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INTEGRATING ARTIFICIAL INTELLIGENCE INTO STRATEGIC DECISION MAKING: A BIBLIOMETRIC ANALYSIS FOR FUTURE RESEARCH DIRECTIONS

Ilham Ramadan Pandu Setia Negara Siregar[1], Heni Setiyaningsih[2]

[1,2]Office Administration Education, Yogyakarta State University[1]
Correspondence Email: ilhamramadan@uny.ac.id

ABSTRACT

A bibliometric analysis was conducted to examine the integration of Artificial Intelligence (AI) in decision-making processes. The study aimed to identify research trends, patterns, and gaps as a foundation for future investigations. The method employed was the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), which consisted of data collection, inclusion criteria description, data extraction, and sample analysis across 40 Scopus-indexed articles. The findings indicate a shift in research trends toward the utilization of AI in strategic decision making. The implications, challenges, and research recommendations emphasize the need for developing more context-specific AI models, improved risk management, enhanced interpretability, data security and privacy protection, industry-specific machine learning applications, stronger human-AI integration, and the development of appropriate success metrics.

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1. INTRODUCTION

Artificial Intelligence (AI) has developed rapidly across various fields. Vukotich (2023) explains that AI is widely utilized to identify trends and patterns, including in cybersecurity, where it provides rapid insights, reduces response time, and mitigates threats based on intelligent algorithms aligned with established security processes and policies. Through the implementation of smart algorithms, AI enables more productive organizational operations (Olan et al., 2022). Moreover, AI ensures consistent production quality and minimizes the occurrence of human error (Qudus, 2025). Therefore, integrating AI within organizations has become essential to ensure long-term sustainability.

The application of AI has also been widely adopted in the domains of business and management. AI plays a crucial role in processing large volumes of information, offering a solution to human limitations in data handling. Furthermore, AI analyzes big data to generate powerful predictive insights, supporting more accurate and timely decision-making (Enholm et al., 2022). Information management using big data enables companies to enhance customer interaction and analyze consumption patterns (Khan & Shao, 2024). A thorough understanding of market trends and consumer behavior allows businesses to adapt their marketing strategies to improve customer experiences, thereby fostering business growth (Riwayat et al., 2024). Data analysis supported by AI and machine learning helps solve problems efficiently through algorithms that improve accuracy and performance (Haleem et al., 2022, p. 119). This is vital for organizations in determining strategic directions and making informed decisions.

Strategic decision-making serves as the initial step for companies in responding to industry patterns and formulating policies accordingly. Kreps (2023) highlights that AI-enabled technologies enhance efficiency, precision, and security in their respective fields. He adds that AI refers to the use of intelligent systems and algorithms that mimic human cognitive abilities, thus having the potential to assist in strategic decision-making. In addition, the use of data and technology drives a collaborative and open innovation approach (Tekic & Füller, 2023). Big data innovations support informed strategic decisions by anticipating trends and future developments (Niu et al., 2021). Accurate strategic decisions are made possible through complete and precise information provided by AI (Citroen, 2011; Hindarsah, 2023), which becomes a key factor in ensuring business success.

Despite the productivity and efficiency gains offered by AI, concerns about security and bias remain prominent issues. The use of AI in decision-making raises ethical considerations and uncertainties that present significant challenges for further exploration (Maghrabie et al., 2019). Decision-making driven by machines also raises concerns about potential implications, underscoring the need for a careful understanding of human–AI collaboration in such processes (Johnson, 2023). Bahangulu dan Owusu-Berko (2025) note the risk of algorithmic bias stemming from skewed data, faulty model assumptions, and a lack of diversity in datasets, all of which pose reputational risks to businesses. Addressing this requires a robust ethical framework that includes bias detection methods, fairness-aware machine learning models, and continuous auditing. Furthermore, issues such as weak legal standards, data privacy, and the integration of legacy systems with emerging technologies

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continue to cast a shadow over AI implementation in business and management (Yedalla, 2025). On the other hand, the strategic use of AI remains indispensable, as "AI won't replace humans, but humans with AI will replace humans without AI" (Lakhani, 2023). Thus, effective strategies are needed to mitigate data security concerns in the application of AI.

