

Digital Entrepreneurship Perspective of Smart Organization and Technological Innovation: A Conceptual Model

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Abstract: *To be successful in today's rapid and increasing changes, innovation is the only option for maintaining growth and competitiveness. Organizations actually need to become "smart" to confront the growing customer needs, and changing markets. Digital entrepreneurship (DE) is perceived as a key pillar for innovation. However, there are a number of concerns surrounding smart organization (SO), DE, and technological innovation (TI), and how they are related is complex and important to understand in this digital age. The recent developments in the context of digitalization invite for revision and advancement.*

The possible combinations between technology and entrepreneurship resulted in a diversity of phenomena with different aspects and socio-economic effects. While the extant literature presents several models for innovation, however, these studies are considered to be incomplete as they do not emphasize the relation between these variables. Based on conducting a deep literature review, this study proposes a conceptual model for SO focusing on TI (i.e. product and process). This integrated model argues that SO's components namely business intelligence, creative orientation, environment understanding, adaptation, and continuous learning significantly contribute to TI. This article is focused on the description of DE, SO, TI in the time of digitization.

Based on current examples, we identify and describe the characterizations of DE, SO and TI with this new delineation of terms, we would like to foster discussion between researchers and entrepreneurs, on the impact of digitization age on entrepreneurship, SO, TI, and set a future research agenda.

Keywords: *Digital Entrepreneurship, Technological Innovation, Smart Organization.*

1. Introduction

In the last century, the economic performance and countries' innovation success have broadly relied on the advancement of digital technology (Konig et al., 2019). Widely, digitalization is associated with the changes related to big data analytics, cloud computing, the adoption of digital technologies, and intensity in their usage (Parviainen et al., 2017). Research reveals that the rates of digitalization continue to grow in today's environment that characterized by uncertainty, market challenges, the workforce's continual demographics changes, and social, political, economic volatile changes in addition to the competition ferocity (Parviainen et al., 2017; Sataalkina & Steiner, 2020).

Thus, in this turbulent situation, innovation is the only choice for sustaining growth and competitiveness, organizations really need to become “smart”(i.e. internetworked, knowledge-driven, able to adapt, learning continually, creative, understand the surrounded environment, flexible in their ability to create home-grown innovative ideas and exploit both external and internal available opportunities (El Haiba et al., 2017; Teece et al., 2016). Indeed, organizations have to innovate continuously in order to thrive (El Bassiti & Ajhoun, 2013). The SO, as a novel organizational shape, is in fact the result of all transformations mentioned above. This notion actually emerged from the firms' and enterprises' urgent need to respond to the progressively changing business landscape in dynamic, innovative, and smarter manners (El Haiba et al., 2017).

The concept SO is therefore utilized for firms that are internetworked, knowledge-driven, dynamically adaptive to novel organizational forms and practices, learning as well as agile in their capability to generate and exploit the opportunities offered by the new economy, in addition to their innovation and creativity capabilities (Filos & Banahan, 2001). Atos (2011) indicated that the SO is established on three major axes, namely, development of knowledge, operations, and communication.

Digital technologies have become a new economic and social force, reconfiguring traditional business paradigms, strategies, structures as well as processes and activities (Beliaeva et al., 2019). Entrepreneurship, in its simplest shape, can be characterized as self-employment (Gohmann, 2012). DE, which focuses on constructing new ventures, transforming existing businesses by developing novel digital technologies or their novel use, is seen as a crucial pillar for economic growth, job creation, and innovation by many states (Sataalkina & Steiner, 2020). On the other hand, DE varies from this definition seeing as it contains entrepreneurial pursuits that occur on a digital platform (Giones & Brem, 2017). DE has a dependence on digital media tools and Information Technology (IT) in the pursuit of entrepreneurial prospects (Giones & Brem, 2017).

