

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. 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. In addition, it proposes that DE mediates the relationship between the SO and TI. Hypotheses development and suggesting further areas of research are discussed.

Key words: *Digital Entrepreneurship, Smart Organization, Technological Innovation.*

1. Introduction

In the last century, the economic performance and countries' innovation success has broadly relied on the advancement of digital technology (Konig, Ungerer, Baltes, and Terzidis, 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, Kääriäinen, Tihinen, and Teppola, 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; Satalkina & 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, Elbassiti, and Ajhoun, 2017; Teece, Peterar & Leih, 2016). Indeed, organizations have to innovate continuously in order to thrive (El Bassiti and 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 and 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, Ferasso, Kraus, and Damke, 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 (Liliya Satalkina and Gerald Steiner, 2020). On the other hand, DE varies from this definition seeing as it contains entrepreneurial pursuits that occur on a digital platform (Giones and Brem, 2017) . DE have a dependence on digital media tools and Information Technology (IT) in the pursuit of entrepreneurial prospects (Giones and 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 pre-condition for the successful use of inventive resources and novel technologies (Demircioglu, 2016a). 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 (Liliya Satalkina et al, 2020). Types of innovation contain but not limited to product (goods and services), process, marketing, and organizational innovation (Elerud-Tryde and Hooge, 2014).

SO, innovation, entrepreneurship, and digital transformation are ever-present, work is increasingly being virtualized, digitalized, or even totally automated (Davenport and Kirby, 2015). Innovation processes themselves are becoming less bounded, more open, less predictable, and more agile (Youngjin Yoo, Richard J. Boland, Kalle Lyytinen ,and Ann Majchrzak, 2012; Majchrzak and 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 and Rannikko, 2018; Von Briel, Davidsson, and Recker, 2018a; Von Briel, Recker, and Davidsson, 2018b).

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

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 and hypotheses development on SO and TI (sec.3.1), SO and DE (sec.3.2), the mediating effect of DE

(Sec.3.3), and present the conceptual model. Finally, we draw conclusion and indicate directions for future research in Section 4.

2. Theoretical lens

2.1. SO: Definition and Conceptualize

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, P.102), as well as willing to generate and exploit the opportunities offered by the digital age (Matheson and 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 and Matheson, 1997; Petković and Lukić, 2014). 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, Bonnet, and McAfee, 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 and Cichocki, 2011; Petković and Lukić, 2014; Petković & Lukić, 2013). However, (Matheson, Matheson, 1997, 96-98) 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 and Lukić, 2014).

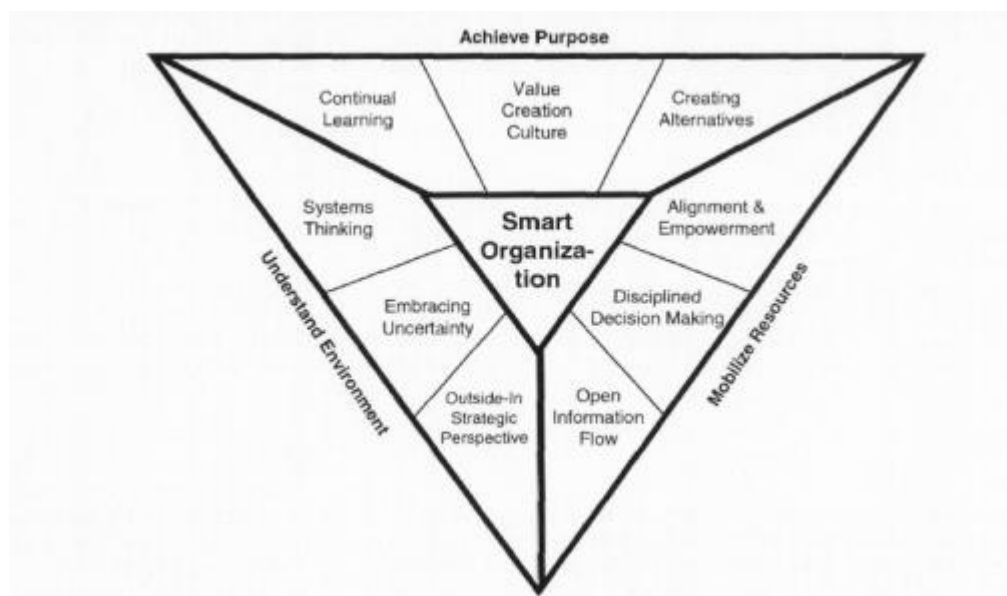


Figure 1. SO's nine principles (components)

