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Peran Sistem Pendukung Keputusan Berbasis Kecerdasan Buatan dalam Pengambilan Keputusan Manajerial di Industri Perhotelan: Tinjauan Literatur Sistematis

The Role Of Artificial Intelligence–Based Decision Support Systems In Managerial Decision-Making In The Hospitality Industry: A Systematic Literature Review

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Abstract

The advancement of Artificial Intelligence (AI) has accelerated the adoption of Decision Support Systems (DSS) to assist managerial decision-making in the increasingly complex and dynamic hospitality industry. This study aims to systematically examine how AI-based DSS are utilized to support managerial decision-making in the hospitality sector, with a particular focus on the types of decisions supported, the AI techniques employed, the benefits obtained, and the challenges of implementation. This research adopts a Systematic Literature Review (SLR) approach guided by the PRISMA framework. A comprehensive literature search was conducted using the Scopus database, resulting in 32 peer-reviewed journal articles that met the inclusion criteria within the publication period of 2017–2026. The findings indicate that AI-based DSS are predominantly used to support operational and tactical decisions, particularly in demand and occupancy forecasting, dynamic pricing and revenue management, workforce scheduling, and service quality management. Machine learning and predictive analytics emerge as the most widely applied AI techniques, while rule-based systems are used to a more limited extent. The literature also highlights key benefits, including improved decision accuracy, enhanced operational efficiency, and better service quality. However, these benefits are accompanied by challenges related to data quality, system transparency, and organizational readiness. This study provides a structured synthesis of the role of AI-based DSS in managerial decision-making within the hospitality industry and offers a foundation for future research and managerial practice.

Keywords: *Artificial Intelligence, Decision Support System, Hospitality Industry.*

Abstrak

Kemajuan Kecerdasan Buatan (AI) telah mempercepat adopsi Sistem Pendukung Keputusan (DSS) untuk membantu pengambilan keputusan manajerial di industri perhotelan yang semakin kompleks dan dinamis. Studi ini bertujuan untuk secara sistematis meneliti bagaimana DSS berbasis AI digunakan untuk mendukung pengambilan keputusan manajerial di sektor perhotelan, dengan fokus khusus pada jenis keputusan yang didukung, teknik AI yang digunakan, manfaat yang diperoleh, dan tantangan implementasi. Penelitian ini mengadopsi pendekatan Tinjauan Literatur Sistematis (SLR) yang dipandu oleh kerangka kerja PRISMA. Pencarian literatur komprehensif dilakukan menggunakan basis data Scopus, menghasilkan 32 artikel jurnal yang ditinjau sejawat yang memenuhi kriteria inklusi dalam periode publikasi 2017–2026. Temuan menunjukkan bahwa DSS berbasis AI sebagian besar digunakan untuk mendukung keputusan operasional dan taktis, khususnya dalam peramalan permintaan dan hunian, penetapan harga dinamis dan manajemen pendapatan, penjadwalan tenaga kerja, dan manajemen kualitas layanan. Pembelajaran mesin dan analitik prediktif muncul sebagai teknik AI yang paling banyak diterapkan, sementara sistem berbasis aturan digunakan dalam skala yang lebih terbatas. Literatur juga menyoroti manfaat utama, termasuk peningkatan akurasi pengambilan keputusan, peningkatan efisiensi operasional, dan kualitas layanan yang lebih baik. Namun, manfaat ini disertai dengan tantangan yang berkaitan dengan kualitas data, transparansi sistem, dan kesiapan organisasi. Studi ini memberikan sintesis terstruktur tentang peran DSS berbasis AI dalam pengambilan keputusan manajerial di industri perhotelan dan menawarkan landasan untuk penelitian dan praktik manajerial di masa mendatang.

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Kata kunci: Kecerdasan Buatan, Sistem Pendukung Keputusan, Industri Perhotelan.

1. Introduction

The hospitality industry is one of the service sectors that operates in a highly dynamic and competitive environment. Its core characteristics include significant demand fluctuations, strong dependence on seasonal factors, rapidly changing consumer preferences, and increasing competitive pressure driven by digitalization and the globalization of services (Guillet & Chu, 2021; Ivanov & Webster, 2017). These conditions require hospitality organizations—such as hotels, restaurants, and tourism services—to make managerial decisions both quickly and accurately in order to maintain operational performance, service quality, and business sustainability. Inaccurate decisions, particularly in areas such as pricing, capacity planning, or workforce scheduling, may directly affect occupancy rates, customer satisfaction, and overall profitability (Varra & Rossi, 2019).

