



Structuring Information Management Capability to Build Data Monetization: a Conceptual Model

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Abstract

The organizations that want to successfully monetize data need to build and consolidate data science capabilities and skills. However, the ability to create value and monetize data is still relatively underexplored in the IS literature. Given the importance of resources and abilities for the generation of data monetization capabilities, we develop a conceptual model based on Dynamic Capabilities (DC) to examine the skills necessary to develop Information Management and Data Monetization Capabilities to enhance Business Performance. Based on the IS literature and qualitative interviews with data analytics and business experts, we developed a set of hypotheses about the capabilities and resources that facilitate data monetization. The paper provides an understanding of the elements that are still incipient in the data monetization literature, being recommended to both IS academics and practitioners. We expect this model can help organizations to identify and analyze what types of skills should be combined for the monetization process and also help them to develop Information Management and Data Monetization Capabilities, leading data-driven organizations to effectively monetize their data to improve their business performance.

Keywords: Capability, Information Management Capability, Data Monetization, Performance.

1 Introduction

How much is your data worth? Which capabilities increase data value and how? There has been considerable debate among practitioners and academics regarding these questions, particularly the direct sale of data controlled by organizations – direct data monetization (Najjar and Kettinger, 2013; Alfaro et al. 2019; Wixom and Ross, 2017). However, today, indirect data monetization enables leaders to combine data capabilities with data from several sources to gain insights into how to improve business agility and performance (Faroukhi et al. 2020a; Parvinen et al. 2020), for example, by reducing costs, fraud, waste, and risks while improving revenues, supply chain partnerships, customer service, market share, and customer loyalty (Laney, 2020; Alfaro et al., 2019; Hanafizadeh and Harati Nik, 2020).

Data value can be constantly increased by securing greater insights into business ecosystems, sharing data with third parties, or enriching the data. The Information Systems literature has shown that organizations that want to successfully monetize data need to build and consolidate data science capabilities and skills (Faroukhi et al. 2020a). One of these is the Information Management Capability (IMC), which according to Grover et al. (2018) involves managing and analyzing data, and creating new insights that allow companies to obtain competitive advantages and enhance their performance by combining resources to generate organizational capabilities, and deal with turbulent business environments (Jung et al. 2007; Kettinger et al., 2021).

Mikalef et al. (2020a) point out that a large number of published studies emphasize the importance of an organization's ability to use big data analytics, indicating that well-structured capabilities will result

in higher levels of competitiveness (Côte-Real et al. 2020; Mikalef, Krogstie, Pappas and Pavlou, 2019). These capabilities are supported by a technological infrastructure that allows companies to store and process data, and develop the skills and knowledge needed to convert data into valuable insights (Gupta and George, 2016). Despite the acknowledged importance of converting people's data and knowledge into business insights (Kettinger et al. 2021), no empirical models related to data monetization capability were found in the academic literature. Thus, to address this research gap, given the importance of resources and abilities for the generation of data monetization capabilities, this study provides a conceptual model designed to help companies to develop information management and data monetization capabilities. To do so, Dynamic Capabilities (DC) are adopted to shed light on the capabilities needed for data monetization. From a practical point of view, it provides professionals with a guide to abilities that they need to consider when planning for data monetization.

2 Theoretical Background

We apply a deductive approach grounded in Dynamic Capabilities (DC) as a theoretical lens in this research. DC allow the assessment of organizational capabilities by investigating how resources can be enhanced to improve performance (Mikalef et al. 2017).

Following the literature, DC offer an explanation of the cost-effective attributes of organizational capabilities generated through big data analytics (Mikalef et al. 2017; Makadok, 2001). This approach goes beyond the Resource-based View (RBV) by considering that other attributes must be associated with the ability to create a competitive advantage in a dynamic environment (Brinkhues et al. 2014). DC deal with a company's ability to respond to a changing environment (Teece et al. 1997; Eisenhardt & Martin, 2000) and describe the skills needed to integrate, build, and reconfigure internal and external skills in response to rapid changes (Toigo et al. 2021; Côte-Real, Oliveira and Ruivo, 2017; Teece et al. 1997).

In this sense, environmental dynamism must be observed by organizations because it is related to the speed and unpredictability of environmental and technological changes, unexpected actions by competitors, and changing customers' intentions as well (Lin et al. 2020). Previous research in the IS domain indicates that in a dynamic environment, IT resources are effective in helping companies to perceive market changes and thus find opportunities that really affect financial performance (Lin et al. 2020). A company's ability to respond to change (Dynamic Capacity) incorporates skills and knowledge built into the organization seeking to modify existing resources and create value (Day, 2014; Teece, 2007), resulting in a competitive advantage for the business (Ambrosini & Bowman, 2009).

2.1 Information Management Capability (IMC)

Information Management is considered an important organizational capability that indicates the ability to use valuable resources combined (Jarvenpaa and Leidner, 1998). Kettinger et al. (2021) define Information Management Capability (IMC) as a company's ability to improve IT, data, and people's information usage behaviors seeking to provide accurate and valuable information for the company to improve its business performance. This construct should also be considered in the contexts of Big Data and Analytics (Ali and Khan, 2019) as it indicates a relationship between skills and firm performance (Mikalef et al. 2018). Thus, a company's IMC can lead to the development of organizational capabilities that increase business performance (Kettinger et al. 2021).

