Original Article

Data monetization capability: from the systematic literature review to the proposition of a multidimensional model

Capacidade de monetização de dados: da revisão sistemática da literatura à proposição de um modelo multidimensional

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Abstract

Purpose: This study explores the underexplored field of data monetization and value creation within Information Systems (IS). Despite the growing interest in leveraging data for financial and operational gains, a literature gap exists in systematically examining the interplay between data-related terms such as monetization, value, capabilities, insights, and performance.

Design/Methodology/Approach: Conducted as a Systematic Literature Review (SLR), the study analyzed 148 articles from the Scopus database using PRISMA guidelines and the Bibliometrix package. Synthesizing existing knowledge sheds light on trends in major IS journals and challenges faced by organizations in extracting value from their data.

Findings: The study reveals influential trends in IS literature on data monetization and uncovers challenges faced by organizations in this domain. Proposing a multidimensional theoretical model, the research integrates information management and data monetization capabilities, contributing to advancing scientific knowledge in IS research.

Practical Implications: The study offers actionable strategies for organizations to monetize data effectively, enhance business agility, and improve performance, guiding them toward becoming data-driven.

Originality/Value: Contributing to the Theory of Administration within IS research, this study conducts a comprehensive analysis of data monetization, synthesizes literature trends, and proposes an innovative theoretical model integrating information management and data monetization capabilities.

Keywords: Data monetization; Data value; Information systems; Systematic literature review; Business performance

Resumo

Objetivo: Este estudo explora o campo pouco explorado da monetização de dados e criação de valor na área de Sistemas de Informação (SI). Apesar do crescente interesse em utilizar dados para ganhos financeiros e operacionais, existe uma lacuna na literatura ao examinar sistematicamente a interação entre termos relacionados a dados, como monetização, valor, capacidades, *insights* e desempenho.

Desenho/Metodologia/Abordagem: Conduzido como uma Revisão Sistemática da Literatura (RSL), o estudo analisou 148 artigos da base de dados Scopus usando as diretrizes PRISMA e o pacote Bibliometrix. Sintetizando o conhecimento existente, ele lança luz sobre tendências em periódicos de SI de destaque e desafios enfrentados por organizações na extração de valor de seus dados.

Resultados: O estudo revela tendências influentes na literatura de SI sobre monetização de dados e descobre desafios enfrentados por organizações nesse domínio. Ao propor um modelo teórico multidimensional, a pesquisa integra capacidades de gestão da informação e monetização de dados, contribuindo para o avanço do conhecimento científico em pesquisas de SI.

Implicações Práticas: O estudo oferece estratégias acionáveis para organizações monetizarem dados de forma eficaz, aprimorarem a agilidade nos negócios e melhorarem o desempenho, orientando-as a se tornarem organizações orientadas por dados.

Originalidade/Contribuição: Contribuindo para a Teoria da Administração em pesquisas de SI, este estudo realiza uma análise abrangente da monetização de dados, sintetiza tendências na literatura e propõe um modelo teórico inovador integrando capacidades de gestão da informação e monetização de dados.

Palavras-chave: Monetização de dados; Valor dos dados; Sistemas de informação; Revisão sistemática da literatura; Desempenho organizacional

1 INTRODUCTION

The emergence of data monetization is being driven by technological trends in big data and its importance has grown considerably both in the academic and business worlds (Hanafizadeh et al., 2021). Najjar and Kettinger (2013) suggested companies can benefit monetarily from the data by selling and exchanging or optimizing their business operations, thereby reducing their overall costs. In this context, data use and monetization can be a real source of competitive advantage for businesses in the digital economy (Baecker et al., 2020; Wixom & Ross, 2017). Gartner (2019) refers to data monetization as a way to use data to achieve a quantifiable economic benefit.

Despite this promise, companies sometimes find it difficult to assess their data (Parvinen, Pöyry, Gustafsson, Laitila, & Rossi, 2020) and understand the full

potential of their data for business (Ray, Menon, & Mookerjee, 2020). According to a survey by McKinsey Analytics (2017), companies monetize their data in a limited way, indicating that many have difficulties extracting economic value from their data. In fact, initiating the process of data monetization can be very challenging for organizations, as it usually requires organizational restructuring and investments in technology (Wixom & Ross, 2017).

The global data monetization market was valued at $2.99 billion in 2023 and is projected to grow to $11.83 billion by 2032 (Fortune Business Insight, 2024). Based on such projections, business leaders have prioritized the building advanced data monetization capabilities (Wixon, Beath, & Owens, 2023). So, to remaining competitive in this scenario, organizations need to adopt strategies to evaluate and prepare their existing business models for data use (Schüritz & Satzger, 2016). Thus, it is essential that organizations identify the most promising opportunities, so they can begin to monetize their data (Baecker et al., 2020; Wixom & Ross, 2017). In addition, organizations can develop data preparation and analytical capabilities aimed at converting the value of extracted data into insights that promote economic benefits (tangible) or value (intangible). In other words, organizations can benefit by adopting data monetization models in an efficient and timely manner.

Although organizations are increasingly interested in how data can be used to reduce costs and increase revenues, the ability to create value and monetize data is still relatively little explored in the Information Systems (IS) literature. A research gap becomes evident due to the scarcity of studies with systematic reviews on the subject. Out of the seven literature reviews found, only two are directly related to data monetization (Faroukhi et al., 2020; Hanafizadeh et al., 2020). While Faroukhi et al. (2020) propose a comprehensive value chain model for big data, Hanafizadeh and Harati Nik (2020) develop a data monetization configuration based on layers identified in the systematic review. Both studies delineate steps and pathways

for monetization but overlook the exploration of the necessary capabilities for organizations to effectively monetize their data. This gap highlights the need for future research to understand such capabilities.

Therefore, this paper presents a Systematic Literature Review (SLR) which aims to map how scientific studies relate the terms data monetization, data value, capabilities, insights and performance in the business context, in order to identify the necessary capabilities for data monetization, and thus, propose a multidimensional theoretical model. To do so, we seek to answer the following research questions:

Q1: What are the main characteristics of publications on data monetization, data value, insights, performance, and capabilities and how does the literature relate these terms in the context of digital business?

Q2: What are the main concepts and elements related to the definition of monetization found in the literature?

Q3: What capabilities are required for data monetization?

The article is structured as follows: in section 2, a brief review of the literature on the topic of data monetization is presented, section 3 highlights the methodological procedures followed in the research development, while section 4 presents the main results obtained in the study. Finally, in section 5, the research final considerations are highlighted.

2 CAPABILITIES FOR DATA MONETIZATION

Moore (2015), at the Gartner Institute, introduced two types of data monetization: direct monetization and indirect monetization. In the direct method, the data are sold, while in the indirect method, the information-based product or service is sold. Recently, Hanafizadeh and Harati Nik (2020) pointed out three data monetization approaches that companies can adopt, namely: (i) selling information solutions, (ii) improving decisions and processes of organizations with data (to

create returns through operational efficiencies), and (iii) structuring information and involving it around organizational products and services (to increase the price of a product, portfolio participation, market share or customer loyalty) (Alfaro et al., 2019). In order to generate measurable economic benefitsof raw data and extracted resources, the monetization options presented by Hanafizadeh & Harati Nik (2020) can be divided, so that the data sale is known as direct, and the use of data for improvements in process and product performance, as indirect.

Information Management is considered an important organizational capability that indicates the ability to use combined valuable resources (Jarvenpaa & 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 performance. Thus, a company's IMC can lead to the development of organizational capabilities that will increase business performance (Kettinger et al., 2021).