Within this context, managerial decision-making in the hospitality industry can no longer rely solely on intuition or managerial experience. The growing complexity of the business environment, combined with the increasing volume of operational data, has intensified the need for more systematic and data-driven decision-making approaches (Mariani, 2020). Hospitality managers are required to make a wide range of strategic and operational decisions, including demand forecasting, revenue management, human resource allocation, and service quality enhancement. Each type of decision involves different levels of uncertainty and consequences, thereby requiring adequate informational support and analytical capabilities (Zahrani et al., 2025).

Advances in information technology and data analytics have created new opportunities for the use of Decision Support Systems (DSS) as tools to assist managerial decision-making. DSS are designed to integrate data, analytical models, and user interfaces to support decision-makers in evaluating alternative courses of action in a more rational and structured manner (Sharda et al., 2023). In the hospitality industry, DSS have been applied to support various managerial decisions, including room price optimization, resource allocation, and service performance evaluation (Mohammed & Denizci Guillet, 2025). However, as data complexity increases and the demand for more accurate predictions intensifies, conventional DSS are often considered insufficient for handling large-scale data and non-linear patterns.

The integration of Artificial Intelligence (AI) into DSS represents a significant development in supporting more adaptive and intelligent managerial decision-making. AI approaches—such as machine learning, predictive analytics, and data mining—enable systems to learn from historical data, identify hidden patterns, and generate prediction-based decision recommendations (Dwivedi et al., 2021). In the hospitality context, AI-based DSS have been applied to forecast demand levels, optimize pricing strategies, analyze online customer reviews, and improve operational efficiency (Mariani, 2020). The incorporation of AI into DSS not only enhances decision accuracy but also enables managers to respond more proactively to market changes.

Despite the considerable potential of AI-based DSS adoption in the hospitality industry, their implementation is accompanied by various challenges. Studies by Buhalis & Leung (2018) and Marinakou et al. (2025) highlight issues related to data quality and integration, the transparency of AI models, and organizational readiness to adopt advanced technologies. Moreover, not all managerial decisions can be fully

automated, underscoring the continued importance of managerial judgment in interpreting system recommendations and making final decisions. This indicates that AI-based DSS should be positioned as decision-support tools rather than substitutes for human decision-makers (Haenlein & Kaplan, 2021).

As the number of academic publications addressing AI, DSS, and hospitality management continues to grow, research in this field has expanded rapidly but remains fragmented. Some studies focus primarily on the technical development of AI models, while others emphasize specific applications such as revenue management or online review analysis (Yao et al., 2025). Consequently, a comprehensive understanding of how AI-based DSS are utilized to support different types of managerial decisions in the hospitality industry remains limited. Existing studies have not systematically mapped research trends, types of supported managerial decisions, AI approaches employed, or the benefits and challenges of implementation from a managerial perspective.

This lack of comprehensive literature mapping has both practical and academic implications. From a practical standpoint, hospitality managers may face difficulties in identifying AI-based DSS approaches that best align with their decision-making needs. From an academic perspective, the absence of structured synthesis limits the development of more focused and cumulative research agendas. Therefore, a systematic review is needed to organize and synthesize existing research findings in order to provide a clearer understanding of the role of AI-based DSS in managerial decision-making within the hospitality industry.

Based on this background, this study aims to conduct a Systematic Literature Review (SLR) of research examining the use of Artificial Intelligence–based Decision Support Systems in supporting managerial decision-making in the hospitality industry. In this study, the hospitality industry is understood as an umbrella sector encompassing hotels, resorts, food and beverage services, and tourism-related activities. Specifically, this research focuses on mapping research trends, classifying the types of managerial decisions supported, identifying the AI approaches used within DSS, and examining the benefits and implementation challenges reported in recent literature.

Through the SLR approach, this study is expected to contribute in two main aspects. First, from a theoretical perspective, it provides a structured synthesis of knowledge regarding the application of AI-based DSS in hospitality management, thereby enriching the literature on managerial decision-making and decision support systems. Second, from a practical perspective, the findings offer insights for practitioners and policymakers into the potential and limitations of AI-based DSS as decision-support tools in the hospitality industry, as well as serving as a foundation for developing more effective technology adoption strategies in the future.

2. Literature Review

Managerial Decision-Making in the Hospitality Industry

In service management studies, managerial decision-making is understood as a systematic process of selecting alternative courses of action based on available information, organizational objectives, and environmental constraints. Within the hospitality industry, managerial decisions are commonly classified into strategic, tactical, and operational decisions, each differing in terms of time horizon, level of uncertainty, and impact on organizational performance. Strategic decisions are

associated with long-term business direction and policy formulation, whereas tactical and operational decisions focus on the management of resources and day-to-day service activities, such as capacity planning and workforce scheduling (Ivanov & Webster, 2017). The service-intensive and data-driven nature of the hospitality industry increasingly amplifies the complexity of managerial decision-making. Demand volatility, perishability of services, and customer experience sensitivity require managers to continuously process large volumes of information and respond to dynamic market conditions. Consequently, from a conceptual perspective, managerial decision-making in hospitality necessitates analytical approaches capable of integrating data, decision models, and business context in order to support more rational, structured, and evidence-based decisions (Guillet & Chu, 2021; Mariani, 2020).

