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A Bibliometric Analysis Of The Implementation Of Big Data In The Managerial Decision-Making Process

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ABSTRACT

Some scientific publications related to big data have been carried out; viral marketing that occurs on social media can be one way to market a product or service, and this article aims to provide information regarding research trends that have been published on the topic of viral marketing in the 2000-2024 periods. The method used in this study was to identify the number of journals using Harzing's Publish or Perish software as well as a bibliometric analysis using VOSviewer. The results showed that there were 987 publications with 21457 citations and 2145.7 cites/year that discussed viral marketing. There are five main clusters based on the results of the bibliometric analysis. This article also provides information related to research topics that have not been widely carried out, so that it can provide benefits for stakeholders who may need it for further research.

***Key word**: Big Data, decision-making, managerial decision-making*

INTRODUCTION

The increasing complexity of today's business environment necessitates the adoption of advanced analytical tools to enhance the decision-making processes. Big data, characterized by its vast volume, velocity, and variety, have emerged as a critical resource for organizations seeking to improve their managerial decision-making capabilities. As companies strive to remain competitive, the integration of big data analytics into decision-making frameworks has become essential. This bibliometric study explores the implementation of big data in managerial decision-making processes, highlighting its significance and impact on organizational effectiveness and strategy formulation (Pratici et al., 2022)

Research indicates that the effective use of big data can lead to more informed and timely decisions, thereby providing organizations with a competitive edge. By leveraging big data analytics, managers can gain insights into market trends, customer preferences, and operational efficiency. This capability not only enhances the quality of decisions but also supports strategic planning and risk-management initiatives. The literature suggests that organizations that embrace big data are better positioned to adapt to changes in the marketplace and respond proactively to emerging challenges (Klievink et al., 2017)

Moreover, the relationship between big data and decision-making processes is multi faceted. This involves understanding how data-driven insights can facilitate the identification of opportunities and threats within the business landscape. The integration of big data into managerial practices requires a shift in organizational culture towards data-driven decision-making, where evidence-based strategies replace intuition-based approaches. This transformation is crucial for maximizing the potential benefits of big data and ensuring that organizations can effectively navigate the complexities of modern business environments effectively (Pratici et al., 2022)

This study employs bibliometric analysis to systematically review the existing literature on big data's role in managerial decision-making. Bibliometric analysis, a quantitative approach to understanding scientific communication, helps to identify influential authors, important publications, collaborative networks, and

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emerging trends within a given field. By incorporating bibliometric analysis, this study not only contributes to the practical understanding of big data but also highlights the evolution and trends in academic discourse around the important intersection between big data and business. The purpose of this article is to provide information on published research trends related to big data for the period 2014-2024

LITERATURE REVIEW

Information has always been considered the key input for improving organizations in all sectors. In recent years, big data has been widely used by the information technology (IT) industry to produce critical information that produces considerable revenue. Currently, there is plenty of data that flood organizational contexts, social activities, health care, etc. In this unprecedented "data flood" era, technological advances are supported at any level that is not manageable with currently available technologies (Amorim et al., 2017; Wang and Hajli, 2017). This phenomenon has led to the conception of the "big data" notion to give details about "the information asset characterized by such a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value" (De Mauro et al., 2016, p. 128).

The literature on the role of big data in the organizational decision-making process focuses on improving the understanding of diverse actions and procedures for transferring information (Fombellida et al., 2020). For organizations using big data analytics in the decision making process, reducing the error and data range is an important goal. Previous research on big data, as a part off health-care and crisis management, has mainly been applied in the fields of blockchain and logistics (Govindan et al., 2018; Wamba and Queiroz, 2020). In both cases, previous research highlighted the need to develop better technology-driven tracking strategies, financial performance relations with data-driven supply chains, and implementation issues (Wamba and Queiroz, 2020).

Previous studies have demonstrated a strong link between big data analytics and improved decision-making performance across various organizational settings. For example, research by Fauzi Purwa Nugraha et al. (2023) explored the relationship between big data, data quality, and decision-making performance in Indonesia's healthcare sector. The results showed that while data quality did not have a significant impact on decision-making performance, the ability to effectively utilize big data analytics positively affected decision-making outcomes. This underscores the essential role of big data analytics capabilities in enhancing business process performance, indicating that organizations that harness these capabilities can achieve better decision-making results and greater operational efficiencies.