IMC has as a premise provides required insights for Big Data strategies to be successful (Maçada et al., 2020) and can be operationalized as the ability to (1) deliver data and information for users with accuracy, punctuality, reliability, security, and confidentiality; (2) provide universal and access connectivity with sufficient range; and (3) adapt infrastructure to emerging business needs (Marchand et al., 2000). However, little research has explored the factors that lead to improving IMC (Kettinger et al. 2021). Mithas et al. (2020) indicate the role of IT-enabled IMC and point to the need for research on performance impacts. In addition, Maçada et al. (2020) also showed that IMC has a positive-effect on business performance (Carmichael, Palacios-Marques and Gil-Pechuan, 2011; Mithas, Ramasubbu, and

Sambamurthy, 2011) which can be seen directly (Carmichael et al., 2011) or mediated by organizational skills (Maçada et al. 2020; Ali and Khan, 2019; Mithas et al. 2011).

According to Mithas et al. (2020), companies need to develop capabilities to take advantage of the strategic value of information. In this sense, several organizational IT-enabled capabilities have been extensively studied in the literature (Kettinger et al. 2021; Yasmin et al. 2020; Park and Mithas, 2020) with a theoretical lens centered on IT capability (Yasmin et al. 2020). Although IT-enabled capabilities can be launched with digital technologies (Nwankpa and Roumani, 2016), there is still a limited understanding of how companies can translate the potential of these digital technologies into changes in business operations and business value (Hanelt et al. 2021).

Thus, managing information means combining a resource with other organizational resources and capabilities to develop tasks (Kettinger and Marchand, 2011). In this sense, this study presents four important variables identified in the IS literature denominated as Information Management Capability: Data Enrichment, Analytical Skills, Technical Skills, and Data Governance (Table 1).

Definition	Authors
Data Enrichment – Creates value from multiple data sources (internal or external) by treating, transforming, and cleaning data for economic benefits	Parvinen et al. 2020; Baecker et al. 2020
Analytical Skills – Analysis and interpretation applied to Big Data to extract information that generates value for the company and obtain a competitive advantage	Najjar and Kettinger, 2013; Grover et al. 2018; Ghasemaghaei et al. 2018; Mikalef et al. 2017
Technical Skills – Knowledge necessary to use recent technologies for collection, storage, recovery, and analysis of various data types available	Najjar & Kettinger, 2013; Ghasemaghaei et al. 2018; Mikalef et al. 2017; Gupta and George, 2016
Data Governance – structures, procedures, and functions to allow the necessary data flow, considering aspects of safety, privacy, ethics, and quality of data	Mikalef et al. 2020; Parvinen et al. 2020

Table 1. Constructs and definitions of Information Management Capability

2.2 Monetization Capability

Moore (2015), at the Gartner Institute, introduced two types of data monetization: direct monetization and indirect monetization. In the direct method, the data is sold, while in the indirect method, the product or service based on the data is sold. For Najjar and Kettinger (2013), data monetization is defined as the conversion of the intangible value of data into real value, usually with the sale of data and/or other tangible benefits. More recently, Parvinen et al. (2020) defined monetization as the direct or indirect conversion of data into financial capital. Data monetization perceives data as an intangible asset that provides opportunities to create and capture value through new ways of exploiting, collecting, and organizing data (Parvinen et al., 2020). From an analytical point of view, before data can be monetized, it needs to be discovered and analyzed before going through the value creation process that involves different technologies and business know-how (Najjar & Kettinger, 2013). Thus, for Najjar and Kettinger (2013), it is important to assess the technical (data infrastructure) and analytical (human) capabilities of the company to determine which strategic path a company should choose to monetize data.

Ghasemaghaei et al. (2018) state that companies need to improve their data analysis competence to make better, more informed, and faster decisions, being increasingly necessary the development of capabilities to integrate, gather, and apply valuable resources (Pralhad and Hamel, 2006). Thus, this paper adopts the term Monetization Capability to mean the ability to create value for organizations, through the development of skills that enable enhanced corporate performance such as increased revenue, reduced costs, improved internal and external processes, improved relationships with customers and stakeholders, customization and the development of new products and services. Here, we propose two skills linked to data monetization capability, namely insights and business agility, which are considered essential for enhancing business performance.

According to Mikalef et al. (2020a), companies must strategically plan and execute data analysis projects and gather the necessary resources to transform data into insights. By doing so, they will be able to identify areas within their business that can benefit from data-driven insights (Gupta and George, 2016; Vidgen et al. 2017). These are becoming increasingly important, particularly for organizations in dynamic business environments, where making informed decisions is essential (Wamba et al. 2017; Mikalef et al. 2019a). Despite the importance of obtaining insights, the literature is not clear about how insight generation practices can be defined and developed (Schulte and Hovorka, 2017). Jiang and Gallupe (2015) point out that there is a significant gap between the analysis provided by experts or tools used and the actual business needs, and that simply implementing analytical tools will not bring valuable insights to organizations. Therefore, the ability to generate insights is identified as an important dynamic capability that can help organizations to adjust their activities and resources when confronted with changing markets (Jiang and Gallupe, 2015).