Decision Support System

Decision Support Systems (DSS) are defined as computer-based systems designed to support decision-making in semi-structured and unstructured problems through the integration of data, analytical models, and decision evaluation mechanisms. Conceptually, DSS are positioned as tools that enhance managers' analytical capabilities rather than replace human decision-makers (Sharda et al., 2023). The evolution of DSS reflects a transition from static, model-driven systems toward intelligent DSS capable of handling large-scale and complex data environments. In the hospitality industry, DSS function as managerial decision-support frameworks across multiple organizational levels, particularly when decisions involve high uncertainty and multiple variables, such as capacity planning and operational strategy formulation. The integration of Artificial Intelligence into DSS enables systems to learn from historical data, recognize non-linear relationships, and generate predictive and adaptive decision recommendations. As a result, AI-based DSS serve not only as analytical tools but also as strategic components that strengthen data-driven managerial decision-making processes within service organizations (Dwivedi et al., 2021; Mohammed & Denizci Guillet, 2025).

Artificial Intelligence in Hospitality Management

Artificial Intelligence (AI) refers to a set of computational techniques that enable systems to analyze data, recognize patterns, and support adaptive decision-making. In the hospitality industry, AI conceptually functions as an enabler of data-driven managerial decision-making, particularly in complex and dynamic environments. AI approaches such as machine learning and predictive analytics allow hospitality organizations to process operational and customer data in order to generate predictive insights relevant to managerial planning and control (Mariani, 2020). However, in the context of decision-making, AI does not operate in isolation. Its managerial relevance emerges when it is embedded within Decision Support Systems that provide structured frameworks for evaluating decision alternatives. Management literature emphasizes that the effectiveness of AI in supporting managerial decisions is strongly influenced by organizational readiness, system transparency, and managers' ability to interpret and utilize the recommendations produced (Varra & Rossi, 2019). Therefore, from a conceptual standpoint, AI in hospitality management should be understood not as a mechanism for decision automation, but as a supporting component within a socio-technical managerial decision-making system.

3. Research Method

Research Design

This study adopts a Systematic Literature Review (SLR) approach to comprehensively examine the application of Artificial Intelligence–based Decision Support Systems (AI-DSS) in supporting managerial decision-making within the hospitality industry. The SLR method was selected because it enables the systematic identification, evaluation, and synthesis of existing research findings in a transparent and replicable manner, thereby providing a structured understanding of developments within a specific research domain. The SLR process in this study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure the traceability and rigor of the literature search, selection, and analysis procedures (Page et al., 2022). This methodological approach aligns with the objectives of the study, which do not aim to test empirical hypotheses, but rather to map research trends, classify the types of managerial decisions supported by AI-DSS, and identify the benefits and challenges associated with their implementation in the hospitality industry.

Data Sources

The literature search was conducted using the Scopus database as the primary source, given its reputation as a comprehensive and high-quality academic database covering leading international journals in management, technology, and hospitality studies. To enhance the breadth of coverage, Google Scholar was employed as a supplementary source to identify relevant articles that may not yet be fully indexed in Scopus. Only peer-reviewed journal articles were considered to ensure the academic quality and validity of the findings included in the analysis. Furthermore, the review was limited to articles published in English to maintain analytical consistency and comparability across studies.

Search Strategy

The literature search strategy was designed to capture studies that explicitly examine the intersection of Decision Support Systems, Artificial Intelligence, managerial decision-making, and the hospitality industry. The search was conducted using a combination of key terms applied to article titles, abstracts, and keywords (*TITLE-ABS-KEY*), as follows: ("decision support system" OR “DSS” AND "artificial intelligence" OR "machine learning" OR "predictive analytics" AND "managerial decision making" OR "management decision" OR "decision making" AND "hospitality industry" OR “hotel” OR "food and beverage" OR “restaurant” OR “tourism”). The publication period was restricted to 2017–2026 to ensure that the reviewed literature reflects recent developments in AI and decision support technologies within the hospitality sector. This search strategy produced an initial pool of articles, which were subsequently refined through a systematic screening process based on predefined inclusion and exclusion criteria, following the PRISMA framework.

