

# **Digital Capabilities as Key to Digital Business Performance**

*Full Paper*

**José Carlos da Silva Freitas Junior**

Federal University of Rio Grande do Sul  
freitas.junior@ufrgs.br

**Antonio Carlos Gastaud Maçada**

Federal University of Rio Grande do Sul  
acgmacada@ea.ufrgs.br

**Rafael Alfonso Brinkhues**

Federal Institute of Rio Grande do Sul  
rafael.brinkhues@caxias.ifrs.edu.br

## **Abstract**

We are currently dealing with the challenges of a digital economy, as well as a digital transformation. Furthermore, digital technologies are reshaping traditional business strategy and transforming the structure of social relationships for both consumers and enterprises. However, there is still no in-depth discussion regarding the skills and abilities that can help organizations face these new challenges in the emerging digital economy. Thus, the objective of our research is to propose a model with digital capabilities as the drivers of digital business performance, particularly in e-commerce and e-business. Our research makes several contributions by conceptualizing digital capabilities, providing some initial results from the qualitative part of the study and presenting a model that will be tested empirically in the near future. The practical value of this research rests on demonstrating the relation between digital capabilities and the digital business performance model.

## **Keywords**

Digital capabilities, digital technologies, digital business performance.

## **Introduction**

Societies, as well as the business world, are undergoing a digital transformation (Zimmermann and Pucihar 2015). To Remane et al (2016), this transformation is due to recent technological advances that have enabled several new digital business models, which are now transforming industrial-age industries. Moreover, companies are facing the challenges of the digital economy, defined by Zimmermann (2000) as an economy based on the digitization of information and its respective information and communication infrastructure. To cope with this new context, developing capabilities is required.

Furthermore, digital technologies are reshaping traditional business strategy into modular, distributed, cross-functional, and global business processes that enable work to be carried out across boundaries of time, distance, and function. These technologies are also transforming the structure of social relationships for both the consumer and the enterprise through social media and social networking (Bharadwaj, El Sawy, Pavlou, and Venkatraman 2013; Kohli and Grover 2008).

To Boulton (2016) top-performing businesses, in which digitalization is already woven into their planning processes and their business models, are spending 34 percent of their IT budget on digital, with plans to increase that to 44 percent by 2018. Driven by consumers accustomed to such niceties as mobile apps, smart appliances and connected cars, the digital business shift is afoot. Tesla and CVS are good examples of this tendency according to many specialists. According to Bock, Iansiti, and Lakhani (2017) digitally transformed organizations (“digital leaders”) performed much better than organizations that lagged behind (“digital laggards”), effectively creating a “digital divide” across companies. For these authors, clearly, digital transformation involves some significant capability building.

These transformations modify the processes and structures within and among businesses and other organizations, increasing the relevance of digital capabilities’ role. According to Aaker (2015) and Yoo (2013), firms are interested in the discussion on transformation in the digital age, thereby leading IS

research to advance theoretically. However, there is still no in-depth discussion regarding the skills and abilities that can help organizations cope with these new challenges in the emerging digital economy.

To fill this void and understand digital capabilities and their role in the digital business model, our research presents the results of the qualitative phase of a broader research that has been conducted. Our study is expected to make several contributions. First, we complement the concept of digital capabilities based on the digital literature. Second, our study advances in identifying the key digital capabilities required to make a digital business model successful, making some adjustments to the model previously presented. The practical value of this research rests on demonstrating the relation of digital capabilities on the digital business performance model.

The research objective is to understand which digital capabilities enable better digital business performance. The theoretical development opens the paper by presenting the propositions and research model, followed by the method. Then, the results are discussed, and the conclusions are presented.

## **Digital Business Model**

The digital business model arose from advertising campaigns promoted by some companies that began using e-business in the late 1990s. "Digital Business" seemingly became popular in the decade of 2000, when consumers witnessed a growing trend of e-business and e-commerce. Many people wondered if it was just the addition of the letter "e," that was not. Although one could think that this transformation in business models through digitization was more fashionable than fact, currently there is enough economic evidence to prove that digitization is a trend that causes deeper implications than just introducing a new distribution channel, as the development of e-commerce did. (Barenfanger and Otto, 2015).