Source: (Matheson and Matheson, 2001; Petković & Lukić, 2013; Petković and Lukić, 2014; Mark A. 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; Avin and Jakar, 2018; Petković and Lukić, 2014; Petković & Lukić, 2013); (Al-Kasasbeh, Al-Kasasbeh, and Al-Faouri, 2016; Al Shobaki, Abu Naser, Abu Amuna, and El Talla, 2018; Mark A. Schafer, 2009) that describe the SO's components (namely business intelligence, creative orientation, environment understanding, adaptation, and continuous learning).

2.2. DE: Definition and Conceptualize

DE is a term that describes how entrepreneurship will shift as business and society go on to be transformed thru digital technology (Davidson and Vaast, 2010). DE highlights transformations in entrepreneurial practice, theory, and education (Matt, Hess, and Benlian, 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, and risk-taking, and competitive edge (Joshua and Smuts, 2020; Ebert and Duarte, 2018; Nambisan, 2017; Davidson and Vaast, 2010).

As per Mladen Turuk(2018:P.179), DE most commonly refers to “the process of creating a new Internet-enabled/delivered business, product/service or process. DE is expanded to the traditional concept of entrepreneurship in the sense that it encompasses a group of participators that is continually developing and are highly distinguished, and they possess unique characteristics (Autio, E., 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, Hess, and Benlian, 2015). As digital technology progress and expanded, so too will these categories (e.g. marketing, sales, products, distribution, stakeholder management, operations), and new categories can potentially be fashioned (Rashidi, R., et al, 2013).

2.3. TI: Definition and Conceptualize

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 and Aravind, 2011). Innovation refers to a firm's tendency to engage in and support new ideas, experiment, and creative processes that may generate new products, services, or technological processes (Shan et a, 2016; Lumpkin and 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.,Walker., & Avellaneda, 2009). Innovation positively influences individuals, communities as well as business organizations, thru introducing new ways of performance, and products, services, and processes, and transfers individuals, organizations to a better position than the current one (Damanpour and 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 technological, 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 mediating effect of DE on this relationship. This section presents hypotheses development and conceptual model.

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, Andreas Kuckertz et al.(2015) 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 der Aa & Elfring, 2002; Veugelers, 2008; Visnjic et al, 2016; R.P. Jayani Rajapathirana & Yan 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, Azadi, & Witlox, 2013). In this vein, developing employees thru 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,Cegarra-Navarro, & Jimenez-Jimenez, 2012), i.e. the organization's attempt to learn continually from external and internal sources can assist uncover new ideas, processes, or techniques that can be applied and foster innovation development and application (Nuno & Coelhob, 2019). Business intelligence is "both a process and a product" (Nuno & 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, markets, products and services, and the overall business environment with a high degree of certainty, all these underline the business intelligence importance in the innovation systems (Berndtsson,Gudfinnsson, & Strand , 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 Shoham 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. Based on the aforementioned discussion, we can suggest the following proposition.

Hypothesis 1 (H1): SO's components positively affect TI (product and process)

3.2. SO and DE

Business intelligence influences firm performance directly and indirectly (Antoncic, Bostjan and Prodan, Igor, Alliances, 2008), directly as it enables entrepreneurship's innovative development dependent on the task interdependence in the firm, and indirectly thru effective knowledge management, efficient organizational learning processes, and increased technological innovation capabilities in the firm, all of these improvements materialize in data, business processes, and applications, which are in turn consider innovative forms of entrepreneurship (Štefan 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 an information and technology-driven economy, innovation, flexibility, entrepreneurship, and creativity is a necessity for continuous learning, the results of Gozde Sezen-Gultekin & Duygu Gür Erdogan(2016) study indicated that there is a positive and meaningful relationship between continuous learning and entrepreneurship characteristics.

