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Dynamic capabilities based on knowledge and transformation in business models in the industry 4.0 scenario

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Abstract

This theoretical essay explores theories related to business models and dynamic knowledge-based capabilities in the digital transformation scenario. First, the main theoretical foundations that conceptualize the themes of business models, innovation in business models, digital transformation, and dynamic capabilities based on knowledge are pointed out. Subsequently, two propositions are presented and discussed. We propose that digital capability is dynamic as it affects the company's knowledge capacity, just as the dynamic knowledge capability can stimulate digital capability. We also propose that not only dynamic knowledge-based capability is necessary for developing a sustainable business model, but the emergence of immediate profits can affect the business model in the company's future. This essay brings theoretical contributions, which can be used in future works, and practical and managerial contributions, which managers and decision-makers can use.

Keywords: Business model. Dynamic capabilities. Knowledge. Digital transformation. Innovation.

Capacidades dinâmicas baseadas em conhecimento e transformação nos modelos de negócios no cenário 4.0

Resumo

Este ensaio teórico tem abordagem crítica e busca explorar as teorias relacionadas com modelos de negócios, bem como as capacidades dinâmicas baseadas em conhecimento no cenário de transformação digital. Em primeiro lugar, são apontados os principais fundamentos que conceituam os temas modelos de negócios (MNs), inovação nos modelos de negócios (IMNs), transformação digital (TD) e capacidades dinâmicas baseadas em conhecimento (CDBC). Na sequência, são apresentadas e discutidas as 2 proposições encontradas. Defende-se que a capacidade digital é dinâmica, uma vez que afeta a capacidade de conhecimento da empresa, assim como pode vir a estimular a capacidade digital. Propõe-se também que não somente a capacidade dinâmica baseada em conhecimento é necessária para o desenvolvimento de um modelo de negócios sustentável; a emergência de lucros imediatos pode afetar o modelo de negócios da empresa. O presente ensaio traz contribuições teóricas que poderão ser utilizadas em trabalhos futuros, além de contribuições práticas e gerenciais que poderão ser aproveitadas por gestores e tomadores de decisão.

Palavras-chave: Modelo de negócios. Capacidades dinâmicas. Conhecimento. Transformação digital. Inovação.

Capacidades dinâmicas basadas en el conocimiento y la transformación de modelos de negocio en el escenario 4.0

Resumen

Este es un ensayo teórico con un enfoque crítico, que busca explorar teorías relacionadas con modelos de negocio y capacidades dinámicas basadas en el conocimiento en el escenario de la transformación digital. En primer lugar, se señalan los principales fundamentos teóricos que conceptualizan los temas de modelos de negocio, innovación en modelos de negocio, transformación digital y capacidades dinámicas basadas en el conocimiento. Posteriormente, se presentan y discuten las dos proposiciones encontradas. Se propone que la capacidad digital es una capacidad dinámica ya que afecta la capacidad de conocimiento de la empresa, así como la capacidad de conocimiento dinámico puede estimular la capacidad digital. También se propone que no solo la capacidad dinámica basada en el conocimiento es necesaria para el desarrollo de un modelo de negocio sostenible, sino que la aparición de beneficios inmediatos puede afectar al modelo de negocio de la empresa. Este ensayo trae aportes teóricos, que pueden ser utilizados en futuros trabajos, y aportes prácticos y gerenciales, que pueden ser utilizados por los gerentes y tomadores de decisiones.

Palabras clave: Modelo de negocio. Capacidades dinámicas. Conocimiento. Transformación digital. Innovación.

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INTRODUCTION

Business Models (BMs) and Business Model Innovation (BMI) have gained increasing relevance in recent years (Brillinger, Els, Schäfer, & Bender, 2020). BMI is a key to organizations' future success (Chesbrough, 2010), while the essence of BM is the way a company adds value to customers, attracts them to pay for it, and converts that payment into profit (Teece, 2010). Essentially, BMs can be defined as the way firms do business (Zott, Amit, & Massa, 2011), or as a construct that mediates technology development and economic value creation (Chesbrough & Rosenbloom, 2020).

BMs are not static in time, but dynamic. The 4.0 scenario has fostered change in organizations, which try to offer customers new value propositions. In all industries, digitalization has become massive, where traditional products are replaced by digital counterparts, or equipped with new digital features (Prem, 2015). In this context, BMs play an essential role in Digital Transformation (DT), since elements can be digitally changed (Schallmo, Williams, & Boardman, 2020).