In addition, Ghasemaghaei et al. (2018) claim that companies need to improve their expertise in data analysis to make better, more informed and faster decisions, and the development of capabilities to integrate, assemble and establish valuable resources is increasingly necessary (Prahalad & Hamel, 2006). Thus, this study adopts the term Monetization Capability as the ability to create value for organizations, capable of generating some kind of benefit through the development of skills that enable improvements in business performance such as: the increase in revenue, the reduction of costs, the improvement of internal and external processes, the improvement in the relationship with customers and stakeholders, and the customization and development of new products and services. The Information Management Capability and Monetization Capability definitions are shown in Table 1.

Table 1 – Main constructs and definitions

Construct	Definition	References
Information Management Capability	Set of company skills that connect people and information architecture, infrastructure, access, and extension to enable changes in the organization in response to the imposition of the competitive environment.	Grover et al., 2018 Kettinger et al. 2021 Maçada et al., 2020 Mithas et al. 2011
Monetization Capability	Ability to create value for organizations, capable of generating some kind of benefit through the development of skills that enable improvements in business performance such as: the increase in revenue, the reduction of costs, the improvement of internal and external processes, the improvement in the relationship with customers and stakeholders, and the customization and development of new products and services.	Elaborated by the authors

Source: Elaborated by the authors

Next, methodological procedures used for the development of this study are introduced.

3 METHODOLOGY

The research was developed based on the methodological principles of the Systematic Literature Review. SLR aims to summarize evidence on existing research, identify gaps in the literature, build theoretical frameworks to support new research activities, and collect empirical evidence to support, contradict or generate new research hypotheses (Kitchenham, 2004). Therefore, "a SLR is more than just summarizing a literature, it is above all structuring research" (Jennex, 2015, p. 141). As a way of operationalizing this review, we chose to follow the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), as suggested by Moher et al. (2009).

This study aims to map the literature on data monetization by examining how terms such as data value, capabilities, insights, and performance are interconnected in the business context. To achieve this, we have formulated the following research questions: Q1: What are the main characteristics of publications on data monetization,

data value, insights, performance, and capabilities and how does the literature relate these terms in the context of digital business, particularly regarding the time evolution of studies, the growth of keywords over the years, and trends concerning these keywords?; Q2: What are the main concepts and elements related to the definition of monetization found in the literature, summarizing the elements related to data monetization definitions? and Q3: What are the required capabilities for data monetization, including constructs, their definitions, and the proposed multidimensional model?

The initial search was conducted in April 2022, utilizing the Scopus database. Similarly to the approach taken by Dwivedi, Ismagilova, Rana, and Raman (2021), the Scopus database was selected to ensure the inclusion of high-quality studies. Scopus was chosen for its prominence in the field of Management, being widely recognized as the primary reference source in Management research. Moreover, its indexing criteria ensure the inclusion of journals that have undergone a careful analysis process (Dwivedi et al., 2021). Notably, the impact factor of publications indexed in Scopus is measured using the SCImago Journal Rank (SJR). The use of online databases for SLR's has become increasingly prevalent in Information Systems research (Dwivedi et al., 2021).

Then, we defined the search strategy using the terms "data monetization" AND "capabilit*" in titles, abstracts and keywords. Only seven (07) publications were returned and six (06) of them were from conferences. Therefore, to expand the selection of the publications portfolios, other terms and filter criteria were defined for search: (i) The document should contain the words ("data monetization") OR ("data value") OR ("big data analytic* capabilit*") OR ("Dynamic Capabilit*") OR ("Information Management capabilit*") OR ("data management capabilit*") AND ("capabilit*") OR ("big data analytic*") OR ("insight") OR ("firm performance") OR ("analytic*") OR ("monetizing data"); (ii) the document should be published in the main IS Journals indicated by the Association for Information Systems (AIS).

The selection process involved a dual analysis, where the researchers filtered articles based on pre-established criteria, identifying and defining valid studies for inclusion in the review. The eight primary IS journals identified by the AIS Basket of

Top Journals were chosen, as they are regarded by researchers in the field as the best journals based on bibliometric data (Lowry et al., 2013). Specifically, the chosen journals are the European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of Information Technology, Journal of Management Information Systems, Journal of Strategic Information Systems, Journal of the Association for Information Systems, and MIS Quarterly. Additionally, other journals recommended by AIS were included: Information and Management, Decision Support Systems, Decision Sciences, MIS Quarterly Executive, International Journal of Information Management, and Communications of the Association for Information Systems. Furthermore, the Journal of Big Data and the Global Journal of Flexible Systems Management were incorporated into the selection criteria due to their relevance to the research theme and meeting the defined quality criteria (H-index 31 and H-index 35, respectively). Table 2 illustrates the search strategy employed in the SLR.

Table 2 – Search strategy used in the systematic review

Base	String + Filtros
Scopus	(TITLE-ABS-KEY ("data monetization") OR TITLE-ABS-KEY ("data value") OR TITLE-ABS-KEY ("big data analytic* capabilit*") OR TITLE-ABS-KEY ("Dynamic Capabilit*") OR TITLE-ABS-KEY ("Information Management capabilit*") OR TITLE-ABS-KEY ("data management capabilit*") AND TITLE-ABS-KEY ("capabilit*") OR TITLE-ABS-KEY ("big data analytic*") OR TITLE-ABS-KEY ("insight") OR TITLE-ABS-KEY ("firm performance") OR TITLE-ABS-KEY ("analytic*") OR TITLE-ABS-KEY ("monetizing data") AND SRCTITLE ("European Journal Of Information Systems") OR SRCTITLE ("Information Systems Journal") OR SRCTITLE ("Information Systems Research") OR SRCTITLE ("Journal of Information Technology") OR SRCTITLE ("Journal of Management Information Systems") OR SRCTITLE ("Journal Of Strategic Information Systems") OR SRCTITLE ("Journal of the Association for Information Systems") OR SRCTITLE ("MIS Quarterly Management Information Systems") OR SRCTITLE ("Information and Management") OR SRCTITLE ("Decision Support Systems") OR SRCTITLE ("Decision Science") OR SRCTITLE ("Mis Quarterly executive") OR SRCTITLE ("International Journal of Information Management") OR SRCTITLE ("Communications of the Association for Information Systems") OR SRCTITLE ("Journal of Big Data") OR SRCTITLE ("Global Journal of Flexible Systems Management")) AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"re"))

Source: Elaborated by the authors

In accordance with Okoli (2015), our systematic review process comprised four phases: planning (study objectives and protocol creation), relevant journal selection, extraction, and execution (result analysis). Since literature searches can yield numerous studies, the use of exclusion criteria, as suggested by Okoli (2015), helped eliminate unnecessary studies. Following the application of selection criteria, 148 articles meeting the specified criteria were identified, constituting the final portfolio of this research (see Figure 1).