Research on the use of AI in decision-making has been extensively conducted. George dan Wooden (2023) discuss transformational management in higher education through AI, highlighting the evolving landscape of decision-making frameworks. Okongwu et al. (2012) describe the practical application of AI in optimal decision-making through the development of decision support systems. Antoncic M. (2020) adds that a paradigm shift has occurred with the rise of big data, the incorporation of sustainability, and AI in corporate governance and strategic decision-making. Bag et al. (2021) explain that AI supported by big data has a positive relationship with user knowledge creation, which in turn positively influences rational decision-making in B2B marketing. Vincent (2021) further elaborates on the role of intuition and AI in organizational decision-making, stating that AI plays a diverse role. When decision alternatives are limited, a confirmatory method is used so that human intuition makes the decision, which is then evaluated by AI. Conversely, when there are many decision alternatives, AI narrows the options through an exploitative method, and human intuition selects the best course of action. Previous studies have largely confirmed the significant role and widespread use of AI in strategic decision-making. However, gaps remain in understanding the full impact and potential of AI integration in such processes. Therefore, further research on AI in decision-making is necessary to address these gaps.

This study emerges in response to the need for a comprehensive understanding of the implications, challenges, and potential research directions regarding the integration of AI in strategic decision-making. The analysis is conducted using bibliometric methods to provide a comprehensive overview of the topic. Bibliometric analysis enables the exploration of research trends, article dynamics, and the mapping of key themes (Terán-Yépez et al., 2020). This study contributes to the growing body of knowledge on the role of artificial intelligence (AI) in strategic decision-making within organizations. Specifically, it aims to explore emerging research trends that highlight the integration of AI into strategic decision-making processes (RQ1). Furthermore, the study examines how key variables are mapped using the AMO framework—antecedents, mediators/moderators, and outcomes—to provide a structured understanding of the factors influencing and resulting from AI integration in strategic contexts (RQ2). Based on the study's findings, it also identifies practical implications, challenges, and potential directions for future research regarding the strategic implementation of AI in organizational decision-making (RQ3).

2. RESEARCH METHODS

This study employs a bibliometric analysis to identify articles related to the integration of Artificial Intelligence (AI) in strategic decision-making, following the methodology of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The research was conducted through the following stages:

1. Data Collection

Data collection was carried out using the Scopus database. The search was conducted using relevant keywords and search terms combined with the "AND" Boolean operator, namely: *"artificial intelligence" AND "strategic decision making"*

2. Inclusion Criteria Description

This bibliometric analysis includes articles selected from the period 1988 to 2025. The selection criteria for the articles were as follows: articles must be written in English, published in reputable journals, and contain discussions of dimensions, antecedents, and consequences related to AI and strategic decision-making.