Study of Kandil, Abdul Auj, Al - Tarfy, Al-Shammari (2019) that 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 in achieving the company's entrepreneurial alertness and individual innovation

Bakhshian, Hamidi, & Ezati (2011) stated that there a relationship between organizational intelligence and entrepreneurship among university educational managers. Ahmadi, Mohammad, and Ranjbari, Meisam (2013) concluded that organizational intelligence affects entrepreneurship improvement. Adnisi and Mandla(2003) argue that there is a relationship between market orientation, organizational flexibility, and job satisfaction, and corporate entrepreneurship. Moreover, Faroun, Al-Anzi, and Al-Khalidi(2015) emphasize the relationship between formulating an entrepreneurial strategy and develop a model for smart organizations. Hence, the following proposition was formulated as follows:

Hypothesis 2 (H2): SO's components positively affects DE

3.3. DE and TI

Arguably digitization nowadays is currently the single most significant engine in entrepreneurship and innovation (Elisabeth Berger, Frederik Von Briel, Per Davidsson, Andreas Kuckertz, 2020). DE is a crucial driver within the innovation systems (Liliya Sataalkina & Gerald 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 and 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 and van Welsum, 2014).

Scheepers, Hough, and Bloom(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.

Hossein, Alipour, and Dangalani(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 [AlQudah \(2018\)](#) 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 thru the availability and technology transmission and innovative ideas, and the existence of infrastructure that supports entrepreneurial efforts.

Entrepreneurship and creativity and innovation form a staggered feedback loop in that entrepreneurship breeds innovation and creativity and vice versa hold true ([Zahra and 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 ([Lisen Selander , Henfridsson , Svahn, 2010](#)).

Meanwhile, the collaboration networks of inter-firms ([Schilling & Phelps, 2007](#)) and the boundary-spanning practices ([Lindgren, Andersson & Henfridsson, 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, G, 2015](#)). Therefore, this study has developed the following hypothesis to explore the relationship between DE and TI.

Hypothesis 3 (H3): DE positively affects TI (product and process)

The conceptual model presented in **Fig. 2** illustrates the potential relationship between the smart organization and technology innovation. More specifically, this model conceptualized the effect of smart organization dimensions (as business intelligence, creative orientation, environment understanding, adaptation, and continuous learning) on technology innovation (namely, product and process). In addition, the model proposes the mediating role of digital entrepreneurship perceptions' in the relationship between the smart organization and technology innovation.

