

# Big Data as a Strategic Capability for Managerial Decision-Making: Evidence from a Systematic Literature Review

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**Abstract.** Big Data has become consolidated as a strategic capability for supporting managerial decision-making in increasingly dynamic, complex, and data-intensive organizational environments. However, the scientific literature on this relationship remains fragmented across technological approaches, sectoral applications, analytical capabilities, and conceptual foundations. This paper aims to analyze the state of the art of research on the influence of Big Data on managerial decision-making. To this end, a Systematic Literature Review was conducted based on Kitchenham's guidelines, considering studies published between 2021 and 2026 in Scopus, Wiley Online Library, Springer Nature Link, and Taylor & Francis Online. From an initial universe of 9 830 records, 55 studies were selected through exclusion criteria and quality assessment. The results show a greater concentration of publications in 2024 and 2025, as well as scientific production led by countries in Asia, Europe, and North America, especially China. Likewise, the predominant definitions of Big Data were found to focus on the management, processing, and integration of large volumes of data, although approaches linked to dynamic capabilities, digital transformation, sustainability, and competitive advantage also emerge. The most represented sectors were manufacturing, retail, and healthcare, while the most frequent analytical capabilities were Business Analytics, Big Data Analytics, and Business Intelligence. The findings show that Big Data should not be understood solely as technological infrastructure, but rather as an organizational capability that strengthens business intelligence and support for managerial decision-making.

**Keywords.** Business analytics, organizational intelligence, digital transformation, competitive advantage, enterprise performance.

## 1 Introduction

Digital transformation has profoundly reconfigured the dynamics of contemporary organizations, modifying the way they capture, process, and interpret information to support their strategic processes. In an environment characterized by high volatility, intensive competition, and increasing operational complexity, organizations face the need to adopt more sophisticated mechanisms to manage information and respond with greater precision to dynamic scenarios. In this context, Big Data has emerged as one of the main enablers of organizational transformation, as it offers capabilities to process large volumes of heterogeneous, fast-moving, and complex data that exceed the possibilities of traditional information systems.

In the business domain, managerial decision-making constitutes a critical process for organizational sustainability and competitiveness, since it conditions the efficient allocation of resources, strategy formulation, and the capacity to adapt to opportunities and risks in the environment. Historically, this process has depended on executive experience, managerial intuition, and retrospective analysis of structured information. However, market acceleration, process digitalization, and the proliferation of unstructured data have created the need to incorporate more robust analytical approaches that improve the quality, timeliness, and accuracy of decisions in complex business contexts.

Under this scenario, Big Data has transcended its initial conception as technological infrastructure

to become consolidated as a strategic capability aimed at transforming data into useful knowledge for organizational action. Its relevance does not lie solely in the massive accumulation of information, but in the possibility of converting dispersed data into analytical inputs that make it possible to interpret patterns, anticipate scenarios, and strengthen the quality of managerial decisions. Consequently, Big Data has acquired a central role in the construction of organizational intelligence and in the generation of sustainable competitive advantages, especially in organizations that require agile, evidence-based, and strategically aligned responses.

Based on the reviewed state of the art, the literature shows that the strategic value of Big Data in organizational management has mainly become consolidated as a capability aimed at transforming data into useful knowledge to improve business performance and decision-making. Along these lines, several studies agree that big data analytics strengthens operational efficiency, increases organizational responsiveness, and improves the sustainable and financial performance of firms, especially when it is articulated with knowledge management mechanisms and dynamic capabilities [1, 4, 7, 20].

From an organizational perspective, multiple studies argue that the impact of Big Data does not depend solely on technological availability, but also on structural factors associated with data quality, organizational maturity, and the capacity to integrate analytical resources into internal processes. In this regard, variables such as data integrity, timeliness, systemic trust, and the articulation of innovation ecosystems have been shown to significantly condition the adoption and strategic use of analytical systems in organizations [5, 15, 16].

The authors in [2, 10, 12], in their studies focused on managerial decision-making, emphasize that the value of Big Data materializes when organizations develop analytical governance structures and integration mechanisms that allow large volumes of data to be translated into more accurate, timely, and strategically aligned decisions.

Under this logic, data-driven decision-making is not limited to operational support, but is configured as a critical managerial capability for reducing

uncertainty and improving strategic coordination [2, 10, 12].

In the field of applied analytics, several studies have shown that Big Data and Business Analytics make it possible to optimize decisions in specific domains such as marketing, strategic purchasing, and customer management, through the use of predictive models, text mining, sentiment analysis, and automated processing of unstructured information. These applications have made it possible to identify behavioral patterns, improve decision segmentation, and strengthen responsiveness to dynamic competitive scenarios [3, 8, 9].

Likewise, recent literature shows that advanced analytics has also been linked to leadership, innovation, and organizational success processes, particularly in contexts where decisions require speed, adaptability, and strategic orientation.

Within this framework, the convergence of entrepreneurial leadership, advanced analytics, and organizational capabilities has been identified as a factor that fosters innovation, improves project performance, and strengthens business adaptability in uncertain environments [6, 17, 22].

From a critical perspective, some authors warn that the growth of Big Data in business environments has also introduced challenges related to ethical governance, algorithmic fairness, and the legitimacy of automated decisions.

In particular, algorithmic biases and the perception of unfairness in analytical systems have been shown to affect the acceptance of data-driven recommendations and compromise managerial trust, which reveals the need to incorporate principles of fairness and transparency into business analytics frameworks [18, 19].

On the other hand, the literature also recognizes that the value of Big Data is not exhausted in its technological dimension, but depends on the organizational capacity to convert data into strategic resources and actionable knowledge. In this regard, it has been emphasized that business analytics acquires greater value when it is articulated with knowledge-based resources, managerial interpretation mechanisms, and organizational structures capable of systematically absorbing, processing, and exploiting information [11, 12, 22].

The evidence suggests that Big Data has evolved from a technological support tool into a strategic capability with direct implications for managerial decision-making, organizational performance, and business competitiveness.

Nevertheless, although the literature reports important advances in adoption, governance, performance, and sectoral applications, conceptual and methodological fragmentation persists, making it difficult to consolidate an integrated view of how Big Data actually influences managerial decision-making from an organizational, strategic, and executive perspective.

Despite the growing volume of research on Big Data in business environments, relevant gaps remain in the comprehensive understanding of its influence on managerial decision-making. The available evidence is widely dispersed across technological approaches, sectoral applications, functional studies, and conceptual frameworks that, although valuable, tend to address the phenomenon in a fragmented manner.

This dispersion limits the consolidation of an articulated view that makes it possible to comprehensively understand how Big Data influences managerial decision-making processes from strategic, organizational, and executive dimensions.

In this sense, the conceptual and methodological fragmentation identified in the literature justifies the need to develop a systematic review that critically synthesizes the available evidence and structures a more integrated understanding of the phenomenon. An approach of this nature will make it possible to identify research patterns, predominant approaches, application sectors, and main theoretical contributions, as well as to recognize knowledge gaps that continue to limit the development of more robust analytical frameworks in this field.

In this context, the present study aims to analyze, through a systematic literature review, the state of the art of research on the influence of Big Data on managerial decision-making. Specifically, it seeks to identify the main analytical approaches, application sectors, thematic patterns, and theoretical contributions reported in the literature, with the purpose of understanding how Big Data has been conceptualized and applied as strategic

support for decision-making in organizational environments.

## 2 Theoretical Background

### 2.1 Big Data

Big Data is defined as a technological and analytical capability aimed at the capture, storage, processing, and interpretation of large volumes of data characterized by high velocity, variety, and complexity, whose magnitude exceeds the capabilities of traditional information management systems. In the organizational context, its value does not lie solely in the massive accumulation of data, but in the possibility of transforming it into strategic knowledge to support more accurate, timely, and business-aligned decisions. From this perspective, Big Data has evolved from a digital support infrastructure into an organizational capability with direct implications for competitiveness, efficiency, and business adaptation.

Several studies argue that the strategic value of Big Data becomes consolidated when its analytical capability is integrated with knowledge management processes and dynamic capabilities oriented toward value creation. Atlas and colleagues [7] show that big data analytics capability significantly improves the financial and market performance of organizations when it is articulated with knowledge management mechanisms. In a complementary manner, Vesterinen and colleagues [20] argue that Big Data strengthens organizational agility by enabling faster responses to environmental opportunities and threats. Along the same lines, Pesqueira and colleagues [4] demonstrate that big data analytics favors operational efficiency and strategic alignment in corporate programs, particularly in contexts where sustainability and institutional adaptation constitute critical factors.

### 2.2 Managerial Decision-Making

Managerial decision-making constitutes a central process in organizational management, since it guides resource allocation, strategy formulation, and institutional responses to uncertainty

scenarios. Traditionally, this process has depended on executive experience, organizational judgment, and retrospective analysis of structured information.

However, the increasing complexity of business environments, together with market acceleration and the expansion of unstructured information, has increased the need to strengthen decision-making processes through more robust and evidence-based analytical approaches.

In this context, managerial decision-making has evolved toward more analytical models, in which the capacity to interpret complex information becomes a critical factor for reducing uncertainty and improving organizational effectiveness. Orjatsalo and colleagues [12] point out that top managers use business analytics not only to monitor performance indicators, but also to complement strategic decision-making processes related to resource allocation and organizational direction. For their part, Alhamdi and Al-Kahtani [9] demonstrate that information systems and analytical transformations positively influence the quality of organizational decisions, particularly in areas related to marketing and strategic management.