Figure 1 – Process of articles selection
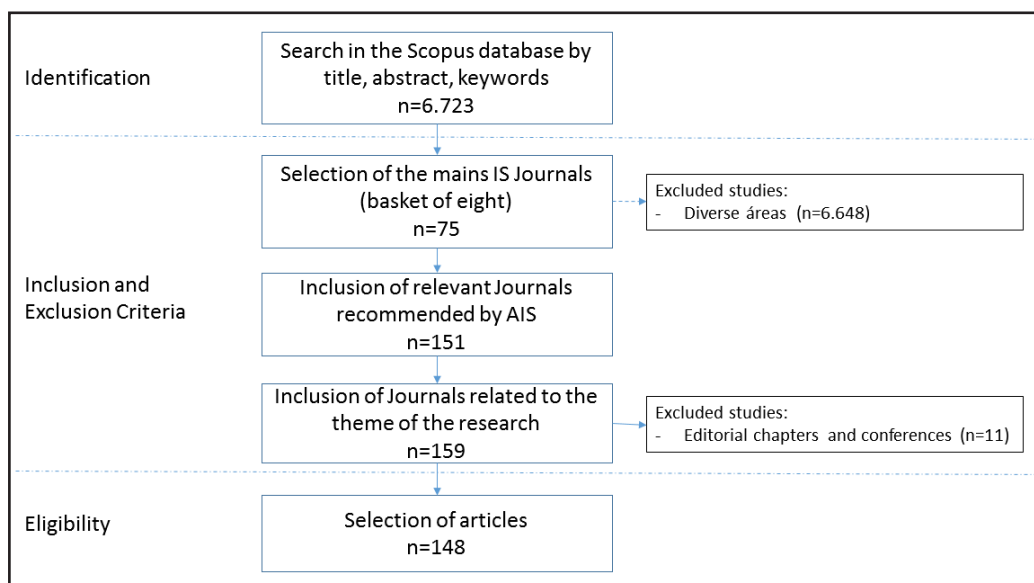
Source: Elaborated by the authors

The analysis procedure started by a bibliometric analysis highlighting the topics and keywords of the bibliographic portfolio documents of this study. This was done by means of a correlation analysis of keywords, more relevant keywords, trend topics, thematic evolution and thematic map with research trends in IT/IS, supported by visual analysis. We used the software R, more specifically the Bibliometrix package and the Biblioshiny application that provides a web interface for Bibliometrix. The package in question aims to assist in the realization of comprehensive and complex scientific mappings involving big data, becoming a useful tool in contemporaneity, in which the volume of scientific production increases gradually and science is constantly

changing. In addition, Bibliometrix presents as an advantage being an open source tool that performs a comprehensive mapping analysis of scientific literature and was programmed in R to be flexible and facilitate integration with other statistical and graphical packages (Aria & Cuccurullo, 2017; Derviş, 2019; Song et al., 2019). Besides, the co-citations of articles were verified of the bibliographic portfolio, through the snowballing technique (Wohlin et al., 2020), to complement the mapping of elements related to the data monetization concept. After the bibliometric analysis, the constructs related to the theme were identified, according to the objectives of the study. Below, we present the results and their discussion.

## 4 ANALYSIS AND DISCUSSION OF RESULTS

This section is divided into three topics: the first presents the studies characteristics of the bibliographic portfolio, the second presents the main definitions related to data monetization and the third presents the proposal of a multidimensional model that combines Information Management Capabilities with Data Monetization Capabilities.

4.1 Bibliometric analysis of the bibliographic portfolio

The study allowed to identify the main characteristics of research related to the topics a) data monetization, b) data value and c) capabilities. Analyzing Figure 2, it is noticed that the first publication related to the research topics occurred in 1986, dealing with the topics "*capabilities*" and "*data management capabilities*". The search topics received greater attention from 2006 on (6 articles). It is from 2016, when the annual scientific production was in only six articles, that there was growth in the number of publications, reaching 18 articles in 2020 and 16 articles published in 2021. It is pointed out that for 2022 only four months of search were considered, which justifies the identification of only eight articles (annual growth rate: 5.95%). In view

of this growth, we can see the contemporaneity and relevance of the topic in the academic environment.

Figure 2 – Time evolution of studies of the bibliographic portfolio
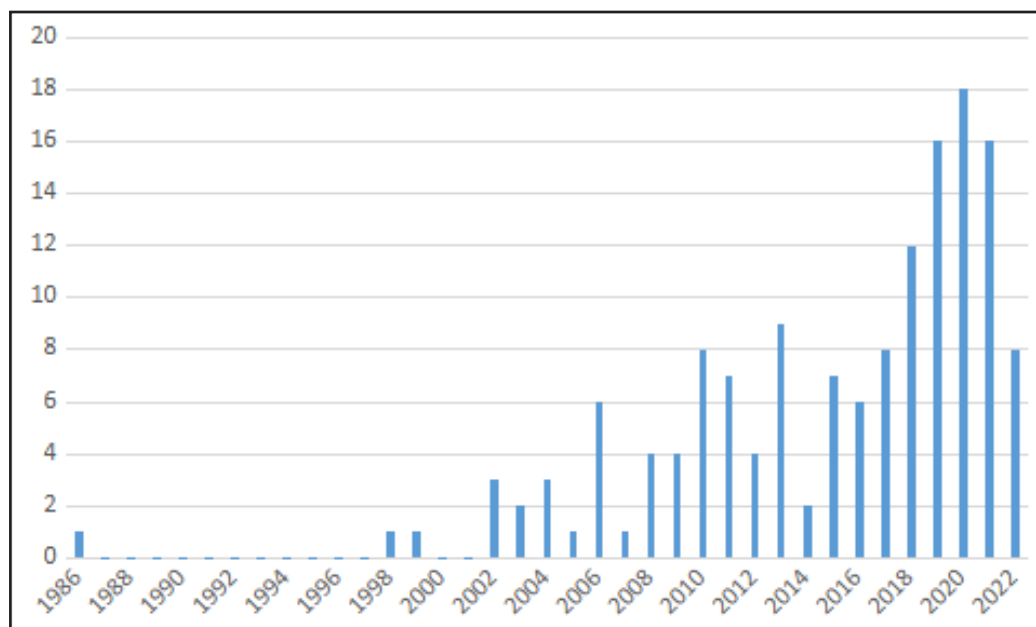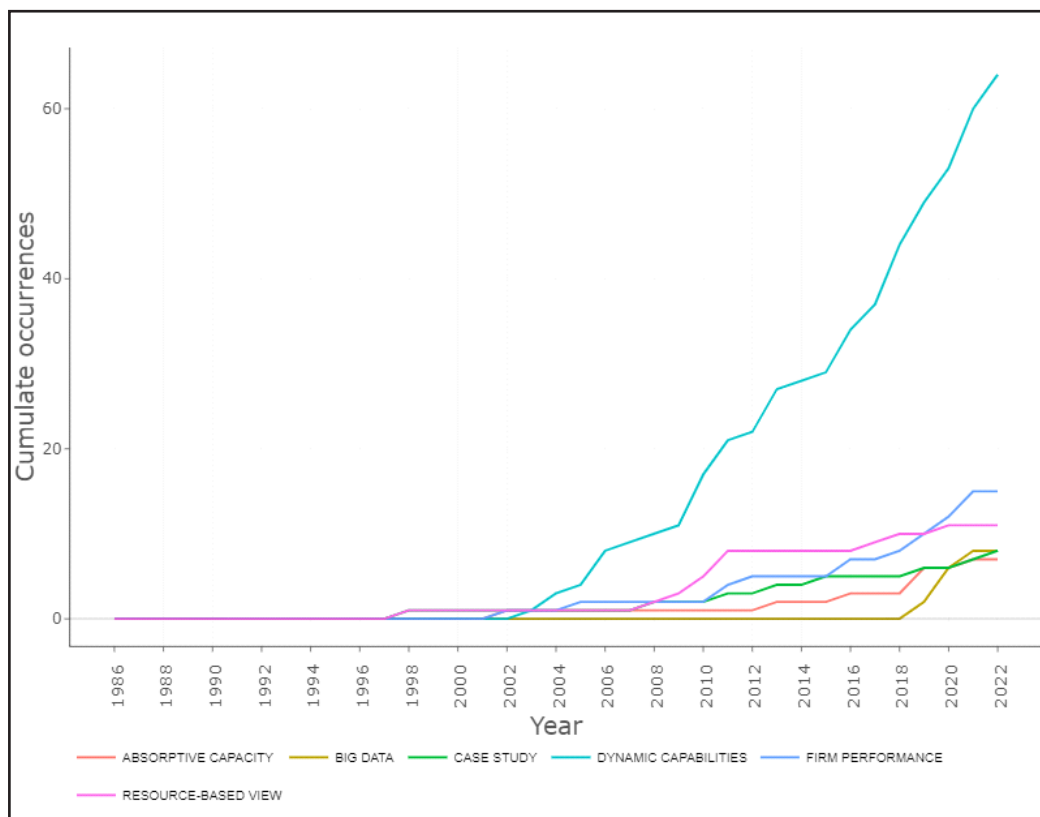

Source: Elaborated by the authors

In order to verify the quality of the articles, we analyze the most relevant journals. Publications are mainly concentrated in four journals: International Journal of Information Management (22 articles), the Information and Management (18 articles), the Journal of Strategic Information Systems (14 articles) and the European Journal of Information Systems (13 articles). In the sequence, we apply different techniques of keyword analysis to map the growth of terms over the years (Figure 3) and trends (Figure 4).