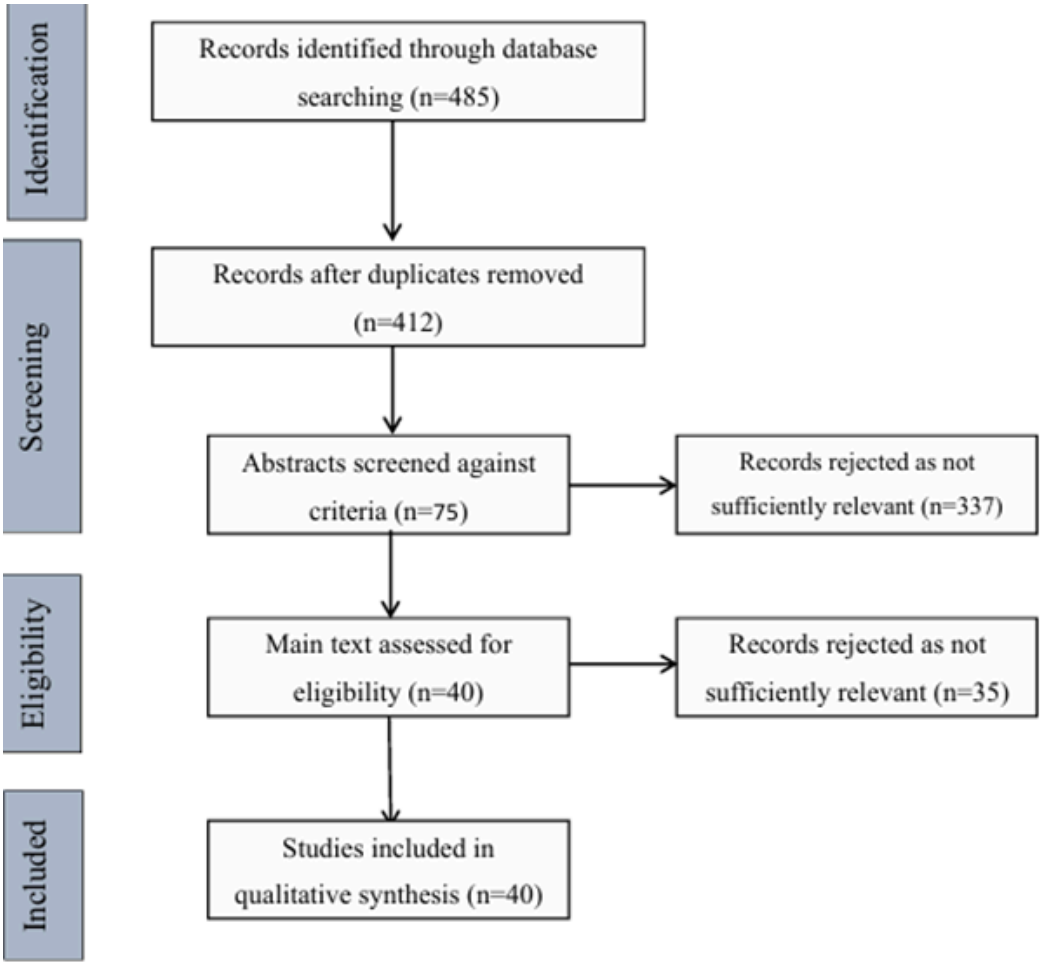

Figure 1 Inclusion Criteria

Source: Researcher, 2025

3. Data Extraction Procedure

The extraction process was conducted by selecting eligible and relevant articles for analysis. In the first stage, the researchers identified 485 articles from the Scopus database. In the second stage, 73 duplicate articles were removed. In the third stage, abstracts were reviewed, and 337 articles were found to have low relevance. In the fourth stage, the researchers read the remaining 75 articles in full and included only 40 articles for detailed analysis. At this stage, it was found that 5 Scopus-indexed articles were discontinued, and 30 articles originated from publishers lacking high reputation.

4. Sample Analysis Description

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To ensure that the selected articles adequately addressed the concepts of AI and decision-making, a comparative analysis was conducted. The factors compared included: research questions and objectives, adopted theoretical frameworks, the integration of AI in strategic decision-making considered in each study, sample characteristics, research design and methods, and key findings.

3. RESULTS AND DISCUSSION

RESULT

Previous Research Trends

The articles selected by the researchers span from 1988 to 2025. Research trends indicate coverage across various aspects, including AI in data analysis, machine learning, natural language processing, and predictive modeling in relation to its integration into strategic decision-making.

The utilization of Artificial Intelligence (AI) in supporting strategic decision-making processes for innovation and new product development has attracted considerable scholarly attention. In this context, strategic risk evaluation and mitigation are addressed through risk-oriented models (Marmier et al., 2013)**.** Antoncic M. (2020) highlights the application of AI in analyzing environmental and sustainability factors within the framework of strategic decision-making, including how AI is integrated in assessing the impact of business decisions. AI is also employed to improve supply chain management and procurement functions. It plays a pivotal role in optimizing inventory levels, analyzing supply chain data, and identifying efficient purchasing patterns (Allal-Chérif et al., 2021). Arumugam and Manida (2024) recommend that businesses adopt AI as a transformative tool across various decision-making processes due to its ability to provide data-driven insights, foster agility, and automate routine tasks. Al-Surmi et al. (2022) further argue that the integration of AI into decision-making frameworks enhances insights, improves operational efficiency, and increases the accuracy of complex and strategic decisions in industries such as manufacturing. A case study presented by Stone et al. (2020) illustrates how AI in retail stores contributes to pricing strategies by adjusting to global customer demand through virtual agents that interact with management teams. In addition, the integration of artificial intelligence with human expertise has been carried out using a hybrid AI-expert approach (Geurts et al., 2022). These studies reflect a growing research trend toward the adoption of AI in supporting strategic decision-making. The sectors most associated with this trend include new product development, supply chain management, and sustainability. The integration of AI into strategic decision-making is expected to enhance organizational effectiveness, efficiency, and responsiveness in addressing business opportunities and challenges.