For traditional businesses beginning to operate in the digital world, the firms must review their organizational logic and IT infrastructure use, which require new capabilities (Yoo, Henfridsson and Lyytinen, 2010).

## **Systematic Review of the Literature on IS Capabilities**

We selected the theory of Dynamic Capabilities (DC) for this study. Eisenhardt and Martin (2000) define DC as the ability to integrate, reconfigure, gain, and release resources to match and even create market change. DC explores the velocity of information, presenting its relationship with organizational processes and people. Karimi and Walter (2015) argue that DC is positively associated with building digital capabilities.

### **Digital Capabilities**

To develop this study, we conducted a full-text search to find articles containing the terms "Digital Capability" and "Digital Capabilities" in the Association for Information Systems (AIS) "basket" of eight top IS journals, namely: *European Journal of Information Systems*, *Information Systems Journal*, *Information Systems Research*, *Journal of the Association for Information Systems (JAIS)*, *Journal of Information Technology*, *Journal of Management Information Systems*, *Journal of Strategic Information Systems*, and *MIS Quarterly*. Additionally, we searched in Ebscohost and Google Scholar. We identified 33 papers in the first round and excluded nine articles due to overlap, resulting in 24.

It is worth highlighting that in this review only the business context was considered, rather than other areas, for example, teaching, which presents other concepts such as digital divide. It is important to say that many articles simply mention the term "digital capability", but do not offer definitions or further implications for this study, so these papers were also excluded from the analysis.

Only six papers clarify a definition for digital capabilities. We can consider digital capabilities to be the skills needed to go beyond pure IT to include specific technologies, such as social media or mobile, as well as the analytic skills to drive value from big data, and we can also conceptualize them as a digital outcome or service (Westerman, Bonnet, and McAfee 2012; Srivastava and Shainesh 2015)

These definitions show that digital capabilities allow organizations to give instantaneous answers either internally or externally by using digital channels that contribute to generating value for the company. These capabilities permit improvement in processes and customer relationships, thereby refining digital business, impacting operational and strategic fields (Schwarz, Kalika, Kefi, and Schwarz 2010), as we demonstrate in the following propositions.

### Proposition Development: Skills and Resources Required for Digital Capabilities

In determining which resources and capabilities, when integrated and reconfigured, encompass digital capability based on the literature review, it was possible to identify four components according to each theory, RBV and dynamic capabilities (DC), as described in Table 1.

Capability	Definition	Authors
Agility	The company’s ability to perceive and respond continuously to market changes by adapting its organizational processes and implementing operational changes rapidly.	Setia, Venkatesh and Joglekara (2013). Barenfanger and Otto (2015)
Ecosystem	Digital platform that enables a continued connection of all corporate partners beyond the traditional supply chains, including customers (and consumers).	Karimi and Walter (2015) Barenfanger and Otto (2015)
Visualization	The capacity to display data analysis results and information in adequate formats (i.e. easily understandable) in all adequate platforms such as laptops, mobile devices, and websites.	Bacic and Fadlalla 2013; Barenfanger and Otto (2015)
Processes digitization	The capacity to automate business processes to the greatest possible extent to ensure process transparency.	Koch (2010); Mishra; Konana; Barua (2007)

**Table 1. Digital capabilities, theories, and definitions**

#### Agility

Kohli and Grover (2008) argue that agility and responsiveness are two capabilities required to respond to market competition. In this sense, digital capabilities act as a foundation upon which other firms can develop complementary products, technologies, and services (Barrett et al. 2015). In this context, agility is a capability of organizational process flexibility and flexible, fast implementation of operational changes, in addition to the digitized process’s reach, customer agility, entrepreneurial alertness (related to e-marketplace development/launch) (Kohli and Grover 2008; Barenfanger and Otto 2015).