Innovation is a means of changing an organization, whether as a response to changes in its internal or external environment or as a preventative action taken to impact and/or be affected by the environment (Demircioglu, 2016). Moreover, the capacity of a firm to innovate is a precondition for the successful use of inventive resources and novel technologies (Demircioglu, 2016). Innovation includes a creative climate, learning, knowledge sharing, cooperation, and risk-taking (Damanpour, 1991). Successful firms not only respond to their existing customer or organizational needs but also foresee future trends and develop an idea, product, service, process, or tools that permit them to meet future demand rapidly and effectively (Sataalkina & Steiner,

2020). Types of innovation contain but not limited to product (goods and services), process, marketing, and organizational innovation (Elerud-Tryde & Hooge, 2014).

SO, innovation, entrepreneurship, and digital transformation are ever-present, work is increasingly being virtualized, digitalized, or even totally automated (Davenport & Kirby, 2015). Innovation processes themselves are becoming less bounded, more open, less predictable, and more agile (Yoo et al., 2012; Majchrzak & Markus, 2014; Nambisan, 2017). Due to the influence of new digital technology on entrepreneurship and vice versa, new shapes of projects and organizations have emerged smarter and more flexible, and adaptable (Nambisan, 2017; Autio & Rannikko, 2018; Von Briel et al., 2018a; Von Briel et al., 2018b).

Nevertheless, there is no work considering two or more determinants of innovation at the same time, i.e., no study takes into account SO, DE, and TI together as far as researchers know. Therefore, the present study purposes to suggest an integrated conceptual model for the relationship between the three variables. Given the limited research in this arena, this model is a strong basis for discussion, criticism, and/or support of future researches.

The remainder of the paper is structured as follows: In Section 2 we provide a theoretical lens to the study presenting an overview of the SO (Sect. 2.1), DE (Sect. 2.2), and TI (Sect. 2.3). The conceptual model development to this study is discussed in Section. 3, by presenting a literature review on SO and TI (sec.3.1), SO and DE (sec.3.2), the potential mediating effect of DE (Sec.3.3). Finally, we draw a conclusion and indicate directions for future researches in Section 4.

2. Theoretical lens

2.1. SO: Definition and Conceptualization

Nowadays, the concept of the SO is utilized to describe organizations that are knowledge-driven, interconnected, networked, dynamically adaptive (Vickers, 2000), and quick response to new organizational forms and emerging practices (Chan, 2006), as well as willing to generate and exploit the opportunities offered by the digital age (Matheson & Matheson, 2001). From a managerial viewpoint, the term SO seems to be arising from the book "Smart Organization: Creating Value through Strategic R&D" which was written by David Matheson and James Matheson in 1997 (Matheson & Matheson, 1997). Bearing that in mind, it is obvious that SO of the 21st century will be those organizations that utilize the whole available resources to become better, faster, smarter, and more rigorous at many core activities and successfully utilize intensively technologies to provide innovative products and processes (Wasterman et al., 2014).

Actually, what does it really mean to be a "SO"? and the characteristics of such new organizational forms are not yet well defined (Irwin & Cichocki, 2011; Petković & Lukić, 2014; Petković & Lukić, 2013). However, Matheson and Matheson (1997) stated that SO have nine basic principles that make them smart (**Fig.1**), those principles are intangible and embedded in the philosophy, people, culture, and organization's support systems (Petković & Lukić, 2014).

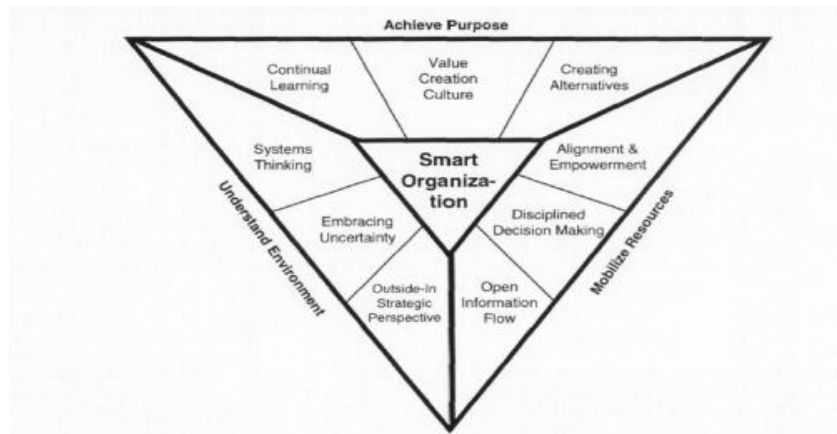


Figure 1. SO's nine principles (components)