This study categorizes the selected articles into several groups. The articles are classified based on the year of publication and their respective sources. The table 1 shows that the topic of AI has been consistently discussed. This trend is evident from the number of articles published: 5 articles in 2019, 3 articles in 2020, 4 articles in 2021, 4 articles in 2022, 3 articles in 2023, 1 article in 2024, 1 article in 2025.

The table 2 presents highly reputable journals indexed in Scopus. Each journal contains one relevant study, except for *Business Horizons* with two articles, *Decision Support Systems* with three articles, *Journal of Business Research* with two articles, *Journal of Cleaner Production* with three articles, and *Technological Forecasting and Social Change* with two articles. These data indicate that *Decision Support Systems* and *Journal of Cleaner Production* are the most frequently studied journals.

Next, a network visualization is presented to represent the interdependencies and relationships among entities within the AI system. This includes a visual representation of the connections between various models, algorithms, and AI components within a given environment. The network visualization illustrates the relationships between AI and strategic decision-making through machine learning models. The network visualization is shown in the following figure:

Figure 2 Network Visualization

Source: Researcher, 2025

Furthermore, this study also presents additional information or metrics through an overlay visualization to support the understanding of context and the impact of decisions. The overlay visualization illustrates the financial implications or associated risks of each decision option. This information serves as an additional layer for decision-makers. The visualization is presented in the following figure:

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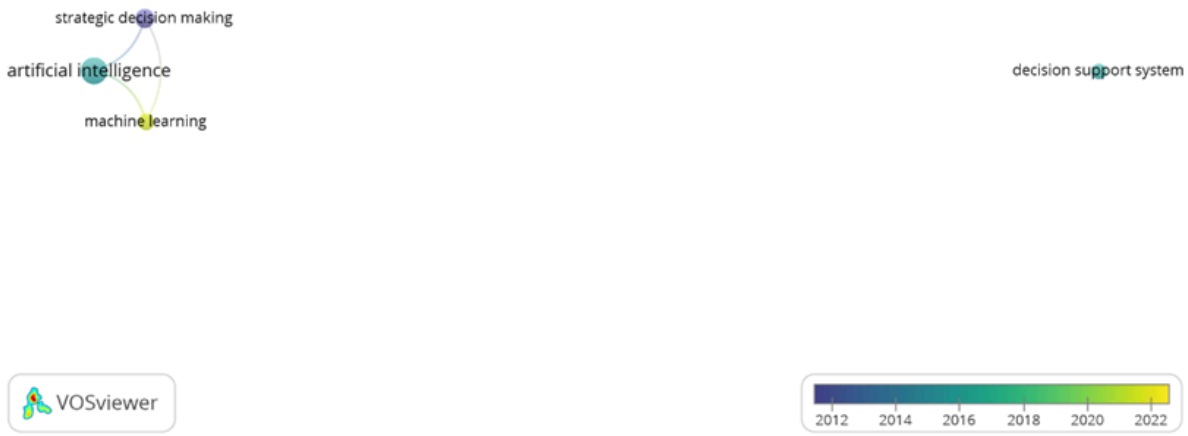

Figure 3 Overlay Visualization

Source: Researcher, 2025

This study also produces a density visualization to illustrate the concentration or distribution of data. The density visualization in this context provides insights into the data distribution and patterns relevant to machine learning models. It helps identify areas where the machine learning model is more focused or requires additional attention. The visualization is presented in the following figure:

Figure 4 Density Visualization

Source: Researcher, 2025

AI, through machine learning models, provides a technological framework for strategic decision-making by processing data, generating predictive models, and delivering insights. Network visualization depicts the relationships among various elements within the AI system. Density visualization aids in understanding the distribution and patterns of data

underlying machine learning models. Overlay visualization enhances the strategic decision-making process by presenting additional relevant information. The combination of these three visualizations enables organizations to better comprehend data complexity, decision impacts, and inter-element relationships, thereby facilitating contextual and informed decision-making.