In addition, the literature recognizes that managerial decision-making does not depend exclusively on access to information, but also on the existence of organizational structures that make it possible to interpret, validate, and translate such information into strategic actions. In this regard, Baijens and colleagues [10] highlight the importance of establishing analytical governance mechanisms that structure the use of data in decision-making and reduce risks associated with deficient or disjointed interpretations. This perspective reinforces the idea that managerial decision-making is not merely a rational act of choice, but an organizational capability supported by interpretation, coordination, and governance.

### **2.3 Influence of Big Data on Managerial Decision-Making**

The relationship between Big Data and managerial decision-making is grounded in the capacity of organizations to transform large volumes of data into useful knowledge that makes it possible to reduce uncertainty, anticipate scenarios, and

improve the quality of the decision-making process. In theoretical terms, this relationship positions Big Data as a strategic enabler of organizational intelligence by providing analytical inputs that strengthen the interpretation of the environment and support more accurate, timely, and well-founded decisions.

The authors in [2, 10, 12], in their studies focused on organizational management, agree that the value of Big Data materializes when organizations develop integration and governance structures capable of converting data into strategic decisions. Rumman and Al-Abbadi [2] show that the integration of analytical architectures significantly improves decision-making and risk assessment by facilitating more consistent and structured information flows. Along the same lines, Baijens and colleagues [10] argue that analytical governance constitutes an essential component to ensure that data are interpreted and used coherently in the formulation of managerial decisions. Complementarily, Orjatsalo and colleagues [12] demonstrate that the usefulness of Big Data in top management becomes consolidated when analytics is incorporated as real support for strategic assessment and not only as an operational monitoring tool.

At the applied level, this influence has also been evidenced in specific functional areas where Big Data improves decision accuracy and strengthens organizational responsiveness. Kyriakidis and Tsafarakis [3] show that the integration of advanced analytics and automated processing makes it possible to extract useful knowledge from unstructured information to guide customer-centered decisions. Similarly, Bodendorf and colleagues [8] demonstrate that business analytics applied to strategic purchasing improves supplier evaluation and optimizes decisions in complex supply chains. In both cases, Big Data acts as a support mechanism that increases the predictive, interpretive, and strategic capacity of the organization.

Together, theoretical and applied evidence supports the view that Big Data directly influences managerial decision-making by strengthening the analytical quality of information, improving the organizational capacity for interpretation, and reducing uncertainty in complex contexts. Its influence is not limited to the technical processing

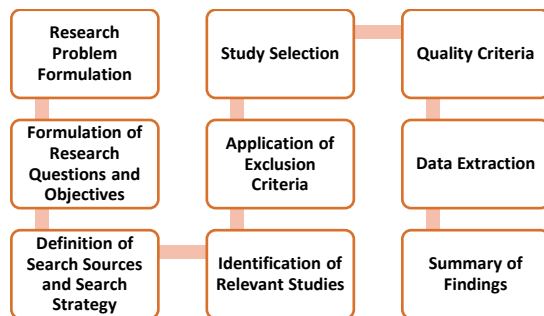


Fig. 1. systematic literature review workflow

of data, but extends to the construction of more robust managerial capabilities oriented toward the formulation of evidence-based strategic decisions.

### 3 Review Method

This paper was developed under the approach of a Systematic Literature Review (SLR), methodologically supported by the guidelines proposed by Kitchenham [56], which provide a rigorous, transparent, and reproducible structure for identifying, selecting, evaluating, and synthesizing relevant scientific evidence. The choice of this approach is appropriate due to the conceptual, technological, and sectoral dispersion existing in the literature on the influence of Big Data on managerial decision-making, as well as the need to consolidate an integrated view of the available knowledge in this field.

The applied methodology was organized into three main phases: design, development, and synthesis. In the design phase, the objective of the review, the research questions, the analysis variables, and the methodological criteria that guided the documentary search process were defined. For this purpose, Big Data was considered the independent variable, and managerial decision-making was considered the dependent variable. Likewise, the key terms associated with both variables, their English equivalents, and their main synonyms were identified in order to construct a broad search equation relevant to the thematic domain of the study.

During the development phase, the systematic search was carried out in the selected databases, the initial universe of studies was consolidated, and a progressive screening process was applied

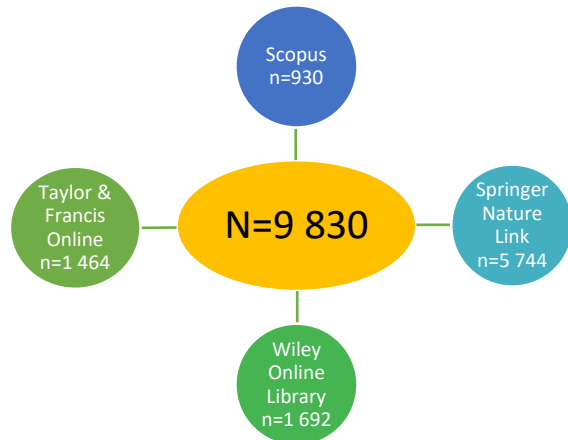
using previously defined exclusion criteria. This process included the review of publication age, language, document type, full-text availability, thematic relevance of the title, keywords, and abstract, as well as the elimination of duplicate studies. Subsequently, the selected papers were subjected to a quality assessment in order to ensure their methodological validity, thematic consistency, and scientific relevance to the objectives of the review.

Finally, in the synthesis phase, the included studies were organized, coded, and categorized according to the research objectives. This stage made it possible to initially characterize the corpus through a bibliometric overview, considering the temporal distribution of publications, source databases, temporal trend, and geographic distribution of scientific production. Then, the analysis aimed at answering the research questions was developed by identifying thematic structures, scientific impact of the sources, definitions and theoretical foundations, business sectors of application, as well as analytical capabilities and data-driven technologies. In this way, the methodology made it possible to build a systematic view of the role of Big Data as strategic support for managerial decision-making. The development of the applied methodological procedure is presented in Figure 1.

#### 3.1 Research Problem and Objectives

The growing adoption of Big Data in business environments has driven the development of new analytical capabilities aimed at improving organizational efficiency, strengthening business intelligence, and optimizing managerial decision-making. However, the scientific evidence on this relationship remains fragmented across technological approaches, sectoral studies, functional applications, conceptual models, and bibliometric perspectives. This dispersion makes it difficult to consolidate a comprehensive understanding of how Big Data influences decision-making processes within organizations.

In this context, the general problem guiding this review can be formulated as follows: what is the state of the art of research on the influence of Big Data on managerial decision-making? Based on this question, there is a need to systematize the



**Fig. 2.** Initial total of studies by source

available evidence in order to identify research patterns, predominant approaches, application sectors, analytical capabilities, and conceptual foundations that make it possible to understand the scientific development of this topic.

The general objective of this Systematic Literature Review is to analyze the state of the art of research on the influence of Big Data on managerial decision-making, with the purpose of identifying thematic structures, bibliometric indicators, conceptual approaches, business sectors of application, and analytical capabilities that make it possible to understand its contribution in organizational environments.

To respond to this purpose, the following specific objectives were formulated:

- **SO1:** Identify the main topics and thematic structures present in research on Big Data and managerial decision-making.
- **SO2:** Analyze the scientific impact of the journals and sources that publish research on Big Data and managerial decision-making, considering indicators such as quartile, productivity, and H-index.
- **SO3:** Examine the definitions, theoretical foundations, and conceptual approaches developed or applied in studies on Big Data and managerial decision-making.
- **SO4:** Recognize the main business sectors in which Big Data is applied to support managerial decision-making.

- **SO5:** Identify the main analytical capabilities and data-driven technologies reported in research on managerial decision-making.

In correspondence with these objectives, the following research questions were formulated:

- **RQ1:** What are the main topics and thematic structures present in research on Big Data and managerial decision-making?
- **RQ2:** What is the scientific impact of the journals that publish research on Big Data and managerial decision-making, considering quartiles, productivity, and H-index?
- **RQ3:** What definitions, theoretical foundations, and conceptual approaches have been developed or applied in studies on Big Data and managerial decision-making?
- **RQ4:** What are the main business sectors in which Big Data is applied to support managerial decision-making?
- **RQ5:** What are the main analytical capabilities and data-driven technologies reported in research on managerial decision-making?

### 3.2 Information Sources and Search Strategies

In order to collect relevant scientific studies on the influence of Big Data on managerial decision-making, academic databases recognized for their rigor, multidisciplinary coverage, and continuous updating were selected. The choice of these sources responds to the need to ensure an exhaustive, reliable, and representative systematic review of scientific production in the fields of data analytics, organizational management, and digital transformation.

