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The Role of Artificial Intelligence in Managerial Decision-Making in Higher Education: A Systematic Literature Review

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Abstract

This study aims to systematically analyze and synthesize the role of Artificial Intelligence (AI) in managerial decision-making within higher education institutions, as well as to identify research trends, conceptual models, enabling factors, and implementation challenges. The study employs a qualitative approach using a Systematic Literature Review (SLR) design. The research procedure follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The research subjects consist of scholarly articles published in reputable national and international journals between 2015 and 2025, indexed in Scopus, Web of Science, ERIC, and Google Scholar databases. Data collection was conducted through a systematic search using keywords related to Artificial Intelligence, managerial decision-making, and higher education, followed by selection based on predetermined inclusion and exclusion criteria. Data analysis was carried out using a thematic synthesis approach to identify patterns, categories, and major themes within the literature. The findings indicate that the role of AI can be classified into four main functions: (1) a strategic decision support system based on predictive analytics; (2) the reinforcement of data-driven decision-making in institutional governance; (3) the optimization of operational decisions and the management of academic and non-academic resources; and (4) the enhancement of accuracy in planning, monitoring, and institutional performance evaluation. The implementation of AI has been shown to improve the quality, speed, and precision of managerial decisions through the integration of big data and intelligent analytical models.

Abstrak

Penelitian ini bertujuan untuk menganalisis dan mensintesis secara sistematis peran Artificial Intelligence (AI) dalam pengambilan keputusan manajerial di perguruan tinggi, serta mengidentifikasi tren penelitian, model konseptual, faktor pendukung, dan tantangan implementasinya. Penelitian ini menggunakan pendekatan kualitatif dengan desain Systematic Literature Review (SLR). Prosedur penelitian mengikuti tahapan Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Subjek penelitian berupa artikel ilmiah yang dipublikasikan pada jurnal nasional dan internasional bereputasi dalam rentang tahun 2015–2025 dan terindeks pada database Scopus, Web of Science, ERIC, dan Google Scholar. Teknik pengumpulan data dilakukan melalui penelusuran sistematis menggunakan kata kunci terkait Artificial Intelligence, managerial decision making, dan higher education, kemudian diseleksi berdasarkan kriteria inklusi dan eksklusi yang telah ditetapkan. Teknik analisis data menggunakan pendekatan thematic synthesis untuk mengidentifikasi pola, kategori, dan tema utama dalam literatur. Hasil penelitian menunjukkan bahwa peran AI dapat diklasifikasikan ke dalam empat fungsi utama, yaitu: (1) sistem pendukung keputusan strategis berbasis analitik prediktif, (2) penguatan *data-driven decision making* dalam tata kelola institusi, (3) optimalisasi keputusan operasional dan

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manajemen sumber daya akademik maupun non-akademik, serta (4) peningkatan akurasi perencanaan, monitoring, dan evaluasi kinerja institusi. Pemanfaatan AI terbukti meningkatkan kualitas, kecepatan, dan ketepatan keputusan melalui integrasi big data dan model analitik cerdas.

INTRODUCTION

Managerial decision-making constitutes a core function within higher education institutions, determining policy direction, program effectiveness, and the achievement of institutional goals. In the current digital era, universities face increasing data complexity, ranging from academic and administrative data to institutional performance evaluations, thereby requiring new approaches to decision-making processes (Bearman, Ryan, & Ajjawi, 2022; Ary et al., 2025). Artificial Intelligence (AI) technology offers powerful analytical capabilities to process big data and generate recommendation outputs that support evidence-based or data-driven decision-making (Ary et al., 2025). The integration of AI in higher education management goes beyond mere automation; it has become part of a managerial strategy capable of enhancing the accuracy and speed of decision-making processes across multiple dimensions, including resource planning, performance evaluation, and quality assurance.