In this context, business agility offers opportunities for companies to respond quickly to changes, be flexible, and implement actions that control the market risks and uncertainties (Sherehiy et al. 2007). For Kale et al. (2019) and Braunscheidel and Suresh (2009), an agile organization adapts its organizational culture to market changes, learns about these changes quickly, benefits from them, and shapes its products/services according to the preferences of its clients, generating opportunity and reorganizing its strategy in response to environmental changes (Sharifi and Zhang, 1999; Shin et al., 2015). Al-Azzam et al. (2017) point out that the ability to be agile is directly related to human performance, processes, and technologies of the organization. Besides, agility can improve the quality of competitive activities of a company and market responses, improving the business performance (Kale et al. 2019; Tallon and Pinsonneault, 2011). In this sense, the concept of Business Agility is defined as the ability to respond quickly to changes, using the available data, and being strategically agile in implementing actions for performance improvement. Next, we present our conceptual model followed by the hypotheses.

3 Conceptual Model and Hypotheses

Based on a Systematic Literature Review (RSL) in the IS field and 29 qualitative interviews with data analytics and business experts, the conceptual model was built as shown in Figure 1. It is composed of seven constructs and seven hypotheses. The Information Management Capability (which includes data enrichment, analytical skills, technical skills, and data governance) represents the combination of human, technological, and analytical factors that facilitate data conversion into insights and knowledge useful for decision-making, favoring the generation of value from the data. However, success for data monetization depends on the appropriate alignment between information management skills related to the generation of insights. Consequently, Monetization Capability (which contemplates the generation of insights and business agility) represents the combination of factors that will influence business performance.

Data enrichment is defined as value creation from various data sources (internal or external), as well as other processes of treatment, processing, or cleansing of data for economic benefits (Baecker et al. 2020). In the context of creating strategic value for the business, Grover et al. (2018) point out that companies are far from making an efficient data analysis, emphasizing that they should evaluate the strategic role of Big Data, analyze and invest in quality data, despite the challenges imposed by their complexity (Faroukhi et al. 2020a). In addition, each organization should consider their different types of data and make them available through the creation of monetization processes (Faroukhi et al. 2020b).

From an organizational perspective, data may come from various sources, internal or external (Günther et al. 2017; Negash, 2004). Companies acquire internal data through their existing IT systems that relate to people (CRM, user, or service data) or business operations (ERP data and transactional data) (Günther et al. 2017; Haddara and Elragal, 2015). In contrast, organizations can also acquire external data, such as data offered by third parties or by users, open data, and sensor data (Günther et al. 2017). However, depending on the variety and granularity, it can be difficult to predict which insights can be extracted (Günther et al. 2017; Constantiou and Kallinikos, 2015).

Najjar and Kettinger (2013) point out that data consolidation is especially important for making internal data relevant to organizations and to make information available to other company departments. The integration of external data to internal data, associated with an IT infrastructure, allows companies to seek alternative ways to benefit when exploring new data-based business opportunities (Parvinen et al. 2020). In this sense, developing skills to collect, store, combine, and manipulate data can be the key to success in the process of generating insights and monetization of the data. Hence, we propose the following hypothesis:

H1: The data enrichment skill is positively associated with the ability to generate insights.

Most companies do not have the information resources needed to explore the possibilities of indirect monetization and obtain valuable insights of their data, since they require technical and analytical skills (Najjar and Kettinger 2013; Hanafizadeh et al. 2021). Analytical skills can be defined as the ability to deploy and combine resources for rigorous and action-oriented analysis, being formed by the association of bigness of data, data quality, analytical skills, knowledge, and sophistication of tools (Ghasemaghahi et al. 2018). Thus, the skill or analytical data capability is operationalized through information technologies, such as Big Data Analytics (BDA) or simply Analytics. Chen et al. (2012) created the term Big Data Analytics (BDA) relating Big Data concepts and tools to Business Intelligence and Analytics, especially regarding data mining and statistical analysis.