The visualizations above result in two clusters. The first cluster consists of AI, machine learning, and strategic decision-making. The second cluster includes decision support. These clusters are illustrated in the following figure:

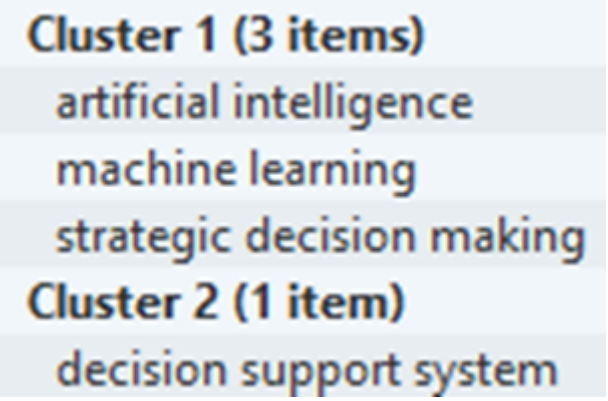

Figure 5 Cluster and Item

Source: Researcher, 2025

Key Variable Mapping

The use of AI is strongly supported by the availability of high-quality data and technological capabilities. This quality data is analyzed with the assistance of machine learning models to provide relevant insights. Subsequently, strategic decision-making becomes the result of the integration of AI with capabilities in information analysis, flexibility, certainty, and alignment with strategic objectives. The mapping provides an overview of the variables interlinked with the use of AI technology through machine learning models in the context of strategic decision-making. The mapping of key variables is presented in the following figure:

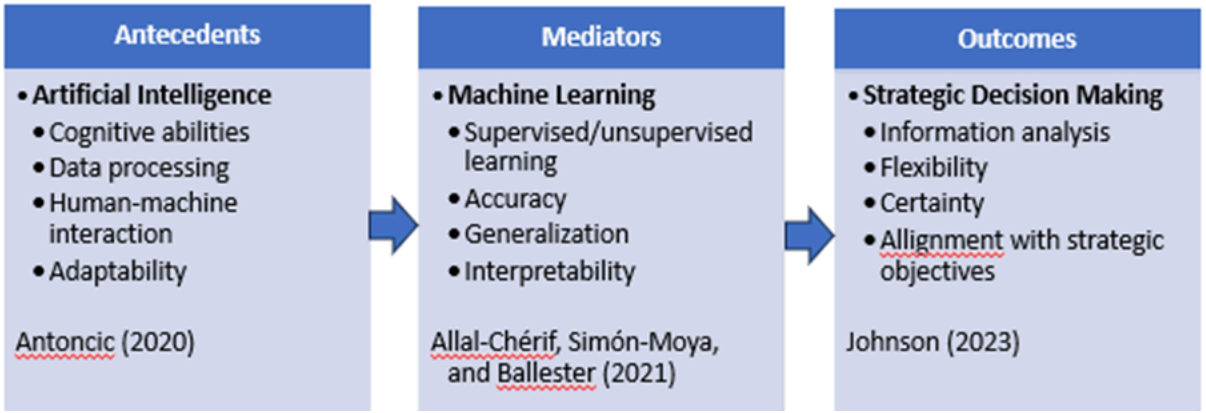

Figure 6 Integration of AI in Strategic Decision-Making: Mediation/Moderation, Outcomes

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Source: Antoncic (2020); Allal-Cherif, Simon-Moya and Ballester (2021); Johnson (2023)

Implications, Challenges, and Suggestions for Potential Future Research

Based on the findings of this study, several implications and suggestions for potential future research are identified as follows:

First, the development of contextual AI models. There is a strong need to develop improved AI models that consider the unique characteristics and context of strategic decision-making. AI models are essential to ensure that supporting data can be properly processed to generate comprehensive insights. Therefore, future research can focus on developing AI models capable of understanding and adapting to specific business contexts.