It became evident that the economics of digital technologies goes far beyond improving products, services, and production processes, and has changed BMs (Prem, 2015). DT is linked to all BMs, to aggregated value chains, and to different actors in a value network (Schallmo et al., 2020).

There are mechanisms that support this dynamics, Dynamic Capabilities [DCs], which organizations use for doing or renewing their activities (Teece, Pisano, & Shuen, 1997). Such capabilities are relevant factors for keeping firm's competitiveness. Likewise, the current and future states of a firm's BM are connected through the firm's DCs and skills for reconfiguring its assets (Ritter & Lettl, 2018).

From another perspective, understanding why organizations in the same industry have different performances is a recurring debate in strategy studies in recent decades (Leih, Linden, & Teece, 2015). Thus, to keep a competitive advantage in this environment of fast and unforeseen changes, firms must rely on DCs, which involve the ability to renew competencies in order to align them with market needs (Teece et al., 1997). Therefore, they must possess a number of capacities that enable them to successfully create knowledge and generate innovation (Faccin, Balestrin, Martins, & Bitencourt, 2019).

Among existing DCs, Knowledge-Based Dynamic Capabilities (KBDCs) stand out; they acquire, generate and combine knowledge resources to detect, explore and handle the environment dynamics for generating innovation (Zheng, Zhang, & Du, 2011). It is one of the most important DCs mentioned in the literature for achieving competitive advantage (Nonaka, Kodama, Hirose, & Kohlbacher, 2014). Knowledge is a key element for innovation in the contemporary world, and an essential asset to attain market differential (Canonico, Nito, Esposito, Iacono, & Consiglio, 2020). Therefore, KBDCs are crucial for an organization's survival.

Although BMI has received a lot of attention, the conceptual clarity of changing BMs is weak, with much research potential. Different BM flows are not only useful to describe the current state of a BM; they also serve as frameworks for describing and developing its future states (Ritter & Lettl, 2018). There is also a lack of studies on BMs based on the 4.0 scenario, especially in emerging countries (Leminen, Rajahonka, Wendelin, & Westerlund, 2020).

There is a connection between DT and BMI, as a result of digital technologies (Chanias, Myers, & Hess, 2019). Some authors suggest DCs as a theoretical basis for exploring the capabilities that companies build to foster the ongoing DT (Vial, 2019; Warner & Wäger, 2019). Understanding, learning, controlling experiments, and learning lessons, continuously, are essential for defining or redefining BMs (Pedroso, 2016). Hence, knowledge-based DCs are paramount for BMI practice and competencies, for organizations' survival in the market. Thus, we justify the choice of this theory for this essay, instead of others.

We organized this paper as follows: Section 2 presents a brief literature review, addressing the concepts of BM, BMI, DT and KBDCs. Section 3 presents and discusses the propositions; and Section 4 presents the conclusions and final remarks.

LITERATURE REVIEW

This theoretical essay presents a traditional literature review through a critical approach, where the researcher explores the topic, develops ideas, and identifies gaps to examine in future studies. Next, we present the main theoretical background that defines the topics of BMs and KBDCs, in the DT scenario.

Business models, business model innovation, and digital transformation

BMs are a holistic approach that explains how firms do business and create value, not how they just capture it (Zott et al., 2011). For Teece (2010), value proposition, value appropriation, market segments, and value chain organization are key elements of BMs.