A study conducted by Putra et al. (2024) showed that big data can greatly improve the effectiveness and efficiency of business decision-making. By qualitatively analyzing various companies that have successfully incorporated big data into their operations, this research found that big data offers valuable insights into market trends and consumer behavior. These insights lead to higher revenues and cost reductions while also enhancing decision-making in competitive settings. This study emphasizes that effectively managing big data is crucial for organizations seeking to enhance their decision-making abilities and overall business performance.

In addition, an extensive review by Mikalef et al. (2018) examined the rise of big data analytics as a transformative technology within both the academic and business sectors. The authors pointed out that organizations that invest in big data analytics are more capable of extracting valuable insights that lead to competitive advantages. They stressed the significance of recognizing the various dimensions of big data analytics capabilities, such as flexible infrastructure and skilled personnel, as essential elements for improving the quality of decision-making. This body of research collectively highlights the need for organizations to establish strong big data management strategies to fully leverage their potential for informed managerial decisions.

Globalization blursboundaries between nations. Location and distance from the market are no longer barriers to access. In such a volatile environment, firms must continuously scan for risks and opportunities and make business decisions quickly based on available data. In this section, we discuss the role of traditional "small data" as well as "big data" in making business decisions (Jeble et al., 2018).

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METHODOLOGY

The research methodology used to achieve the objective of comprehensively understanding the methodologies used in big data for managerial decision-making and conducting bibliometric analysis used VOSviewer to explore the scientific landscape of the field.

VOSviewer, a widely used bibliometric analysis tool, was used to map and visualize the scholarly landscape of research related to big data analytics and business decision making. The following steps outline the bibliometric analysis process.

Data collection: Metadata for relevant articles, including authors, titles, abstracts, keywords, citations, and references, was collected from selected databases with Publish or Perish (PoP) from Google Scholar published in the last ten years (2014-2024). The keywords used in this research are big data implementation and managerial decision-making.

RESULT AND DISCUSSION

The bibliometric analysis conducted using VOSviewer enhanced our comprehension of the academic environment in this area. By pinpointing key authors and their collaborative networks, it promotes the sharing of knowledge and teamwork, which in turn supports the advancement of research and its practical use. Recognizing research clusters and trends aids both researchers and practitioners in navigating the changing terrain of big data implementation and managerial decision-making.

Figure 1: Data on the number of journals, citations and cites/year.

The results of the bibliometric analysis show that there are 987 publications with 21457 citations and 2145.7 cites/years that discuss the implementation of Big Data (Figure 1). Figure 2 shows five main clusters. Figure 2 shows five main clusters. The red cluster discusses big data technology, machine learning, impact, digital transformation, insight, challenges, and better decision-making. The green cluster is more directed towards the discussion of managers, decision support systems, multi-criteria decisions, cases, problems, and decision making. The blue cluster represents data mining, algorithms, information technology, knowledge, and information systems. The yellow cluster is related to risk, risk management, employees, influence, information systems, and the government. The purple cluster is related to the discussion of artificial intelligence, the Internet, iot, and machine learning.

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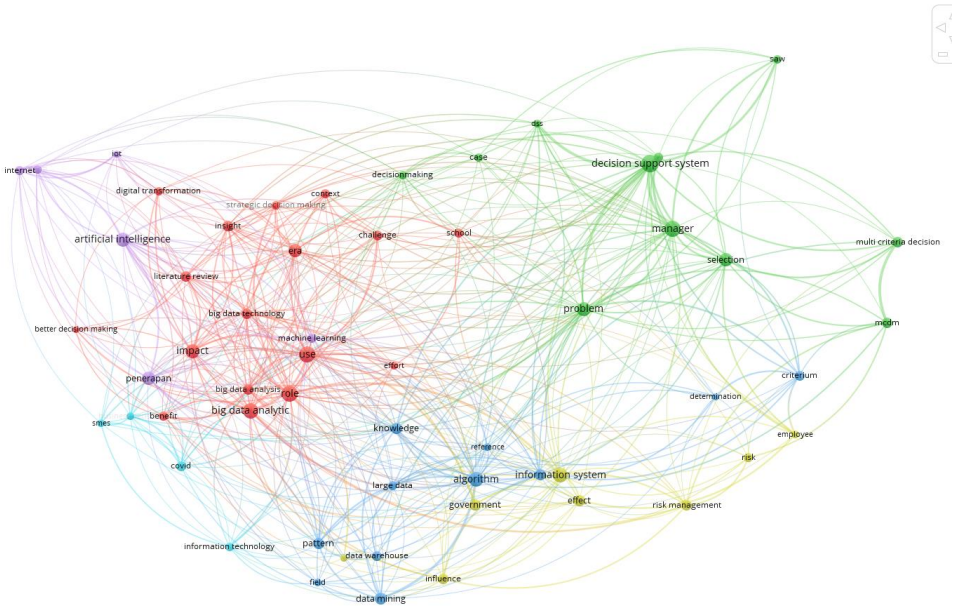