The sources consulted included Scopus, Wiley Online Library, Springer Nature, and Taylor & Francis, as they constitute repositories with broad coverage of peer-reviewed papers and indexed publications on Big Data, business analytics, and organizational decision-making. To guide the retrieval of relevant studies, a search equation composed of Boolean operators and key terms in English was developed, incorporating synonyms and equivalent expressions for both study variables. This strategy sought to maximize the

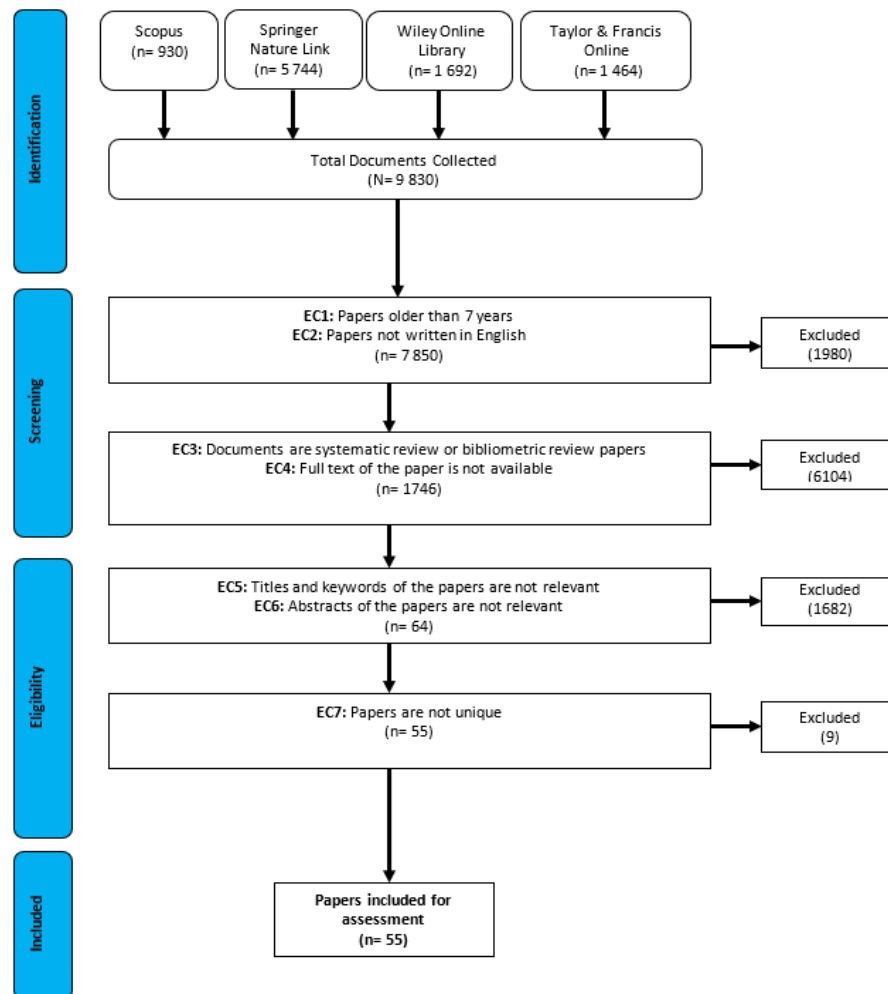


Fig. 3. PRISMA flow diagram

sensitivity and specificity of the results, considering both the independent variable, Big Data, and the dependent variable, managerial decision-making.

### 3.2.1 General Search Equation Used.

("big data" OR "big data analytics" OR "big data analytics capabilities" OR "data analytics" OR "advanced analytics" OR "business analytics") AND ("managerial decision-making" OR "management decision-making" OR "organizational decision-making" OR "business decision-making" OR "strategic decision-making" OR "executive decision-making").

### 3.3 Identified Studies

Figure 2 presents the initial distribution of the 9 830 studies identified in the four databases selected for this Systematic Literature Review (SLR). The largest proportion of records came from Springer Nature ( $n = 5\,744$ ), followed by Wiley Online Library ( $n = 1\,692$ ), Taylor & Francis ( $n = 1\,464$ ), and Scopus ( $n = 930$ ).

This initial compilation reflects broad coverage of high-impact scientific sources, which ensures a solid and representative documentary base of the state of the art regarding the relationship between

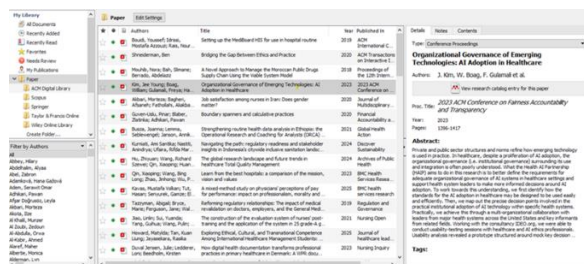


Fig. 4. Mendeley screenshot

Big Data and managerial decision-making. The thematic diversity contained in this set of studies makes it possible to address the phenomenon from multiple analytical, organizational, and sectoral perspectives, favoring a broader understanding of its evolution and application in business environments.

### 3.4 Study Selection

Figure 3 presents the adapted PRISMA flow diagram that summarizes the systematic study selection process in this Systematic Literature Review. The procedure was structured into four phases: identification, screening, eligibility assessment, and inclusion, following rigorous methodological standards to ensure the validity and relevance of the final sample.

To refine the initial record base, methodological and thematic criteria were applied: EC1 (papers older than 7 years), EC2 (documents not written in English), EC3 (systematic review or bibliometric review papers), EC4 (absence of full text), EC5 (non-relevant titles or keywords), EC6 (non-pertinent abstracts), and EC7 (duplicates). The progressive application of these criteria made it possible to ensure that the included studies were current, relevant, unique, and methodologically consistent.

In the identification stage, 9 830 documents were collected. During the initial screening, 1,050 records were excluded under EC1 and EC2, followed by 6,104 under EC3 and EC4. In the eligibility phase, 1,682 papers were discarded according to EC5 and EC6, and finally 9 duplicates were removed under EC7. As a result of this process, 55 papers met all the established criteria, constituting the final corpus that supports the analysis of this systematic review.

### 3.5 Quality Assessment

In order to ensure the methodological validity and scientific relevance of the studies included in this systematic review, a set of quality assessment questions (Quality Assessment, QA) was applied. These questions made it possible to evaluate, in a structured manner, key aspects of the design, execution, and presentation of each study, ensuring that the final corpus met the necessary standards to support the analysis.

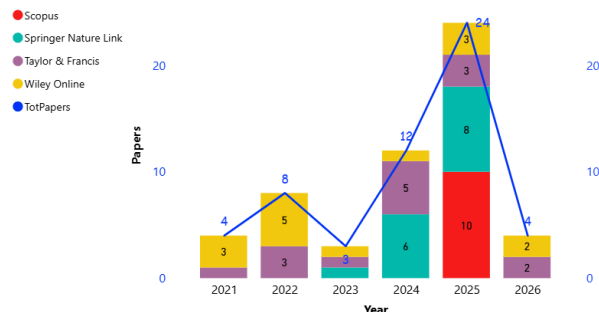
The criteria used were:

- **QA1:** Is the purpose of the research clearly explained?
- **QA2:** Is the methodology used in the study clearly described and appropriate for the objectives?
- **QA3:** Are the study findings presented clearly and supported by the data?
- **QA4:** Does the document specifically address the topic under study?
- **QA5:** Is the dataset used clearly identified and relevant to the topic?
- **QA6:** Is sufficient background and contextual information provided in the document?
- **QA7:** Are the results and conclusions of the paper well supported and aligned with the study objectives?
- **QA8:** Does the paper include updated and relevant references for the topic?

These criteria made it possible to conduct a homogeneous assessment of the selected studies, excluding those with methodological weaknesses or limited internal coherence.

### 3.6 Data Extraction Strategy

The extraction and organization of the selected studies were carried out using Mendeley, a tool employed to collect, store, classify, and manage the references included in this review. Its use enabled the systematic management of the 55 selected papers, facilitating the process of critical reading, variable coding, and classification of relevant information by authors, countries, sectors, analytical approaches, and thematic categories.



**Fig. 5.** Distribution of selected studies by publication year and source database (2021-2026)

| Kendall Trend |         |                |  |
|---------------|---------|----------------|--|
| Trend         | p-value | Equation       |  |
| No Trend      | 0,221   |                |  |
|               |         | R <sup>2</sup> |  |

**Fig. 6.** Kendall trend analysis of scientific production on big data and managerial decision-making

The use of a specialized bibliographic management tool made it possible to strengthen documentary traceability and ensure the consistency of the extraction process, ensuring that all analyzed references remained properly organized, classified, and linked to the research questions proposed (see Figure 4).

### 3.7 Synthesis of Findings

Based on the 55 selected studies, the key data linked to each research question were extracted and systematized, making it possible to build an integrated view of the state of knowledge on the influence of Big Data on managerial decision-making. This process was structured according to the research questions (RQ1-RQ5), ensuring methodological correspondence between the evidence collected, the analysis conducted, and the interpretation of results.

## 4 Results and Discussion

### 4.1 Overview of the Studies

Figure 5 presents the temporal distribution of the 55 studies selected in this systematic review,

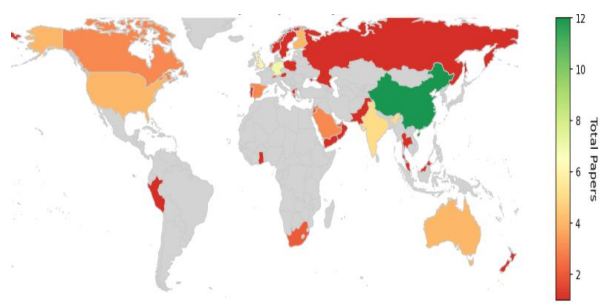
classified according to publication year and source database. The analysis makes it possible to identify the evolution of scientific production related to the influence of Big Data on managerial decision-making during the period from 2021 to 2026.