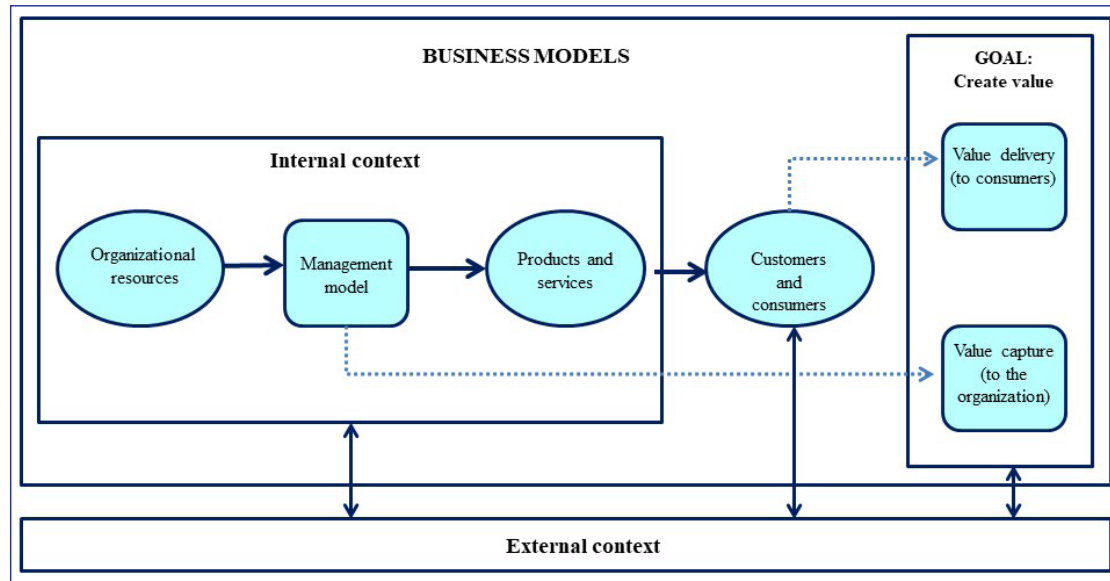
BMs can be defined as what each company should describe on its business, regarding what it does, that is, the flow of activities in a certain environment, based on capabilities; what it offers (value proposition); how the offer is provided (interaction with the customer in person and through channels); and who the customers are (Ritter & Lettl, 2018). From another perspective, a BM guides the organization in defining its competitive strategy, through what it offers to the market, how it charges, what it costs, how it distinguishes itself, what is the value proposition, and how it integrates the value chain (Shafer, Smith, & Linder, 2005). In short, the BM key dimensions are grouped into offer (what?), which includes the value offer; customers (for whom?), which includes the customer segment; distribution channels and customer relationship; infrastructure (how?), which includes the key activities, the main resources and the main partnerships; and financial feasibility (why?), which includes the structure of costs and source of revenues (Tidd & Bessant, 2014).

Osterwalder (2004) proposes the currently widespread BM Canvas, which uses four main components to represent a BM: product, customer interface, infrastructure management, and financial aspects. Similarly, in a literature review of 681 articles on BM, Wirtz, Pistoia, Ulrich, and Göttel (2016) identified four main elements: design, innovation, change and evolution, performance and control. They also defined the core components of a BM: strategic (strategy models, resource models, and networks), customer and market (models of customer, of market offering, and of revenue), and value creation (manufacturing, purchasing, and financial models). In addition, there is an interrelationship among these groups.

Value creation is the essence of any BM (Beuter, Faccin, Martins, & Balestrin, 2019). The foundations of an organization are its activities, its resource transactions, and its changes. Therefore, activities, processes, or capabilities serve as the basis for understanding what a business does, and are the micro-foundations, or building blocks of BMs, essential to all other perspectives (Ritter & Lettl, 2018). Hence, value capture means achieving value and revenue from providing services and goods, or information, to customers or users (Teece, 2010).

Pedroso (2016) defines BM as a conceptual model formed by a set of components that support the design or architecture of an organization's business, with the goal of adding value to its consumers and capturing value for the organization (Figure 1).

Figure 1
Business Model concept



Source: Pedroso (2016, p. 35).

Therefore, a BM is an organization's business architecture. BM archetypes are typical models of value creation and capture that transcend industry boundaries (Baden-Fuller & Morgan, 2010; Ritter & Lettl, 2018). An important virtue is that it offers a holistic view of the business, which combines company's internal and external factors (Frankenberger, Weiblen, Csik, & Gassmann, 2013). Hence, BM is a concept that extends the boundaries of the firm, which is embedded in an ecosystem. The main function of the BM is to explain how the firm captures value for itself and for the various stakeholders in that ecosystem (Frankenberger et al., 2013).

In contrast, there are conceptual differences about BMs, and some ambiguity among definitions. Ritter and Lettl (2018) identified five different perspectives on the term BM, explained in Box 1.