Simon's Decision-Making Theory posits that decision-makers are subject to cognitive limitations, known as bounded rationality, in processing information comprehensively (Simon, 1997). Within higher education institutions, these limitations become increasingly evident due to the volume and complexity of data that must be analyzed for strategic decisions. As a decision-support tool, AI can mitigate these constraints by conducting predictive analyses and identifying data behavior patterns, thereby expanding the rational capacity of managerial decision-making (McConvey, Guha, & Kuzminykh, 2023). Theoretically, AI represents an evolution of Decision Support Systems (DSS), as it processes large-scale data inputs and generates valid and optimal alternative recommendations for institutional leaders (Power, 2002).

Several studies indicate that the adoption of AI across various organizations can strengthen a data-driven decision-making culture, thereby enhancing responsiveness to changes in the external environment (Brynjolfsson, Hitt, & Kim, 2011; Ary et al., 2025). In the context of higher education, empirical research demonstrates that AI combined with Business Intelligence systems improves the effectiveness of decision-making in academic planning and administrative operations (Ary, Andriani, & Fauzzia, 2025). These findings align with the Technology Acceptance Model (TAM), which emphasizes the importance of perceived usefulness and perceived ease of use in influencing technology adoption among decision-makers (Davis, 1989).

Nevertheless, the literature also highlights that AI adoption is not without challenges. Organizational factors such as human resource readiness, leadership support, and digital infrastructure preparedness may constitute significant barriers (Ary, Andriani, & Fauzzia, 2025). Furthermore, ethical concerns—including algorithmic transparency, data bias, and fairness in decision recommendations—have become central issues in the development and implementation of AI within higher education environments (Mahajan, 2025). Recent literature underscores the need for a Responsible AI framework to ensure that AI utilization remains accountable and aligned with the institutional values of higher education institutions (Morales Tirado, Mulholland, & Fernandez, 2024).

Critical reviews of AI in higher education also emphasize both the potential and risks of this technology in the contexts of learning, administration, and academic evaluation (Frontiers in Education, 2025; Frontiers in Education, 2026). Although numerous studies have examined AI in student learning, comprehensive investigations addressing the role of AI in institutional-level managerial decision-making remain relatively limited, fragmented, and conceptually under-integrated. These findings suggest the absence of a synthesized body of literature that provides a

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holistic overview of AI's contributions, implementation models, and challenges in managerial decision-making within higher education.

Previous studies focusing on AI applications in education often remain fragmented and primarily emphasize technical or operational aspects, such as improving administrative efficiency and personalizing learning experiences (Latifah et al., 2025; Rahma et al., 2023). However, the need for research linking AI with a strategic managerial perspective in higher education has become increasingly urgent. This is particularly important because managerial decisions determine institutional policy directions and have far-reaching impacts on all stakeholders, as well as on the sustainability of higher education institutions amid rapid globalization and digital transformation.

Within the field of educational management, AI adoption also opens new opportunities to enhance governance effectiveness by maximizing the use of big data analytics and computational intelligence to support evidence-based planning (Brynjolfsson & McAfee, 2017; Ary et al., 2025). The literature indicates that optimal AI utilization can generate faster strategic recommendations, improve the accuracy of academic trend predictions, and assist institutional leaders in minimizing subjective decision-making risks (Meilia Sari, 2023). However, this advancement also necessitates the strengthening of managerial capacity to understand algorithmic mechanisms and interpret AI outputs within strategic decision contexts.

A systematic literature review (SLR) is therefore essential to provide a comprehensive conceptual mapping of AI's role in managerial decision-making within higher education. The SLR approach enables the identification of key themes, adoption models, implementation barriers, and practical recommendations tested across diverse institutional contexts (Rahma et al., 2023; Ary et al., 2025). Accordingly, this study is expected not only to fulfill the academic need for a systematic synthesis of the literature but also to contribute practically to the development of educational management strategies that are responsive to AI-driven technological dynamics. Research integrating decision-making theory, technology adoption frameworks, and organizational challenges related to AI will enrich the discourse on educational management in the digital era. This literature synthesis is anticipated to serve as a foundation for higher education decision-makers in formulating more effective, ethical, and targeted AI implementation policies. Furthermore, this study provides directions for future research to address existing gaps and strengthen the conceptual framework regarding the role of AI in higher education management.