Second, risk and uncertainty management in strategic decision-making. The use of AI is vulnerable to concerns such as potential implications, data and algorithm biases, errors in model assumptions, and dataset diversity. These risks must be mitigated to ensure AI models can be utilized optimally. Thus, future research should develop AI models capable of managing uncertainty in decision-making.

Third, interpretability of AI models. The complexity of data involved in AI models can be difficult for human decision-makers to interpret. Bias in interpretation may impact business reputation and the quality of decisions. Concerns may arise regarding trust in AI models. Therefore, future research could develop interpretability techniques for AI models and investigate their effects on trust and adoption.

Fourth, data management and privacy. Data privacy is a critical issue related to the increasing use of AI. Managing data security and privacy presents challenges. Hence, future studies could develop frameworks and solutions to safeguard data privacy in the context of strategic decision-making.

Fifth, industry-specific machine learning. Different industries have unique characteristics and requirements. Machine learning models need to be tailored to the needs and traits of specific sectors. Consequently, future research should focus on developing optimized machine learning models for various industries.

Sixth, human-AI integration. AI and humans collaborate in decision-making. The integration should minimize interpretative bias of insights to optimize decision quality. Therefore, future research can explore enhanced human-AI integration to mutually reinforce decision-making.

Seventh, development of success metrics. Success metrics in the context of strategic decision-making with AI need clear definitions. Future research may develop metrics that measure the effectiveness and positive impact of AI integration.

This study proposes several potential directions for future research. Future investigations should aim toward the development of more contextual AI models, improved risk management, enhanced interpretability, stronger data security and privacy protections, industry-specific machine learning, better human-AI integration, and appropriate success metrics. These recommendations can help overcome challenges and maximize the potential of AI technology in strategic decision-making.

This study also identifies several future challenges, including:

1. AI integration in strategic decision-making. AI demands high-quality and accurate data. Unrepresentative or problematic data can lead to unreliable decisions.
2. Algorithm understanding. Humans face limitations in understanding and explaining decisions produced by AI algorithms. The complexity of AI algorithms poses transparency challenges.
3. Ethical and privacy issues. AI-driven strategic decisions require complex ethical and privacy considerations. Risks related to unethical data use or privacy breaches may harm business reputation and trigger negative stakeholder reactions.
4. Cost concerns. Implementing and developing AI requires significant financial investment and employee skill development. Business organizations may face financial and skill-related barriers to optimal AI adoption.
5. Change management. AI integration may cause resistance to change among employees and stakeholders, leading to difficulties managing the cultural and structural changes necessary to support AI use in strategic decision-making.

Based on the above findings, a deep understanding of implications, challenges, and potential research suggestions is crucial for designing, implementing, and managing successful AI integration in strategic decision-making.

DISCUSSION

The bibliometric analysis indicates that AI has been applied in various decision-making contexts, including marketing management, supply chain management, and product development. Some studies highlight the successful implementation of AI, while others emphasize the challenges and constraints faced by organizations (Schneider & Leyer, 2019). Kagalwala et al. (2025) explain that AI and machine learning transformations can reliably predict consumer behavior and economic trends, reduce uncertainty in supply chain strategy design, enhance decision-making, and optimize inventory management. The study also addresses challenges related to ethics, integration complexity, and data quality when adopting AI in supply chain management Zadeh et al. (2024) add that in project management, AI can automate routine tasks, perform rapid analyses, and provide insights that improve team performance efficiency and responsiveness. Meanwhile, challenges concerning data privacy, the need for enhanced managerial capacity and skills, and potential dependency were identified as key findings. Therefore, AI plays a critical role in ensuring better decision quality supported by more accurate insights.