Box 1
Five different perspectives on BM concept

Perspective	Definition
Activities	This is a description of the activities that the company has put together to implement its strategy; a series of activities, from raw material acquisition to final consumer's satisfaction (Arend, 2013; Chesbrough, 2010; Ritter & Lettl, 2018).
Logic	This flow focuses on why certain activities make sense for a company in terms of the value creation logic that these activities introduce (logic of low cost or quality of the service provided). It is a representation of the underlying core logic of a company, a set of logical relationships and consequences (Brynjolfsson & Milgrom, 2013; Casadesus-Masanell & Ricart, 2011).
Archetypes	These are well known and general BM logics, such as sales of Nespresso coffee machines, which require special coffee capsules, or dual-platform BMs like Uber and Airbnb (Ritter & Lettl, 2018).
Elements	It structures BMs based on essential elements to capture the important parts of a business. The underlying idea is that every company can and should describe its business in terms of what it does, similar to the flow of activities. It seeks to answer who are the customers, what they value, and how to make money in that business. That is, what is the underlying economic logic that explains how to deliver value to customers at an appropriate cost (Magretta, 2002, p. 4; Ritter & Lettl, 2018).
Alignment	The success and failure of organizations are also determined by their complementarity, interrelationships, and alignment. This focus on the interaction of BM elements brings them closer to the general notion of strategy, since a company's strategy describes how pieces fit together (Ritter & Lettl, 2018; Silva & Trkman, 2014).

Source: Elaborated by the author.

Theory presents different concepts of BMs. However, a BM is not a theory in itself, but rather a theoretical mechanism that combines distinct streams of literature (Ritter & Lettl, 2018). As such, research on BM is a central connecting component in the subsequent development of the field of strategic management. That is because the significant increase in competitiveness in recent years has forced organizations to seek new competitive advantages, and because BM should be seen as a basis for defining competitive strategy (Keen & Qureshi, 2006).

The strategic direction chosen by companies and the BM adopted can define their performance and success, compared to their competitors. Thus, BMs relate to the success or failure of companies, more often than to factors like market attractiveness or technological superiority (Gibson & Jetter, 2014). This is because unsuccessful BMs can prevent competitiveness and the full exploitation of business opportunities, reducing the value achieved by the company (George & Bock, 2011).

It is not just the BM design that defines the success or failure of an organization (Keen & Qureshi, 2006; Magretta, 2002); other factors, such as the external environment's influence, are equally important for a business to succeed.

The literature has focused on a static view of BM, at a certain time, but is gradually moving towards a more dynamic view, to address changes in existing BMs over time (Pedroso, 2016; Saeedi, Lien, & Foss, 2016). These changes can be incremental or radical, caused by different factors, and be voluntary or mandatory. Literature has also emphasized studies on start-ups, and given little attention to established firms, because of their complexity (Santos, Spector, & Van der Heyden, 2015).

Every organization provides some kind of value proposition: a product or service, or some combination that end users appreciate. Such aspects are becoming increasingly relevant, like the constant innovation and the perception of the real value delivered to customers. Business Model Innovation is responsible for creating new or better ways to deliver that value; thus, it makes sense to explain the model the company uses, if it is sustainable or vulnerable to replacement (Tidd & Bessant, 2014).

BMI has received a significant amount of attention from researchers, academics, and practitioners (Chesbrough, 2010; Ritter & Lettl, 2018). Likewise, it can also be regarded as BM reinvention, BM modification, or BM transformation (Ritter & Lettl, 2018). A relevant feature in BM studies concerns an innovative value proposition.

BMI can be defined as a new way to create and capture value, achieved through a change in one or more components of the firm's BM (Chesbrough, 2010; Tidd & Bessant, 2014). In other words, BMI takes place when the firm changes or improves at least one of value dimensions (Abdelkafi, Makhotin, & Posselt, 2013). BMI can also be seen as a process that deliberately changes the core elements of a company and its business logic (Bucherer, Eisert, & Gassmann, 2012). New business ideas, new sectors, and developing existing BMs are central to this research line (Chesbrough, 2010; Ritter & Lettl, 2018; Teece, 2010).

Established firms that innovate their BMs experience positive effects on performance (Cucculelli & Bettinelli, 2015; Zott & Amit, 2007). However, research in this field is still scarce, and does not address how a firm can innovate its BM systematically (Frankenberger et al., 2013).