Source: (Matheson & Matheson, 2001; Petković & Lukić, 2013; Petković & Lukić, 2014; Schafer, 2009)

Guided by the study purpose, this study builds on Matheson and Matheson (2001) SO's nine components and also many previous works of literature, for example (El Haiba et al., 2017; Petković & Lukić, 2014; Petković & Lukić, 2013; Al-Kasasbeh et al., 2016; Al Shobaki et al., 2018; Schafer, 2009) that describe the SO's components namely business intelligence, creative orientation, environment understanding, adaptation, and continuous learning.

2.2. DE: Definition and Conceptualization

DE is a term that describes how entrepreneurship will shift as business and society go on to be transformed through digital technology (Davidson & Vaast, 2010). DE highlights transformations in entrepreneurial practice, theory, and education (Matt et al., 2015). DE includes everything that is new and different about entrepreneurship in a digital world, including novel ways of finding customers for entrepreneurial ventures, designing and presenting products and services, innovation, creativity, generating revenue and minimizing costs, opportunities to collaborate with platforms and stakeholders, opportunity sources, risk-taking, and competitive edge (Joshua & Smuts, 2020; Ebert & Duarte, 2018; Nambisan, 2017; Davidson & Vaast, 2010).

As per Mladen Turuk (2018), DE most commonly refers to the process of creating a new Internet- delivered/enabled business, service /product or process. DE is expanded to the traditional concept of entrepreneurship in the sense that it includes a group of participants that is continually developing and are highly distinguished, and they possess unique characteristics (Autio et al., 2018). This moves far from the traditionally established participant to a more ever-changing aggregation of participants who have their own, and differing, competencies, ambitions, and, in the end, objectives (Kraus et al., 2019), therefore, DE may belong to several business categories (Gohmann, 2012; Matt et al., 2015a).

2.3. TI: Definition and Conceptualization

In view of the rapid developments in the current era, there is an imperative need for innovation by organizations in order to keep pace with this development and survive despite the environmental dynamism in which they operate. Accordingly, much research focused on the

relation between innovation and performance relationship, in particular TI (Damanpour & Aravind, 2011). Innovation refers to a firm's tendency to engage in and support new ideas, experiments, and creative processes that may generate new products, services, or technological processes (Shan et al., 2016; Lumpkin & Dess, 1996). According to Damanpour and Evan (1984, p. 394), TI refers to "the implementation of a creative idea for a new product or a new service or the introduction of new elements in an organization's production processes or service operations".

For this reason, innovation considers the main entry for the future and a good indicator of the superior performance of an organization (Damanpour et al., 2009). Innovation positively influences individuals, communities as well as business organizations, through introducing new ways of performance, and products, services, and processes, and transfers individuals, organizations to a better position than the current one (Damanpour & Wischnevsky, 2006).

Damanpour (1991, P.556) mentioned that "an innovation can be a new product or service, a new production process technology, a new structure or administrative system, or a new plan or program", these factors are also considered dimensions of innovation, in addition, innovations' kinds can be administrative vs. technical, product vs. process, and incremental vs. radical. (Damanpour, 1991). Guided by the study purpose, this study builds on Damanpour (1991) classification that divides innovation into product, and process.

3. Conceptual Model Development

This study aimed at investigating the relationship between the SO's components and TI (product and process) with an emphasis on the potential mediating effect of DE on this relationship. It aimed also at proposing an integrated conceptual model for a smart organization focusing on process and product innovation.