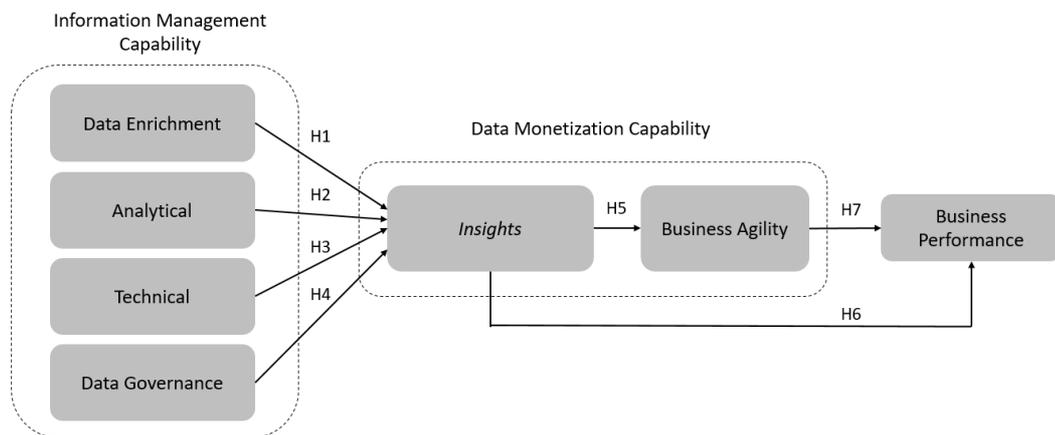


Figure 1. Conceptual model

Complementarily, the literature defines BDA as a technology designed to extract economic value from large volumes and a variety of data, structured and unstructured, along with their collection, analysis, and visualization tools (Côte-Real, Oliveira and Ruivo, 2017; Duan and Cao, 2015). These tools offer methods that use data for competitive value and advantage (Ferraris et al. 2019). The BDA essence is in the transformation of a lot of data into information and knowledge for decision-making, becoming a new source for innovations and technology-enabled opportunities, that is driven by the information revolution (Duan, Cao, and Edwards, 2020).

Jiang and Gallupe (2015) suggest that big data analytics is related to getting insights and innovations, promoting, and producing better results for the organization. In this sense, many companies have used big data analytics to get insights into their organizational performance, which will enrich the decision-making process, develop a dynamic organizational structure to respond to the market, improve capability utilization, and increase the return on assets (Grover et al. 2018). Thus, attention to analytical skills becomes decisive for the generation of insights that will assist the decision-making process. Hence, we suggest the following hypothesis:

H2: Analytical skill is positively associated with the ability to generate insights.

According to Gupta and George (2016), big data's technical skills refer to the knowledge needed to use new forms of technology to extract intelligence from data. Some of these skills include machine learning, data extraction, data cleansing, and statistical analysis. IT technical skills, such as

programming, database skills, analysis, and systems design are currently no longer considered rare since such skills can be explained in procedures, documents, and manuals (Mata et al., 1995). However, organizations that develop technical skills and capabilities associated with big data, and have high-skilled employees will probably have advantages over their competition (Gupta and George, 2016).

Chwelos et al. (2001) point out that the sophistication of IT tools is related to the level of the technological expertise of the organization - and based on how sophisticated these tools are, the depth of the analysis may vary between one company to another (Davenport, 2013). Thus, sophisticated tools offer more possibilities for companies to generate business insights and improve the performance of decision-making (Cao and Duan, 2015; Ghasemaghaei et al. 2018).

Big data technology resources refer to new information technologies that are required to deal with the various formats and data types (Najjar and Kettinger, 2013). Technologies also include data storage and analytical tools, which allow the collection and integration of big data in real-time, providing analytical results in an affordable and understandable way for executives, supporting business decision-making (Chen et al. 2012; Jelinek and Bergey, 2013; Nunan and Di Domenico, 2013; Suoniemi et al. 2020). So, technical skills are required to deal with newly available technologies and assist organizations in the monetization and data conversion process into insights. On the other hand, organizations that have data and computational infrastructure, but lack of analytical and technical skills, will not succeed in the monetization process of their data. Hence, the following hypothesis is proposed:

H3: Technical skill is positively associated with the ability to generate insights.

In addition to developing and using technical and human resources (Tambe, 2014; Brinkhues et al. 2015), organizations also need to develop well-established structures, procedures, and functions that allow the data flow, considering aspects of security, privacy, and ethics (Mikalef et al. 2020). Tallon et al. (2013) pointed out the importance of the role of data governance in the big data era and indicated that although some studies have explored the main dimensions and components of information governance, there is still little empirical evidence of its effects and mechanisms of use in the organizational environment.

The rapid growth of data has made information governance a critical issue for top IT managers when planning their big data projects (Mikalef et al. 2020; Mikalef et al. 2017). For Tallon et al. (2013) information governance is a set of capabilities or practices for creating, capturing, assessing, storing, using, monitoring, accessing, archiving, and excluding information and resources related to the data life cycle. Mikalef et al. (2020) highlighted that organizational roles are still unclear on data resources, with undefined processes around data management and transformation, as well as organizational structures that restrict efficient data flow, contributing to failures of big data projects and business analytics (Popovič et al. 2018; Tallon et al., 2013). In many organizations, they do not have clear rules on how data should be processed or what are property rights and how information can be manipulated for insight generation (Mikalef et al. 2019; Tallon et al., 2013).

In addition, by monetizing data, organizations need to consider privacy and security issues, since many data include user information. Several companies do not monetize data due to reputation risks and issues related to the trust and property of data that can foster many conflicts between stakeholders in cases of data commercialization with sellers and buyers (Thomas and Leiponen, 2016). In this way, the limited understanding of the regulation on data privacy becomes a barrier to monetization (Mendonça, 2021). Data security imposes significant constraints and risks on the type of business model that a company can use in the monetization process (Parvinen et al. 2020). So, authorization, access, auditing, and encryption become relevant factors when a company deals with confidential data (Yousif, 2015).

While data privacy laws and regulations impose limits on data that companies can collect and explore, they also clarify the rules of use for all (Parvinen et al. 2020). In this way, the law needs to be seen as ethical and sustainable use of consumer data and organizations should take advantage of it to identify how to monetize the data through its adequate use (Mendonça, 2021). In addition, it is understood that data governance is important in the monetization process and will influence the ability to generate insights. Hence, the following hypothesis is proposed:

H4: Data governance is positively associated with the ability to generate insights.