There are two perspectives to view the interrelationship between BMs and innovation. Just as a clear and well-designed BM can capture value from innovations, BMs themselves are susceptible to innovations (Tidd & Bessant, 2014), which can change the entire architecture of industries and modify all the rules of the game. Successful BMIs have completely redefined some scenarios or industries, redistributing billions of dollars (Johnson, Christensen, & Kagermann, 2008).

Therefore, BMI is an engineered, innovative, and non-trivial change in the key elements of a company's BM, or in the architecture that connects such elements (Foss & Saebi, 2017). As mentioned, it requires significant change in at least two of the four dimensions: customers, value proposition, value chain, and profit mechanism (Pedroso, 2016). From another perspective, BMI can range from incremental changes in its components, extension of the existing BM, or BM disruption, which potentially replaces the existing BM by an essentially different one (Khanagha, Volberda, & Oshri, 2014).

As for BMs and DT, digital technologies are capable of changing whole industries, enabling new BMs and being a potential for industry transformation (Cziesla, 2014). In addition to technologies that enable new BMs, they cause intermediation/disintermediation, and customer centricity becomes increasingly important for financial service providers. Thus, it is important that organizations in the financial sector constantly review their BMs in this DT scenario, in order to continue innovating and creating value.

Given the emergence of digital technologies, organizations in all segments are seeking initiatives to leverage benefits in their BMs (Vial, 2019). Because of the growing competition fostered by globalization and the importance of a customer-centric approach, organizations are becoming more digital, to survive and achieve competitive advantage (Singh & Hess, 2017). Hence, to increase the possibilities offered by digital technologies and respond to digital interrupts, established companies have enhanced their digital capabilities, called Digital Transformation (Sebastian et al., 2017).

DT is a business-centered change that uses information technology as a critical asset (Vial, 2019). Therefore, using new technologies to enhance customer experience, increase business performance, create new BMs, and achieve operational excellence is a transformation strategy that guides the organization in its journey towards Digital Transformation (Singh & Hess, 2017).

Organizations are realizing that becoming a digital leader is not just about technical knowledge; it is about creating a flexible structure to identify market changes and react quickly with the most competitive solution (Puthiyamadham, 2017). Similarly, DT is more than process automation; it requires deep cultural changes to transform structures, functions, skills, technology use, and value added to customers (Nadkarni & Prügl, 2021; Vial, 2019).

Given the above, DT can be defined as an initiative by which organizations continuously engage in digital innovation to develop or improve products, services, and BMs, in order to achieve or keep competitive advantage (Vial, 2019). Likewise, DT is a change in the way a company employs digital technologies to develop a new digital BM that helps create and appropriate more value for the company (Verhoef & Bijmolt, 2019). The use of digital technologies can transform the organization's BM, which will enable sustainable growth for the future.

Technology can rethink a company's products, its organizational structures or processes. In other words, DT concerns technological and digital changes, which can result in modifying a company's BM (Hess, Matt, Benlian, & Wiesböck, 2016). It results in changed products, organizational structures, or process automation. From another perspective, the growth of digital products and services in the last two decades (big data, social media, mobile devices, telephony, and artificial intelligence) resulted in new markets and transformed BMs (Lucas & Goh, 2009). We observe these changes through the increasing demand for internet-related media, which has led to modifications in all BMs (Hess et al., 2016).

Digital Transformation became vital, since it regards how a business can be sustainable in the digital age (Chanias et al., 2019). Despite the evolution of studies, it is still an emerging field, and more research is needed to consolidate definitions, since the literature on the subject is limited (Vial, 2019). There is a connection of the subject with BMI, because of the implementation of digital technologies (Chanias et al., 2019). DCs should be used as a theoretical basis to explore firms' capabilities to foster the ongoing DT (Vial, 2019; Warner & Wäger, 2019).

Dynamic capabilities

An organization's capability to renew its tangible and intangible assets is a relevant factor for competitiveness (Teece et al., 1997). A capability is a qualification or skill required for a certain activity (Day, 1994). Organizational capabilities are embedded in firms' processes and systems, which allows them to repeat the activities over time (Ritter & Lettl, 2018). Capabilities are organizational routines by which combinations of resources (inputs) are transformed into new resources (outputs); some elements of the processes and systems may be tacit, and difficult for competitors to copy.

