

IT CAPABILITY AND ITS RELATIONSHIP WITH BOTH INFORMATION QUALITY AND INFORMATION SERVICE QUALITY IN A DIGITAL BUSINESS CONTEXT

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INTRODUCTION

High investments in Information Technology (IT) show a significant change in the IT usage pattern from the simple automation of tasks to the improvement of the organizational processes (Samhan, 2017). Firms use IT to increase the effectiveness and efficiency of employees and operations, reducing costs, and creating innovative and new applications that lead to advantage (Hemmatfar, Salehi & Bayat, 2010). The usage of IT with this focus brought to light the concept of Information Technology Capability or IT Capability.

From the theoretical perspective of the Resource Based View (RBV) (Penrose, 1959; Barney, 1991; Peteraf, 1993), the term IT Capability is the ability of a company to acquire, deploy and leverage IT-related resources in combination with other resources and capabilities in order to achieve its business goals (Bharadwaj, 2000; Zhang, Sarker & Sarker, 2008; Rai et al., 2012). IT capability focuses on information technologies, composed by: hardware, software, and network, although the whole information processing capacity involves much more instruments of structure, such as human efforts, committees and teams for example (Karaawi & Huimin, 2018).

IT capability may directly influence performance as an organizational capacity the role of the IT capability is to support activities by providing IT resources and ensuring the integration with other relevant resources (Lee, Sambamurthy & Zmud, 1997; Bharadwaj 2000; Chae, Koh, & Park, 2018). However, there is evidence that IT capabilities may also contribute to information quality and to information service quality rather than merely supporting the organizational activities. Studies indicate that IT capabilities could, for example, facilitate the acquisition of large amounts of relevant and reliable customer data and customer information. Furthermore, some studies questioned the ability of IT to contribute pointedly to the goal of a company. This phenomenon is called “paradox of productivity. Now a Days, recently researches have shown the constant importance of IT in making business value and competitive advantage for companies. IT has become a basis of progress (Jacks, Palvia, Schilhavy & Wang, 2011; Tohidi, 2011).

These data and information includes demographics, purchasing habits and levels of satisfaction with services (Varadarajan & Yadav, 2002; Nakata, Zhu & Kraimer, 2008). The IT capabilities can also assist in data sharing with stakeholders, in decision making, in problem solving and in planning by providing the correct and necessary information (Yu, Chavez, Jacobs, & Feng, 2018). However, few academic studies have investigated the relationship between these elements. Moreover, those studies that do so neither investigate the relationship of the IT capability to either information quality or information service quality, nor do they address the influence that information quality and information service quality have on the relationship between IT capabilities and firm performance.

Furthermore, is important to notice the impact of digital business models and the impact of IT on digital business in these days. According to a research from IDG Communications, 89% of companies have plans to adopt or have already implemented a digital-first business strategy, 95% are start-ups. Moreover, some examples of top technologies already implemented are: big data/analytics (58%) and mobile technologies (59%) (IDG’s 2018 state of digital business transformation, 2018). Some companies have achieved incredible success developing this kind of business model (Alcácer, Cantwell, & Piscitello, 2016), as a good example of this is “Uber”

who developed an online platform and enables its users to offer, share and request a ride, as a digital taxi booking (Mittendorf, 2017).

Given the importance of the issue and the lack of related research, there is a need to analyze: (1) the relationship of IT capabilities to both information quality and to information service quality provided by companies in order to understand whether and how IT capabilities influence them, and (2) how IT capabilities influence firm performance through information quality and information service quality. Hence, this study aims to fill this gap and seeks to answer the following questions: is the IT capability related to both information quality and information service quality in a digital business context? And, Is the IT capability related to firm performance, either directly or through information quality and information service quality in a digital business context?

In the next section, we present the theoretical development followed by conceptual-theoretical and research model, method, contributions, limitations and guide for further research. Into the theoretical development we first present the concepts of information technology and capability.

1 THEORETICAL DEVELOPMENT

In this section we present the literature review. We started with concepts of information technology capability, followed by information quality and information service quality, firm performance and digital business.