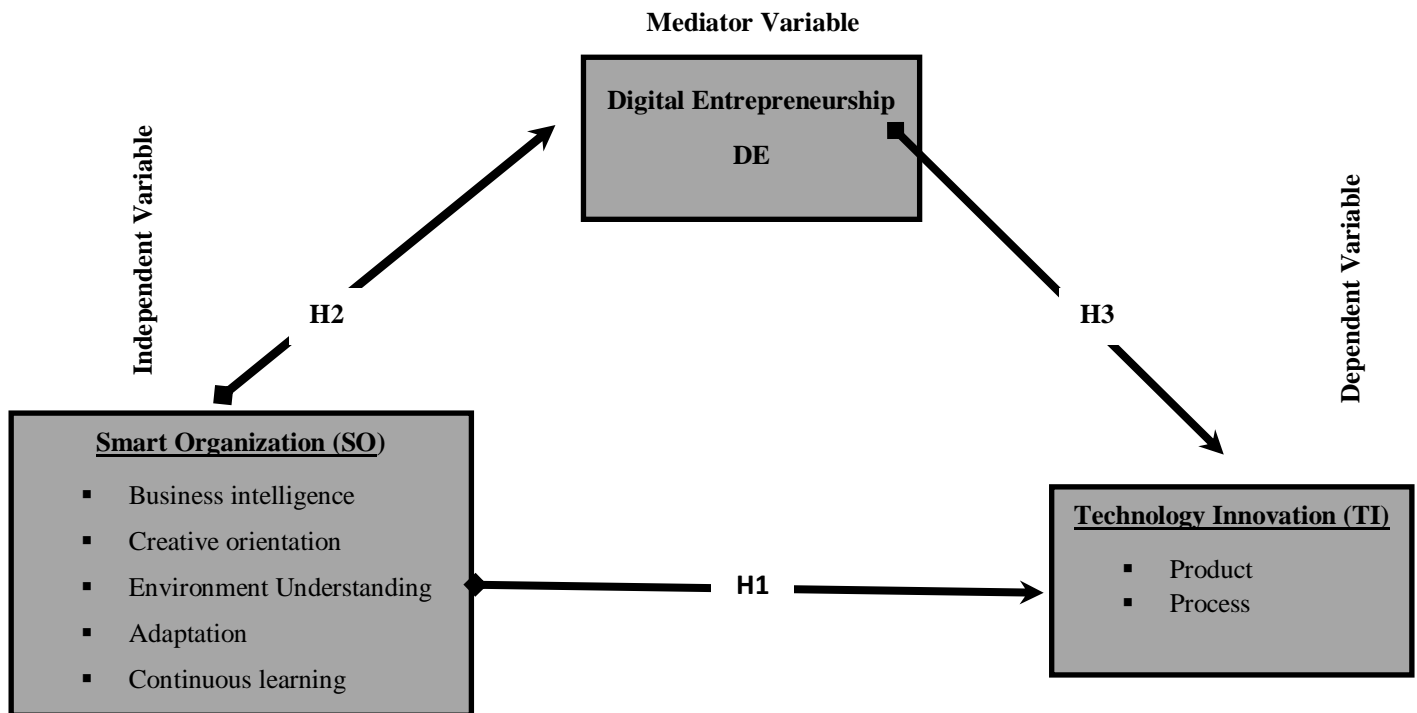


Fig 2: Smart Organization - Based Model to Technology Innovation.

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. *The research purpose to evolve a valid measure of SO using business intelligence, creative orientation, environment understanding, adaptation, and continuous learning as its dimensions. The impact of these dimensions on TI (product and process) is visualized from the DE perspective is conceptualized.* The need to develop an improved measure of SO and TI is due to various conceptualizations and measurements available in the related literature. This research suggests that SO characteristics can lead to the innovation of processes and products. The challenge for business organizations nowadays is to identify the role of the entrepreneurial that lead to various forms of innovations in the current environmental dynamism and intense competition and to verify the forms of these phenomenon (e.g. SO and DE) that produce the best outcomes for their corporations. There are many implications to the suggested model that should be specified before the discussion of its implications. First, in spite of its intentionally generic orientation, however, the model may not be applicable to all enterprises.

Specifically, it is intended to characterize the causes and consequences of entrepreneurship within a specific type of organization (i.e.SO) and is, therefore, might not apply to small/medium size new ventures, but rather in large and multinational firms. Second, while the model components are clearly specified, many of them represent wide constructs that operate at a high level of generality. For instance, the dissimilarity in terms of the definition and elements of smart organization between scholars and researchers can make it difficult to specifically incorporate it in a single model.

A primary theoretical implication is that firms can and should be seen as smart and entrepreneurial entities. Innovation is the only common theme underlying all forms of corporate entrepreneurship and smart organization. Thus it is a defensible and meaningful assertion based on the fact that smart organization characteristics and entrepreneurship are closely related to various types of innovations, including technological innovation (Al Qudah, 2018; Al Shobaki et al.2018).

Another implication is that many fundamental antecedents affect innovation within smart organization. To be more specific , because of the numerous and complex interrelationships between smart organization and entrepreneurship , management must focus , to the extent possible, on intangible resources that supports and helps sustain effective performance and innovativeness capacity. Thus, this would require consideration of the two main aspects (i.e. smart organization and entrepreneurship) and their direct effect and indirect effect on technology innovation. The suggested model has value in that it conceptualizes the two and their direct and indirect impacts on product and process innovations due to the lack of studies in this field.

Conducting further empirical studies in the future to validate the proposed model as well as analyzing the impact of the smart organization on technology innovation thru the mediating of digital entrepreneurship represents a promising research path within the context of business organizations in several industries.

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