Figure 3 shows the six terms with the highest emphasis on occurrences per year. They all had an increase over time. As shown in the figure, most of these keywords began to appear in the search scenario around 2010 and continued to grow later. However, some terms have experienced more dynamic growth compared to others. The term with the highest occurrence increase was "*Dynamic Capabilities*", reaching 64 occurrences accumulated in 2022. Another term that

received attention over the years was "*Firm Performance*", with 15 occurrences accumulated in 2022. Moreover, "*Resource Based View-RBV*" also stood out, with 11 occurrences accumulated in 2022. The significant increase in the terms Dynamic Capabilities and Resource-Based View highlights the importance of studying these two theories by the main IS journals.

For Teece, Pisano and Shuen (1997), there is a positive relationship between the Dynamic Capabilities of an organization and its performance. Additionally, Sherehiy, Karwowski and Layer (2007) claim that business agility is a way to improve performance. The theory of Dynamic Capabilities began to gain attention in the field of IS due to its high relevance in contemporary business environments, which are characterized by high levels of turbulence and dynamism. In this sense, data analysis can strengthen the dynamic capabilities of a company (Mikalef et al., 2021).

Figure 3 – Growth of keywords

Source: Elaborated by the authors

To complete the previous analysis, Figure 4 displays an analysis of trend topics based on the authors' keywords. During the analysis, the following parameters were configured: (i) the time interval was defined from 1986 to 2022, (ii) the minimum frequency of words was defined as five (05) and (iii) the number of words per year was defined as five (05). The articles keywords, which the authors define, are usually connected to the publication content and suffice to derive topics from a field (Song et al., 2019). This analysis provides more information on trend topics in terms of keyword occurrences in the literature over the years. Although the authors' keywords are shown in Figure 3, the analysis in Figure 4 presents the hierarchical arrangement of topics discussed by scholars per year. These topics can be related to the field data monetization and data value in several ways. For example, in 2021, the ability to manage information was the most discussed topic and is a construct that is related to the generation of value and data monetization. Similarly, in 2020, big data analytics and big data were the main topics, which are key features for value generation and monetization. It is assumed that the Information Management Capacity construct provides the necessary insights for big data strategies to be successful (Maçada, Brinkhues, & Freitas, 2020) and can be operationalized as the ability to: (i) deliver data and information to users with accuracy, timeliness, reliability, security and confidentiality, (ii) provide universal and access connectivity with sufficient reach, and (iii) tailor the infrastructure to emerging business needs (Marchand, Kettinger, & Rollins, 2000). In 2016, the dynamic capabilities were at the top of the list, which demonstrates the importance of this theory in the context of data analysis and value generation.

Figure 4 – Keyword trend topics
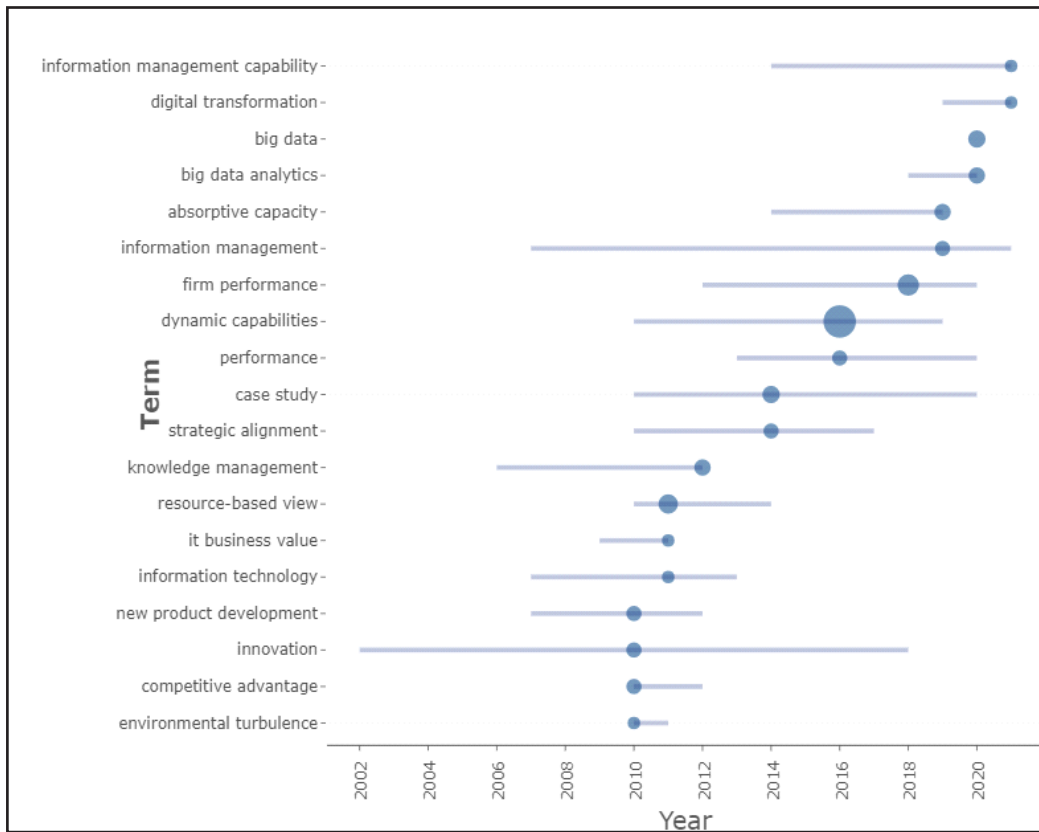
Source: Elaborated by the authors

In Figure 5 we show the co-occurrence network using a multi-dimensional scale to gain more insight into field trends and how the literature relates search terms. The networks were designed by selecting the vertices with a higher degree. In this analysis, the co-occurrence of keywords of titles was used in order to measure the most common words and those that appear most frequently in the titles of documents (Laengle et al., 2017). In the network, the size of the bubbles shows the keywords frequency in the dataset, and the thickness of the lines indicates the frequency of co-occurrence of the keywords in the same document. The thicker line indicates a strong association among these keywords; thinner lines represent weak association and keywords without connecting lines indicate that no relationship has been established. The distance among the nodes does not imply a specific meaning and is decided in favor of the best layout of the diagram. Thus, the co-occurrence network presents the link among the keywords in the literature, which gives a view of the structure of

the field knowledge (Esfahani, Tavasoli, & Jabbarzadeh, 2019). Therefore, the result shows that, in addition to identifying the authors' frequent keywords, growth and trend topics, the co-occurrence network of title keywords reveals the connections among them. Gupta and George (2016) argue that companies that develop a big data analytics capability will be more attuned to market responses and, as such, will have a stronger ability to detect opportunities in the data (Mikalef et al., 2021). In addition, Côrte-Real, Ruivo and Oliveira (2019) argue that big data analysis can allow organizations to generate business insights.