In 2021, 4 studies were recorded, while in 2022 production increased to 8 publications. Subsequently, in 2023 a decrease to 3 studies was observed, followed by a significant increase in 2024 with 12 publications. The highest volume of scientific production was reached in 2025, the year in which 24 papers were identified, representing the highest value in the entire time series. Finally, in 2026, 4 studies were recorded. The 2026 figure should be interpreted with caution, since it corresponds to a year that had not yet concluded at the time of the search.

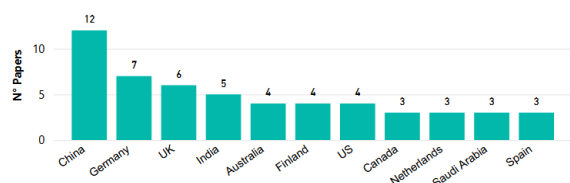
Regarding information sources, Springer Nature Link and Scopus concentrated the largest number of publications during the years of greatest scientific activity, especially in 2024 and 2025. Likewise, Wiley Online Library and Taylor & Francis maintained a constant participation throughout the period, contributing to the diversity of sources included in the study.

This behavior is comparable to that reported by Hakami and colleagues [57], who identified a sustained expansion of research on Big Data technologies during the period 2015-2024, highlighting that the recent growth of the field is associated with the integration of artificial intelligence, real-time processing, and new data management capabilities. Similarly, Theodorakopoulos and Theodoropoulou [60] evidenced a progressive increase in studies on Big Data Analytics in digital marketing between 2013 and 2023, confirming that interest in data-driven analytical applications has also intensified in specific business domains.

Likewise, Sanz Martín and colleagues [61], in their systematic and bibliometric review on artificial intelligence and advanced technologies in accounting and finance, reported a growing concentration of publications in the most recent years, particularly since the expansion of artificial intelligence and advanced analytics in financial-accounting contexts. This coincidence suggests that the growth observed in Figure 5 does not constitute an isolated phenomenon, but rather



**Fig. 7(a).** Geographic distribution of scientific production on big data and managerial decision-making: world distribution map



**Fig. 7(b).** Geographic distribution of scientific production on big data and managerial decision-making: top contributing countries

forms part of a broader trend toward the consolidation of data-driven technologies in organizational and business research.

The increasing trend observed between 2021 and 2025 suggests a progressive rise in academic interest in the study of Big Data as a tool to support managerial decision-making. This behavior could be associated with the acceleration of digital transformation processes in organizations, the increase in the availability of business data, and the need to develop analytical capabilities that make it possible to respond to increasingly dynamic and complex environments.

Similarly, the marked growth recorded in 2024 and 2025 could indicate a stage of consolidation in this line of research, in which Big Data is no longer analyzed solely from a technological perspective, but becomes a strategic element linked to value generation, organizational intelligence, and the improvement of decision-making processes.

Figure 6 presents the results of the Kendall trend test applied to scientific production related to Big Data and managerial decision-making during the analyzed period. This test makes it possible to

assess whether there is a statistically significant monotonic trend in the temporal evolution of the selected publications.

The results show a statistical significance value of  $p = 0.221$ , which is higher than the conventional significance level of 0.05. Consequently, the test identifies a “No Trend” condition, indicating that there is not statistically sufficient evidence to affirm the presence of a significant monotonic trend in the scientific production of the evaluated period.

Although the annual distribution shows an apparent increase between 2024 and 2025, the Kendall trend test did not identify a statistically significant monotonic trend ( $p = 0.221$ ). Therefore, no trend equation or  $R^2$  value was reported, since the Kendall test evaluates monotonic association and does not fit a linear regression model.

The absence of a statistically significant trend may be associated with the relatively short time horizon considered in the study and the variability observed between consecutive years. In particular, the decrease recorded in 2023 and the reduction observed in 2026 contribute to reducing the consistency of a possible increasing trend throughout the entire time series.

Similarly, this result suggests that the evolution of research on Big Data and managerial decision-making is still in a stage of consolidation, characterized by specific increases in certain years rather than by continuous and uniform growth. From a bibliometric perspective, this indicates that scientific interest in this topic has increased significantly in recent years, although it still does not present sufficiently stable behavior to be considered a statistically consolidated trend.

Figure 7 presents the geographic distribution of scientific production associated with Big Data and managerial decision-making. Subfigure 7(a) shows the spatial distribution of studies worldwide through a country-level heat map, while Subfigure 7(b) presents the number of publications from the main contributing countries within the analyzed corpus. Taken together, both representations make it possible to identify the geographic concentration of research and the countries leading scientific development in this area.

Figure 7(a) shows that scientific production is mainly distributed across countries in Asia, Europe, and North America. China stands out in particular, as it presents the highest publication

intensity within the global map. Likewise, relevant participation is observed from European countries such as Germany, the United Kingdom, Finland, the Netherlands, and Spain, in addition to important contributions from the United States, Canada, Australia, India, and Saudi Arabia.

This distribution is confirmed in Figure 7(b), where China leads scientific production with 12 publications. It is followed by Germany with 7 studies and the United Kingdom with 6 publications. India ranks fourth with 5 papers, while Australia, Finland, and the United States record 4 studies each.

Finally, Canada, the Netherlands, Saudi Arabia, and Spain present 3 publications each.

In general terms, the eleven countries with the greatest representation concentrate a significant proportion of the total studies analyzed, evidencing an unequal geographic distribution of scientific production around this topic.

This pattern is comparable to that reported by Hakami and colleagues [57], who identified, through bibliometric analysis, an international concentration of research on Big Data technologies in countries with high technological capacity and consolidated scientific production. In that review, the authors also highlight the relevance of leading countries in the development of Big Data, as well as the existence of international collaboration networks that reflect an unequal distribution of scientific knowledge in this field.

The coincidence between both results suggests that research on Big Data, whether addressed from its technological evolution or from its influence on managerial decision-making, tends to concentrate in economies with more developed digital ecosystems. This concentration could be explained by the availability of advanced technological infrastructure, higher levels of investment in research and development, as well as the presence of data-intensive business sectors that demand analytical solutions to improve efficiency, innovation, and decision-making.

Nevertheless, while the review by Hakami and colleagues [57] offers a broad view of Big Data technologies across multiple domains, the present study delimits the analysis to the link between Big Data and managerial decision-making. Therefore, the comparison confirms that the observed

geographic concentration not only characterizes the general field of Big Data, but is also reproduced in research oriented toward its strategic application in organizational contexts.

The concentration of research in China and in several developed economies in Europe and North America suggests a close relationship between the scientific development of Big Data and the level of digital maturity of countries. The nations leading this production are usually characterized by consolidated technological ecosystems, higher investments in research and development, advanced digital infrastructure, and broader adoption of technologies oriented toward data analytics and business intelligence.

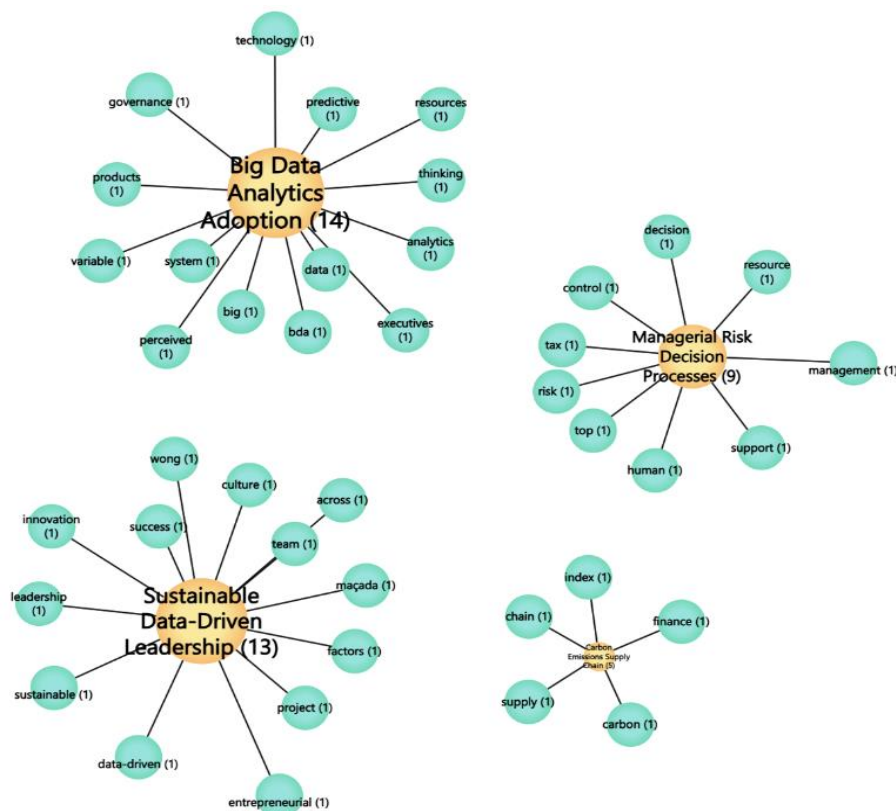
China's leadership may be associated with the sustained growth of its capabilities in artificial intelligence, data science, and digital transformation, as well as with the large volume of information generated by its productive, financial, and commercial sectors. Similarly, the prominent presence of Germany and the United Kingdom reflects the strategic role played by business digitalization and technological innovation within their economic and scientific development agendas.

On the other hand, the limited participation of regions such as Latin America and Africa could reflect differences in technological infrastructure, research investment, data availability, and organizational adoption of Big Data-based solutions. This behavior shows that knowledge generation in this area continues to be concentrated in countries with more developed digital ecosystems, opening opportunities for future research oriented toward emerging contexts and economies undergoing digital transformation.