1.1 Information Technology Capability

Studies that address the topic of IT Capability are mainly concerned with discussing its impact on the organization, which can be seen, for example, through firm performance (systems performance) (Thambusamy & Palvia, 2011; Queiroz, Tallon, Sharma & Coltman, 2018), organizational agility (Liu et al, 2013), the effect on the capital market (Schaefferling, Wagner & Becker, 2012), the intangible value of the firm (Huang et al., 2006; Liu, Lu & Hu, 2008; Mishra, Modi & Animesh, 2013) and competitive advantage (Chae, Koh, & Park, 2018).

However, the relationship of the IT capability to both information quality and information service quality is rarely and only fleetingly mentioned, as is the influence information quality and the information service quality have on the relationship between IT capabilities and firm performance.

Regarding the dimensions of the IT capability, the academic articles do not follow a consistent pattern. Here, due to their suitability to the digital business context and to the aims of the present study, a set of widely adopted dimensions (Bharadwaj, Sambamurthy & Zmud, 1999; Araújo, 2002; Zhang, Sarker & Sarker, 2008; Hecht, Wittges & Krcmar, 2011) will be employed, as explained below:

1. IT business partnerships: the ability to foster partnerships between technology providers (IT teams) and technology users (business unit managers), encouraging risk sharing and experimentation.
2. External IT linkages: technology-based links between the company and its business partners (customers, suppliers and others).
3. Business IT strategic thinking: the managerial ability to imagine how IT contributes to business value, as well as the ability to integrate IT planning with business strategies.

4. IT Business process integration: the ability to adapt the existing business and IT work processes to continuously improve their efficiency and effectiveness, as well as influence emerging IT capabilities.
5. IT management: activities related to IT function management, such as the IS planning and designing, the delivery of IS applications, IT project management and the planning of standards and controls.

1.2 Information Quality and Information Service Quality

The concept of information quality is subjective and difficult to define. For Wang and Strong (1996), information that has quality is that which is suitable for consumers use. While for DeLone and McLean (2003) and Landrum and Prybutok (2004), the concept refers to the information quality of products or services.

Many studies adopt a multi-dimensional approach to the information quality construct. Wang, Reddy and Kon (1995), when addressing quality indicators, Wang and Strong (1996), in dealing with data quality, and Wang (1998), focusing on the perspective of information quality management, refer to, among other dimensions: accuracy, volatility, completeness and accessibility. Yang et al. (2005) address usability, usefulness, adequacy, accessibility and interaction in their study about the information quality of websites.

One of the most important facts is that information quality dimensions can ensure that an organization has a good level of information to support their decisions. That's occur because decisions only might be considered as good if the information with the company gathered and considered was good. (Shamala, Ahmad, Zolait, & Sedek, 2017)

Information service quality o can be defined as the comparison between the information services the customer feels should be provided and what is actually delivered (Grönroos, 1984; Parasuraman, Zeithaml & Berry, 1985) in terms of accuracy, volatility, consistency, accessibility, usefulness, ease of understanding, ease of use, adequacy, interaction, etc. (Wang, 1998; Jeong & Lambert, 2001; Yang et al., 2005) or in terms of reliability, responsiveness, empathy, assurance and tangibles (Pitt, Watson & Kavan, 1995; Watson, Pitt & Kavan, 1998; Delone & Mclean, 2003; Zhu & Nakata, 2007; Miller et al., 2008).

The studies that address information quality and information service quality are mainly concerned in discussing scales, such as the most widely adopted: SERVQUAL (Watson, Pitt & Kavan, 1998; Landrum & Prybutok, 2004; Miller et al., 2008;) which includes the items reliability, responsiveness, empathy, assurance and tangibles. Regarding information quality, several studies (Wang, 1998; Pipino, Lee & Wang, 2002; Fehrenbacher & Helfert, 2008; Blake & Mangiameli, 2011; Gorla, Somers & Wong, 2011) refer to the dimensions: completeness, accuracy, volatility, conciseness and consistency. In view of the fact these elements meet the purpose of this study and fit the context of digital business, we have adopted them as dimensions of information service quality and information quality.

Some recently researches used the SERVQUAL (Meng & Zhou, 2016; Diallo & Seck, 2018), however none of these studies investigate the relationship between IT capability and both information quality and information service quality. Furthermore, these studies do not investigate the influence of information quality and information service quality on the relationship between IT capability and firm performance.

