the falling prices of those gadgets in future.

Hence, it is due to mentioned necessity; the interdisciplinary courses will get huge chances in future to become more popular. Soon, one among the educational departments called computer science may fade away, become only for aspirants, and almost all the other departmental students would be forced to study the required skills. Currently India is taking essential steps to improve digitalization and digital India plan has been announced. It is believed that, it will experience a grand success, as it is at par with the current global scenario. The virtual learning education is not yet designed to stimulate the crowd-based or classroom learning, unless the courses are conducted live with the aid of an online tutor with sufficient gadgets. India presently produced a draft of a bill "New educational policy" that will give an upsurge to online education system and related fields. The universities and the colleges would be forced to follow a separate virtual-learning page for every course, which may be maintained by the tutor with monitoring authority hierarchy. Even it may be a course, which is common to the related students that can eliminate the issue of non-standardization of course information among students. Petrina, S. 2007 analysed the instructional methods and learning styles of various teachers with different demography too, in which it is strongly suggested to adopt various instructional approaches for different subjects, different lessons and for different learning styles.

Many online courses in India are currently like an extracurricular activity, but possess no credit or recognition in academics. The online course will have academic credits in future for successful completion of degrees. There might be some online teaching methodology course for higher educational institutional tutors too, which may become mandatory for the post from the entry-level tutors. If the foreign direct investment plan is open to educational institutions, the global educational institutions will offer such courses for their respective faculties too. Indian tutors will have a greater vision about the global curriculums, research and development. In future, more concentration will be given to self-learning and dedication, which is more essential for research and development, and the online virtual learning educational system may develop that too among the learners. Online courses are usually like self-paced learning. Owing to a lack of direct contact, there is limited or insignificant enthusiasm among the learners. The rate of completion of online courses is, therefore, very low. Game oriented teaching technology will emerge significantly. As the online course is full of information, there will not be any distraction and it would be difficult for a human to concentrate more and more on screens and monitors.

Virtual learning online course programmes will look to deliver courses in unexpected subjects such as forensic science, cyber law, etc., in addition to common subjects such as data science, and digital marketing etc. The providers of online courses via virtual learning would build or may prefer a peer-to-peer model to cultivate collaborative virtual learning on a shared platform between learners through notes and sharing of ideas. There are high chances for the usage of technology such as artificial intelligence, data analytics, etc., to provide profile-based personalized online courses. There is a bright prospect for virtual learning industry; it may be on its way to the next sunrise market. However, it is extremely unlikely that conventional learning will be replaced; both models will work in together instead. In modelling online education, the content, distribution and access trio will serve as a deciding agent. Over the last three

years, there have been several high-ticket deals in the Indian virtual learning sector. One can think about how the virtual companies like Biju's, Erudite, Edu Pristine, Khan Academy and others became l widely popular and how much investment they grabbed in the recent years. Even in Indian school textbooks, QR code based three dimensional structural explanation was incorporated for chemical structures. The day is not far away to have the hybrid system.

However, despite some negative points, virtual learning can be implemented in higher education where the learners' mass will be mature with room for self-awareness. Finally, in this technological world, almost all the children need counselling to increase their confidence and motivate them towards achieving their goals and leading a peaceful life in the society, especially with the help of their parents & gurus. In addition to that, with no way for denial, the society and the government should take essential steps in shaping the future generation in a healthy way.

The problems faced by special children are enormous. Necessary guidance and motivation is badly needed for the special children especially in this situation like the pandemic. The common problems in special children include speech delay, language delay, autism and learning disabilities. Here, the author wishes to propose an approach that possesses to overcome such issues through online with the best use of available resources. For instance, here, it is proposed to form a voluntarily association like a self-help group (SHG) that is monitored and administrated by the Government called Online Association for Special Children (OASC). The members of the proposed association guide the parents & members of other institutions with their ideas, procedures and policies for the need and development of special children especially during critical situations like the current pandemic. Here, it is proposed to adopt the mathematical and networking models in formulating the organisational structures, answering online queries, fulfilling the requirements, and the usage of artificial intelligence for such associations. It is not an understatement if said, every model has its own pros and cons.

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