Screening Process

Table 1. Inclusion and Exclusion Criteria

No.	Criteria	Inclusion	Exclusion

1	Publication Type	Scientific articles that have gone through a peer-review process.	Books, editorials, or book chapters.
2	Industrial Context	The research is in the context of the hospitality industry (hotels, resorts, food and beverages, tourism).	Research outside the context of the hospitality industry.
3	Research Focus	Discuss managerial decision-making.	It does not discuss managerial decision-making.
4	Research Approach	Use or discuss Decision Support System (DSS).	Discussing information systems or technologies without the context of DSS.
5	Technology Aspect	Integrate or discuss the application of Artificial Intelligence in DSS.	Discussing AI or digital technologies with no connection to DSS.
6	Year of Publication	Published in the range of 2017–2026.	Published outside the range of the year.
7	Language	Articles are written in English.	Articles written in other than English.
8	Availability	The article is available in full text and has methodological clarity.	Articles are not available full text or methodology information is inadequate.

Following the screening process based on inclusion and exclusion criteria, a total of 32 articles were identified as meeting all inclusion requirements and were subsequently analyzed. The selection process was visualized using a PRISMA flow diagram.

In accordance with the PRISMA guidelines, the identification stage involved an initial search of the Scopus database as the primary source, with Google Scholar serving as a supplementary source. The initial search yielded 312 articles. After removing duplicate records, 247 articles remained and were screened based on their titles and abstracts. At this stage, 163 articles were excluded due to irrelevance to the research focus. The remaining 84 articles underwent a full-text eligibility assessment, resulting in the exclusion of 52 articles that did not specifically address managerial decision-making, were not situated within the hospitality industry, or did not involve Artificial Intelligence–based Decision Support Systems. Consequently, 32 articles were retained for further thematic synthesis.

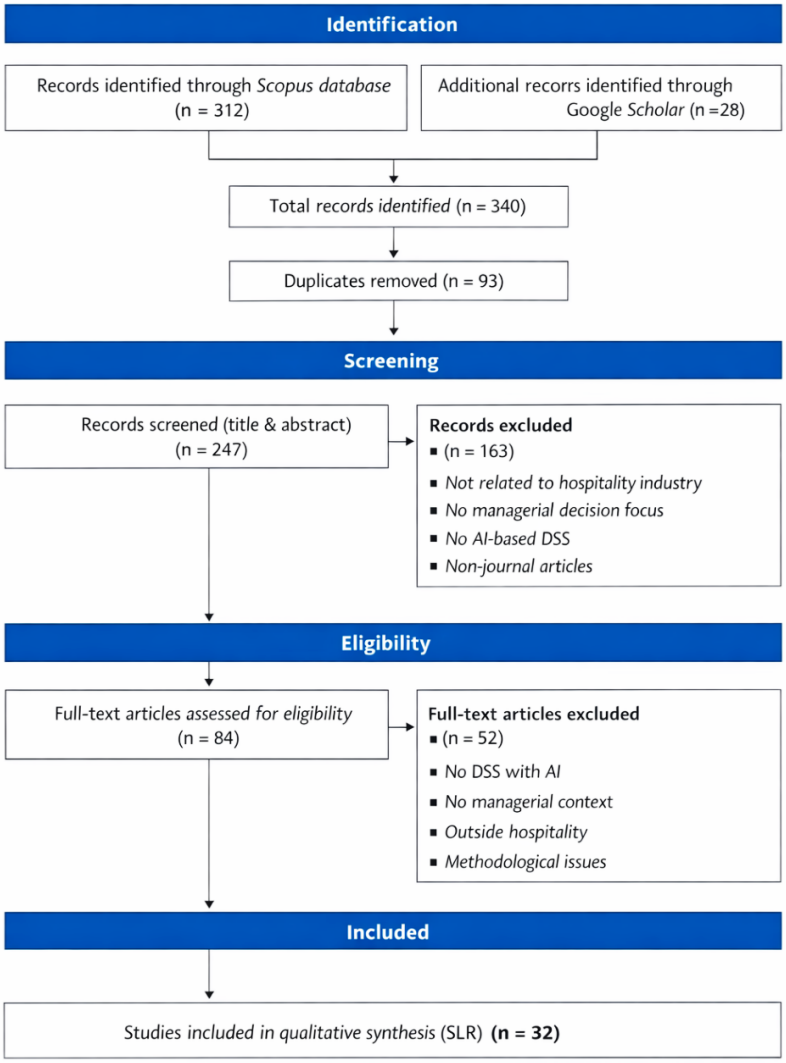

Figure 1. Screening Article Process based on PRISMA

Data Analysis

Data analysis was conducted using a thematic analysis approach to identify recurring patterns and dominant themes across the selected literature. Each article was systematically reviewed and classified according to three primary dimensions: (1) the types of managerial decisions supported by AI-DSS, (2) the characteristics and AI techniques employed within the decision support systems, and (3) the benefits and challenges associated with the implementation of AI-DSS in the hospitality industry. The analysis process involved extracting key information from each study, followed by the grouping of findings into relevant thematic categories. This approach enabled the development of a structured and conceptual synthesis of how AI-based DSS are utilized by hospitality managers to support decision-making across different managerial levels.