1.3 Digital Business

Studies that address the topic of digital business commonly include one of the following key concepts: the digital business ecosystem, digital business strategy and digital business models, each of which is explained below.

A digital business ecosystem is a transparent and self-organized virtual environment in which open relations are established among committed and cooperative entities, thus determining their interaction and the sharing of knowledge (Baggio & Chiappa 2013). Accordingly, a digital business ecosystem is flexible and based on the proactive and responsive collaboration of the parties involved (Hussain et al., 2007).

A digital business strategy consists in moving from a situation where the IT strategy is subordinated to the business strategy to one where the two are fused. From this point of view, the strategy is formulated and implemented to take advantage of digital resources and to create differential value (Brousseau & Penard, 2007a).

Finally, digital business models can be defined by their distinct abilities to create and efficiently accumulate knowledge. Differences between models are the result of individual incentives to share information with others, and the capacity of each innovative individual to access and retrieve relevant information and knowledge (Brousseau & Penard, 2007a).

Based on the above-mentioned conceptualizations and the opinions of international experts in the field of IT/IS, it can be said that digital businesses are those in which:

- The interaction with stakeholders occurs by means of a digital interface, through the use of ‘digitalized’ and shared digital platforms and digital technologies.
- The obtainment, use and distribution of knowledge and information, and even the work processes are ‘digitalized’.

From these elements, it can be said that digital business involves the adoption of standards for the entire community of digital businesses, with the aim of enabling interconnection with several partners without the need for adaptation. Furthermore, they may include, among other tools, flexible platforms, social networks, digital marketing, big data and cloud computing (McKinsey & Company, 2012; Bharadwaj et al., 2013a).

In a context of digital business, until now, no studies have investigated the relationship of the IT capability to both information quality and information service quality. Accordingly, there are no studies that investigate the influence information quality and information service quality have on the relationship between IT capability and firm performance. To complement the literature review we present the conceptual-theoretical and research model in the next section.

2 CONCEPTUAL-THEORETICAL AND RESEARCH MODEL

Below, the theoretical-conceptual model of the study is presented (figure 1), in which the Resource-Based View (RBV) (Barney, 1991) is used as a lens to view the research elements (IT capability, information quality, information service quality and firm performance) as well as the digital business context:

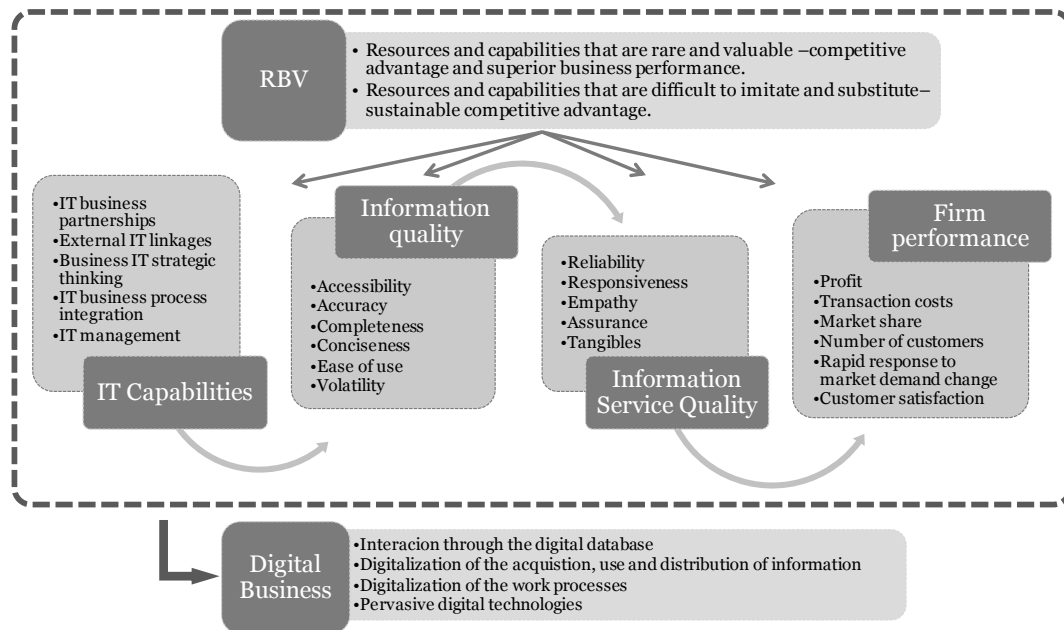


Figure 1: Conceptual-Theoretical Model

Source: created by authors

In addition to conceptual-theoretical model, we present the research model (figure 2) in order to solve the main objective: understand the relation of IT capacities with the information quality and the information service quality in the context of digital business, under the theoretical lens of the RBV. Followed by the study propositions associated with evidence in the literature (table 1).

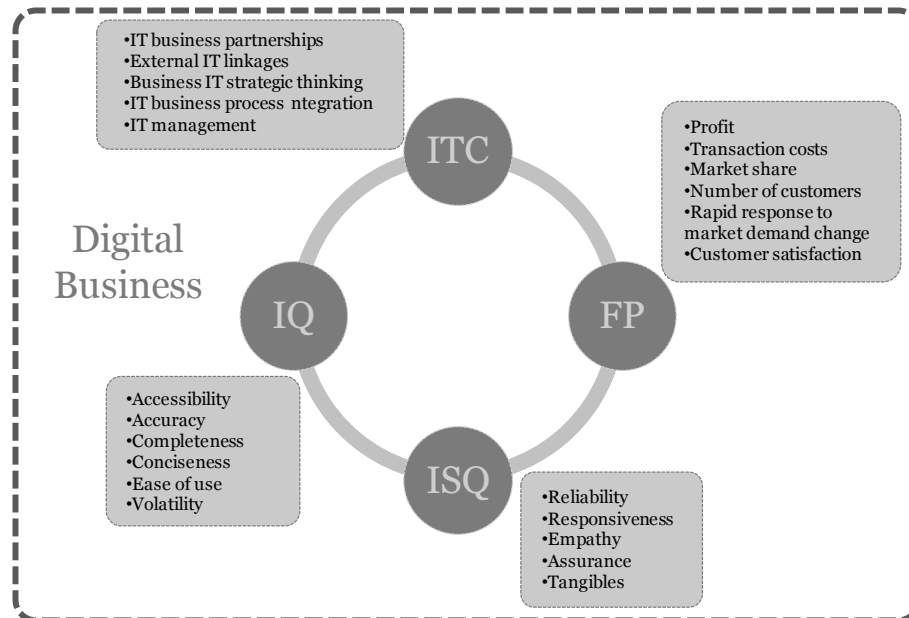


Figure 2: Research Model

Source: created by authors

| Proposition: | Evidence in the Literature: |
|---|---|
| P1: IT Capabilities are related to Information Quality. | Varadarajan and Yadav (2002) Nakata, Zhu and Kraimer (2008) |
| P2: IT Capabilities are related to Information Service Quality. | Varadarajan and Yadav (2002) Zhu and Nakata (2007) Nakata, Zhu and Kraimer (2008) Thambusamy and Palvia (2011) Chen and Tsou (2012) |
| P3: IT capabilities, related to other capabilities and resources, enable reach better information quality. | Varadarajan and Yadav (2002) Nakata, Zhu and Kraimer (2008) |
| P4: IT capabilities, related to other capabilities and resources, enable reach better information service quality. | DeLone and McLean (1992) Zhu and Nakata (2007) Nakata, Zhu and Kraimer (2008) |

Table 1: Propositions of the study

Source: created by authors

3 METHOD

To answer our research question, we adopted an exploratory and qualitative research method and the research strategy employed is a multiple-case study. To do so, we conducted interviews with managers and specialists who work in digital business. The respondents are from native digital companies and traditional ones who have digital processes that involves create and share information and knowledge with their stakeholders. This sampling of companies contributes to the aim of the study.

3.1 Research Strategy: Case Study

We applied several techniques to ensure the quality of this research: the development and use of a case study protocol, in order to ensure the reliability of the study. The units of analysis are organizations, since the theoretical lens adopted (RBV) uses them as level of analysis; and the use of multiple sources of evidence (interviews and document analysis) to triangulate the findings and obtain construct validity (Yin, 2010).