3.1. SO and TI

The SO enhances innovation by enabling communication in order to generate new knowledge and innovative idea to support the evolution of new products/processes (Bixler, 2005, P .57). In their study, Kuckertz et al. (2017) empirically proved that an organization's flexibility and adaptability have a positive and meaningful effect on organizational innovation (i.e. innovation in the product, innovation in the process, technology innovation).

Organizational innovations are strongly associated with all the administrative efforts including renewing the organizational systems, procedures, routines, adaptability, creativity, encourage team cohesiveness, coordination, collaboration, information and knowledge sharing practice, and continuous learning (Van derAa & Elfring, 2002; Veugelers, 2008; Visnjic et al., 2016; Rajapathirana & Hui, 2018). In order for a firm to develop successful management of technology and innovation strategy, it is imperative that the organization be ready for the effort, this requires flexibility, smartness because changes and adjustments, and improvements in products and processes are usually filled with uncertainty and risk (Soltani et al., 2013). In this vein, developing employees through training and continuous learning opportunities may affect product and process enhancement (Stock & Reiferscheid, 2014).

Many scholars have suggested that the organization's capability to exploit external knowledge is a critical component of innovative capabilities (Cepeda-Carrion et al., 2012), i.e. the organization's attempt to learn continually from external and internal sources can assist uncover new ideas, techniques, or processes that can be applied and foster innovation development and application (Caseiroa & Coelhob, 2019). Business intelligence is both a process and a product (Caseiroa & Coelhob, 2019), i.e. the process is composed of methods that enterprises utilize to evolve advantageous information or intelligence, that can assist firms to survive, thrive, and compete (AL-Shubiri, 2012), while the product is information that will permit enterprises to predict the behavior of their competitors, suppliers, customers, technologies, acquisitions, products, services and markets, and the overall business environment with a high degree of certainty, all these underline the business intelligence importance in the innovation systems (Berndtsson et al., 2015).

According to Onizat and Alraggad (2020), knowledge creation and transfer within an organization affect TI (i.e. product and process innovation) which ultimately influence new product performance. Aviv et al. (2012) conducted a study in which they determined that innovativeness was a multidimensional construct, they defined five dimensions to measure organizational innovativeness, specifically: creativity, risk-taking, continuous learning, future orientation, openness to change, and proactiveness.

3.2. SO and DE

Business intelligence influences firm performance directly and indirectly (Antoncic & Prodan, 2008), directly as it enables entrepreneurship's innovative development dependent on the task interdependence in the firm, and indirectly through effective knowledge management, efficient organizational learning processes, and increased technological innovation capabilities in the firm, all of these improvements materialize in data, business applications and processes, which are in turn consider innovative forms of entrepreneurship (Bojnec, 2001). Regarding entrepreneurial organizations particularly, extant literature indicates that individuals will interact differently to the need to adapt to their environment, to learn continually, based on such factors as their psychological make-up and the existence of tangible incentives to change and support for innovative initiatives (Starr & Nanette, 1992). In information and technology-driven economy, innovation, flexibility, entrepreneurship, and creativity is a necessity for continuous learning, the results of Gozde and Erdogan (2016) study indicated that there is a positive and meaningful relationship between continuous learning and entrepreneurship characteristics.

The study of Kandil et al. (2019) aims to analyze the influence of the role of SO characteristics (strategic vision, the culture of merit, incentives, and rewards) in promoting entrepreneurial alertness by adopting proactive work behaviors of the application in Asia-Cell for mobile communication in Iraq, the findings reveal that the adoption of proactively work behaviors is instrumental in enhancing the relationship between organization's smart characteristics, and company's entrepreneurial alertness and individual innovation

Bakhshian et al. (2011) stated that there is a relationship between organizational intelligence and entrepreneurship among university educational managers. Adnisi (2003) argues that there is a relationship between market orientation, organizational flexibility, job satisfaction, and corporate entrepreneurship. Moreover, Faroun et al. (2015) emphasize the relationship between formulating an entrepreneurial strategy and develop a model for smart organizations.