Figure 5 – Network of co-occurrence of keywords in titles
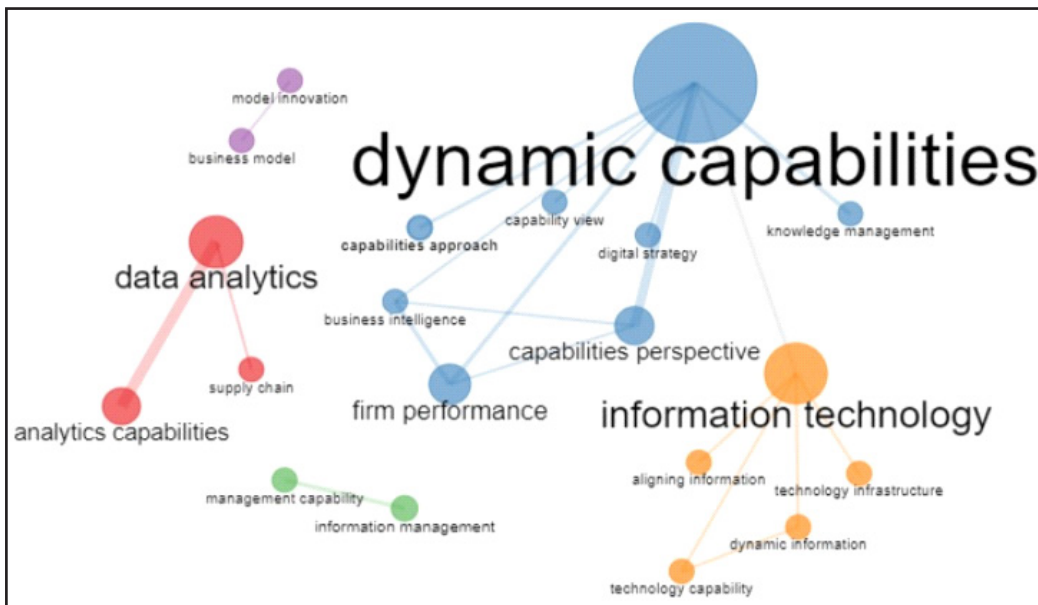
Source: Elaborated by the authors

Notably, five clusters were identified and some keywords seem to have a greater impact on the network. For example, "Dynamic Capabilities" connects to firm performance, business intelligence, capabilities approach, digital strategy, capabilities perspective and knowledge management. Likewise, Information technology is closely connected to technology capability, dynamic information, alighting information and technology infrastructure, and the term data analytics connects to analytics capabilities, and supply chain. According to Laguir, Gupta, Bose, Stekelorum and Laguir (2022),

with analytical capabilities companies have the ability to collect, save and analyze considerable volumes of data, often achieving valuable insights that can create value and generate organizational competitiveness.

In addition, the keywords thematic evolution over the last decades has shown a clear change in the scientific fields. The emergence of broad and central theme is captured using thematic evolution (Figure 6). A closer look at the interconnections among the themes may be separated by three times, the period 1986-2013, 2014-2019 and 2020-2022 highlights the thematic evolution. The six main themes of the first period were competition, resource-based view, information systems, information technology, dynamic capabilities and knowledge management. In the second period (2014-2019), the themes of information management, big data, information systems and digital platforms emerged, while in the third period (2020-2022) the themes advanced analytics, enterprise resource management, firm performance and business value appeared. It is noted that the term dynamic capabilities remained relevant over the years supporting the management of business resources, as well as the term information management and information systems.

Figure 6 – Thematic evolution of the keywords indexed by time period
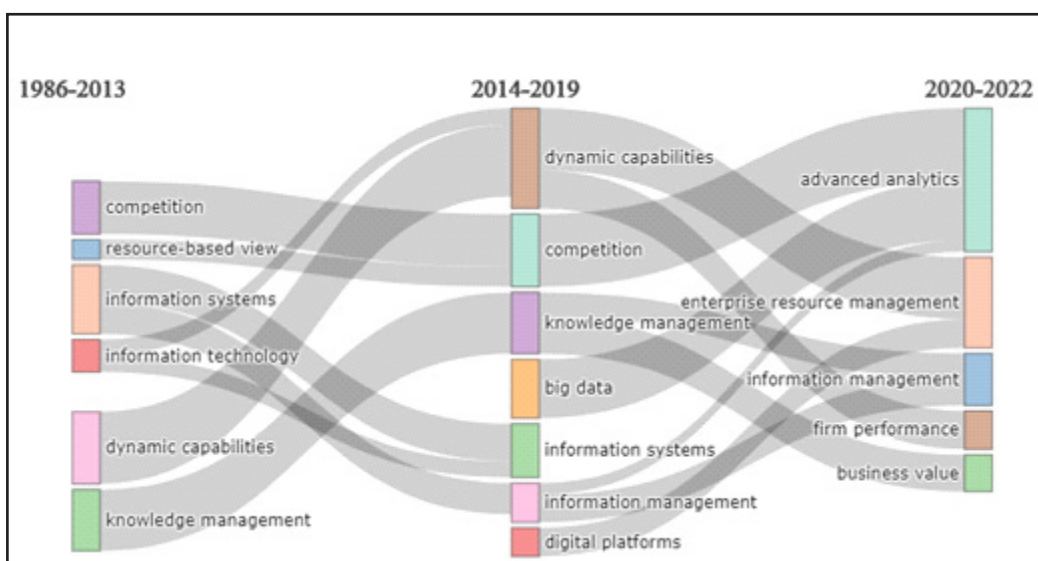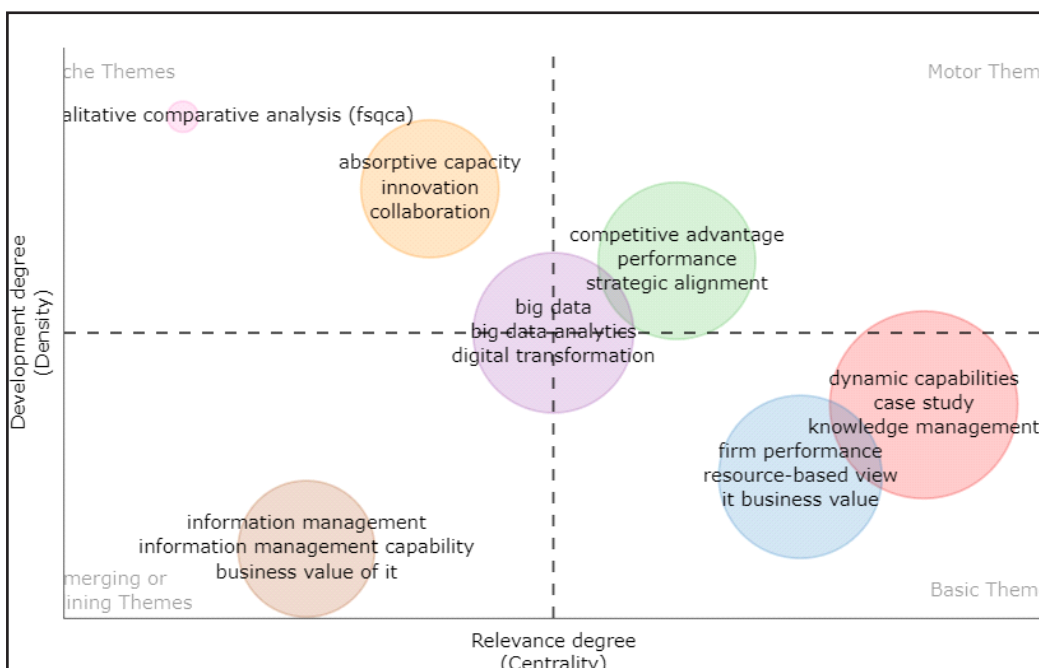

Source: Elaborated by the authors

In order to obtain a comparative view of the centrality and relevance of the keywords, we use thematic map function. This function creates a map based on co-word and clustering network analysis (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011). The thematic map illustrated in Figure 7 incorporates more keywords than the previous figures and shows the network of the five main clusters of co-words occurrences, considering the maximum number of 100 keywords and the maximum number of three keywords for each cluster. The objective of making a thematic map is to obtain information about the field current status and what its future sustainability reserves. This analysis is useful to provide knowledge to researchers and stakeholders about the potential for future research development of thematic areas within a field. The thematic map presents a visual design capable of analyzing the themes and in which quadrants they are located: Upper right quadrant (Q1): Motor themes - Good themes for discovery and important for the research structure; Upper left quadrant (Q2): Emerging and underdeveloped themes, marginal; Lower left quadrant (Q3): Special and important themes for the research object, but not developed; Lower Right Quadrant (Q4): Main themes – they represent well-developed themes with internal relations, but with trivial external relations (Tayebi et al., 2019).