Consequently, digital capabilities enable learning-by-doing and react to new information technology. It implies the need for agility and responsiveness capabilities (Barenfanger and Otto 2015; Setia, Venkatesh and Joglekara 2013). So, we propose the following:

*P1 – Agility is related to Digital Business Performance*

#### Ecosystem connectivity

Barenfanger and Otto (2015) argue that ecosystem connectivity is a digital capability. Dong, Hussain, and Chang (2007) note that the goal of digital ecosystems is to improve communication efficiency among internal agents and to structuralize the existing Business Ecosystem. Ecosystem architecture can be constructed based on the firm’s characteristics—its needs, internal and external clients, suppliers, etc.—or it can be adapted. In addition, this ecosystem allows for condensing information from all corners of the IT organization (Garbani 2015). According to Yoo et al. (2012), ecosystem capabilities enable a firm “to search, explore, acquire, assimilate, and apply knowledge about resources, opportunities, and how resources can be configured to exploit opportunities.” So, we propose the second proposition.

*P2 – Ecosystem connectivity is related to Digital Business Performance*

#### Visualization

According to Lyytinen, Yoo, and Boland Jr. (2016), digitization makes it possible to radically reconfigure nearly all industrial-age products’ design and production. In this sense, visualization is the capability to

visually display business information (Yoo et al. 2012). The authors also suggest that visualization capability allows the organization to reduce information complexity and uncertainty, presenting data and information in an appropriate format.

The key strength of Internet and digital technologies is the ability to provide information across time and space (BARUA et al 2004). As defined in this capability's concept, it enables integration and reconfiguration of digital resources, contributing to better digital business results, thus maintaining the highlighted aspects of the dynamic capabilities theory. Therefore, we make the following proposition:

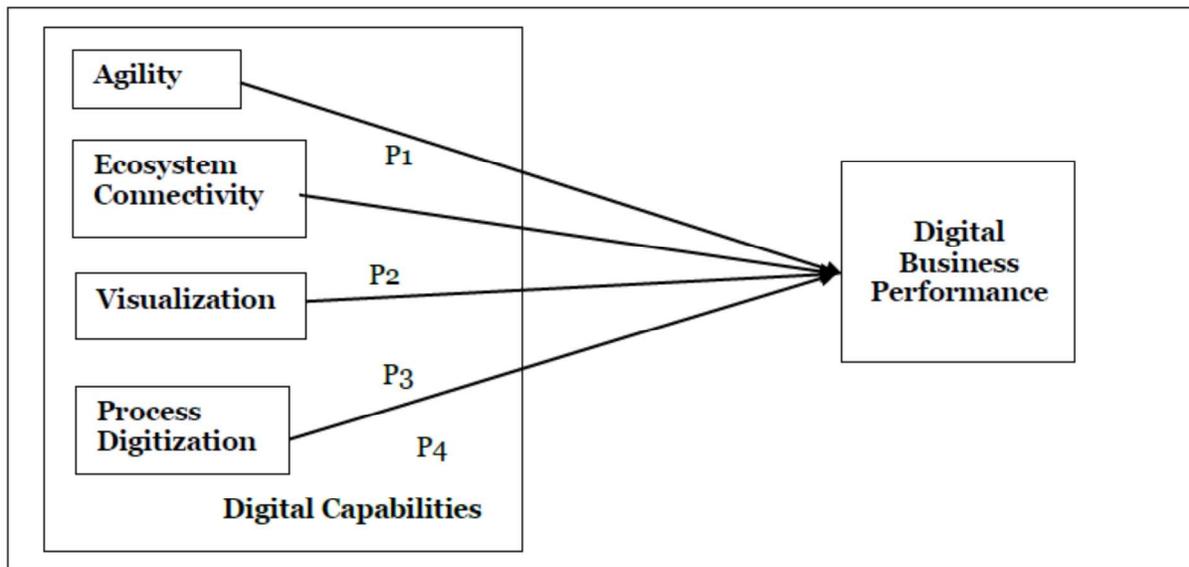
*P3 – Visualization is related to Digital Business Performance*

**Process Digitization**

According to Barnir, Gallagher, and Auger (2003), processes digitization is the transition from running business traditionally to digitally. According to the authors, digital resources obtained through the Internet, although available to all firms, often require unique capabilities that exist more in some firms than in others and offer benefits that are more important to some firms than to others. This would be the process digitization capability.