3. Result and Discussion

Publication Trends

Figure 4.1 illustrates the publication trend of studies related to Artificial Intelligence–based Decision Support Systems (AI-DSS) in managerial decision-making

within the hospitality industry over the period 2017–2026. Overall, the number of publications shows a steady upward trend, indicating growing academic interest in the application of AI-DSS in hospitality management.

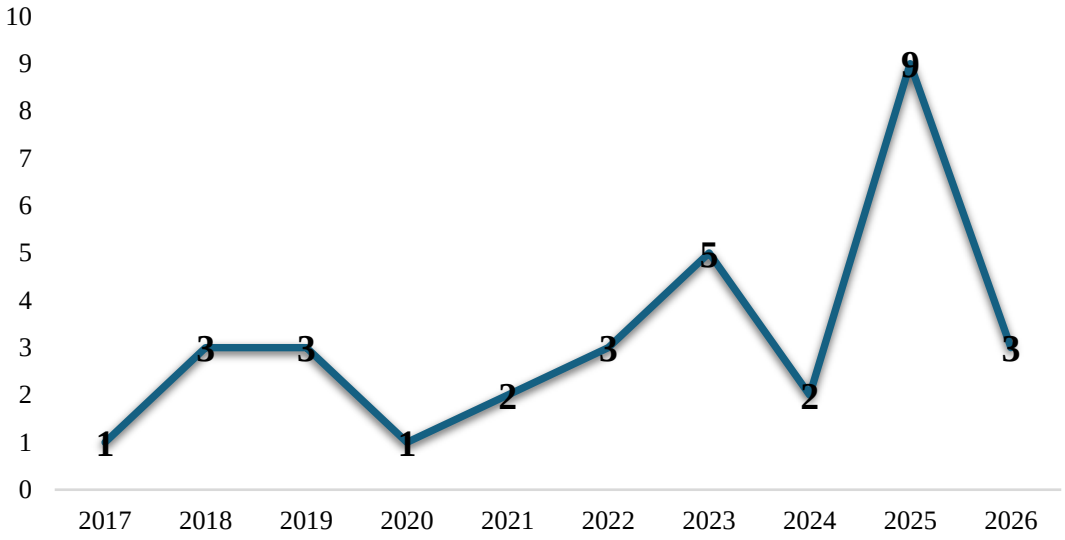

Figure 2. Publication Tren based on Year of Publish

The most significant increase in publications occurred during the 2024–2025 period, marking an acceleration compared to previous years. This surge can be associated with the post–COVID-19 recovery phase of the hospitality industry, during which organizations faced heightened uncertainty in demand patterns and shifts in consumer behavior. In this context, AI-based DSS gained increased relevance as decision-support tools for revenue recovery, capacity planning, and operational efficiency, reflecting the industry's need for more adaptive and data-driven managerial decision-making.

Table 2. Distribution of Research Topics

No.	Main Topics	Frequence	Article Identities
1.	Service Personalization	8	(Alrumi, 2023; Çalı & Balaman, 2019; Doborjeh et al., 2022; Ismael et al., 2025; Jiang & Wang, 2026; Kwok & Lau, 2019; Souha et al., 2025; Zajia et al., 2025)
2.	Competitive Positioning	5	(Kim, 2021; Liu et al., 2025; Lu & Zhu, 2024; Y. Wang et al., 2023; Yang & Miao, 2024)
3.	Revenue Management	5	(Borrero et al., 2022; Chebrolu, 2025; Miah et al., 2017; Penna et al., 2021; Wu et al., 2026)
4.	Barriers or Challenge of Adoption	3	(Cubric, 2020; Mousavian et al., 2023; Tan et al., 2018)
5.	Digital Reputation Management	3	(Antonio et al., 2019; Gao et al., 2018; Nnanna et al., 2025)
6.	Sustainability	3	(Baidya et al., 2025; Ma et al., 2025; X. Wang et al., 2025)

7.	Strategic Decision Making	2	(Ćurlin et al., 2024; Y. Wang et al., 2023)
8.	Supply Chain Management	2	(Huang et al., 2023; Jeong & Ramírez-Gómez, 2018)
9.	Operating Automation	1	(Li et al., 2022)
Total		**32**	

Table 2 presents the distribution of the main research topics addressed by the 32 selected articles. Service personalization emerges as the most dominant topic, followed by competitive positioning and revenue management. These findings suggest that the majority of studies emphasize the use of AI-DSS to support managerial decisions aimed at enhancing customer value and strengthening competitive advantage in hospitality organizations. Other topics, such as barriers to adoption, digital reputation management, and sustainability, appear less frequently but demonstrate a gradual expansion of research focus beyond operational concerns toward more strategic and long-term issues. In contrast, topics such as supply chain management and operational automation remain relatively underexplored. This pattern indicates potential research opportunities related to cross-functional decision-making and end-to-end operational integration within the hospitality industry.