However, these capacities are not static, as the resource-based view considers them (Priem & Butler, 2001). They are dynamic, due to the agility needed to renew competencies, in order to align with fast-changing markets. Hence, the concept of DC is the organization's ability to integrate, build, and internally reconfigure external competencies, responding to the environment's quick changes (Teece et al., 1997).

Zollo and Winter (2002) define DCs as a learning, and a stable pattern of collective activities by which the firm reorganizes its routines to achieve high effectiveness. DCs are a firm's potential to solve problems systematically, through its capacity to perceive opportunities and threats, to make correct market-oriented decisions, and to change its resource base (Barreto, 2010). DCs support the rearrangement of the firm's resources and routines established by decision makers (Zahra, Sapienza, & Davidsson, 2006).

The central goal of DCs is not short-term efficiency, but sustainability over time, through an evolutionary fit (Teece, 2018). In other words, it is the efficiency of the organization in a dynamic and evolutionary way, which ensures perpetuity and long-term sustainability.

However, there is a shortage of academic papers on how organizations build DCs for DT (Vial, 2019; Warner & Wäger, 2019). Therefore, organizations should seek paths to create the necessary DCs, by understanding how they originated in the past and by an appropriate decision-making in the present, to foster positive outcomes in the future (Suddaby, Coraiola, Harvey, & Foster, 2020).

Among the existing forms of DCs, knowledge-based dynamic capabilities [KBDCs] are a specific type, defined as the ability to acquire, create, and combine knowledge resources to detect, exploit, and cope with the environment dynamics to generate innovation (Zheng et al., 2011). Many theoretical streams have emphasized the importance of knowledge and its practices as essential elements for an organization's survival, and an explanation for distinct business performances (Barton, 1995; Beuter et al., 2019; Grant, 1996).

Knowledge management was considered one of the main sources of organizations' competitive advantage, both at the individual and interorganizational levels (Nonaka, Toyama, & Hirata, 2011; Nonaka et al., 2014). Despite its importance, there is a small number of empirical articles published on KBDCs (Beuter et al., 2019).

Hence, knowledge is the key to innovation in the contemporary world, and a vital asset to achieve competitive advantage (Canonico et al., 2020). It emerges from experience, which is a subjective process of perception, and from interpreting the environment (Nonaka & Takeuchi, 1995). There are two types of knowledge mentioned in the literature: tacit and explicit. The first relates to ontology, and is the knowledge that the individual acquires throughout his/her life, through experience, while the second relates to epistemology - formal, clear, regulated, and easy to communicate (Nonaka & Von Krogh, 2009). The key of the modern theory of knowledge creation is in the process of conversion from tacit to explicit, through the Seci model: socialization, externalization, combination, and internalization (Nonaka, Toyama, & Konno, 2000).

Hence, the process of organizational knowledge creation is a company's ability to create new knowledge, disseminate it throughout the organization, and incorporate it into services, products, and systems (Nonaka & Takeuchi, 1995). Not just within the organization, but including the environment as a knowledge ecosystem, which brings the concept of creation in an interorganizational way (Nonaka et al., 2011).

In addition to DT, the current scenario of the Covid-19 pandemic emphasized the importance of open and collaborative actions for public and private organizations, while innovation will have an important role in recovering from its consequences (Chesbrough, 2020). Thus, we notice the relevance of knowledge building for the present context, and this paper seeks to help understanding the field, since company's innovation is a knowledge-intensive activity (Nonaka & Takeuchi, 1995).

PROPOSITION DEVELOPMENT

Innovation is among the main drivers of sustainable development and a source of competitive advantage for organizations in the current context of globalization and market competition. The central purpose of an innovation is to create value for the customer and competitive advantage for companies. Some innovations can change existing BMs or create new ones in a disruptive way, changing the rules of the game.

The literature shows a rise of digital products and services over the past two decades, changing BMs and creating new markets (Lucas & Goh, 2009). Organizations in all segments are adopting a range of initiatives to increase benefits in their BMs, with the emergence of digital technologies (Vial, 2019). The DCs that organizations possess for renewing and creating value are of paramount importance, especially regarding learning and knowledge, to facilitate the process. However, studies that address KBDCs for sustainable development are still scarce (Tran, Zahra, & Hughes, 2019).