As a result, the reach of digitized processes ensures more agility in accessing information for the customers and within the firm. This digitization may be related, for instance, to the development / launch of electronic businesses, such as e-marketplace, e-commerce, among others (Koch 2010). Also, according to Barnir, Gallagher, and Auger (2003), process digitization delivers benefits to informational flow in various business sectors, such as marketing and IT. Digitization can be understood in light of the DC theory since it provides integration and reconfiguration of internal and external, contributing to responsiveness to rapid environmental changes. The following proposition is then made:

*P4 - Processes digitization is related to Digital Business Performance.*



**Figure 1- Research Model**

**Methods**

Following the guidelines for developmental mixed-methods studies (Venkatesh, Brown, and Bal 2013), we adopted a qualitative research method first to explore digital capabilities. Here, we present this first part. We conducted interviews with 24 managers and specialists who work in Digital Business.

To Sarker, Xiao, and Beaulieu (2013), there is no recommended number of interviews, but they suggest that the number of interviews must be reported and well-detailed. We selected respondents from native digital companies and traditional ones that started working with digital, such as e-commerce. This sampling of different-sized organizations from distinct industry sectors contributes to the study's analytical generalization (Benbasat et al. 1987). In each case, the respondents are executives in IT, business, and company strategy.

### Data Collection and Analyses

The interviewees were asked a series of questions based on a semi-structured instrument that was developed as Myers (2007) suggests. We prepared beforehand some questions based on the literature review. Three specialists validated the qualitative study's protocol, and, to double check, we conducted a pilot interview before initiating data collection. Only after all these steps were completed did we begin to collect data. Only one researcher conducted all the interviews.

The pilot was conducted at a multinational retail company headquartered in South Brazil. This company is the largest retail clothing company in the country and with the best financial result in the last years. Were interviewed 3 managers with experience in digital business, the CIO, the director of E-commerce and director of Digital Marketing. Subsequent participants were obtained through a snowball sampling of these participants, as well as an advertisement made to the community of a Federal University located in one of the state capitals in South Brazil. We were able to reach out to the authors' networks and reach participants from around the country and made a subsequent snowball sampling of all those contacts. All Interviewees participated voluntarily without compensation. In addition to the experience with digital business, we take into account the characteristics of the companies that work. Companies were chosen according to the following rank: profit, revenue and market share. In the case of e-service companies and the consultant, it was observed whether the companies served met the representativeness indicated above.

The interviews were audio taped, professionally transcribed, and analyzed, according to suggestions by Walsham (2006). The average interview length was 45 minutes, with interviews as short as 28 minutes and as long as one hour and 17 minutes. However, it is worth mentioning that the unit of analysis is the interviewee. The average experience of the interviewees is of 12 years in the area of IT or in digital processes, being the interviewee with less time 6 years ago and the most experienced 27 years ago. A synthesis of our 24 managers and specialists interviewed is provided in Table 2.