For organizations that operate in dynamic business environments where making informed decisions is fundamental, being able to gain insights generated by data is extremely relevant (Wamba et al. 2017). Practices to understand and increase awareness for the recognition of insights are not well defined (Swanson and Ramiller, 2004). However, it has been possible to identify that the use of big data analytics allows greater depth, speed, and assertiveness in the data-driven insights, obtaining greater value for the organization and increasing competitiveness (Tambe, 2014).

Insights generated from BDA can be used to create value in many areas such as process improvement, product innovation and services, customer experience and market improvement, organization performance improvement, creation of brand image value, and company reputation. It would also improve operational efficiency, productivity, accessibility, and availability, transforming process information streams to gain a competitive advantage (Grover et al. 2018; Duan, Cao, and Edwards, 2020). Kitchin and McArdle (2016) argue that big data analytics stands out when it has speed and exhaustiveness of the data collected and can be a valuable tool for generating insights, allowing better decisions from the data (Lam et al. 2017). However, it is not always the amount, volume, and variety of data that matters, but what organizations do with their data, and how they interpret and apply them. Insights are not automatically displayed as a finished result from these tools. They stem from a human and analytical process of creating meaning, individual or collective, executed by analysts and decision-makers who use processed data and analytical tools to extract them (Constantiou and Kallinikos, 2015). In this sense, Al-Azzam et al. (2017) indicate that the ability to be agile is related to human performance, processes, and technologies present in the organization, which can improve the quality of the competitive activities of a company and its responses to the market, increasing its organizational performance (Kale et al. 2019; Tallon and Pinsonneault, 2011). However, internal and external environments must be constantly examined, the information should be collected and used quickly, and respond to market changes rapidly (Kumkale, 2016). From these arguments, the following hypotheses are proposed:

H5: The ability to generate insights is positively associated with business agility.

H6: The ability to generate insights is positively associated with business performance.

Finally, business agility also offers the opportunity for companies to respond quickly to changes they face. Besides firms become more flexible and can implement actions to control uncertainties and risks related to the market (Sherehiy et al. 2007). According to Côte-Real, Oliveira, and Ruivo (2017) and Chen et al. (2014), this concept is related to the operational flexibility of organizational processes and IT systems to support changes in the environment.

Agility corresponds to the application of functions such as adaptation to change, high quality, flexibility, response to innovation, low cost, and short-term delivery to obtain some advantages in a competitive market (Sherehiy et al. 2007; Kale et al. 2019). In addition, to achieve agility, it is also necessary to process a large and varied amount of information (Côte-Real, Oliveira, and Ruivo, 2017; Goldman et al. 1995). Several studies highlight the importance of strategic agility in enhancing business performance by creating competitive advantage (Kumkale, 2016; Kale et al. 2019). Accordingly, this study perceives business agility as the ability to respond quickly to changes using the available data and being strategically agile in implementing actions for business performance improvement, data usage performance, and competitive advantage gains. Thus, the following hypothesis is proposed:

H7: Business agility is positively associated with business performance.

4 Conclusions

In this study, we have sought to point out the importance of data monetization capabilities in enhancing business performance. Building on recent findings in the literature and the 29 qualitative interviews with data analytics and business experts that highlight the challenges faced by organizations seeking to monetize and create value from their data, we developed a theory-driven approach that delineates the main needed resources, which were grouped into capabilities, ensuring a better business performance when these resources are enhanced. Regarding the Information Management Capability, the proposed

model introduces the “data enrichment” construct, which is a novelty in the IS literature, but important for the monetization and insight generation processes. Given the lack of theoretical models in the literature that explore the capabilities required to ensure data monetization, this study contributes by connecting and defining concepts based on DC theories. In conclusion, we expect the proposed research model can help organizations to identify what types of skills should be combined to ensure an effective monetization. Our intention here was to provide evidence to support the introduction of significant changes to the way data is used in business so that data-driven organizations can effectively monetize their data to improve business agility and, consequently, their organizational performance. This paper presents several hypotheses developed based on a mixed-method approach involving an initial SLR, followed by a qualitative stage where experts in data analytics and business were interviewed. Finally, a survey with data analytics and business professionals will be carried out to test the hypotheses presented here.