In line with the study questions, we selected this research strategy for the reason that it might facilitates the understanding of complex social phenomena and allows questions such as ‘how’ and ‘why’ to be answered when exploring situations in which the evaluated intervention does not have a single clear set of results. When preparing the theoretical background, it was decided to develop theoretical propositions to guide the data collection and the data analysis (Yin, 2010).

The sampling of managers and specialists who work in digital business allows our research to predict similar results (literal replication) as well as produce contrasting results, although for predictable reasons (theoretical replication). Thus, it is intended to ensure the representativeness of the cases in relation to the research topic (Yin, 2010).

3.2 Data Collection and Analysis

To collect data, triangulation through multiple sources of evidence, such as in-depth semi-structured interviews and document analysis are used. We organized interviews with 12 managers (CEO, Business Managers and IT Managers) from South Brazil who work in digital business

from native digital companies and traditional ones. Subsequent participants were obtained through a snowball sampling of these participants. All interviewees participated voluntarily without compensation.

To complement our analysis, documents produced by people with direct experience of the phenomenon under study (primary source) that contribute and expand the evidence obtained from the interviewees were used, including texts published in the media such as, letters, memos, internal and external reports, statistics, and other types of records organized in databases.

A descriptive analyze are employed, thus highlighting the frequency of the coded features, through empirical comparison of texts from different cases. Following the steps recommended by Bardin (2011) and Bauer and Gaskell (2013), a codebook adjusted to both the theory and the findings was be drawn up.

The pilot interview was conducted to identify the reliability of the codes and validate the interview protocol. The first case selected was a collective-purchase site from Rio Grande do Sul state. The company was bought by American giant “Groupon” but maintain his original name. Three managers were interviewed with experience in digital business: two business manager and one IT manager.

After both the interview and with the protocol validated we conducted the next interviews with other three companies, the complete descriptions of our 12 respondents might be seen in table 2. The interviews were audiotaped, professionally transcribed, analyzed and conducted by the first author. In the next section we present the results for each proposition.

| Case | Type of Enterprise | Interviewee Position |
|----------------------------|---|--------------------------------------|
| A (Pilot) | Collective-purchase site (company is part of American giant “Groupon”) | Business manager (founding partner). |
| | | Business manager (founding partner). |
| | | IT Manager (founding partner). |
| B | Provider of mobile services (focuses on task automation) | CEO (founding partner). |
| | | IT Manager. |
| | | Business coordinator. |
| C | Information portal (one of the most important entertainment and local news portal of Brazil). | Business manager. |
| | | Business coordinator. |
| | | IT Manager. |
| D | Technology solutions (American company leader in servers sales at Brazil) | Business manager. |
| | | IT Manager. |
| | | IT Manager. |

Table 2: Characteristics of Respondents

Source: created by authors

Furthermore, for each category was applied a level of importance criteria according to the relevance established by the interviewees in each case and the analysis extracted from the “MAXqDA” program. One category might be defined as “strong”, “medium” or “weak”. Regarding to the level of importance was defined the conclusion of proposition: 1) supported: if more than half of categories were strong and there were not two weak; 2) not supported: if more than half of categories were weak and there were not two strong; 3) partially supported in the other cases.

4 RESULTS

Concerning the categorization process, a mixed model was adopted, in which categories we selected a priori. The categories are homogeneous, complete, exclusive, objective and appropriate to the content of the messages and the purpose of the research (Bardin, 2011). The results of each case study and the conclusion for each proposition might be seen in table 3. It's important to highlight that proposition 1 and 4 are partially supported and the proposition 2 and 3 are supported in some cases and partially supported in others. Therefore, in our research none proposition was rejected.