Artificial Intelligence (AI) functions as an antecedent in strategic decision making through the processing of large-scale data. Chatterjee et al. (2023) explain that the adoption of big data analysis significantly influences decision-making, forecasting, and business performance. The use of AI and cognitive computation enables businesses to analyze unstructured data and generate reliable and accurate insights. These systems can produce data by identifying hidden patterns and correlations. Furthermore, they support interaction with humans through their capacity to process natural human language (Mesmari, 2023). The ability of humans to collaborate and interact in interpreting AI-generated information

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plays a crucial role in ensuring adequate insights for informed decision making. Hao et al. (2024) argue that while AI is effective in reducing cognitive load and providing data-driven and predictive analysis support, it also poses potential risks such as dependence, limited out-of-the-box thinking, lack of contextual creativity, and intrinsic bias. Additionally, AI's flexibility in processing data aids businesses in acquiring the most up-to-date information. Data mining, as a component of AI, enhances organizational flexibility by delivering information quickly and accurately. This capability has a direct impact on improving the competitiveness of businesses in the market (Selvarajan, 2021). Therefore, AI serves as a fundamental antecedent in ensuring the availability of high-quality supporting information necessary for strategic decision making.

Machine learning serves as a core component that provides alternative algorithms and approaches to analyze and present accurate information for decision-making processes (Jayatilake & Ganegoda, 2021). Beyond data analysis, machine learning also acts as a mediator between AI and strategic decision making by converting raw data into high-quality information, emphasizing accuracy, feasibility, and timeliness (Selvarajan, 2024). It can detect patterns in existing datasets (Shu & Ye, 2023), and its capacity to learn and identify relevant data offers critical insights to human decision-makers (Mosqueira-Rey et al., 2023) . This suggests that the quality of information generated from data directly influences the strategic value of resulting decisions. Accordingly, machine learning functions as a bridge between AI systems and human judgment in decision-making processes.

The outcome of integrating AI, mediated by machine learning, is enhanced strategic decision making. Accurate analysis of trends and predictions enables businesses to make more confident strategic choices (Vudugula et al., 2023), which helps avoid unforeseen losses. Moreover, the ability of AI and machine learning to adapt to dynamic data and respond to changes in real time ensures more accurate information delivery, thus minimizing uncertainty (Shethiya, 2024). As a result, decisions made are more likely to align with organizational goals. Therefore, the quality of strategic decision outcomes is largely determined by the effectiveness of AI and machine learning in processing data and presenting accurate insights.

Although many studies examine AI use in strategic decision-making, several research gaps remain that require further investigation. These gaps include: first, the need for additional research to understand how humans and AI can collaborate effectively in strategic decision-making; second, the need to explore the ethical impacts of AI use in strategic decisions and how to address potential ethical challenges; third, current research primarily focuses on large organizations, so studies on AI adoption in small and medium-sized enterprises (SMEs) are urgently needed; fourth, this study did not identify any moderating variables, making it important for future research to discover moderating factors to strengthen AI integration in strategic decision-making. Therefore, future studies addressing these gaps are essential to ensure AI usage in decision-making provides strong integration, accurate interpretation, and positive impact across various industries.

The bibliometric analysis in this study provides a comprehensive overview of AI use in strategic decision-making, identifies research gaps that need further exploration,

formulates relevant research questions, and develops propositions or hypotheses to guide future research in this field. The role and potential of AI in business operations, along with emerging challenges, present interesting topics for further investigation. This study is expected to offer deeper and useful insights for researchers, practitioners, and policymakers interested in understanding the evolving research directions in this area.

4. CONCLUSION

Previous research trends reflect a shift toward the use of Artificial Intelligence (AI) to support strategic decision making across various sectors. This study highlights that the integration of AI in strategic decision making is mediated or moderated by the variable of machine learning. The implications and challenges identified in this research emphasize the need for developing more context-specific AI models, improved risk management, enhanced interpretability, strengthened data security and privacy protection, industry-specific machine learning applications, better human-AI integration, and the development of appropriate success metrics. Therefore, a deep understanding of these implications, challenges, and future research recommendations is essential for designing, implementing, and managing successful AI integration in strategic decision making.

This study has limitations in accessing data collection on companies that make strategic decisions using artificial intelligence. Suggestions for further research to be able to continue this bibiliometric analysis in empirical research.