The clusters of themes are characterized by properties (density and centrality). Density is represented on the vertical axis, while the centrality takes the horizontal axis. Centrality is the degree of correlation among different topics; density measures cohesion among the nodes (Esfahani et al., 2019). These two properties measure whether certain topics are well developed (or not) and important (or not). The higher the number of relationships a node has with others in the thematic network, the greater the centrality and importance, being within the essential position in the network. Similarly, the cohesion between nodes, which represents the density of a research field, delineates their ability to develop and sustain themselves. Figure 7 shows that the largest cluster comprises dynamic capabilities, case study, and knowledge management while the second is the most significant cluster related to

the firm's performance, resource-based vision, value of IT business – framed as key themes. The third largest cluster, framed as a motor theme, is related to competitive advantage, performance and strategic alignment. The fourth largest cluster and central comprises the big data, big data analytics and digital transformation themes, indicated as highly relevant and high level of importance (density) themes. Whereas the fifth cluster comprises information management, information management capability and business value of IT – framed as emerging themes, while the sixth cluster comprises absorption capability, innovation and collaboration, indicated as emerging and poorly developed themes. Thus, it is perceived the relevance and importance of new studies on the big data, big data analytics, information management and information management capability which are highlighted as special, relevant and emerging.

Figure 7 – Thematic map of the authors' keywords

Source: Elaborated by the authors

Through the thematic map it is possible to visualize that the themes big data, analytics, information management, absorption capability, firm's performance and dynamic capabilities are still little associated in the IS literature, thus highlighting the

relevance of this work to the academic environment. According to Božič and Dimovski (2019), companies face information overload due to the increasing amount of data (big data) being generated. The data processing capability is limited and may negatively influence the company's performance. In this sense, organizations are increasingly relying on Business Intelligence & Analytics to expand their absorption capability by increasing the ability to acquire and process information (Božič & Dimovski, 2019).

After the bibliometric analysis examines the main characteristics of scientific research related to the subject and how the literature relates these terms in the context of digital business, the main concepts and elements related to the monetization of data identified in the articles of the bibliographic portfolio are presented below, as well as the capabilities needed for monetization.

4.2 Key definitions related to data monetization

Najjar and Kettinger (2013) define data monetization as converting the intangible value of data into real value, usually with the sale or other tangible benefits. More recently, Parvinen et al. (2020) defined monetization as direct or indirect conversion of data into financial capital. Monetization addresses data as an intangible asset that provides opportunities to create and capture value through new ways to explore collected and organized data (Parvinen et al., 2020).

For Hanafizadeh and Harati Nik (2020), monetization is a process of transforming an input (representations of raw data) into a valuable output, similar to what is done in crude oil refining, thus using something of value as a source of monetary or non-monetary achievement. From an analytical point of view, before the data can be monetized, they need to be processed and discovered to later go through the value creation process that involves different technologies and business know-how (Najjar & Kettinger, 2013). It should be noted that in this SLR, few articles were found related to the definition of data monetization in IS journals.

The other articles in the portfolio focus on topics related to the value of data and social media data. Below, Table 3 presents the definitions of data monetization found in the portfolio of this review.

Table 3 – Data monetization definitions

Year	Definitions	Authors
2013	It occurs when the data intangible value is converted into real value, usually with the sale or other tangible benefits. Data monetization is an act of converting data into a valuable product or service or information that will result in a monetary or non-monetary benefit	Najjar and Kettinger
2020	Process of transforming an input (representations of raw data) into a valuable output, similar to what is done in crude oil refining	Hanafizadeh and Harati Nik
	Using data from an organization to generate profit through the sale directly or indirectly from the creation of value	Faroukhi et al.
	Monetization data addresses data as an intangible asset that provides opportunities to create and capture value through new ways to explore collected and organized data	Parvinen et al.

Source: Elaborated by the authors

The idea of monetization creating new value and revenue from data is not new, even though the concept has not been widely studied in the IS area. Based on the literature found, it can be concluded that there are still few journals in the area dealing with the theme. In order to seek a better understanding of the data monetization concepts and identify the main elements related to monetization definitions, we used the co-citations of articles in the bibliographic portfolio, since monetization is a generalist theme, applied to other areas of knowledge. According to Webster's and Watson's recommendations (2002), when reviewing and developing theory it is necessary to consult articles from outside the related area. Thus, Table 4 presents the complete mapping of elements related to data monetization definitions, including in this table journals not entered in the initial selection criteria.

Table 4 – Summary of elements related to data monetization definitions

Authors/Elements related to Monetization definitions	Competitiveness	Data Sale	Data Discovery	Data Processing	Value creation	Revenue generation	Internal and external data	Generating insights	Data direct and indirect conversion	Monetary/non-monetary benefit	Business intelligence & Analytics
Najjar and Kettinger (2013)		x	x		x	x				x	
Mohasseb (2014)			x	x		x				x	
Prakash (2014)				x		x	x	x			
Shukla and Dubey (2014)			x	x	x			x			
Liu and Chen (2015)		x			x	X				x	
Thenuan and Raina (2016)					x	x					x
Wixom (2014)	x		x	x	x					x	
Wixom and Ross (2017)	x		x	x	x					x	
Teece and Linden (2017)					x						
Visconti et al. (2017)					x	x					x
Fred (2017)			x			x					
Gartner (2015; 2019)										x	
Alfaro et al. (2019)		x							X	x	
Faroukhi et al. (2020)		x			x					x	
Hanafizadeh and Harati Nik (2020)	x	x			x				x	x	
Parvinen et al. (2020)		x		x	x						
Hanafizadeh et al.(2021)			x	x	x			x	x	x	x

Source: Elaborated by the authors

Elements such as value creation, data direct and indirect conversion, competitivity, revenue generation, internal and external data, insights generation, Business Intelligence & Analytics, among others, are essential for companies to remain competitive and should be better explored in the academy to help companies monetize their data assets. Such elements reinforce the importance of variables related to performance, insights, business agility, data enrichment, technical and analytical capability to be combined in the model for data monetization.

Monetization definitions have resulted in a focus on data-driven business and involved various economic sectors such as telecommunications, retail,

e-commerce, banking services, among others (Liu & Chen, 2015). The changes in the business environment have created new opportunities for the use of data, enabling companies to new ways of use and value generation that academic literature does not cover. For Suseno, Laurell and Sick (2018), empirical studies are limited and necessary to examine value creation practices as a result of interactions among the stakeholders. In this sense, we present in the following section the information management capabilities mentioned in the literature, able of assisting in the generation of insights and monetization of data.

4.2.1 Information Management Capability and Data Monetization Capability

Owning the data and being able to monetize them is certainly a success factor of tomorrow's market leaders, allowing innovations and creations of new business models. Despite the importance of data monetization, only three articles from the portfolio identified capabilities related to data monetization (see Hanafizadeh & Harati Nik, 2020; Najjar & Kettinger, 2013; and Parvinen et al., 2020). Then, after identifying the concepts and the main elements related to data monetization, we perceived the need for a clear understanding of the necessary capabilities to monetize the available data.