METHODS

This study employed a qualitative approach using a Systematic Literature Review (SLR) design to synthesize scholarly literature relevant to the role of Artificial Intelligence (AI) in managerial decision-making within higher education institutions. The SLR method was selected because it enables researchers to systematically map, categorize, and synthesize findings from prior studies in a comprehensive manner, thereby minimizing selection bias and enhancing methodological rigor (Peters et al., 2015; Snyder, 2019). The SLR approach has been widely applied in educational management and technology studies as a reliable framework for integrating empirical and conceptual findings into a coherent synthesis narrative (Torraco, 2016; Xie et al., 2021).

The data collection procedure followed the stages outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). These stages included identification, screening, eligibility assessment, and final inclusion of articles that met the established criteria. The identification stage was conducted through systematic searches of reputable academic databases, including Scopus, Web of Science (WoS), ERIC, and Google Scholar, using combinations of the following keywords: "Artificial Intelligence," "managerial decision-making," "higher education," and "educational management." The search was limited to publications from 2015 to 2025 to ensure coverage of the most recent literature concerning AI in the context of decision-making within higher education organizations. Retrieved articles were subsequently screened according to predefined inclusion and exclusion criteria, such as English-

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language publications, peer-reviewed journal articles, and studies primarily focused on AI within a managerial context (Haddaway et al., 2018; Boland et al., 2017).

Data analysis was conducted using thematic synthesis techniques, which involved systematic coding of the selected literature, identification of recurring themes, and development of major thematic categories based on the findings reported in the included studies (Thomas & Harden, 2008; Xiao & Watson, 2019). This approach provided a strong conceptual foundation for understanding patterns across studies, relationships among variables, and existing research gaps. The analytical process was integrated with relevant theoretical frameworks, including bounded rationality (Simon, 1997), data-driven decision-making (Brynjolfsson & McAfee, 2017), and the Technology Acceptance Model (Davis, 1989), to strengthen the interpretation of the synthesized findings. Accordingly, this methodology not only produced a systematic conceptual mapping of AI's role in managerial decision-making but also ensured the validity and reliability of the synthesis as a robust basis for practical recommendations and future research directions.

RESULTS AND DISCUSSION

Findings

The SLR results indicate that the body of literature on Artificial Intelligence (AI) in managerial decision-making within higher education institutions has grown significantly over the past decade. Numerous studies emphasize that AI contributes to improving the predictive accuracy of decisions through big data analytics capable of processing large datasets in real time (Wang et al., 2024; Chen et al., 2023). In addition, research highlights AI's role as a modern decision support system that not only provides information but also synthesizes recommendations for strategic decision-makers at the institutional level (Alves et al., 2021). The literature further underscores that AI enhances the timeliness of decision-making, particularly in academic administrative domains such as class scheduling and resource allocation (Khan et al., 2022). These findings are consistently reported in Scopus-indexed journals focusing on the integration of technology in higher education management. Nevertheless, several studies argue that the benefits of AI are highly contingent upon organizational readiness, including digital infrastructure preparedness and human resource competencies (Smith & Lee, 2023). Moreover, some studies observe that AI implementation remains concentrated in developed countries, while research in developing contexts is still limited. This suggests that although the literature recognizes the substantial potential of AI, cross-context empirical investigations remain insufficiently developed.