Short-term financial results create tensions and conflicts of interests with future sustainability (Bansal & Desjardine, 2014). Organizations often adopt immediate behaviors with short-term focus and actions, considered harmful over time and known as 'short-termism' (Laverty, 1996; Marginson & Mcaulay, 2008). This expectation of immediate profits by organizations can compromise future sustainability of BMs over time, especially in the current scenario of emerging technologies, which result in propositions of higher value and lower cost for customers. Is it possible for traditional companies, created before the Internet age, to waive exorbitant profit margins or strategies oriented to shareholders in order to deliver value to customers differently? Such strategic models focused on short-term results may compromise the sustainability of organizations in the long term. Therefore, we make the following proposition: KBDCs are necessary for a sustainable organizational development, and the emergence of immediate profits can affect company's business model in the future (P1).

In addition to new services, products, and digital channels, distinct forms of value creation, enabled by digital technologies, will require changes in organizations' purpose and identity (Wessel, Baiyere, Ologeanu-Taddei, Cha, & Blegind-Jensen, 2021). It requires deep cultural changes to transform structures, functions, skills, use of technologies, and the value added to customers, redefining the organization's value (Nadkarni & Prügl, 2021; Vial, 2019; Wessel et al., 2021). Rethinking the workplace, understanding digital skills, developing a digital mindset, and building organizational agility are essential capabilities of DT (Warner & Wäger, 2019). Organizations must identify the digital workforce, recruit external digital talents, and take advantage of the company's internal digital knowledge; it must readapt to a new digital strategy (Gurbaxani & Dunkle, 2019; Li, Su, Zhang, & Mao, 2018). However, we wonder: is digital capacity a dynamic capability or just a new capability that organizations need to develop in the 4.0 scenario? Does digital capacity renew other organizational capacities?

The literature merges the concepts of digital capabilities, defining them as DT: to leverage the possibilities that digital technologies provide and respond to digital interrupts, organizations have enhanced their digital capacities and resources by naming them DT (Sebastian et al., 2017; Svahn, Mathiassen, Lindgren, & Kane, 2017).

DT is organizations' ability to incorporate digital technologies into their routine, leading to a change in the way they create value for their customers, supported by rethinking their whole structure and processes, reshaping their BM (Albino & Souza, 2019). Several definitions describe DT as a reinvention of the company's strategy, recognizing technology as a powerful capacity for adding value to business (Albino & Souza, 2019; Warner & Wäger, 2019). It requires organizing digital, technological, and business strategies to enable an effective change in the BM, a flexible technology infrastructure, as well as the strategic

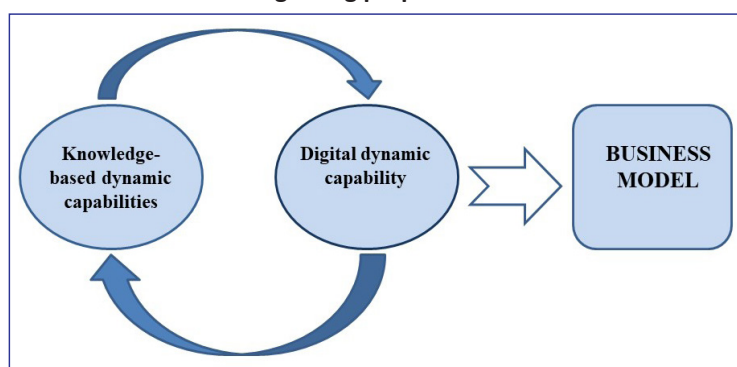
use of new digital and data technologies (Haffke, Kalgovas, & Benlian, 2017). In addition, it encourages the use of technology to create new streams of revenue, increase business performance, and enhance customer experience (Albino & Souza, 2019; Vial, 2019). It is a change that goes beyond process digitalization and requires deep changes in organizational structures and business processes, as well as the advanced use of technologies and improvement in value creation, to adjust or create entirely new BMs (Albino & Souza, 2019; Chanas et al., 2019; Haffke et al., 2017; Hess et al., 2016).