In the systematic review of Hanafizadeh and Harati Nik (2020), the authors sought to clarify the configuration of data monetization. Four global themes have been identified that constitute the main aspects of big data: the monetization layer, the data refinement layer, the base layer and access layer, and processing restrictions, providing organizations with a hands-on approach to ensuring a data monetization process. In the monetization layer, the themes related to direct sales, analytics, insights and final consumer were identified. In relation to the data refinement process, the active themes, models, data-based operations and value were identified and, within the third aspect, which provides a basis for the success of data monetization, the subjects related to people, perception, analytical

capabilities, techniques and platforms. At the last layer, which affects all other layers, are legal, ethical and privacy issues.

For Najjar and Kettinger (2013), it is important to evaluate the company's technical (data infrastructure) and analytical (human) capabilities to determine which strategic path a company should choose to monetize its data. Technical capability includes hardware, software, and network resources that allow to collect, store, and retrieve their data. Whereas analytical capability is related to the construction of high analytical capability based on mathematical and analytical business knowledge (Najjar & Kettinger, 2013) and can be defined as the ability to deploy and combine resources for rigorous and action-oriented data analysis, being formed by the association of data greatness, data quality, analytical skills, knowledge and sophistication of tools (Ghasemaghaei et al., 2018).

The study by Parvinen et al. (2020) point out that companies need to invest in their data infrastructure so that they can deliver secure and easily accessible data. In this sense, professionals with skills to refine, exploit the data and sell them are essential. In addition, the authors indicate that the increasing data resources allow companies to start integrating internal data with external data, considering new ways of use, through data enrichment (Parvinen et al., 2020).

Thus, the results of this SLR showed that more research should be carried out to identify the capability gap that plays an important role in data monetization. For Ghasemaghaei et al. (2018), companies need to improve their data analytics competence to make better, more informed and faster decisions. It is necessary that companies have strong integration, management, sharing and analysis capabilities of big data to create value (Grover et al., 2018; Prahalad & Hamel, 2006). In this sense, it was identified the need for new approaches, based on the construction and consolidation of capabilities in data science, acquisition of IT infrastructures, analytical capabilities, talents, and qualified professionals, for the development of indirect monetization (Faroukhi, El Alaoui, Gahi, & Amine, 2020).

Thus, a clear understanding of the capabilities that must be combined in the data monetization process can help many organizations gain performance.

Based on the bibliographic portfolio of this SLR, four skills that form the ability to manage information and two skills necessary for data monetization were grouped. Thus, we present the skills that will compose the capability of information management and the capability of monetize the data, supported by the articles of the bibliographic portfolio of this study.

4.2.1.1 Information Management Capability

Companies create competitive advantage by gathering their resources to work together to generate organizational capabilities. According to Grover et al. (2018), the capabilities are skills to manage, analyze data and create new insights. For Mithas et al. (2020), companies need to develop capabilities to leverage the strategic value of information. In this sense, several organizational capabilities enabled in IT have been widely studied in the literature (Kettinger et al., 2021; Yasmin et al., 2020) with a theoretical lens centered on IT capability (Yasmin et al., 2020). While IT-enabled resources can be launched with digital technologies (Nwankpa & 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 employing a resource in combination with other resources and organizational capabilities for task development (Kettinger & Marchand, 2011). In this sense, this study presents four important variables identified in the IS literature called Information Management Capability: Data Enrichment, Analytical Skill, Technical Skill, and Data Governance (Table 5).

Table 5 – Constructs and definitions of Information Management Capability

Definition	Authors
Data Enrichment – Ability to create value from various data sources – internal/external – data processing, transformation or cleaning for economic benefit	Parvinen et al. (2020), Baecker et al. (2020), Laguir et al. (2022)
Analytical – Ability to analyze and interpret the data applied to big data to extract information that generates value to the company	Najjar and Kettinger (2013), Grover et al. (2018), Ghasemaghaei et al. (2018), Mikalef et al. (2017), Laguir et al. (2022)
Technical – Know-how necessary to use new technologies for the collection, storage, recovery and analysis of the various types of data	Najjar and Kettinger (2013), Ghasemaghaei et al. (2018), Mikalef et al. (2017), Gupta and George (2016)
Data Governance – definition of structures, procedures and functions to enable the necessary data flow, taking into account the aspects of data security, privacy, ethics and quality	Mikalef et al. (2020), Parvinen et al. (2020)

Source: Elaborated by the authors

These capabilities, which include the use and combination of different data sources, enable companies to generate useful insights for data monetization and, consequently, performance improvements. Companies tend to use analytical and technical capabilities to handle unstructured and varied data sources in a short period of time, which will promote speed, effectiveness and efficiency of data-generated insights that can be used for new business opportunities (Laguir et al., 2022). For Srinivasan and Swink (2018), analytical capability can be understood as a set of "tools, techniques and processes that allow a company to process, organize, visualize and analyze data, producing insights that enable planning, decision-making and execution." However, in this study the analytical capability of Srinivasan and Swink (2018) was dismembered in the four variables presented (Table 5) called Information Management Capability.

4.2.1.2 Data Monetization Capability

According to Mikalef et al. (2020), the companies must strategically plan and execute data analysis projects and gather the resources needed to transform data

into insights. Thus, the organizations will be developing organizational capabilities to identify areas within their business that can benefit from data-driven insights (Gupta & George, 2016), as obtaining data-driven insights has become increasingly important, especially for organizations operating in dynamic business environments where making informed decisions is essential (Mikalef et al., 2019; Wamba et al., 2017).

Despite the importance of obtaining insights, the literature is not clear on how insights-generating practices can be defined and developed (Schulte & Hovorka, 2017). Jiang and Gallupe (2015) state that there is a significant gap between the analysis provided by experts or tools used and the real business needs, and that the simple implementation of analytical tools will not bring valuable insights to organizations. Therefore, the ability to generate insights has been identified as an important dynamic capability that can help organizations adjust their activities and resources when faced with changing markets (Jiang & Gallupe, 2015).

In this context, strategic agility offers opportunities for companies to respond quickly to changes, be flexible and implement actions that control the risks and uncertainties of the market (Sherehiy et al., 2007). For Kale et al. (2019), 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 customers, generating opportunity and reorganizing its strategy in response to environmental changes (Shin et al., 2015).

Al-Azzam et al. (2017) point out that the ability to be agile is directly related to the human performance, processes and technologies of the organization. In addition, agility can improve the quality of a company's competitive activities and market responses, improving strategic performance (Kale et al., 2019; Tallon & Pinsonneault, 2011). However, internal and external environments should be constantly examined, information should be collected and used quickly, and market changes should be answered as the same way (Kumkale, 2016).

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 (Tallon & Pinsonneault, 2011). The link between the company's agility and performance highlights the need for companies to adapt rapidly to new market conditions and the risks of not reacting in time (Queiroz, Tallon, Sharma, & Coltman, 2018; Sambamurthy et al., 2003). Other studies have shown that agility is an important capability through which IT capabilities affect the company's performance (Chen et al., 2014; Ravichandran, 2018). Based on studies that argue that agility affects the organizations' performance (Chen et al., 2014; Tallon & Pinsonneault, 2011), we have also identified that the ability to generate insights can indirectly improve performance through Business Agility. Thus, the two abilities related to the proposed data monetization capability are: Insights and Business Agility (Table 6), considering them essential for improving business performance.