3.3. DE and TI

Arguably digitization nowadays is currently the single most significant engine in entrepreneurship and innovation (Berger et al., 2020). DE is a crucial driver within the innovation systems (Satalkina & Steiner, 2020). DE is a form of entrepreneurship that explains the practices of seeking out and/or identifying business opportunities that can be exploited, these practices include developing new products/services and processes, moreover, DE is perceived as a key pillar for economic growth, job creation, and innovation (Joshua & Smuts, 2020).

According to Zahra and Covin (2005), the extant literature proves the hypothesis that organizational entrepreneur and innovation have a close relationship with each other and the outcomes of this relationship result in improvement of process and product. Cloud computing dramatically reduces technical and investment barriers to bringing new digital products, services, and processes to market (Clayton & Welsum, 2014).

Scheepers et al. (2008) have investigated the relationship between the environment of organizational entrepreneurs and risk-taking innovation in their study, the findings showed that there is a positive relationship between the atmosphere of organizational entrepreneur and innovation.

Safarzade et al. (2015) investigate the influence of organizational entrepreneurship atmosphere on organizational innovation, the findings reveal that managerial support, the flexibility of organizational borders, accessibility of time and reward, and enabling employees affect innovation, in addition, results show that the atmosphere of organizational entrepreneurship has a meaningful effect on the organizational innovation.

The results of Al Qudah's (2018) study indicated that there is a positive impact of entrepreneurship initiatives (such as strategies, technology, resources, management support, and culture) on creativity and innovation within organizations and enterprises. According to Audretsch (2004), each technology innovation comes with a wave of new entrepreneurs and new start-ups, he further noted that entrepreneurial activity acts through the availability and technology transmission and innovative ideas, and the existence of infrastructure that supports entrepreneurial efforts.

Entrepreneurship, creativity and innovation form a staggered feedback loop in that entrepreneurship breeds innovation and creativity and vice versa hold true (Zahra & Covin, 2005). As per Audretsch (2004), innovation necessitates putting inventions into practice, it involves developing new processes, new products, on contrary, entrepreneurship has been identified as a concept that includes the exploitation and discovery of opportunities, and it is thus exceedingly considered as the best approach to increasing innovation and creativity (Klein, 2008).

This indicates that DE will enable the SO to thrust process and product innovations in organizations.

According to Yoo (2010), in this regard, digital innovation can be defined as the implementation of new components of digital and non-digital resources to produce novel products and processes, and because of the limited resources and knowledge available in general within many firms, consequently, organizations seek to leverage external resources to create new digital technological innovations (Selander et al., 2010).

Meanwhile, the collaboration networks of inter-firms (Schilling & Phelps, 2007) and the boundary-spanning practices (Lindgren et al., 2008) have significant influences on innovation, thus, digital innovation typically includes multiple actors and interactions between entrepreneurship and organization. Innovation and entrepreneurship are often intertwined since several digital entrepreneurial ventures are based on digital innovation (Schilling & Phelps, 2007; Bessant & Tidd, 2007; Yip, 2015).

4. Conclusion and Future Research

The digital revolution has transformed the meaning of entrepreneurship worldwide. The field of digital entrepreneurship researches has not been able to keep pace with the rapid changes in the digitization of our society and economy. This study aimed at proposing an integrated conceptual model for a smart organization focusing on process and product innovation. In addition, it aims to help entrepreneurs as well as researchers interested in further discovering the possibilities that the digital age and entrepreneurship generate. Based on an integrative review of relevant extant literature, this study revealed that smart organization's components (i.e. business intelligence, creative orientation, environment understanding, adaptation, and continuous learning) contribute to product and process innovation. Furthermore, how digital entrepreneurship perceives the importance of organizational intelligence and innovativeness for firms in the contemporary business world to survive through the mediating role of digital entrepreneurship in the relationship between smart organizations and technology innovation. Conducting further empirical studies in the future to validate the proposed model as well as analyzing the impact of the smart organization in technology innovation through the mediating role of digital entrepreneurship represents a promising research path within the context of business organizations in several industries.

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