Figure 2. VOSViewer mapping result

The visualization in Figure 3 shows that several studies have linked big data technology with decision making, decision support systems, artificial intelligence, and business strategy. However, no research has directly linked big data with managers. However, big data are indirectly related to better decision-making and decision support systems, which are the complete skills of a manager. Managers need these skills to solve the problems faced by their organization. Research related to the effect of big data implementation on managerial decision-making processes.

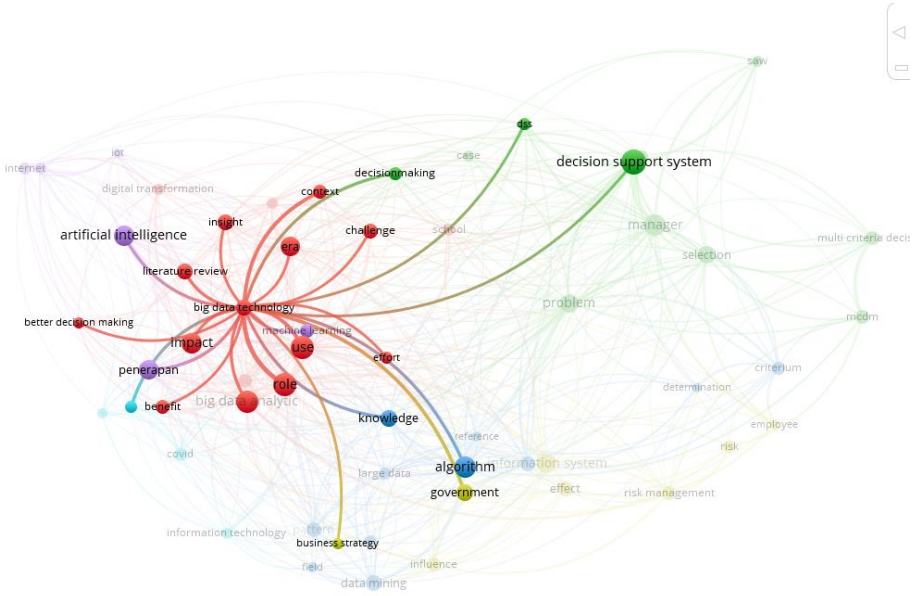

Figure 3. Visualization of relationships between topics related to big data technology

The visualization in Figure 4 indicates that several studies have explored the connections between managers and decision support systems, issues, multi-criteria decisions, information systems, criteria, data warehouses, and knowledge. However, no study has been found that directly linked managers to big data. The topics of managers and big data are intriguing because they can offer insights into the process of making more strategic managerial decisions for the organization.