References

- Al-Azzam, Z. F., Irtameh, H. J. A., and Khaddam, A. A. H. (2017). “Examining the Mediating Effect of Strategic Agility in the Relationship between Intellectual Capital and Introduction Organizational Excellence in Jordan Service Sector,” *Journal of Business*, 6(1), 7-15.
- Alfaro, E., Bressan, M., Girardin, F., Murillo, J., Someh, I., and Wixom, B. H. (2019). “BBVA’s Data Monetization Journey,” *MIS Quarterly Executive*, 18(2).
- Ali, M. S., and Khan, S. (2019). “Organizational capability readiness towards business intelligence implementation,” *International Journal of Business Intelligence Research (IJBIR)*, 10(1), 42-58.
- Ambrosini, V., and Bowman, C. (2009). “What are dynamic capabilities and are they a useful construct in strategic management?,” *International Journal of Management Reviews*, 11(1), 29-49.
- Baecker, J., Engert, M., Pfaff, M., and Krcmar, H. (2020). “Business Strategies for Data Monetization: Deriving Insights from Practice,” in: *Wirtschaftsinformatik (Zentrale Tracks)*, 972-987.
- Braunscheidel, M. J., and Suresh, N. C. (2009). “The organizational antecedents of a firm’s supply chain agility for risk mitigation and response,” *Journal of Operations Management*, 27(2), 119-140.
- Brinkhues, R., Freitas, J. C., Jr., and Maçada, A. C. (2015). “Information management capability as competitive imperfection in the strategic factor market of big data,” in: *Proceedings of the Twenty-First Americas Conference on Information Systems*, Puerto Rico.
- Brinkhues, R., Maçada, A. C., and Casalinho, G. (2014). “Information Management Capabilities: Antecedents and Consequences,” in: *Americas Conference on Information Systems*, Savannah.
- Carmichael, F., Palacios-Marques, D., and Gil-Pechuan, I. (2011). “How to create information management capabilities through web 2.0,” *The Service Industries Journal*, 31(10), 1613-1625.
- Chen, H., Chiang, R. H., and Storey, V. C. (2012). “Business intelligence and analytics: From big data to big impact,” *MIS Quarterly*, 1165-1188.
- Chen, Y., Wang, Y., Nevo, S., Jin, J., Wang, L., and Chow, W. S. (2014). “IT capability and organizational performance: the roles of business process agility and environmental factors,” *European Journal of Information Systems*, 23(3), 326-342.
- Chwelos, P., Benbasat, I., and Dexter, A. S. (2001). “Empirical test of an EDI adoption model,” *Information Systems Research*, 12(3), 304-321.
- Constantiou, I. D., and Kallinikos, J. (2015). “New games, new rules: big data and the changing context of strategy,” *Journal of Information Technology*, 30(1), 44-57.
- Côrte-Real, N., Oliveira, T., and Ruivo, P. (2017). “Assessing business value of Big Data Analytics in European firms,” *Journal of Business Research*, 70, 379-390.
- Côrte-Real, N., Ruivo, P., and Oliveira, T. (2020). “Leveraging internet of things and big data analytics initiatives in European and American firms: Is data quality a way to extract business value?,” *Information & Management*, 57(1), 103141.
- Davenport, T.H. (2013). “Analytics 3.0,” *Harvard Business Review*. 91 (12), 64.
- Day, G. S. (2014). “An outside-in approach to resource-based theories,” *Journal of the Academy of Marketing Science*, 42(1), 27–28.

- Duan, Y. and Cao, G. (2015). "An Analysis of the Impact of Business Analytics on Innovation," in: Twenty-Third *European Conference on Information Systems*, Münster, Germany.
- Duan, Y., Cao, G., and Edwards, J. S. (2020). "Understanding the impact of business analytics on innovation," *European Journal of Operational Research*, 281(3), 673-686.
- Faroukhi, A. Z., El Alaoui, I., Gahi, Y., and Amine, A. (2020a). "Big data monetization throughout Big Data Value Chain: a comprehensive review," *Journal of Big Data*, 7(1), 1-22.
- Faroukhi, A. Z., El Alaoui, I., Gahi, Y., and Amine, A. (2020b). "An Adaptable Big Data Value Chain Framework for End-to-End Big Data Monetization," *Big Data and Cognitive Computing*, 4(4), 34.
- Ferraris, A., Mazzoleni, A., Devalle, A., and Couturier, J. (2019). "Big data analytics capabilities and knowledge management: impact on firm performance," *Management Decision*, 57 (8), 1923-1936.
- Ghasemaghahi, M., Ebrahimi, S., and Hassanein, K. (2018). "Data analytics competency for improving firm decision making performance," *The Journal of Strategic Information Systems*, 27(1), 101-113.
- Goldman, Steven L. (1995). "Agile competitors and virtual organizations." *Strategies for enriching the customer*. Van Nostrand Reinhold.
- Grover, V., Chiang, R. H., Liang, T. P., and Zhang, D. (2018). "Creating strategic business value from big data analytics: A research framework," *Journal of Management Information Systems*, 35(2), 388-423.
- Günther, W. A., Mehrizi, M. H. R., Huysman, M., and Feldberg, F. (2017). "Debating big data: A literature review on realizing value from big data," *The Journal of Strategic Information Systems*, 26(3), 191-209.
- Gupta, M., and George, J. F. (2016). "Toward the development of a big data analytics capability," *Information & Management*, 53(8), 1049-1064.
- Haddara, M., and Elragal, A. (2015). "The readiness of ERP systems for the factory of the future.," *Procedia Computer Science*, 64, 721-728.
- Hanafizadeh, P., and Harati Nik, M. (2020). "Configuration of Data Monetization: A Review of Literature with Thematic Analysis," *Global Journal of Flexible Systems Management*, 21(1), 17-34.
- Hanafizadeh, P., Firouzabadi, M. B., and Vu, K. M. (2021). "Insight monetization intermediary platform using recommender systems," *Electronic Markets*, 1-25.
- Hanelt, A., Bohnsack, R., Marz, D., and Antunes Marante, C. (2021). "A systematic review of the literature on digital transformation: insights and implications for strategy and organizational change," *Journal of Management Studies*, 58(5), 1159-1197.
- Jarvenpaa, S. L., and Leidner, D. E. (1998). "An information company in Mexico: Extending the resourcebased view of the firm to a developing country context," *Information Systems Research*, 9(4), 342-361.
- Jelinek, M., and Bergey, P. (2013). "Innovation as the strategic driver of sustainability: Big data knowledge for profit and survival," *IEEE Engineering Management Review*, 41(2), 14-22.
- Jiang, J., and Gallupe, R. B. (2015). "Environmental scanning and business insight capability: the role of business analytics and knowledge integration," in: Proceedings of the Twenty-First *Americas Conference on Information Systems*, Puerto Rico.
- Jung, J. U., Kim, H. S., Choi, H. R., and Hong, S. G. (2007). "Critical Success Factors of RTE Based on Policy Leverage of System Dynamics." *Journal of Information Systems*, 16 (4), 177-194.
- Kale, E., Aknar, A., and Başar, Ö. (2019). "Absorptive capacity and firm performance: The mediating role of strategic agility," *International Journal of Hospitality Management*, 78, 276-283.
- Kettinger, W. J., and Marchand, D. A. (2011). "Information management practices (IMP) from the senior manager's perspective: an investigation of the IMP construct and its measurement," *Information Systems Journal*, 21(5), 385-406.
- Kettinger, W. J., Ryoo, S. Y., and Marchand, D. A. (2021). "We're engaged! Following the path to a successful information management capability," *The Journal of Strategic Information Systems*, 30(3), 101681.
- Kitchin, R., and McArdle, G. (2016). "What makes Big Data, Big Data? Exploring the ontological characteristics of 26 datasets," *Big Data & Society*, 3(1).
- Kumkale, İ. (2016). "Organization's tool for creating competitive advantage: Strategic agility," *Balkan and Near Eastern Journal of Social Sciences*, 2(3), 118-124.