Table 6 – Constructs and definitions of Data Monetization Capability

Definition	Authors
Insights - 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) Schulte and Hovorka (2017)
Business Agility - defined as the ability to respond quickly to changes, using the available data, and being strategically agile in implementing actions for performance improvement	Kale et al. (2019) Tallon and Pinsonneault (2011) Kumkale (2016) Sherehiy et al. (2007) Queiroz et al. (2018)

Source: Elaborated by the authors

In the next section, we present the development of the multidimensional model and some research propositions.

4.3 Multidimensional Model Proposition

The development of the preliminary model of this research was based on the main definitions presented in section 4.2. 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 the conversion of data into insights and knowledge useful for decision-making, favoring the generation of value from the data. However, the success of data monetization depends on the proper alignment of information management skills related to generating insights. Consequently, the Monetization Capability (which includes generating insights and business agility) represents the combination of factors that will influence business performance. Thus, it is aimed herein to investigate the effects of Information Management Capability on the Data Monetization Capability and, consequently, on Business Performance.

The definition of Data Monetization Capability of this study is adjusted to the term capabilities, present in the Theory of Dynamic Capabilities, which describes the skills that organizations must have to integrate, build and reconfigure internal and external competencies, in response to rapidly changing environments (Laguir et al., 2022; Teece et al., 1997). The Theory of Dynamic Capabilities seeks to understand how organizations achieve sustainable competitive advantages in environments of constant technological change and rapidly changing markets (Teece et al., 1997).

In today's hypercompetitive business environment, companies must constantly update and reconfigure their resources, responding to changes in the external environment to develop a sustainable competitive advantage (Lin & Wu, 2014). A company's ability to respond to change (dynamic capability) incorporates skills and knowledge built into the organization to change existing resources and create new value (Teece, 2007), which can result in a sustainable competitive advantage (Ambrosini & Bowman, 2009). More specifically, for this work, the three categories of dynamic

capacities proposed by Teece (2007) were adapted: (i) *Sensing*: detecting opportunities in data, (ii) *Seizing*: seize opportunities by creating products, processes or businesses through available data and (iii) *Transforming*: manage threats and, where necessary, reconfigure tangible and intangible resources to adapt to changing market conditions (Laguir et al., 2022).

Based on the above, the conceptual model was constructed as illustrated in Figure 8, consisting of seven constructs and seven propositions involving the relationships among them, namely: **P1:** Data enrichment is related to the ability to generate insights; **P2:** Analytical skills are related to the ability to generate insights; **P3:** Technical skills are related to the ability to generate insights; **P4:** Data governance is related to the ability to generate insights; **P5:** The ability to generate insights is related to business agility; **P6**: The ability to generate insights is related to the business performance; **P7**: The business agility is related to business performance.

Figure 8 – Multidimensional Model proposed from SLR
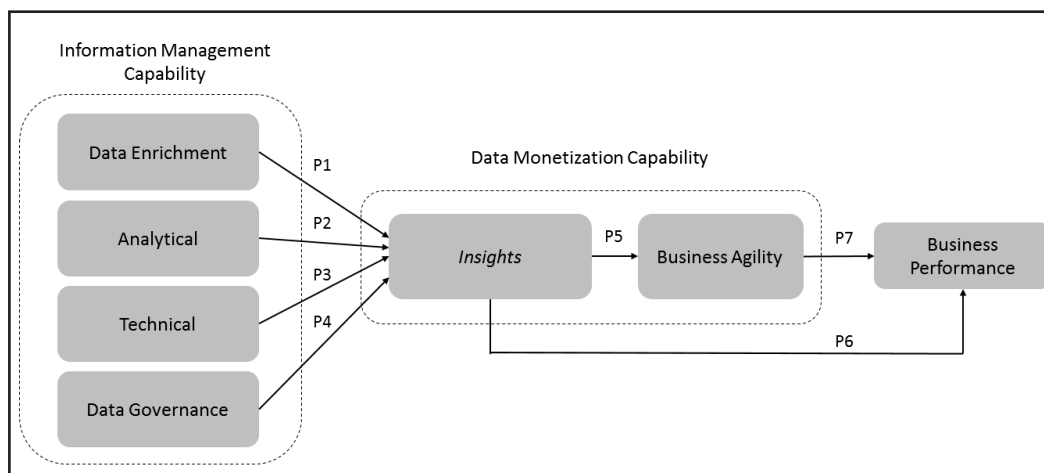
Source: Elaborated by the authors

5 FINAL CONSIDERATIONS & FUTURE RESEARCH OPPORTUNITIES

Most organizations have encountered difficulties measuring the value generated by data, and monetization – defined as the process of converting data and their analyses

(*analytics*) into financial return – still an unknown opportunity. Thus, the organizations have been developing data preparation and analytical capabilities aimed at converting the value from extracted data into insights that promote economic benefits (tangible) or value (intangible). Although organizations are increasingly interested in obtaining knowledge in order to monetize it, the ability to do so is still relatively little explored in the IS literature. Thus, this study has sought to map how scientific studies relate the terms data monetization, data value, capabilities, and insights and performance in the business context. This was achieved by analyzing article's keywords to discover the most influential trends of studies published in leading journals of IS area available on Scopus database.

The analysis of the articles identified in this systematic review highlights the challenges faced by most organizations that seek to create value by monetizing their data. Thus, this study proposes a theoretical model that outlines the main capabilities needed to ensure a better organizational performance. Regarding the Information Management Capability, the research model introduces the novel construct to IS literature "data enrichment", which is considered as an important skill for monetization and insight generation.

Given the lack of theoretical models in the IS literature that explore the necessary capabilities to ensure the data monetization, this study contributes to connecting and defining concepts based on the theory of dynamic capabilities. In addition, the proposed research model contributes managerially by identifying which capabilities should be combined to ensure effective monetization. This study provides evidence to support significant changes in the way data are used can allow organizations to effectively monetize their data, improve business agility and, consequently, their organizational performance, thus becoming data-driven organizations.

5.1 Future Research Opportunities

To further advance our understanding of data monetization, the proposed theoretical model requires empirical validation. This could best be achieved through a mixed-methods approach that combines qualitative interviews with data management

experts and quantitative analyses involving professionals from various organizational contexts. By doing so, it would be possible to assess and confirm the applicability and effectiveness of information management and data monetization capabilities.

Additionally, research should delve into data monetization strategies in Business-to-Business (B2B) environments to identify innovative business models and practices that facilitate effective data exchange and monetization. The potential of emerging technologies such as Artificial Intelligence (AI) and Blockchain in enhancing the security, transparency, and efficiency of data monetization processes could also be investigated. These technologies should be pivotal in integrating new value propositions within business strategies. Concurrently, it would be timely to explore the impact of data protection regulations, such as Brazil's General Data Protection Law (LGPD) and similar frameworks globally, on data monetization. This exploration would enable organizations to align their monetization strategies with legal requirements while maintaining competitiveness and innovation

Further studies could also explore how investments in different stages of the data value chain – ranging from data preparation to advanced analytics – affect insight generation and decision-making processes, thereby improving organizational performance and providing a cost-benefit analysis of these investments. Lastly, longitudinal studies could provide a deeper insight into the long-term effects of data monetization strategies on organizational performance, contributing to a sustainable business model that leverages data as a significant asset. This comprehensive research agenda may help clarify the dynamics of data monetization and guide organizations to become truly data-driven.

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1. Definition of research problem	√	√	√	√
2. Development of hypotheses or research questions (empirical studies)	√	√	√	√
3. Development of theoretical propositions (theoretical work)	√	√		√
4. Theoretical foundation / Literature review	√			
5. Definition of methodological procedures	√			
6. Data collection	√			
7. Statistical analysis				
8. Analysis and interpretation of data	√	√		
9. Critical revision of the manuscript	√	√	√	√
10. Manuscript writing	√			
11. Other (please specify)				

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