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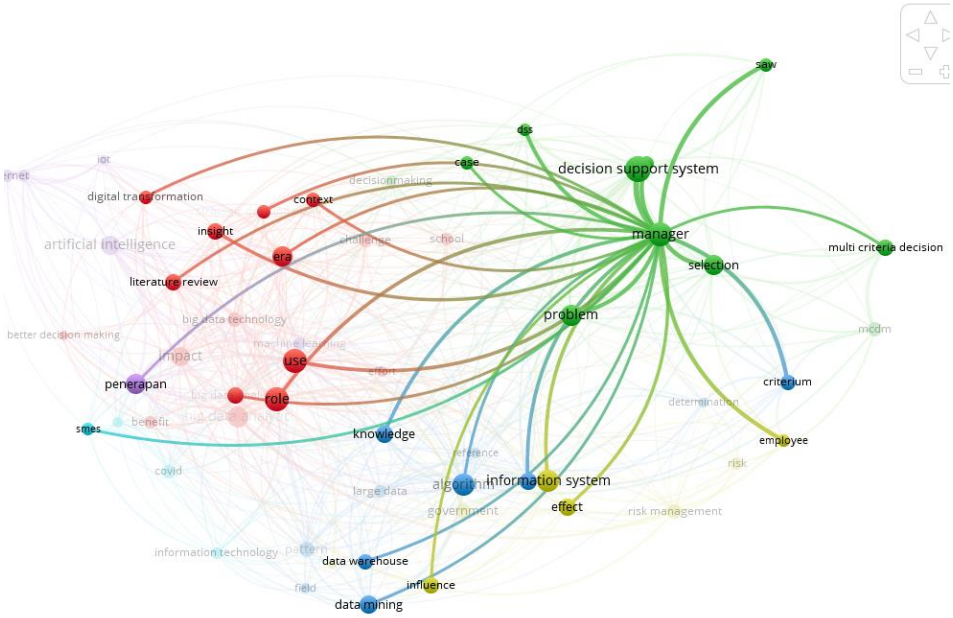

Figure 4. Visualization of relationships between manager-related topics

Figure 5 shows that several studies have linked decision-making with decision support systems, multi criteria decision big data, and artificial intelligence. However, no research has linked big data with managers and their relationships to problems. Research related to decision- making regading problems is also an interesting topic because it can provide information related to the utilization of big data in the managerial decision-making process.

Figure 6 shows timeline navigation as a research trend over the last ten years. Based on the visualization of the timeline, some recent research has led to artificial intelligence, context, digital transformation, and better decision-making. Previously, more research related to big data discussed information systems, knowledge, data mining, risk management, and decision-support systems.