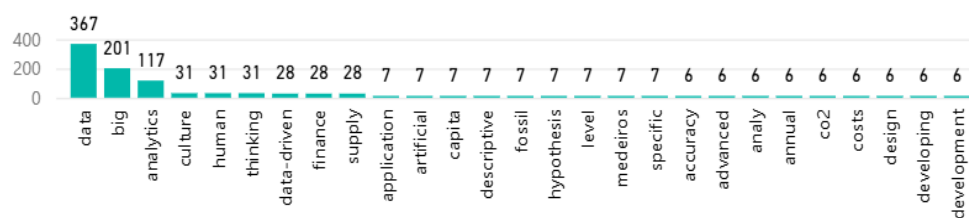
## 4.2 Answers to the Research Problems

### 4.2.1 RQ1: What are the Main Topics and Thematic Structures Present in Research on Big Data and Managerial Decision-Making?

Figure 8 presents the thematic structure of research on Big Data and managerial decision-making through a tetragram analysis. Subfigure 8(a) shows the thematic clusters obtained using the Louvain algorithm, Table 1 presents the most



**Fig. 8 (a).** Thematic structure of research on big data and managerial decision-making based on tetragram analysis: Louvain clusters



**Fig. 8 (b).** Thematic structure of research on big data and managerial decision-making based on tetragram analysis: word frequency distribution

frequent tetragrams identified in the analyzed studies, and Subfigure 8(b) shows the frequency distribution of the words with the greatest presence within the identified tetragrams. These representations make it possible to identify the main thematic lines that have guided scientific production in this field.

The results show the existence of four main thematic groupings. The first cluster is centered on

Big Data Analytics Adoption, integrating concepts related to analytical capabilities, organizational resources, predictive systems, and support technologies.

The second cluster is associated with Sustainable Data-Driven Leadership, incorporating elements such as innovation, entrepreneurial leadership, teamwork, and sustainability. The third cluster addresses Managerial Risk Decision

**Table 1.** Top Tetragrams Identified in Studies on Big Data and Managerial Decision-Making

| N.º | Tetragram                              | Qty. |
|-----|----------------------------------------|------|
| 1   | big data analytics bda                 | 6    |
| 2   | ai-driven big data analytics           | 2    |
| 3   | big data analytical capabilities       | 2    |
| 4   | big data analytics capability          | 2    |
| 5   | big data technology                    | 2    |
| 6   | accounting big data analysis           | 1    |
| 7   | accuracy perceived costs big           | 1    |
| 8   | achieving project success involves     | 1    |
| 9   | achieving sustainable project success  | 1    |
| 10  | active inventory datasets using        | 1    |
| 11  | actual velocity feedback current       | 1    |
| 12  | adding company-level control variables | 1    |
| 13  | addition drops offer high              | 1    |
| 14  | addition organizational design         | 1    |
| 15  | address specific sustainability issues | 1    |
| 16  | adjusted effect size increased         | 1    |

Processes, linking concepts such as decision support, management, control, and risk assessment. Finally, the fourth cluster presents lower thematic density and is related to supply chains, finance, and environmental sustainability.

The tetragram analysis reveals that the most frequent expressions correspond to big data analytics bda (6 occurrences), ai-driven big data analytics (2 occurrences), big data analytical capabilities (2 occurrences), and big data analytics capability (2 occurrences).

Likewise, the word distribution shows a clear predominance of the terms big, data, and analytics, followed by concepts associated with human factors, strategic thinking, leadership, and organizational management.

This thematic structure is related to what was reported by Hakami and colleagues [57], who identified, through bibliometric analysis, the presence of recurring topics in research on Big Data technologies, such as big data, machine learning, data mining, deep learning, and artificial

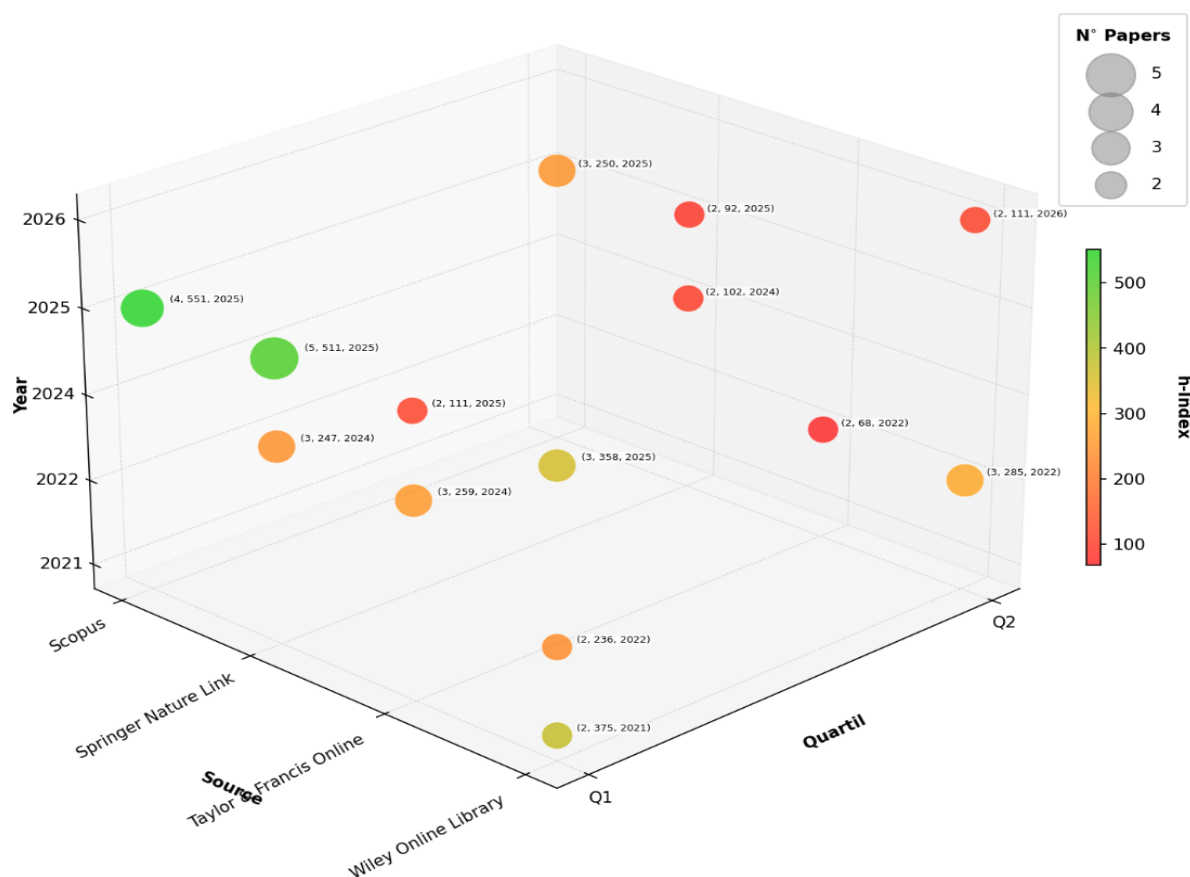
intelligence. The coincidence between both studies indicates that recent literature tends to articulate Big Data with advanced analytical capabilities and intelligent technologies oriented toward the processing, interpretation, and strategic use of data.

Likewise, Sanz Martín and colleagues [61] reported a thematic structure organized into clusters related to FinTech Advanced Analytics, Financial Analytics and Emerging Technologies, and Advanced Accounting and Auditing Technologies. Although that study is limited to the accounting and financial domain, its results coincide with the orientation observed in RQ1, insofar as both works show that data-driven technologies tend to cluster around sectoral applications, advanced analytics, and decision-making processes supported by artificial intelligence, machine learning, and emerging technologies.

For their part, Cassaro and colleagues [59] propose a conceptual framework on Big Data Analytics for sustainability, integrating sectoral applications, enablers, barriers, and strategic outcomes. This perspective makes it possible to contrast the cluster identified as Sustainable Data-Driven Leadership, since both results suggest that Big Data is not only studied as a technical tool, but also as a mechanism to improve sustainability, innovation, and the strategic orientation of organizations. Complementarily, Urbanovič and Holubčík [58] highlight the role of artificial intelligence in sustainable managerial decision-making, especially in ESG monitoring, resource optimization, and risk assessment, which coincides with the presence of the Managerial Risk Decision Processes cluster identified in the present study.

The identified thematic structure suggests that research on Big Data and managerial decision-making has evolved beyond purely technological analysis, progressively incorporating organizational, strategic, and human dimensions. The dominant presence of the cluster related to Big Data analytics adoption indicates that much of the literature continues to focus on understanding how organizations develop analytical capabilities and integrate them into their business processes.

At the same time, the emergence of clusters associated with sustainable leadership and risk management evidences an expansion of the field



**Fig. 9.** scientific impact of publication sources by quartile, h-index and productivity: three-dimensional distribution of sources

toward issues linked to organizational value creation, sustainability, and strategic decision-making. This behavior suggests that Big Data is increasingly being conceived as an enabler of managerial capabilities and not only as technological infrastructure for information processing.

In addition, the relevance of terms related to human factors and decision-making processes indicates that recent literature recognizes the importance of the interaction between analytical capabilities and managerial competencies to transform data into effective decisions.

Consequently, the results show that current research is oriented toward a more comprehensive view of Big Data, where technological, organizational, and strategic aspects converge in support of managerial decision-making.