- Lam, S. K., Sleep, S., Hennig-Thurau, T., Sridhar, S., and Saboo, A. R. (2017). "Leveraging frontline employees' small data and firm-level big data in frontline management: An absorptive capacity perspective," *Journal of Service Research*, 20(1), 12-28.
- Laney, D. (2020). *Data Monetization: New Value Streams You Need Right Now*. URL: <https://www.forbes.com/sites/douglaslaney/2020/06/09/data-monetization-new-value-streams-you-need-right-now/?sh=73b65a9d46ff>. (visited on October 26, 2021).
- Lin, J., Li, L., Luo, X. R., and Benitez, J. (2020). "How do agribusinesses thrive through complexity? The pivotal role of e-commerce capability and business agility," *Decision Support Systems*, 135, 113342.
- Maçada, A. C. G., Brinkhues, R. A., and Freitas, J. C. D. S. (2020). "The influence of Information Management Capability on Companies' Sustainable Competitive Advantage: A Multiple-Case Study of Brazilian Market-Leading Companies," *Revista Brasileira de Gestão de Negócios*, 22, 876-899.
- Makadok, R. (2001). "Toward a synthesis of the resource-based and dynamic-capability views of rent creation," *Strategic Management Journal*, 22(5), 387-401.
- Marchand, D. A., Kettinger, W. J., and Rollins, J. D. (2000). "Information orientation: people, technology and the bottom line," *MIT Sloan Management Review*, 41(4), 69.
- Mata, F. J., Fuerst, W. L., and Barney, J. B. (1995). "Information technology and sustained competitive advantage: A resource-based analysis," *MIS Quarterly*, 487-505.
- Mendonça, D. (2021). *Vencendo os desafios para a monetização de dados*. URL: https://www.ey.com/pt_br/big-data-analytics/os-5-principais-desafios-das-organizacaoes (visited on October 26, 2021).
- Mikalef, P., Boura, M., Lekakos, G., and Krogstie, J. (2019). "Big data analytics capabilities and innovation: the mediating role of dynamic capabilities and moderating effect of the environment," *British Journal of Management*, 30(2), 272-298.
- Mikalef, P., Boura, M., Lekakos, G., and Krogstie, J. (2019a). "Big data analytics and firm performance: Findings from a mixed-method approach," *Journal of Business Research*, 98, 261-276.
- Mikalef, P., Boura, M., Lekakos, G., and Krogstie, J. (2020). "The role of information governance in big data analytics driven innovation," *Information & Management*, 57(7), 103361.
- Mikalef, P., Framnes, V. A., Danielsen, F., Krogstie, J., and Olsen, D. (2017). "Big data analytics capability: antecedents and business value," in: *PACIS 2017 Proceedings*. 136.
- Mikalef, P., Krogstie, J., Pappas, I. O., and Pavlou, P. (2020). "Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities," *Information & Management*, 57(2), 103169.
- Mikalef, P., Pappas, I. O., Krogstie, J., and Giannakos, M. (2018). "Big data analytics capabilities: a systematic literature review and research agenda," *Information Systems and e-Business Management*, 16(3), 547-578.
- Mikalef, P., Pappas, I., Krogstie, J., and Pavlou, P. A. (Eds.). (2020a). *Big data and business analytics: A research agenda for realizing business value*, Elsevier.
- Mithas, S., Lium C., Kimbrough, M., and Tafti, A. (2020). "Information technology investments and management forecasts: theory and evidence," in: *Proceedings of the Fortyfirst International Conference on Information Systems (ICIS 2020)*.
- Mithas, S., Ramasubbu, N., and Sambamurthy, V. (2011). "How information management capability influences firm performance," *MIS Quarterly*, 237-256.
- Moore, S. (2015). How to Monetize Your Customer Data. Smarter With Gartner
- Najjar, M. S., and Kettinger, W. J. (2013). "Data Monetization: Lessons from a Retailer's Journey," *MIS Quarterly Executive*, 12(4).
- Negash, S. (2004). "Business intelligence," *Communications of the Association for Information Systems*, 13, 177-195.
- Nunan, D., and Di Domenico, M. (2013). "Market research and the ethics of big data," *International Journal of Market Research*, 55(4), 505-520.
- Nwankpa, J. K., and Roumani, Y. (2016). "IT capability and digital transformation: A firm performance perspective," in: *International Conference on Information Systems*, Dublin.