| Degree of Importance of Early Categories: | Proposition 1: IT capabilities are related to information quality. | | | | Conclusion: |
|---|---|---------------|--------|---------------|--|
| | Case A | Case B | Case C | Case D | |
| Internal partnerships | Strong | Strong | Medium | Strong | Partially Supported. |
| External Partnerships | Medium | Strong | Medium | Medium | |
| Strategic thinking of IT business | Strong | Medium | Medium | Strong | |
| IT Business Process Integration | Weak | Medium | Medium | Medium | |
| IT Management | Weak | Medium | Medium | Medium | |
| Degree of Importance of Early Categories: | Proposition 2: IT capabilities are related to information service quality. | | | | Conclusion: |
| | Case A | Case B | Case C | Case D | |
| Internal partnerships | Weak | Strong | Medium | Strong | Partially Supported: A e C. |
| External Partnerships | Strong | Strong | Medium | Medium | |
| Strategic thinking of IT business | Strong | Strong | Medium | Medium | Supported: B e D. |
| IT Business Process Integration | Weak | Medium | Medium | Strong | |
| IT Management | Strong | Medium | Medium | Strong | |
| Degree of Importance of Early Categories: | Proposition 3: IT capabilities, related to other capabilities and resources, enable reach better information quality. | | | | Conclusion: |
| | Case A | Case B | Case C | Case D | |
| Marketing | Strong | - | - | - | Partially Supported: A, B e C. |
| Commercial | Medium | - | - | - | |
| Communication | - | Medium | - | - | |
| Customer relationship | - | Medium | | Strong | Supported: D. |
| Culture | - | - | Medium | - | |
| Human Resources | - | - | Medium | Medium | |
| Business | - | - | - | Strong | |
| Degree of Importance of Early Categories: | Proposition 4: IT capabilities, related to other capabilities and resources, enable reach better information service quality. | | | | Conclusion: |
| | Case A | Case B | Case C | Case D | |
| Analytics | - | - | - | Strong | Partially Supported. |
| Commercial | Medium | - | - | - | |
| Communication | Medium | Medium | - | - | |
| Customer relationship | - | Strong | - | Medium | |
| Culture | - | - | Medium | - | |
| Human Resources | - | - | Medium | Strong | |
| Logistic | - | - | - | Medium | |
| Legislation | - | - | - | Medium | |
| Outsourcing infrastructure | - | - | - | Medium | |

Table 3: Summary of Study Results

Source: created by authors

Followed by the results of the propositions we presented the conclusions and contributions of this research. We structured the conclusions as theoretical and managerial contributions.

5 THEORETICAL AND MANAGERIAL CONTRIBUTIONS

This research contributes to both academic and business knowledge. Following one of our research questions, this study aimed to investigate the relation between IT capability and the information quality and information service quality in a digital business context. For that reason, IT capabilities dimensions present in the literature have been cross-referenced, revealed and combined with the information quality and information service quality.

Another academic implication of the study is the procedure in the content analysis of the interviews. We presented a broad review of the literature and a well-defined coding script that can serve as a model for future research.

In business terms, our study extend which elements of IT capabilities and other capabilities digital business organizations should focus to reach better information quality and information service quality. Furthermore, our results confirmed the influence that information quality has on the information service quality and support the findings of previous research showing the importance of information quality to help executives decision-making (Shamala, Ahmad, Zolait, & Sedek, 2017).

Finally, in answering the second research question, this study explains the importance of investing in IT capability for digital businesses because it increases firm performance in several ways (Kmieciak, Michna & Meczynska, 2012; Liu et al., 2013). Moreover, considering IT can be an import differential in firm performance, changing business processes and more (Chae, Koh, & Park, 2018), our study provides an opportunity to reflect on these current topics in the contemporary business context.

6 LIMITATIONS AND FURTHER RESEARCH

First, the study present companies from one location (South Brazil). We suggest that future research should consider replicating this study in other countries and different companies. Furthermore, this research focuses on the elements of IT capabilities and their relationship with other dimensions (information quality and information service quality). Thus, these two elements were not dismembered in items, which may have partially compromised the explanatory power of the relations studied.

Third, this study investigated similar companies that have information or the information service as a product, in order to obtain convergent results and, thus, similar predispositions literal replication). Thus, the divergent findings were not expanded.

Moreover, it's important to highlight the limitations related to the concept and definition of the digital business profile. This theme is commonly addressed in the literature as "business digital ecosystem", "digital business strategy" or "digital business models" so it became necessary to grasp the concept of digital business from findings in the literature. To mitigate this adversity, we consulted IT and IS specialists. Future research might consider do a systematic literature review and/or interview more IT and IS specialists to find a general concept.

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