Type of enterprise/Rank	Gender/Number of interviewees			Business System/Service	Origin	
	Male	Female	Total		Digital Native	Digital Immigrant
E-Commerce Clothing and Accessories Retail Rank: profit	2	1	3	B2C	X	
E-Commerce Shoes Rank: profit	2	1	3	B2C		X
E-commerce Retail stores groups: electronics and furniture Rank: profit	2	1	3	B2C		X
E-business Ecosystem and marketplace integration Rank: revenue	3	-	3	B2B e B2C	X	
Industry Rank: market share	1	1	2	B2B		X
Private Bank Rank: profit	-	3	3	Financial Service		X
State Bank Rank: profit	2	-	2	Financial Service		X

e-Service Rank: Experience and companies served met the established rank.	3	-	3	IT Solutions	X	
IT Consulting Rank: Experience and companies served met the established rank	1	-	1	IT Consulting		X

**Table 2. Characteristics of respondents**

Finally, we analyzed the results by utilizing the content analysis technique (Bardin 1977). The analysis, with the use of the qualitative analysis software N’VIVO. This analysis was performed by all the researchers, following a qualitative coding analysis protocol developed for this research, which due to lack of space, could not be included here. In summary, the data analysis codes were initially grouped into inductive themes based on the literature, while the data analysis revealed new themes. The analytical categories were established based on this set of themes. For this paper we employed the categories that correspond to digital capabilities (agility – ecosystem connectivity – visualization - process digitization). Next, we present the results.

## Results

This section presents the results from interview analysis. For each category, a table is presented with evidence that aims to verify the relationship between the digital capability and digital business performance and then discussed with the literature. The right column of the table expresses to which degree the evidence and proposition relate, according to the analysis extracted from the N’Vivo program and based on the evidence’s representativeness, according to other managers. We consider high to be when the table brings only three pieces of evidence but is mentioned by more than half, medium when mentioned by six to twelve, and low when mentioned by two to six. Although other pieces of evidence emerged, we opted to present evidence that is mentioned by at least more than two interviewees.

### Agility

Proposition	Interviewee	Evidence	Degree of relation
P1 – <i>Agility is related to Digital Business Performance</i>	CIO of E-commerce Retail stores groups: electronics and furniture	“[...] We talk about agility. We have to capture the latest trend, so there has to be much agility. We have an area that looks at the client, and another market intelligence area that looks at the competition. These are sacred areas, upon first impression, but when we look at them internally, the latest trend has to pass through various other areas, such as style, purchases, production, and even supplier. The supplier has to receive this same information in a nutshell since they have to produce with agility to quickly make the product available to the client.	High
	Industry Digital Marketing Director	Being agile involves generally changing the culture, seeking to digitalize processes. For example, one of our clients decides to open a virtual store, so they need to load our products’ data, such as images, videos, among others. Thanks to the agility that our resources provide, we are able to transmit all these data instantly, and they can load up their site quickly and safely, without losing data, which demonstrates our good performance.	Medium
	CEO of E-business Ecosystem and marketplace integration	A digital business must be agile, so it must always provide the client with a better experience, the ability to obtain product information at any moment, instant customer service, through systems and programs or BackOffice personnel. That is agility to us.	Low

**Table 3. Agility Evidence**

As mentioned by Kohli and Grover (2008), agility is the capability of organizational process flexibility and flexible, fast implementation of operational changes. Agility is the ability to respond to the Market and also internally, according to Setia, Venkatesh, and Joglekara (2013) and Barenfanger and Otto (2015). As we can see in table 3, there are internal and external evidences. Externally, this can be evidenced by declarations made by the CIO and Director of Clothing and Accessories Retail E-Commerce, who remind us that a physical store can change its display window each season or, at most, once a month. A digital store changes every minute according to each client’s characteristics. The E-commerce Director complements by citing that the client previously needed to go to the store to make a complaint. With the digital transformation, the client posts the complaint to the store’s site. Accordingly, digital has enabled consumer empowerment. If a community begins to complain and makes the store apologize or change its attitude, it can viralize in seconds. Thus, whoever wants to have a strong brand has to be more careful and agile, capable of responding instantly, immediately to the client’s needs, whether good or bad.

Internally, agility is observed in various situations, such as decision making. A situation that exposes this internal agility is one related by the CIO, who said that on the day iPhone 7 was launched in Brazil, on-line sales were not being converted. The e-commerce platform’s systems analysis verified that the clients were not buying because of delivery time, which was longer than that of the competition. Immediately, the CIO contacted the CEO and logistics Director and found an alternative to decrease delivery time, which was done on the site, and, minutes later, sales began to increase. All this activity reveals how agility is a digital capability related to business performance.