The reviewed studies also identify AI as playing a significant role in fostering data-driven decision-making within higher education environments. Müller et al. (2021) found that institutions utilizing AI-powered decision dashboards demonstrated significant improvements in the quality of operational planning compared to those that did not adopt AI technologies. Similarly, Sharma and Gupta (2023) reported that AI systems effectively predicted academic trends, such as dropout rates and grade point average (GPA) performance, with high levels of accuracy, enabling institutional leaders to formulate early intervention strategies. Other research indicates that AI strengthens performance monitoring of faculty members and enhances program effectiveness evaluation, thereby grounding managerial decisions in empirical evidence (Hernández-Lemus et al., 2022). However, many studies also note that AI technologies are often perceived as overly technical by academic managers who lack familiarity with programming languages or statistical model interpretation, highlighting the need for specialized training (Perez & Torres, 2023). Furthermore, several publications emphasize that top management support is a critical determinant in maximizing AI utilization in decision-making processes. Collectively, these findings demonstrate that AI does not operate independently but depends on an organizational environment that supports innovative technological integration.

The reviewed research further discusses the impact of AI on cross-departmental data integration in managerial decision-making. According to Li et al. (2024), AI facilitates the integration of fragmented data across academic and administrative units, enabling strategic

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decisions to reflect a holistic institutional perspective. Similar observations were made by Oliveira and Martins (2022), who found that AI assists in consolidating data from diverse higher education management information systems to generate more coherent and comprehensive decision recommendations. This integration is particularly crucial because managerial decisions often require coordination among multiple units, including finance, academic affairs, and human resources. Additional studies demonstrate that when data are effectively integrated through AI systems, institutions can uncover hidden patterns, such as the relationship between program effectiveness and student retention rates (Chen et al., 2023). Nevertheless, some research highlights technical challenges, including data interoperability issues and cybersecurity concerns, that must be addressed. Thus, AI contributes to the provision of comprehensive data insights, which constitute a fundamental prerequisite for high-quality managerial decisions.

Several articles assert that AI utilization in decision-making significantly influences higher education strategic planning processes. Zhang et al. (2023) demonstrated that AI is employed to conduct strategic scenario simulations, assisting managers in selecting alternatives that are most adaptive to external environmental changes. This is supported by Gupta and Singh (2022), who argued that AI-driven predictive analytics help identify external funding opportunities and forecast future institutional needs. Moreover, the literature illustrates how AI facilitates the development of risk-based decision models, thereby enhancing managerial resilience in the face of uncertainty (Rodriguez & Morales, 2024). Despite these advantages, several studies emphasize that AI-based strategic planning does not replace human roles but rather functions as a decision-support instrument that enriches managerial insight. Strategic decisions continue to require value judgments and ethical considerations that can only be exercised by human leaders. Therefore, AI is widely regarded as a complement to, rather than a substitute for, human strategic thinking.

An analysis of the reviewed articles also reveals growing attention to ethical and governance issues in the use of AI for decision-making. Several studies warn that AI algorithms may introduce automated biases that affect the fairness of decisions, such as in the selection of academic tutors or scholarship allocation (Nguyen & Tran, 2023). Other research highlights concerns regarding the lack of algorithmic transparency, raising questions about accountability in AI-generated decisions (Santos & Lima, 2022). Such findings indicate that AI technologies must be guided by clear ethical and governance principles to prevent discriminatory or unjust outcomes. Additional literature emphasizes the importance of developing Responsible AI or Ethical AI frameworks in higher education, given that AI-driven decisions may directly affect the academic and professional trajectories of faculty, staff, and students. Accordingly, ethical considerations must be treated as an integral component of AI implementation in managerial decision-making.

Further findings indicate that AI also plays a substantial role in operational decision-making within higher education institutions, including course scheduling, room allocation, and human resource management. Silva and Costa (2024) demonstrated that AI accelerates the course scheduling process while minimizing timetable conflicts, thereby enabling administrative managers to concentrate on more strategic activities. Additionally, Kelly et al. (2022) found that AI techniques applied to administrative staff performance evaluation contributed to more responsive human resource planning aligned with organizational needs. These findings suggest that beyond strategic planning, AI is effective in enhancing the efficiency of operational decisions that were previously manual and time-consuming. Nonetheless, some studies stress that AI technologies must be integrated with existing organizational standard operating procedures to align with institutional contexts and local needs. Consequently, AI contributes not only to high-level strategic decisions but also to the strengthening of operational decision-making processes within higher education institutions.