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APPENDIX

1. Previous Research Trends

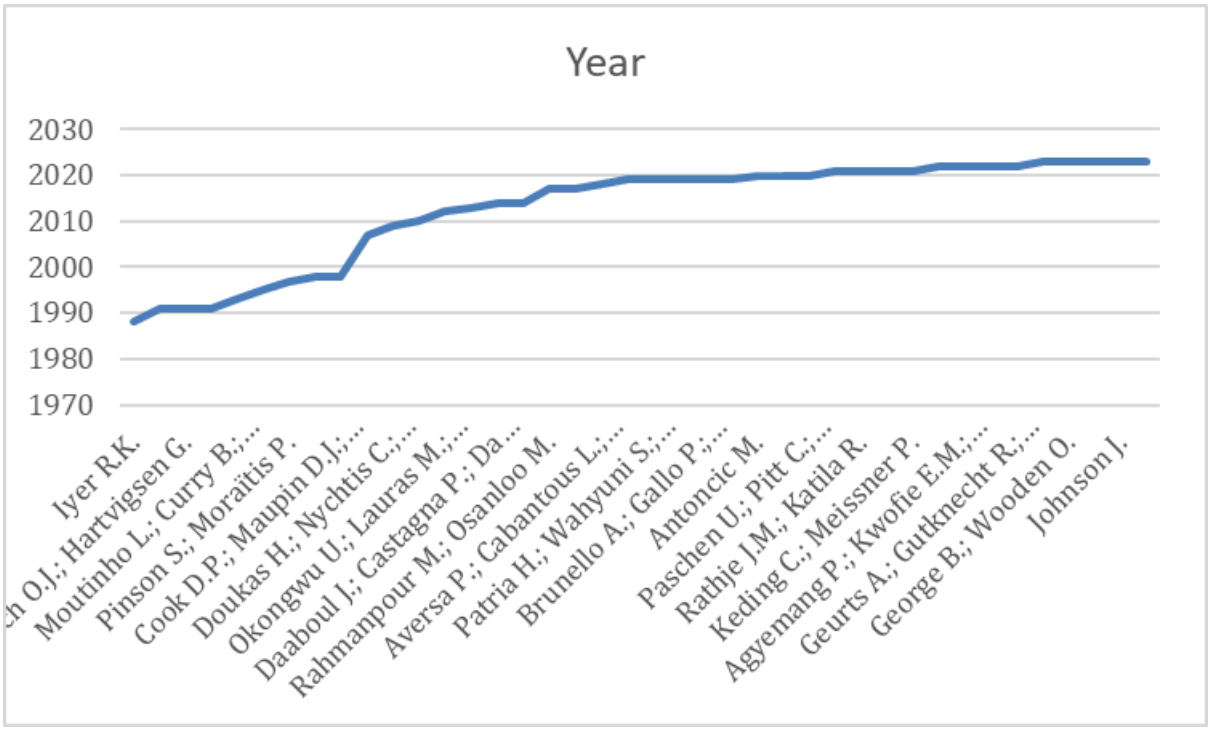

Figure 7 Previous Research Trends
Source: Researcher, 2025

2. Research Year

Table 1 Research Year

Research Year	1988	1991	1993	1995	1997	1998	2007	2009	2010	2012	2013
Number of Studies	1	3	1	1	1	2	1	1	1	1	1

Research Year	2014	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Number of Studies	2	2	1	5	3	4	4	3	1	1	**40**

3. Source of Publication

Table 2 Source of Publication

Source of Publication	Number of Studies
Administrative Sciences	1
Asian Journal of Business and Accounting	1
Building and Environment	1
Business Horizons	2
Computational Economics	1
Decision Support Systems	3
Defence Studies	1
European Review of Agricultural Economics	1
Futures	1
Futures and Foresight Science	1
Group Decision and Negotiation	1
IEEE Transactions on Engineering Management	1
Industrial Management and Data Systems	1
Information and Management	1
International Journal of Information Management Data Insights	1
International Journal of Intelligent Information Technologies	1
International Journal of Production Research	1
Journal of Business Research	2
Journal of Cases on Information Technology	1
Journal of Cleaner Production	3
Journal of Computer Information Systems	1
Journal of Risk Management in Financial Institutions	1
Journal of Strategic Information Systems	1
Journal of Strategic Studies	1
Knowledge-Based Systems	1
Managerial and Decision Economics	1
Production Planning and Control	1
Strategic Management Journal	1
Strategy Science	1
Sustainability (Switzerland)	1
Technological Forecasting and Social Change	2
The Service Industries Journal	1
TQM Journal	1
Total	**40**

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