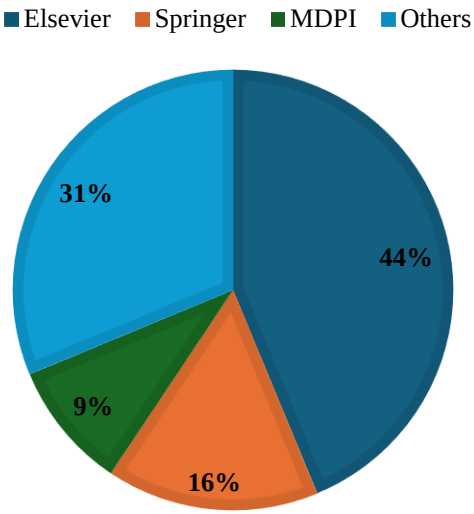

Figure 3. Distribution of Publisher

From a publication outlet perspective, the reviewed articles are predominantly published in internationally recognized journals under Elsevier. Springer ranks as the second most frequent publisher, followed by MDPI and several other academic publishers. This distribution suggests that research on AI-based DSS in hospitality is largely disseminated through established international publishers, reflecting the academic maturity and global relevance of the topic.

Table 3. Top 12 Keywords

No.	Keywords	Frequency
1.	Artificial Intelligence	11
2.	Machine Learning	10
3.	Decision Support	10
4.	Tourism	8

5.	Hotel	5
6.	Decision Making	4
7.	Predictive Analytics	4
8.	Online Review	3
9.	Data Mining	3
10.	Multi Criteria Decision Making	3
11.	Hospitality	3
12.	Fuzzy Decision Support System	3
Total		**67**

The keyword frequency analysis presented in Table 3 indicates that *artificial intelligence*, *machine learning*, and *decision support* are the most frequently occurring keywords across the reviewed literature. The prominence of these terms reinforces the central role of AI technologies in the development of DSS to support managerial decision-making in the hospitality sector.

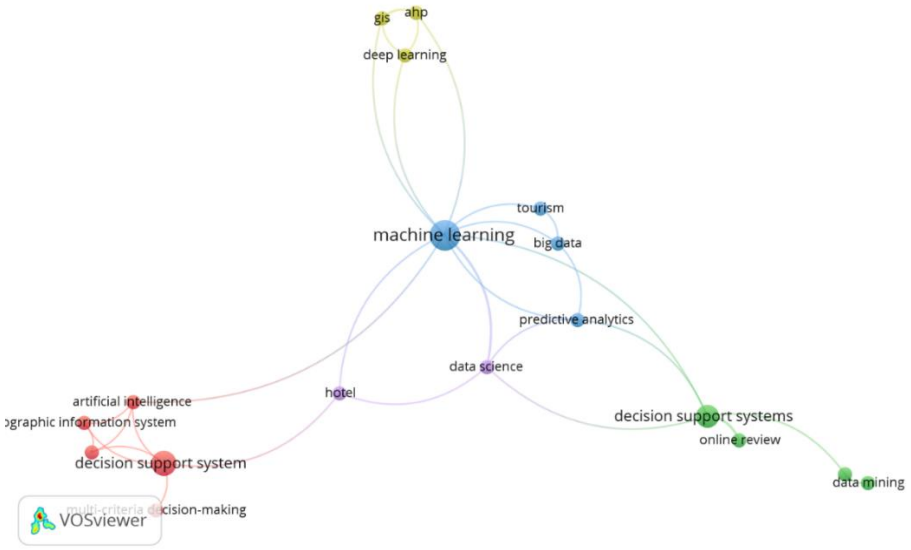

Figure 4. Keywords Clustering

Figure 4 displays the results of keyword clustering analysis, revealing several major thematic clusters. The blue cluster, which is the most dominant, centers on keywords such as machine learning, predictive analytics, and tourism. This cluster reflects a strong research focus on the use of AI-driven predictive approaches to support demand forecasting and data-based planning in hospitality management. The prominence of this cluster indicates that managerial decision-making is largely oriented toward anticipating demand fluctuations and mitigating market uncertainty. The green cluster emphasizes keywords such as decision support systems, data mining, and online review, highlighting the role of DSS in supporting managerial decisions based on customer-generated data and digital information, particularly in evaluating customer experience and online reputation. Meanwhile, the red cluster highlights the intersection of artificial intelligence, decision support systems, and multi-criteria decision-making, suggesting the application of AI-DSS to structured managerial decisions involving multiple evaluation criteria, such as operational strategy selection or policy assessment. A smaller yellow cluster includes keywords such as analytic hierarchy process (AHP), geographic information systems (GIS), and deep learning, reflecting exploratory efforts to integrate advanced analytical methods

into DSS development. Overall, the clustering patterns indicate that AI-based DSS research in the hospitality industry is inherently multidisciplinary, bridging management, information systems, and data analytics perspectives, with managerial decision-making serving as the central point of convergence.