**Ecosystem connectivity**

Proposition	Interviewee	Evidence	Degree of relation
P2 – Ecosystem connectivity is related to Digital Business Performance	Director of E-commerce Retail stores groups: electronics and furniture	It is very broad. The first big integration of this area of technology with the company’s own ERP system, we have the e-commerce platform and an ERP that manages all of the entire company’s BackOffice, and then we have to relate this ERP to the platform because product registration, financial management of payments, orders, all these mechanisms have to be related to the site. Through it, there exists a very intense integration of these two agents so that the e-commerce system works.	High
	CIO of E-business Ecosystem and marketplace integration	Today, a digital operation is extremely complex. There are more than 200 players connected to one platform. There are payment methods, delivery methods, display windows, risk analysts, recommendation software. In short, there are many partners. To keep that working is very complex, and probably there will be other systems that will have to converse with the platform, ERP, a CRM, and making that stick is a very difficult job. And that is what we focus on, to offer a platform that allows the interconnection of all these actors and systems here.	Medium
	IT Consultant	The big companies’ ecosystems enable organizational performance [...] the platforms that compose the ecosystem generate information on-line to mobile devices, to consolidated Dashboards, which speeds up the directors’ shares, in addition to the stakeholders’ integration, which improves results because it decreases lead time.	Low

**Table 4. Ecosystem connectivity evidence**

The on-line environment is inspired by biological systems and actively populated by agents that enable communities to collaborate. It can also be seen as socio-technical processes that offer ultimately affordable and trustworthy cooperative solutions through investment and engagement by local stakeholders (Gatautis ; Medziausiene 2014). It is supported by a Digital platform that enables a continued connection of all corporate partners beyond the traditional supply chains, including customers (and consumers) (Karimi and Walter (2015; Barenfanger and Otto 2015). It was possible to notice this

throughout the analysis. The digital businesses examined possess this connectivity capability through the ecosystem, and it is directly related to business performance, which can be verified by evidence in Table 4.

**Visualization**

Proposition	Interviewee	Evidence	Degree of relation
P3 – Visualization is related to Digital Business Performance	Industry IT Manager	We now have hourly sales reports, sms and e-mail. Besides, every morning, we have all the previous day’s sales volume, and those reports have graphs and are on the managers’ IPads.	High
	Digital Business Manager of State Bank	The bank has developed solutions for clients and our internal team. We are always analyzing the market. Now, Fintechs exist. We have to be fast, and the client must be satisfied. One example is our applications, that make it possible to access account data and perform practically all financial operations and communicate with the bank, e.g. every transaction the client receives a sms, so he can confirm or not the operation, which increases the security and confidence of the client.	Medium
	CEO of E-Commerce Shoes	Everyone involved in the ecosystem receives an access level and, with it, can give and receive input, participating and viewing information flow according to each one’s role in the ecosystem, including product development. For example, last month, a director went to a shoe fair in Milan. There, he saw the trends, such as design and colors, sent photos from his cell phone to an internal communication system, and discussions to develop those shoe and color trends began, with everyone’s participation. This reduces time, costs and improves productivity.	Low

**Table 5. Visualization evidence**

The evidence indicates that visualization is the capability to display business information visually, presenting data and information in an appropriate format, as defined by Yoo et al. (2012). Moreover, data and information are available in all adequate platforms such as laptops, mobile devices, and websites (Bacic and Fadlalla 2013; Barenfanger and Otto 2015). The relation to performance is clear in the declarations made by the CEO of Shoe E-Commerce. The bank directors also corroborated this affirmation.