#### 4.2.2 RQ2: What is the Scientific Impact of the Journals that Publish Research on Big Data and Managerial Decision-Making, Considering Quartiles, Productivity, and H-index?

Figure 9 shows a three-dimensional representation of the scientific sources according to quartile, publication year, number of papers, and H-index, while Table 2 presents the detailed bibliometric indicators associated with each source. Together, these results make it possible to simultaneously assess the scientific productivity and academic influence of the journals that publish research related to Big Data and managerial decision-making.

The results show a marked concentration of publications in journals classified in quartiles Q1

and Q2. Among the analyzed sources, Springer Nature Link presents the highest scientific productivity, recording five publications in Q1 journals during 2025 and three additional publications in Q1 during 2024. In addition, these publications are associated with high H-index values, reaching 511 and 247, respectively. Scopus also shows a significant presence in high-impact journals, with four publications in Q1 during 2025 and an H-index of 551, the highest value observed in the analyzed set. Similarly, Wiley Online Library presents publications distributed between quartiles Q1 and Q2, reaching H-index values of up to 375. For its part, Taylor & Francis Online concentrates a smaller number of studies, although it maintains a presence in Q1 and Q2 journals with H-index values ranging from 68 to 259. The H-index/Paper indicator shows important variations among the different sources.

The highest values correspond to Wiley Online Library, which reaches a ratio of 187.5 average citations per paper in a Q1 publication from 2021, followed by Scopus with 137.8 and Springer Nature Link with 102.2 in specific records. This finding can be partially compared with Hakami and colleagues [57], who reported the most productive journals in research on Big Data technologies, identifying a concentration of publications in certain academic sources. Although that review does not jointly evaluate quartile, H-index, and H-index/Paper, it does provide a valid point of contrast in terms of journal productivity and the concentration of scientific production in specialized sources. Similarly, Sanz Martín and colleagues [61] present a distribution of the journals with the highest number of selected papers in the field of artificial intelligence, accounting, and finance. This evidence makes it possible to contrast the bibliographic productivity component observed in RQ2, although from a specific sectoral domain.

The coincidence between both studies suggests that research linked to advanced technologies, Big Data, and artificial intelligence tends to concentrate in specialized or interdisciplinary journals that articulate management, technology, finance, innovation, and data analysis. Similarly, Theodorakopoulos and Theodoropoulou [60] report the distribution of relevant papers by search sources and publishers in their review on Big Data Analytics in digital

marketing. In this case, the comparison is more limited, because the study does not analyze quartiles or academic impact indicators, but it does make it possible to observe how certain databases and publishers concentrate an important part of the literature on business applications of Big Data.

The predominance of publications in Q1 and Q2 journals indicates that research on Big Data and managerial decision-making is mainly developed in scientific outlets with high visibility and academic impact. This behavior suggests that the topic has reached an important level of scientific maturity, becoming positioned within journals recognized for their high editorial standards and influence within research communities.

Likewise, the high H-index values observed in several of the analyzed sources reflect that studies published in this field generate significant interest within the academic community. The coexistence of high levels of productivity and high impact indicators suggests that research on Big Data and managerial decision-making has experienced growth not only in publication volume, but also in scientific recognition.

For its part, the differences observed in the H-index/Paper ratio could indicate different levels of influence among publications. While some journals present a reduced number of papers with high citation capacity, others concentrate greater productivity with impact distributed across multiple contributions.

Therefore, these results show that research on Big Data and managerial decision-making is supported by high-quality and high-impact scientific sources, strengthening the academic solidity of the field and its relevance within contemporary literature on management and organizational analytics.

#### **4.2.3 RQ3: What Definitions, Theoretical Foundations, and Conceptual Approaches Have Been Developed or Applied in Studies on Big Data and Managerial Decision-Making?**

Tables 3 and 4 present the conceptual classification of the selected studies according to the theoretical foundations and definitions associated with Big Data within the field of managerial decision-making. The first table organizes the studies according to the main

**Table 2.** Source performance metrics by quartile, year, productivity and h-index

| Source                     | Quartile | Year | N° Papers | H-Index | H-Index/<br>Paper |
|----------------------------|----------|------|-----------|---------|-------------------|
| Springer Nature<br>Link    | Q1       | 2025 | 5         | 511     | 102.2             |
|                            |          | 2024 | 3         | 247     | 82.3              |
|                            | Q2       | 2024 | 2         | 102     | 51.0              |
|                            |          | 2025 | 2         | 92      | 46.0              |
| Wiley Online Library       | Q1       | 2025 | 3         | 358     | 119.3             |
|                            |          | 2021 | 2         | 375     | 187.5             |
|                            |          | 2022 | 2         | 236     | 118.0             |
|                            | Q2       | 2022 | 3         | 285     | 95.0              |
|                            |          | 2026 | 2         | 111     | 55.5              |
| Scopus                     | Q1       | 2025 | 4         | 551     | 137.8             |
|                            | Q2       | 2025 | 3         | 250     | 83.3              |
| Taylor & Francis<br>Online | Q1       | 2024 | 3         | 259     | 86.3              |
|                            |          | 2025 | 2         | 111     | 55.5              |
|                            | Q2       | 2022 | 2         | 68      | 34.0              |

theoretical foundations used to explain the role of Big Data in organizational contexts, while the second systematizes the predominant definitions of Big Data identified in the analyzed literature.

Regarding the theoretical foundations, the category with the greatest presence corresponds to Big Data architectures, technologies, and processing, with 10 studies, equivalent to 32.3% of the total. This category groups research focused on infrastructures, algorithms, and advanced technologies for storing, processing, and exploiting large volumes of data. In second place is the category of data analytics and business decision-making, with 7 studies, representing 22.6%. Next are dynamic capabilities and competitive advantage, and sectoral applications and sustainability, both with 6 studies and 19.4%, respectively. Finally, digital transformation and Industry 4.0/5.0 records 2 studies, equivalent to 6.5%.

Regarding the definitions of Big Data, the predominant category is Big Data as management and processing of large volumes of data, with 24 studies, equivalent to 47.1%. This category brings

together definitions centered on volume, variety, complexity, source integration, and the treatment of massive data. In second place is Big Data Analytics for business decisions and performance, with 14 studies, representing 27.5%, where Big Data is understood as an analytical resource aimed at generating insights, identifying trends, and supporting strategic, operational, and business decisions. To a lesser extent, Big Data in specific sectors and industrial applications appears with 6 studies (11.8%), Big Data as an organizational capability and competitive advantage with 4 studies (7.8%), and non-identifiable definitions or ambiguous evidence with 3 studies (5.9%).

This result is highly comparable to Hakami and colleagues [57], who develop a conceptual basis for Big Data and Big Data Analytics from their central characteristics, such as volume, velocity, variety, and veracity. In that review, Big Data is understood as a set of massive, complex, and heterogeneous data that require advanced technologies for storage, processing, and analysis, while Big Data Analytics is associated with the

**Table 3.** Theoretical foundations associated with big data in managerial decision-making studies

| Category                                             | Theoretical Foundation                                                                                                                                               | Reference                                       | Qty. (%)  |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------|
| Dynamic capabilities and competitive advantage       | Strategic use of big data and analytics to create value, improve performance, sustain competitive advantage, and strengthen organizational dynamic capabilities.     | [6] [7] [17] [20] [27] [55]                     | 6 (19.4)  |
| Data analytics and business decision-making          | Processing, analysis, and use of large volumes of data to support managerial and organizational decision-making.                                                     | [5] [10] [12] [22] [35] [47] [54]               | 7 (22.6)  |
| Big Data architectures, technologies, and processing | Infrastructures, algorithms, and advanced technologies for storing, processing, and exploiting large volumes of data, including textual data and advanced analytics. | [2] [8] [23] [24] [30] [34] [37] [39] [46] [51] | 10 (32.3) |
| Digital transformation and Industry 4.0/5.0          | Integration of digital technologies, IoT, analytics, and artificial intelligence to optimize processes, smart manufacturing, and real-time decisions.                | [40] [42]                                       | 2 (6.5)   |
| Sectoral applications and sustainability             | Use of big data and analytics in specific sectors to improve outcomes, sustainable innovation, equity, and ecosystem or risk management.                             | [15] [18] [38] [43] [45] [53]                   | 6 (19.4)  |

extraction of patterns, trends, and useful insights for decision-making.

This coincidence supports the predominant category identified in the present study, in which Big Data appears to be defined mainly from a technical and operational perspective. However, the results of RQ3 also show that an important part of the literature has begun to interpret Big Data from organizational, strategic, and sectoral approaches, especially those linked to dynamic capabilities, competitive advantage, digital transformation, and sustainability.

In this sense, Cassaro and colleagues [59] offer a relevant point of comparison, since they propose a conceptual framework that integrates Big Data Analytics with sustainability, organizational enablers, barriers, sectoral applications, and strategic outcomes. This perspective coincides with the theoretical foundations identified in RQ3, particularly with the categories related to sectoral applications and sustainability, as well as with the use of Big Data as a resource to strengthen organizational capabilities and generate strategic value.

Complementarily, Urbanovič and Holubčík [58] analyze artificial intelligence in managerial decision-making for sustainable business models, incorporating ESG criteria, decision support systems, and AI-assisted decision models. Although their main focus is not Big Data, their review is comparable insofar as it addresses conceptual approaches to managerial decisions based on advanced technologies and

sustainability criteria. This is related to the approaches in RQ3 that understand Big Data not only as technological infrastructure, but also as conceptual support for strategic decisions, organizational monitoring, and risk assessment.