Types of Managerial Decisions Supported by AI-DSS in Hospitality Industry

The analysis of the selected studies reveals that AI-based Decision Support Systems are applied to support a wide range of managerial decisions in the hospitality industry. The most frequently reported decision type relates to demand and occupancy forecasting, where AI-DSS are used to predict demand fluctuations based on historical data and external variables such as seasonality and customer behavior (Liu et al., 2025; Song, 2025; Wu et al., 2026). These decisions are primarily situated at the operational and tactical levels, as they directly inform capacity planning and resource allocation. Another prominent category involves dynamic pricing and revenue management decisions. In this context, AI-DSS support the evaluation of alternative pricing strategies and revenue optimization scenarios by incorporating demand forecasts and customer segmentation (Ismael et al., 2025; X. Wang et al., 2025; Zajia et al., 2025). Several studies also report the use of AI-DSS in workforce scheduling, particularly in aligning staff allocation with anticipated service demand patterns (Ćurlin et al., 2024; Souha et al., 2025). Additionally, AI-DSS are employed to support service quality management decisions, including the analysis of customer feedback and online reviews to inform service improvement initiatives (Li et al., 2022; Yang & Miao, 2024). Overall, these findings demonstrate the diversity of managerial decision types supported by AI-DSS across different decision-making levels within the hospitality industry, with a strong emphasis on operational efficiency and demand-driven management.

AI Techniques Used in DSS of Hospitality Industry

The review indicates that machine learning is the most widely adopted AI technique in the development of DSS for the hospitality industry. Machine learning approaches are primarily used to identify patterns in historical data and generate predictive insights that support managerial decision-making, particularly in demand forecasting and service personalization (Baidya et al., 2025; Chebrolu, 2025; Jiang & Wang, 2026). Predictive analytics also features prominently as an analytical approach for projecting future conditions based on operational and customer data (Ma et al., 2025; Nnanna et al., 2025; Y. Wang et al., 2023). In addition to data-driven techniques, several studies report the use of rule-based systems within DSS, especially for decisions governed by predefined rules or organizational policies, such as standard operating procedures and managerial constraints (Huang et al., 2023; Penna et al., 2021). Although rule-based approaches are less prevalent than machine learning and predictive analytics, they remain relevant in contexts where consistency and policy compliance are critical. These findings suggest that hospitality AI-DSS development often involves a combination of AI techniques tailored to the characteristics of the supported decisions.

Benefits of AI-DSS in Hospitality Managerial

The reviewed literature identifies several key benefits associated with the implementation of AI-based DSS in the hospitality industry. The most frequently

reported benefit is improved decision accuracy, particularly for decisions involving demand prediction and operational scenario evaluation (Liu et al., 2025; Mousavian et al., 2023; Song, 2025). AI-DSS are also found to contribute to enhanced operational efficiency by optimizing resource utilization and reducing inefficiencies in planning processes (Ćurlin et al., 2024; Souha et al., 2025). Another notable benefit is the improvement of service quality, achieved through the use of customer data and feedback analysis to support informed service enhancement decisions (Li et al., 2022; Yang & Miao, 2024). Several studies further indicate that AI-DSS enable hospitality organizations to respond more quickly and systematically to changing operational conditions. Collectively, these benefits highlight the potential of AI-DSS to enhance both operational performance and service outcomes in managerial decision-making contexts.

Challenges and Limitations of AI-DSS adoption in Hospitality Industry

Despite the reported benefits, the literature also highlights several challenges associated with the adoption of AI-based DSS in the hospitality industry. The most commonly cited challenge relates to data quality and availability, including issues of incomplete, inconsistent, or poorly integrated data (Doborjeh et al., 2022; Y. Wang et al., 2023). Such limitations directly affect the reliability of AI-generated decision recommendations (Alrumi, 2023; Çalı & Balaman, 2019). Another significant challenge concerns system transparency and trust. Several studies report that managers experience difficulty understanding the underlying logic of AI-based recommendations, which can reduce confidence in system outputs. Organizational readiness also emerges as a key barrier, encompassing limitations in human resource competencies and resistance to technological change (Jeong & Ramírez-Gómez, 2018; Li et al., 2022). These findings indicate that the challenges of AI-DSS implementation extend beyond technical issues to include organizational and managerial dimensions.