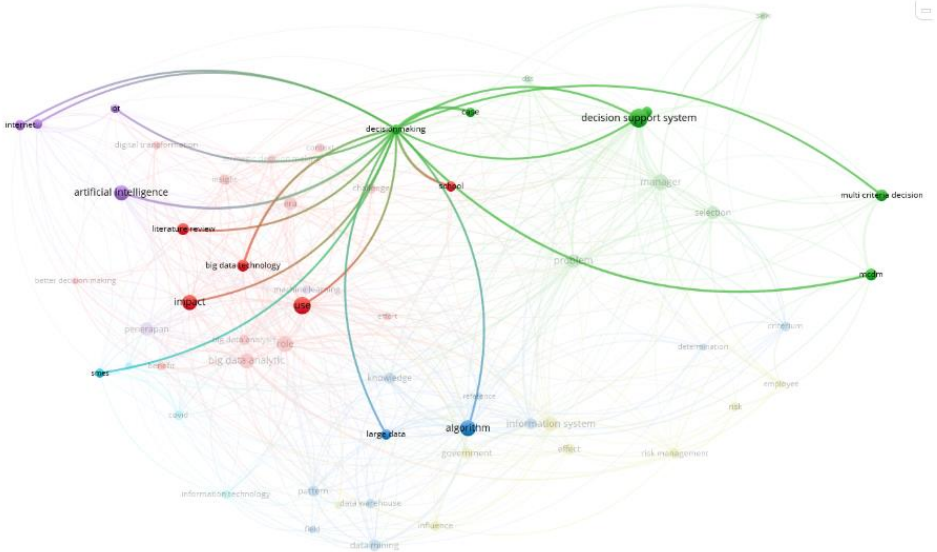

Figure 5. Visualization of relationships between decision-making topics

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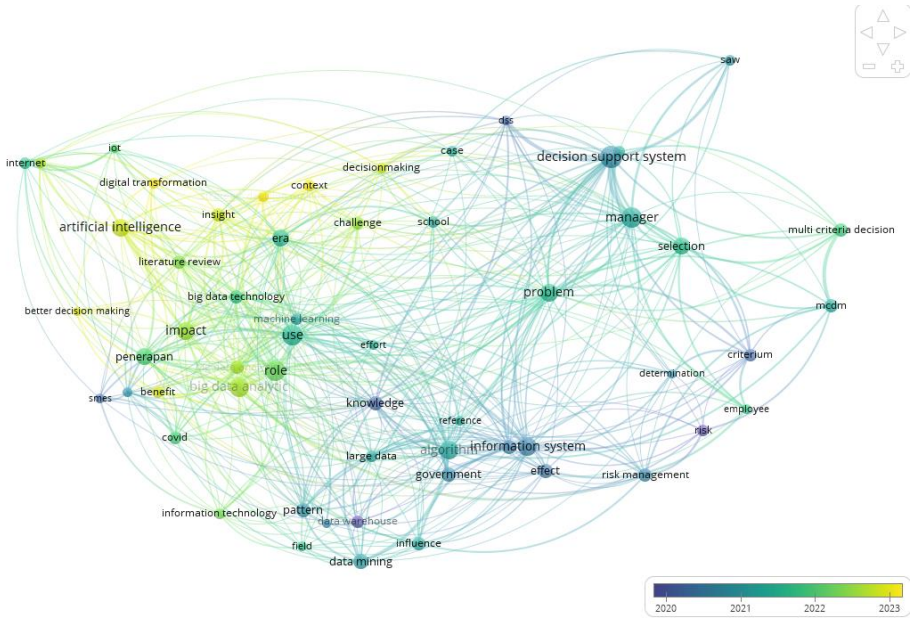

Figure 6. Overlay visualization

Related to the research topics that are rarely discussed are shown in Figure 7. The fainter the color shown in the image, the more rarely the topic is discussed or, in other words, there has not been much research on this topic. From the image, it can be seen that multicriteria decision, decision making, and digital transformation are topics that have rarely been raised in journal article publications indexed on Google Scholar in the last ten years.

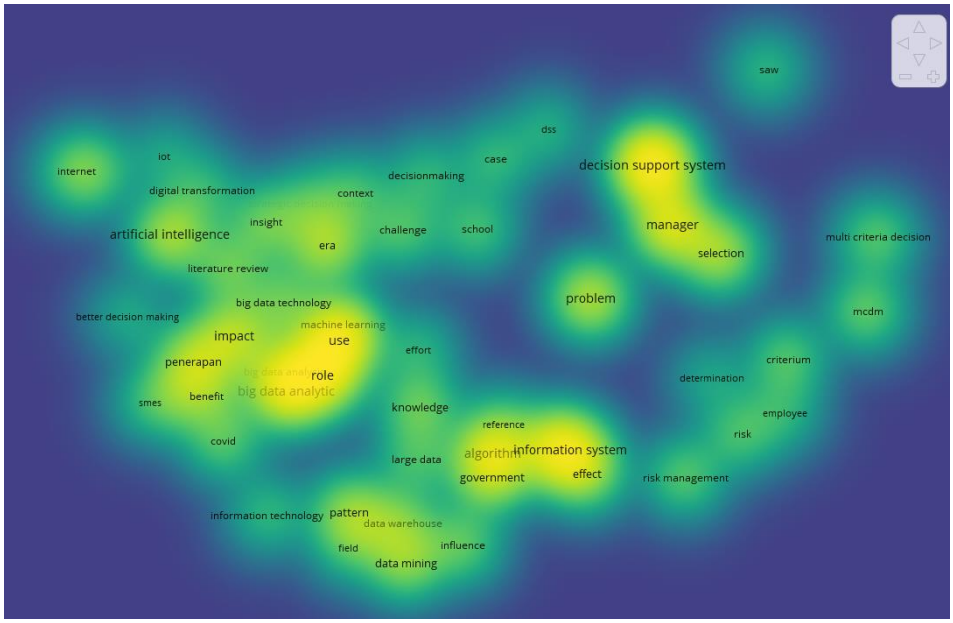

Figure 7. Visualization Cluster Destiny

CONCLUSIONS

There are five clusters that can be grouped:1) clusters that discuss big data technology, machine learning, impact, digital transformation, insight, challenge, and better decision making; 2) clusters that discuss managers, decision support systems, multi criteria decisions, cases, problems, and decision-making; 3) clusters that discuss data mining, algorithms, information technology, knowledge, and information systems; 4) clusters related to risk, risk management, employees, influence, information systems, government, and 5) clusters that are more related to the discussion of artificial intelligence, internet, iot, and machine learning. Topics that are

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still rarely published in Google Scholar indexed journals in the last ten years include multicriteria decision, decision making, and digital transformation.

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