For their part, Sanz Martín and colleagues [61] conceptually integrate artificial intelligence, machine learning, blockchain, and Big Data in the accounting and financial field, showing how these technologies redefine processes of analysis, transparency, auditing, and decision-making in financial organizations. This review makes it possible to contrast the sectoral dimension of RQ3, especially regarding Big Data as a capability applied in specific contexts. Likewise, Theodorakopoulos and Theodoropoulou [60] address Big Data Analytics from digital marketing and consumer behavior, highlighting the use of metrics such as page visits, clicks, browsing patterns, and customer analytics. This perspective contributes to comparing the applied definitions of Big Data in sectors where decision-making depends on behavioral data and business analytics.

The results show that the literature on Big Data and managerial decision-making maintains a dual conceptual orientation. On the one hand, an important part of the studies continues to understand Big Data from a technical perspective, associated with the processing, storage, and integration of large volumes of data. However, a relevant proportion of research conceptualizes it as an analytical capability aimed at improving

**Table 4.** Conceptual definitions of big data identified in managerial decision-making studies

| Category                                                           | Theoretical Foundation                                                                                                                                     | Context                                                                                                                                           | Reference                                                                                                          | Qty. (%)  |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------|
| Big Data as management and processing of large volumes of data     | It involves the processing, storage, integration, and analysis of large volumes of data, often complex or unstructured, to extract useful information.     | Definitions centered on the technical nature of big data: volume, variety, complexity, source integration, and treatment of massive data.         | [2] [5] [6] [7] [8] [12] [15] [17] [22] [23] [24] [27] [30] [32] [34] [37] [38] [40] [41] [43] [46] [52] [54] [55] | 24 (47.1) |
| Big Data Analytics for business decisions and performance          | The analysis of large volumes of data makes it possible to generate insights, identify trends, and support strategic, operational, and business decisions. | Definitions that emphasize the analytical use of big data to improve decision-making, organizational performance, and competitive advantage.      | [3] [9] [10] [18] [20] [26] [31] [33] [35] [39] [42] [47] [50] [53]                                                | 14 (27.5) |
| Big Data in specific sectors and industrial applications           | The use of big data is applied to specific sectoral contexts such as tourism, hospitality, manufacturing, supply chain, banking, and business ecosystems.  | Definitions situated in specific industries or domains where big data is used to optimize processes, understand consumers, or improve operations. | [11] [16] [19] [29] [45] [51]                                                                                      | 6 (11.8)  |
| Big Data as an organizational capability and competitive advantage | Big data is understood as a dynamic or organizational capability that helps transform resources into value, agility, and sustainable innovation.           | Definitions linked to dynamic capabilities, organizational resources, agility, innovation, and business value creation.                           | [14] [21] [25] [28]                                                                                                | 4 (7.8)   |
| Non-identifiable definitions or ambiguous evidence                 | The evidence is absent or ambiguous, or no explicit definition of big data is provided.                                                                    | Cases in which the text does not offer a sufficient definition or does not allow a clear conceptual category to be inferred.                      | [1] [4] [36]                                                                                                       | 3 (5.9)   |

decision-making, organizational performance, and competitive advantage.

This distribution suggests that the field still maintains a strong technological basis, but is progressively moving toward a more strategic and organizational understanding of Big Data. The presence of categories linked to dynamic capabilities, competitive advantage, sustainability, and business decision-making indicates that Big Data is no longer treated only as digital infrastructure, but as a resource capable of transforming information into actionable knowledge for managerial management.

Likewise, the lower presence of studies associated with digital transformation and Industry 4.0/5.0 could indicate that, although these frameworks are relevant, they have not yet become consolidated as dominant approaches within the specific literature on Big Data and

managerial decision-making. The tables show that the conceptual development of the field is articulated between a technical view of Big Data and a strategic view oriented toward the generation of organizational value.

#### 4.2.4 RQ4: What are the Main Business Sectors in Which Big Data is Applied to Support Managerial Decision-Making?

Table 5 presents the main business sectors identified in the analyzed studies on Big Data and managerial decision-making. The classification makes it possible to recognize the organizational contexts in which data-driven technologies and analytical capabilities have been applied most frequently, evidencing the business domains that concentrate the interest of scientific research.

The results show that the Manufacturing sector is the most represented business context, with 24

studies, equivalent to 43.6% of the analyzed corpus. This sector concentrates research related to process optimization, operational efficiency, digital transformation, industrial automation, and improvement of organizational performance through the use of data-driven analytical capabilities.

In second place is the Retail sector, with 12 studies (21.8%), followed by Healthcare, with 11 studies (20.0%). Both sectors present a relevant participation within the literature, particularly in applications oriented toward customer analysis, decision support, resource management, and improvement of service quality.

For its part, Supply Chain and Logistics records 7 studies (12.7%), evidencing the importance of Big Data in activities linked to supply chain management, logistics, planning, and operational coordination.

At lower frequency levels, Banking and Financial Services appears with 4 studies (7.3%), Telecommunications with 3 studies (5.5%), and Tourism and Hospitality with 2 studies (3.6%).

This result is comparable to Hakami and colleagues [57], who identify that Big Data technologies have relevant applications in sectors such as healthcare, finance, marketing, education, and logistics. Although that review addresses the general field of Big Data technologies and not specifically managerial decision-making, there is coincidence in the presence of sectors such as Healthcare, Finance, Marketing/Retail, and Logistics. This similarity suggests that the business domains identified in RQ4 form part of areas widely recognized by recent literature as priority spaces for the adoption of Big Data.

Along the same lines, Cassaro and colleagues [59] highlight the use of Big Data Analytics for sustainability within sectors such as supply chains, energy, mobility, circular processes, public and private organizations, as well as contexts related to healthcare, retail, and local governments. This review makes it possible to especially contrast the Supply Chain and Logistics, Healthcare, and Retail sectors identified in RQ4. The coincidence is relevant because it shows that Big Data is not only used to improve operational or commercial decisions, but also to support sustainability strategies, resource efficiency, cost reduction, and value generation for different stakeholder groups.

**Table 5.** Sectoral applications of big data in managerial decision-making studies

| Business Sector                | Reference                                                                                                                           | Qty. (%)     |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Manufacturing                  | [2] [4] [8] [14] [15]<br>[17] [21] [28] [29]<br>[30] [31] [32] [33]<br>[34] [35] [37] [39]<br>[40] [41] [42] [49]<br>[51] [53] [55] | 24<br>(43.6) |
| Retail                         | [3] [7] [14] [17] [18]<br>[25] [30] [31] [32]<br>[34] [51] [53]                                                                     | 12<br>(21.8) |
| Healthcare                     | [3] [4] [10] [17] [18]<br>[19] [25] [28] [34]<br>[41] [50]                                                                          | 11<br>(20.0) |
| Supply Chain and Logistics     | [18] [29] [31] [32]<br>[39] [47] [50]                                                                                               | 7<br>(12.7)  |
| Banking and Financial Services | [17] [27] [37] [53]                                                                                                                 | 4<br>(7.3)   |
| Telecommunications             | [3] [9] [13]                                                                                                                        | 3<br>(5.5)   |
| Tourism and Hospitality        | [15] [34]                                                                                                                           | 2<br>(3.6)   |

For their part, Theodorakopoulos and Theodoropoulou [60] offer a specific comparison with the Retail, Tourism and Hospitality, Banking, and digital marketing sectors. Their review shows that Big Data Analytics is used to analyze consumer behavior, optimize digital experiences, personalize marketing strategies, and improve decision-making based on user interactions. This approach coincides with the sectors identified in RQ4, where information from customers, transactions, and digital channels is fundamental for guiding managerial decisions.

Complementarily, Sanz Martín and colleagues [61] focus on the field of accounting and finance, integrating artificial intelligence, blockchain, and Big Data as technologies applied to financial processes, auditing, transparency, and strategic analysis. Although their scope is more sectorally limited, it makes it possible to contrast the Banking and Financial Services component identified in RQ4, especially in relation to the use of advanced technologies to improve the quality, traceability, and timeliness of financial information.