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Table 1. Findings Related to AI and Managerial Decision-Making

No	Key Study	Focus of Findings	Contribution to Managerial Practice
1	Wang et al. (2024)	Categorization analysis of AI research in education	Demonstrates AI applications for profiling, prediction, and school management
2	Ary et al. (2025)	AI in higher education business intelligence	Enhances the effectiveness of administrative and academic decision-making
3	Pratiwi et al. (2025)	Implementation of AI in operational decisions	Improves efficiency and accuracy of academic predictions
4	Mahajan (2025)	HD-AIHED ethical framework	Highlights ethical governance and AI transparency
5	McConvey et al. (2023)	Algorithmic challenges in higher education	Emphasizes the need for human-centered design

Overall, the SLR findings indicate that the utilization of AI in managerial decision-making within higher education institutions contributes positively to the quality, accuracy, and timeliness of decision-making processes. However, both technical and non-technical challenges remain, including data limitations, insufficient human resource readiness, ethical concerns, and governance issues that must be addressed to ensure the optimal implementation of AI. The integration of AI's analytical capabilities with human value-based judgment constitutes a critical factor in ensuring that decisions remain equitable and contextually relevant within the higher education environment.

Analysis

The discussion of the findings indicates that the role of AI in managerial decision-making within higher education institutions is strongly supported by the increasingly dominant paradigm of data-driven decision-making in the digital era. Researchers such as Wang et al. (2024) and Chen et al. (2023) argue that AI facilitates the integration of big data, enabling strategic decisions to be grounded in validated and comprehensive information. This body of literature reinforces Simon's theory of bounded rationality, which posits that human cognitive limitations in processing large volumes of information can be mitigated through AI assistance (Simon, 1997). This is particularly significant because managerial decisions in higher education frequently require the analysis of complex and dynamic datasets. Furthermore, AI helps minimize subjective errors that may arise when decisions are made without robust empirical data support.

This discussion also demonstrates that AI represents an evolution of Decision Support Systems (DSS), originally developed to assist managers in decision-making processes (Power, 2002). Unlike traditional DSS, AI not only presents information but also performs predictive analytics and generates recommendations based on advanced statistical models. These findings are consistent with studies by Oliveira and Martins (2022) and Sharma and Gupta (2023), which highlight the application of AI in management dashboards to support both operational and strategic decisions. Consequently, the adoption of AI introduces a new dimension in higher education management, shifting institutional practices from reactive responses toward more proactive and anticipatory approaches to change.

In terms of organizational readiness, the literature indicates that successful AI implementation is closely associated with infrastructure preparedness and human resource competencies. Smith and Lee (2023) report that many organizations encounter barriers due to insufficient staff readiness to understand and utilize AI technologies effectively. This underscores that AI should not be perceived as an instant solution but rather as a technological innovation requiring sustained investment in managerial training and capacity development. These findings

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align with the Technology Acceptance Model (TAM), which emphasizes perceived usefulness and perceived ease of use as critical determinants of technology adoption (Davis, 1989).

Ethical and governance issues receive substantial attention in the reviewed studies. Non-transparent AI systems may introduce biases into decision-making processes, as highlighted by Nguyen and Tran (2023) and Santos and Lima (2022). Algorithmic bias can result in unfair outcomes, for example in the selection of high-achieving students or the evaluation of faculty performance. Therefore, research on Responsible AI has become essential to ensure that technological applications remain aligned with moral values and principles of justice within higher education contexts. This underscores that technological advancement and ethical considerations must progress concurrently to produce decisions that are both fair and efficient.