Discussion

The findings of this Systematic Literature Review indicate that the adoption of Artificial Intelligence–based Decision Support Systems (AI-DSS) in the hospitality industry has primarily evolved as a response to the increasing complexity of managerial decision-making. The dominance of AI-DSS applications in operational and tactical decisions—such as demand forecasting, dynamic pricing, and workforce scheduling—reflects the industry's need to manage demand uncertainty, service perishability, and resource constraints in a more systematic manner. These results suggest that AI-DSS function as mechanisms for uncertainty reduction in a highly volatile service environment, particularly during the post-pandemic recovery phase of the hospitality sector.

From a managerial perspective, the findings highlight that AI-DSS have not yet been fully leveraged to support long-term strategic decision-making. The concentration of existing studies on operational and short-term performance outcomes indicates that AI adoption in hospitality management remains largely pragmatic and efficiency-driven. While such an orientation is understandable given the immediate pressures faced by hospitality organizations, it also reveals an opportunity to expand the role of AI-DSS into strategic domains, such as long-term capacity planning, sustainability management, and business model innovation.

Extending AI-DSS beyond operational optimization could enhance their contribution to organizational resilience and long-term competitiveness.

The analysis of AI techniques used within DSS further demonstrates that machine learning and predictive analytics dominate due to their ability to extract patterns from historical data and generate forward-looking insights. At the same time, the continued use of rule-based systems in certain contexts indicates that not all managerial decisions require complex or fully adaptive AI solutions. Instead, the coexistence of data-driven and rule-based approaches reflects the need for balance between analytical flexibility and adherence to organizational policies or operational standards. This combination suggests that AI-DSS in hospitality are developed in a context-sensitive manner, tailored to the characteristics and risk profiles of specific decision types.

The identified benefits of AI-DSS—namely improved decision accuracy, enhanced operational efficiency, and better service quality—underscore their potential value for hospitality management. However, the discussion also reveals that these benefits are not realized automatically through technology adoption alone. The effectiveness of AI-DSS is strongly influenced by non-technical factors, including data governance practices, managerial trust in system outputs, and organizational readiness to integrate AI into existing decision-making processes. This finding reinforces the view that AI-DSS should be conceptualized as socio-technical systems, where technology, human judgment, and organizational context interact to shape decision outcomes.

The challenges associated with AI-DSS adoption further support this socio-technical perspective. Issues related to data quality, system transparency, and human competencies indicate that technological sophistication alone is insufficient to ensure effective decision support. Managers' ability to interpret AI-generated recommendations and align them with organizational objectives remains a critical determinant of successful implementation. Consequently, hospitality organizations need to complement technological investments with managerial training, change management initiatives, and clear governance frameworks to foster trust and effective system use.

From a managerial and policy standpoint, these findings imply that hospitality organizations should adopt a holistic approach to AI-DSS implementation. Rather than viewing AI-DSS solely as tools for automation or efficiency enhancement, organizations should integrate them into broader decision-making frameworks that emphasize accountability, transparency, and human oversight. By doing so, AI-DSS can serve as strategic enablers that support informed, adaptive, and responsible managerial decision-making in the hospitality industry. Overall, while AI-based DSS demonstrate substantial potential to enhance managerial decision-making, their current utilization remains selective and context-dependent. Expanding their application to strategic decision domains and strengthening organizational readiness may enable hospitality organizations to maximize the long-term value of AI-driven decision support.

5. Conclusion

Based on the results of the Systematic Literature Review of 32 selected studies, this research concludes that Artificial Intelligence–based Decision Support Systems (AI-DSS) play an increasingly important role in supporting managerial decision-

making within the hospitality industry, particularly at the operational and tactical levels. AI-DSS are most frequently applied in demand and occupancy forecasting, dynamic pricing and revenue management, workforce scheduling, and service quality management. Machine learning and predictive analytics emerge as the dominant AI techniques due to their capability to process historical data and generate predictive decision recommendations. Despite their demonstrated benefits in improving decision accuracy, operational efficiency, and service quality, the implementation of AI-DSS continues to face challenges related to data quality, system transparency, and organizational readiness.

This study contributes theoretically by providing a structured synthesis of the existing literature on the role of AI-DSS in hospitality managerial decision-making, thereby enriching research on decision support systems and data-driven management. From a practical perspective, the findings offer insights for managers and policymakers regarding both the potential and limitations of AI-DSS as decision-support tools, emphasizing the importance of a socio-technical approach to implementation. However, this review does not differentiate in detail between hospitality sub-sectors. Future research is therefore encouraged to explore AI-DSS applications in more specific hospitality contexts, as well as to examine their role in supporting strategic and long-term managerial decision-making through empirical and theoretical approaches.

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