**Table 6.** Analytical capabilities and data-driven technologies reported in studies on big data and managerial decision-making

| Analytical Capability / Technology | Reference                                                                                                                                                                                                               | Qty. (%)  |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Business Analytics (BA)            | [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [14] [15] [16] [17] [18] [19] [20] [21] [22] [23] [24] [25] [26] [27] [28] [30] [31] [32] [34] [35] [36] [37] [39] [40] [41] [42] [44] [47] [50] [51] [53] [54] [55] | 45 (81.8) |
| Big Data Analytics (BDA)           | [1] [2] [4] [5] [6] [7] [9] [10] [11] [12] [14] [15] [16] [17] [18] [19] [20] [21] [22] [23] [24] [25] [26] [27] [28] [31] [32] [34] [35] [36] [37] [39] [40] [41] [42] [44] [47] [50] [51] [53] [54] [55]              | 42 (76.4) |
| Business Intelligence (BI)         | [1] [2] [3] [4] [7] [8] [9] [10] [13] [14] [15] [17] [18] [20] [21] [22] [23] [24] [25] [26] [27] [28] [29] [31] [32] [34] [35] [36] [37] [39] [40] [41] [42] [46] [47] [48] [49] [50] [51] [52] [55]                   | 41 (74.5) |
| Machine Learning (ML)              | [1] [2] [3] [4] [7] [8] [9] [10] [13] [14] [15] [17] [18] [19] [20] [21] [24] [25] [26] [29] [30] [32] [34] [37] [39] [40] [42] [43] [45] [46] [47] [48] [49] [51] [55]                                                 | 35 (63.6) |
| Advanced Analytics                 | [1] [3] [4] [7] [9] [10] [12] [14] [16] [17] [19] [20] [21] [22] [23] [24] [25] [28] [30] [31] [32] [34] [35] [37] [39] [40] [41] [42] [44] [47] [51] [55]                                                              | 32 (58.2) |
| Artificial Intelligence (AI)       | [1] [2] [3] [4] [9] [13] [14] [17] [18] [20] [21] [22] [23] [24] [25] [26] [28] [29] [31] [34] [35] [39] [40] [41] [46] [48] [49] [50] [51] [55]                                                                        | 30 (54.5) |
| Predictive Analytics               | [1] [4] [5] [7] [9] [10] [11] [14] [15] [17] [18] [20] [21] [22] [23] [24] [25] [30] [31] [32] [34] [36] [39] [40] [41] [47] [51] [54] [55]                                                                             | 29 (52.7) |

The predominance of the manufacturing sector suggests that the adoption of Big Data for managerial decision-making is closely linked to environments where the generation of operational data is high and where process optimization has a direct impact on productivity and competitiveness.

The availability of data from production systems, sensors, industrial platforms, and automated processes makes manufacturing a particularly favorable setting for the application of advanced analytics and evidence-based decision support.

At the same time, the prominent presence of the retail and healthcare sectors shows that the value of Big Data transcends traditional industrial environments.

In retail, analytical capabilities are used to understand consumer behavior patterns, optimize commercial strategies, and improve the customer experience. In healthcare, applications are mainly oriented toward supporting clinical, administrative, and resource management decisions by leveraging large volumes of information generated by healthcare systems.

On the other hand, the participation of sectors such as logistics, financial services,

telecommunications, and tourism demonstrates that the adoption of Big Data has progressively extended to different economic domains.

However, the lower frequency observed in these sectors could indicate that research continues to concentrate on those contexts where data availability, operational complexity, and the need for optimization generate greater opportunities for the implementation of advanced analytical solutions.

In this way, the results show that Big Data has become consolidated as a cross-cutting resource for managerial decision-making, although its scientific development and practical application present a greater concentration in data-intensive sectors highly oriented toward operational efficiency and the generation of organizational value.

#### 4.2.5 RQ5: What are the main analytical capabilities and data-driven technologies reported in research on managerial decision-making?

Table 6 presents the main analytical capabilities and data-driven technologies identified in studies on Big Data and managerial decision-making. This

classification makes it possible to recognize the most recurrent analytical approaches in the reviewed literature and to establish which technologies or capabilities are most frequently used as support for organizational decision-making processes.

The results show that Business Analytics (BA) is the most recurrent category, appearing in 45 studies, equivalent to 81.8% of the analyzed corpus. It is followed by Big Data Analytics (BDA) with 42 studies (76.4%) and Business Intelligence (BI) with 41 studies (74.5%). These three categories concentrate the largest proportion of mentions, evidencing a predominant orientation toward analytical approaches applied to the generation of business knowledge and the support of managerial decisions.

At a second level of frequency are Machine Learning (ML) with 35 studies (63.6%), Advanced Analytics with 32 studies (58.2%), and Artificial Intelligence (AI) with 30 studies (54.5%). Finally, Predictive Analytics appears in 29 studies, equivalent to 52.7% of the total. Although these categories present a lower frequency than BA, BDA, and BI, they maintain a significant presence within the reviewed corpus, indicating their relevance as complementary technologies for predictive analysis, automation, and pattern identification in organizational contexts.

This result is highly comparable to Hakami and colleagues [57], who identify central technologies and approaches in the evolution of Big Data, such as Big Data Analytics, Hadoop MapReduce, Spark, real-time processing, integration with artificial intelligence, machine learning, data mining, and deep learning. The coincidence between both studies confirms that Big Data has evolved from a perspective centered on storage and processing toward an ecosystem of analytical technologies oriented toward generating actionable knowledge for decision-making.

Similarly, Urbanovič and Holubčík [58] highlight the role of artificial intelligence, machine learning, predictive analytics, natural language processing, and decision-support algorithms in sustainable business models. This review is especially comparable with the Artificial Intelligence, Machine Learning, and Predictive Analytics categories identified in RQ5. In addition, its focus on sustainable managerial decisions reinforces the

idea that these technologies not only fulfill a technical function, but also support monitoring, resource optimization, risk assessment, and strategic decision-making.

For their part, Theodorakopoulos and Theodoropoulou [60] report the use of tools and techniques such as Google Analytics, Semrush, Adobe Analytics, click analysis, browsing patterns, web analytics, social media analytics, and machine learning in the context of digital marketing. This evidence makes it possible to contrast the applied use of analytical capabilities in customer-oriented business environments, especially in relation to Business Analytics, Big Data Analytics, Business Intelligence, and Machine Learning. In this case, the technologies appear linked to the interpretation of consumer behavior, strategy personalization, and customer experience improvement.

For their part, Sanz Martín and colleagues [61] identify advanced technologies such as artificial intelligence, machine learning, data mining, deep learning, text mining, support vector machines, neural networks, blockchain, and Big Data in the accounting and financial field. Although their field of application is specific, their results coincide with the technological categories identified in RQ5, particularly regarding AI, ML, Advanced Analytics, and Big Data as support for processes of analysis, auditing, traceability, and financial decisions.

Finally, Cassaro and colleagues [59] provide a complementary perspective by analyzing Big Data Analytics as a strategic capability for sustainability. Although their review does not present such a detailed technical list of tools, it makes it possible to contrast the role of BDA as an organizational enabler to improve efficiency, monitor data in real time, support sustainable decisions, and generate strategic outcomes. This coincides with the predominant presence of Big Data Analytics and Business Analytics in RQ5, understood not only as technologies, but also as organizational capabilities oriented toward performance.

The predominance of Business Analytics, Big Data Analytics, and Business Intelligence suggests that the literature on Big Data and managerial decision-making is mainly oriented toward analytical capabilities of a strategic and business nature, rather than toward specific technological tools. This indicates that the reviewed studies tend to conceptualize Big Data as

a resource for transforming data into useful knowledge, improving organizational monitoring, and strengthening evidence-based decision-making.

Likewise, the relevant presence of Machine Learning, Advanced Analytics, Artificial Intelligence, and Predictive Analytics shows that the field also incorporates more advanced analytical approaches associated with prediction, automation, and learning from data. However, their lower relative frequency compared with BA, BDA, and BI could indicate that these technologies are treated as technical components within broader business analytics frameworks, rather than constituting the main axis of the managerial discussion.

In sum, these results show that research on Big Data and managerial decision-making privileges an integrative view, where business analytical capabilities function as a bridge between data infrastructure and managerial action. This orientation reinforces the idea that the value of Big Data does not depend solely on the technology employed, but on its capacity to generate processable information, support strategic decisions, and improve organizational performance.

## 5 Conclusions and Future Research

The review of 55 studies showed that scientific production on Big Data and managerial decision-making is mainly concentrated in recent years, especially in 2024 and 2025. Nevertheless, the Kendall test did not confirm a statistically significant monotonic trend. Likewise, the highest production was located in countries from Asia, Europe, and North America, with China as the main contributor. Regarding RQ3, the predominant definitions conceive Big Data as the management, processing, and integration of large volumes of data. However, approaches associated with dynamic capabilities, digital transformation, sustainability, and competitive advantage were also identified. In relation to RQ4, the most represented sectors were manufacturing, retail, and healthcare. This shows that Big Data is applied more frequently in data-intensive contexts, where operational efficiency, customer analysis, resource

optimization, and timely decision support are required.

Regarding RQ5, the most frequent analytical capabilities were Business Analytics, Big Data Analytics, and Business Intelligence, followed by Machine Learning, Advanced Analytics, Artificial Intelligence, and Predictive Analytics. These results show that the literature prioritizes broad business analytical capabilities, complemented by advanced technologies for prediction, automation, and support for managerial decision-making.

From an academic perspective, this review contributes to organizing the literature on Big Data and managerial decision-making by identifying predominant conceptual approaches, application sectors, and analytical capabilities.

From a managerial perspective, the findings suggest that organizations should understand Big Data not only as a technological tool, but as a strategic capability that requires integration with management processes, leadership, and analytical culture. This review presents some limitations.

First, the study was based on four information sources: Scopus, Wiley Online Library, Springer Nature Link, and Taylor & Francis Online.

Second, only studies published in English and within the period defined by the selection criteria were considered.

Finally, some analytical categories may have overlapped, because the same paper could address more than one capability, sector, or conceptual approach.

Future research could expand the documentary corpus by incorporating other databases, such as Web of Science, ScienceDirect, Emerald, IEEE Xplore, or ACM Digital Library. Likewise, it would be relevant to develop empirical studies that analyze the relationship between Big Data capabilities, the quality of managerial decisions, and organizational performance.

It is also recommended to further examine sectoral differences in Big Data adoption, especially in less represented sectors such as education, public administration, agriculture, energy, and professional services. Finally, future research should address in greater detail the ethical and organizational challenges associated with the use of Big Data in managerial decisions, including privacy, algorithmic bias, transparency,

explainability, data security, and accountability in automated decisions.

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