Thus, digital skills, talent management, and collaboration are the foundations of new organizational arrangements (Gurbaxani & Dunkle, 2019). Research on DCs represents a research path in management, particularly in DT's dynamic capabilities (Vial, 2019). Strategy and intelligent use of digital technologies are crucial elements required by DT skills (Albino & Souza, 2019). Understanding digital skills, developing a digital mindset, fostering expertise, supporting knowledge for DT and managing technical talent for innovation, as well as taking a calculated risk for leaning and building organizational agility, are internal capabilities required for a successful DT (Albino & Souza, 2019; Warner & Wäger, 2019). In addition, a successful DT demands a wide range of partnerships, creating an intelligent ecosystem for developing better solutions (Albino & Souza, 2019; Svadberg, Holand, & Breunig, 2019).

TD fosters organizations to develop DCs, which allow them to identify and address opportunities, changing the organization, reconfiguring resources and building digital capabilities, therefore returning to industry changes, triggering strategic renewals that influence BMs and companies' culture (Albino & Souza, 2019; Warner & Wäger, 2019). Organizations also depend on changing BMs to enhance performance, improve customer experience, create new businesses, and achieve operational excellence (Singh & Hess, 2017; Warner & Wäger, 2019). DT provides ways to enhance products and services, which means producing a remarkable portfolio of experiences to customers, as well as new ways to achieve improvements in company's performance (Singh & Hess, 2017; Verhoef & Bijmolt, 2019).

As already mentioned, knowledge is the key to innovation in contemporary world and a vital asset to attain competitive advantage. Building and using dynamic resources are important theoretical lenses to allow companies to cope with technological transformation and preserve strategic flexibility, in order to sustain competitiveness (Albino & Souza, 2019; Teece, 2014). A radical technological disruption creates capability gaps for established firms and introduces new technical knowledge, new ways of doing activities, and new forms of value creation (Albino & Souza, 2019; Warner & Wäger, 2019). Therefore, we present Proposition 2 that refers to KBDCs and digital dynamic capability, based on the reflections raised so far from literature review: knowledge-based dynamic capabilities help digital dynamic capability, which, in turn, can assist KBDCs (P2).

Figure 2
Regarding proposition 2



Source: Elaborated by the author.

Thus, figure 2 presents the idea that KBDCs affect an organization's digital dynamic capability, just as the latter affects the former. Both change or affect the firm's BM.

FINAL REMARKS

This paper is a theoretical essay that sought to explore the theories related to BMs and KBDCs in the 4.0 scenario. We present two final propositions for use in future studies.

There are different definitions of BMs in the literature, but they all share the idea on how the organization can add value to customers and achieve better results. The scenario and emerging technologies are drivers for the creation of new BMs. Anticipating, accompanying, or even creating new BMs is a condition for delivering value and reaching the desired result. Companies should do that, before or as soon as the competition. As an example, we mention digital music in the beginning of the Internet, which replaced conventional CDs, driven by emerging technologies and DT. In addition, many industries are affected by the current scenario, such as film and television, as well as finance, through the creation of fintechs and bitcoins, challenging traditional banks with blockchain technologies. The same happens with the educational industry, proposing massive open online courses such as Coursera and edX. Companies like Uber, Spotify, Netflix, YouTube, Google, Facebook, and others have created a disruption by adopting digital technologies to create new customer experiences.

DT can threaten traditional models, by proposing ways for organizations to rebuild themselves. When the innovation is disruptive, the challenge is even greater, especially when there is an organizational culture with beliefs that limit change and innovation. DT requires new strategies and new ways of thinking, and organizational cultures embedded in the company's DNA may compromise a holistic view on potential needs for change.

One of the theories that best explains BM is DCs, which are an evolutionary process of value creation to keep competitiveness, as explained before. We addressed KBDCs and the concepts of DT and BMI. One of the propositions presented, based on theory, is that digital capability is a dynamic capability because it affects the firm's knowledge capability, just as knowledge-based DCs can stimulate digital capacity, changing the entire BM of the industry, incrementally or radically. Furthermore, organizations should develop such DCs within them, as competitive differentials for firms' sustainability.

Also regarding the sustainability of existing and future organizations' BMs, we propose that KBDCs are necessary for the development of a sustainable organization, and that the emergence of immediate profits can affect companies' future BMs, especially of those created before the internet. Thus, resistance to change, shortsighted culture or strategies, aimed at achieving profits to meet the stock market, may act against the continuity of the BM over time.

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