- Park, Y., and Mithas, S. (2020). "Organized Complexity of Digital Business Strategy: A Configurational Perspective," *MIS Quarterly*, 44(1).
- Parvinen, P. Pöyry, E. Gustafsson, R. Laitila, and M. Rossi, M. (2020). "Advancing data monetization and the creation of data-based business models," In: *CAIS*, 47(1), 2.
- Popovič, A., Hackney, R., Tassabehji, R., and Castelli, M. (2018). "The impact of big data analytics on firms' high value business performance," *Information Systems Frontiers*, 20(2), 209-222.
- Prahalad, C.K. and Hamel, G. (2006). "The core competence of the corporation," in: *Strategische unternehmensplanung—strategische unternehmensführung*, 275–292. Springer Berlin Heidelberg
- Sambamurthy, V., Bharadwaj, A., and Grover, V. (2003). "Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms," *MIS Quarterly*, 237-263.
- Schulte, C. and Hovorka, D. (2017). "Heuristics for Gaining Project Insights," in: *Australasian Conference on Information Systems*, Hobart, Australia.
- Sharifi, H., and Zhang, Z. (1999). "A methodology for achieving agility in manufacturing organisations: An introduction," *International journal of production economics*, 62(1-2), 7-22.
- Sherehiy, B., Karwowski, W., and Layer, J. K. (2007). "A review of enterprise agility: Concepts, frameworks, and attributes," *International Journal of Industrial Ergonomics*, 37(5), 445-460.
- Shin, H., Lee, J. N., Kim, D., and Rhim, H. (2015). "Strategic agility of Korean small and medium enterprises and its influence on operational and firm performance," *International Journal of Production Economics*, 168, 181-196.
- Suoniemi, S., Meyer-Waarden, L., Munzel, A., Zablah, A. R., and Straub, D. (2020). "Big data and firm performance: The roles of market-directed capabilities and business strategy," *Information & Management*, 57(7), 103365.
- Swanson, E. B., and Ramiller, N. C. (2004). "Innovating mindfully with information technology," *MIS Quarterly*, 553-583.
- Tallon, P. P., and Pinsonneault, A. (2011). "Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model," *MIS Quarterly*, 463-486.
- Tallon, P. P., Ramirez, R. V., and Short, J. E. (2013). "The information artifact in IT governance: toward a theory of information governance," *Journal of Management Information Systems*, 30(3), 141-178
- Tambe, P. (2014). "Big data investment, skills, and firm value," *Management Science*, 60(6), 1452-1469.
- Teece, D. J. (2007). "Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance," *Strategic Management Journal*, 28(13), 1319–1350.
- Teece, D. J., Pisano, G., and Shuen, A. (1997). "Dynamic capabilities and strategic management," *Strategic Management Journal*, 18(7), 509–533.
- Thomas, L. D., and Leiponen, A. (2016). "Big data commercialization", *IEEE Engineering Management Review*, 44(2), 74-90.
- Toigo, T., Wegner, D., da Silva, S. B., and de Mattos Zarpelon, F. (2021). "Capabilities and skills to orchestrate innovation networks," *Innovation & Management Review*, v. 18 (2), 129-144.
- Vidgen, R., Shaw, S., and Grant, D. B. (2017). "Management challenges in creating value from business analytics," *European Journal of Operational Research*, 261(2), 626-639.
- Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., and Childe, S. J. (2017). "Big data analytics and firm performance: Effects of dynamic capabilities," *Journal of Business Research*, 70, 356-365.
- Wixom, B. H. and Ross, J. W. (2017). "How to monetize your data," *MIT Sloan Management Review*, 58(3).
- Yasmin, M., Tatoglu, E., Kilic, H. S., Zaim, S., and Delen, D. (2020). "Big data analytics capabilities and firm performance: An integrated MCDM approach," *Journal of Business Research*, 114, 1-15.