**Process Digitization**

Proposition	Interviewee	Evidence	Degree of relation
P4 - Process digitization is related to Digital Business Performance.	CEO of E-commerce Retail stores groups: electronics and furniture	Our processes are digitalized, and that reflects in the results. For example, product restocking was manual. What we sold would come out from there. Someone there would decide how to buy and make the purchase orders. With our digital transformation, we only need to program the system and follow the stock levels, and the system sees how much sells and restocks, even suggesting: do not even restock this product here anymore because we are having market difficulties. So, this process digitization reduces costs and lead time. We do not need to make any more manual decisions based on outdated reports.	High
	Director of E-Commerce Clothing and Accessories Retail	Process digitization affects information flow. For example, if we look ten years ago when we began this E-commerce operation, there was no payment gateway. There was no online reconciliation of payments at the firm. Reconciliation was manual, was done by the financial office manually, so there was no online reconciliation. There were no automation rules for order approval. For example, when a credit card order would	Medium

	come in, analysis of that credit or that card's risk was made totally manually. The firm needed to adapt to digital solutions, to bring that to the e-commerce universe, to improve the flow of the e-commerce process. So, many things that were before manual at the firm, we began to bring to the digital universe precisely due to the necessity of E-commerce.	
IT Consultant	Process digitization allows information to flow more quickly. Software will permit decisions to be made more quickly and more precisely, will execute part of the work, will be supplied data analysis. In short, it will speed up decisions. It is a question of survival. We cannot be slow, and there is no way to be fast doing things manually. Process digitization is the result of the search for efficiency. If one is not competitive, there will be no margin, because on one end, who makes the price is the consumer, and they want quality. Process digitization synonymous with quality; it is a question of survival.	Low

**Table 5. Process digitization evidence**

The evidence featured unveils a palpable relationship between process digitization and business performance, highlighting the flow of information, improvement in data quality, reductions in costs and lead time, coinciding with what Koch (2010) affirms. This capability also meets the Dynamic Capabilities criteria that contributes to a quick response to the environment.

### ***Synthesis of the relationship between Digital Capabilities and Digital Business Performance***

It is possible to verify that Digital Capabilities impact digital business performance. Based on these evidences all of the propositions are confirmed, and we can highlight that each capability influences in more than one element of business performance. It is important to remember that the evidences presented in this paper are the synthesis of each result.

Agility creates business value, increases all the stakeholders' satisfaction, mainly the clients, and speeds up decision making. The Ecosystem's connectivity allows integration and connection to all the business's systems, thereby improving communication, information flow and promoting better internal collaboration. Visualization improves internal and external communication and reflects positively on information flow and quality. Finally, process digitization leads to reduction in lead time and restocking, impacting the final consumer's satisfaction. It also contributes to internal collaboration and improves the quality and security of data and information.

### **Conclusions**

To sum up the paper and study results, it is possible to identify the relationship between digital capabilities and performance. We aimed to understand which digital capabilities enable better digital business performance.

The study presents evidence that agility, ecosystem connectivity, process digitization, and visualization influence Digital Business performance. The company's agility allows for fast decision making, and that impacts the client's satisfaction and the company's image. Ecosystem connectivity enables collaboration, among other aspects, and improves internal communication, but it requires platforms interconnected to e-commerce. Process digitization improves informational flow and the quality and security of data and information. Finally, visualization is tied to agility, making the company act quickly, providing data and information that can be accessed by stakeholders, according to each one's level, consequently leading to the client's satisfaction and reducing operating times and costs, according to the presented evidence.

This paper contributes to the academic field by offering the conceptualization of digital capabilities, a theoretical model (figure 1) and the preliminary results from the qualitative part of the study. These results indicate not only the next steps to be taken in this research, but offer insights for other researchers

and for IS research as a whole. The practical value of this research rests on demonstrating the relation between digital capabilities and the digital business performance model.

This study's main limitations are its being a qualitative study, which cannot be generalized, and that the capabilities' impact on digital business cannot be measured quantitatively.

Therefore, in future studies, verification of the model through qualitative research that identifies each digital capability's level of impact on Digital Business performance is suggested. It is also suggested that this study encompass other digital businesses other than e-commerce.

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