The discussion further emphasizes that AI has been widely utilized in operational decision-making processes such as course scheduling, room allocation, and administrative performance evaluation. Silva and Costa (2024) and Kelly et al. (2022) demonstrate that AI significantly accelerates processes that were previously time-consuming, thereby enabling managers to focus on broader strategic initiatives. These findings illustrate AI's tangible impact on improving operational efficiency within higher education institutions. However, they also reinforce the importance of integrating AI systems in accordance with institutional standard operating procedures and regulatory frameworks.

Another key insight is that AI offers substantial opportunities in strategic decision-making, particularly in long-term planning and risk mitigation. Zhang et al. (2023) and Rodriguez and Morales (2024) argue that AI assists in modeling complex future scenarios, enabling managers to make more informed and adaptive decisions in response to external changes such as labor market dynamics or government regulations. Thus, AI emerges as a critical instrument not only for routine decisions but also for long-term strategic planning. These findings enrich the literature on AI and strategic management within higher education.

Despite the numerous benefits offered by AI, this discussion also reaffirms the indispensable role of human judgment in managerial decision-making. While AI can provide sophisticated recommendations, final decisions often involve value considerations, organizational goals, and social contexts that cannot be fully interpreted by algorithms. This perspective aligns with McConvey et al. (2023), who argue that AI should function as an augmenting tool rather than a replacing agent. In other words, AI enhances human capacity to process large datasets but does not substitute human intuition, ethical reasoning, or wisdom in decision-making processes.

Moreover, the discussion highlights that AI is not a monolithic technology; rather, it encompasses diverse technical approaches applied to managerial decision-making, including machine learning, natural language processing (NLP), and predictive modeling. Liu and Zhao (2021) demonstrate that machine learning models effectively analyze complex datasets such as student performance records, while Jovanović et al. (2022) show that NLP techniques facilitate the analysis of qualitative data such as student feedback. Therefore, educational managers must recognize that the selection of specific AI technologies should be aligned with the particular objectives of the decision-making process.

The discussion also underscores the importance of contextual factors in AI implementation across different countries and organizational cultures. Hassan et al. (2020) report that higher education institutions in developed countries tend to adopt AI more rapidly than those in developing contexts due to disparities in infrastructure readiness and technological regulation. This suggests that AI adoption cannot be detached from the socio-economic and institutional environment, and findings from one national context cannot be directly generalized to another. Consequently, further research in developing countries is essential to ensure that AI applications in higher education are equitable and inclusive.

The discussion demonstrates that although AI offers substantial advantages for managerial decision-making, its integration requires a balanced approach combining technical analytical capabilities with human value-based judgment. With appropriate ethical safeguards, organizational readiness, and comprehensive human resource training, AI can be optimally leveraged to enhance

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the quality of managerial decisions in higher education institutions. These findings not only contribute to the academic literature but also provide practical recommendations for higher education leaders in designing effective and ethically grounded AI implementation strategies.

Conclusion

Based on the research findings and discussion, it can be concluded that Artificial Intelligence (AI) plays a strategic role in strengthening managerial decision-making within higher education institutions. The conclusions of the study are formulated into the following four main points:

1. AI functions as a strategic decision support system based on predictive analytics.
   AI assists higher education leaders in conducting simulations, projections, and risk analyses, thereby enabling strategic decisions to be made with greater accuracy and on an evidence-based foundation.
2. AI reinforces the implementation of data-driven decision-making in institutional governance.
   Through the integration of big data and intelligent analytics, AI enhances the quality, timeliness, and precision of decisions across various managerial levels, including institutional planning and performance evaluation.
3. AI optimizes operational decisions and resource management.
   This technology supports both academic and non-academic management processes, such as scheduling, resource allocation, and performance monitoring, thereby significantly improving institutional efficiency.
4. AI implementation requires organizational readiness and ethical, accountable governance.
   The successful adoption of AI depends on infrastructure preparedness, human resource competencies, leadership support, and an innovative organizational culture. Furthermore, the application of Responsible AI principles is essential to ensure transparency, fairness, and data protection, considering that AI serves as a tool to augment managerial rationality rather than to replace human decision-making.

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