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AI-Driven MIS Evolution: A Review on Optimizing Operational Efficiency, Consumer Engagement, and Socio-Economic Sustainability

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Abstract: Artificial Intelligence (AI) has revolutionized the role of Management Information Systems (MIS) by bringing in a new era of intelligent, predictive, and automated decision-making support to help organizations make more informed choices. This review explores how MIS has been evolving to become more AI-powered and how this development is helping to streamline business operations, enhance customer interactions, and drive positive social and economic outcomes in various industries. It considers the evolution of MIS, the incorporation of AI technologies like machine learning, deep learning, natural language processing, and predictive analytics, and the transformation of enterprise decision-making. It also discusses the architecture of AI-driven MIS, optimization dimensions, methods to evaluate its performance, strategies for implementing it, its practical applications, and the governance requirements. The review points out the benefits of AI in ERP, CRM, DSS, and business intelligence systems, such as better process automation, resource management, customer personalization, and organizational responsiveness. AI-powered information systems are currently playing a significant role in various sectors such as manufacturing, healthcare, finance, government, retail, and smart city management, all of which rely on the power of AI to aid in the decision-making process and operational efficiency. The study further explores critical issues that arise with the use of AI, such as privacy, cybersecurity, explainability, adapting the workforce, ethical governance, and sustainability. In the broader context, AI-driven MIS is a paradigm shift that combines intelligent technologies with enterprise information systems to enhance organizational effectiveness, foster customer relations, and drive long-term socio-economic sustainability.

Keywords: Artificial Intelligence, Management Information Systems, Decision Support Systems, Operational Efficiency, Socio-Economic Sustainability.



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1. Introduction

Management information systems (MIS) have become intelligent, AI-powered systems, making significant strides beyond conventional information processing systems to drive strategic decision-making, operational excellence, and sustainable organizational growth over the years. Artificial Intelligence (AI) technologies, such as machine learning, NLP, computer vision and advanced analytics, have taken MIS beyond its data storage and reporting role [1]. With the power of modern AI, MIS can automate repetitive tasks, process vast amounts of structured and unstructured data, produce predictive insights and assist in real-time decision-making throughout

enterprise operations. The progression of MIS is all related to the growing demand of organizations to manage both people, processes and technology in a dynamic business world. MIS was initially designed in the past to help managers in obtaining information in time and in an accurate manner, and thus primarily facilitated administrative functions like accounting, finance, inventory control and human resource management [2]. Since organizations are becoming increasingly data-driven, MIS is now expanding to include decision support systems, executive information systems, data warehousing and online analytical processing systems, enabling managers to conduct more complex analysis and make better strategic choices. With the advent of cloud computing, big data, and digital transformation, MIS has evolved to become a comprehensive enterprise platform [3]. Enterprise Resource Planning (ERP) integrated information across the organization's departments and Customer Relationship Management (CRM) systems focused on the customer information and interactions during the customer lifecycle. The seamless integration of ERP, CRM, and other enterprise applications resulted in a streamlined information landscape, enhancing transparency, collaboration, and operational efficiency [4]. Organizations are even more responsive and decision making is faster due to real-time data access, cloud-based infrastructure and mobile technology. AI has emerged as the game-changer for the next generation in MIS. AI-driven MIS can integrate predictive analytics, intelligent automation, recommendation engines, and chatbots to streamline business processes, enhance personalization, and boost efficiency [5]. By using advanced analytics, organizations can gain insights into customer preferences, predict demand, optimize resource allocations, detect anomalies, and streamline repetitive business processes. Additionally, AI can improve customer relationship management by offering personalized marketing strategies, intelligent lead nurturing, customer segmentation, and proactive service, which ultimately leads to better customer satisfaction and sustained profitability [6]. Modern MIS architectures are becoming increasingly integrated with cloud platforms, real-time data processing capabilities, feature stores, data lakes and AI-driven decision support solutions, enabling scalable and intelligent enterprise solutions. Such technologies allow organisations to manage risk, innovation, and performance, and help in evidence-based decision making in the public and private sectors [7]. The ongoing enhancement of evaluation metrics, usability assessment, recommender systems, and performance measurement further showcases the continued development of AI-powered MIS.

2. Materials and Methods

This study employed a structured literature review design to examine the evolution of AI-driven Management Information Systems (MIS) and their role in optimizing operational efficiency, consumer engagement, and socio-economic sustainability. The review followed established principles of systematic and narrative synthesis, in which relevant conceptual and empirical studies were identified, screened, interpreted, and organized thematically to build an integrated understanding of AI-enabled MIS development [30], [31], [32].

The literature search focused on studies discussing artificial intelligence, management information systems, decision support systems, enterprise resource planning, customer relationship management, business intelligence, predictive analytics, intelligent automation, and sustainability. Sources consisted of peer-reviewed journal articles, books, review papers, and recent academic publications relevant to AI applications in organizational information systems. Priority was given to publications that addressed AI integration in ERP, CRM, DSS, analytics platforms, governance, operational performance, customer engagement, and socio-economic sustainability.

The inclusion criteria consisted of studies that directly examined AI-enabled information systems, MIS evolution, enterprise decision support, performance optimization, implementation practices, and sector-based applications. Studies were excluded when they did not focus on management information systems, lacked relevance to AI-driven organizational decision-making, or did not contribute to the review themes. After selection, the literature was organized according to major analytical categories, namely the scope of AI-driven MIS, optimization dimensions,

performance evaluation, implementation practices, challenges, risk considerations, and future research opportunities.

The extracted information was synthesized using thematic analysis. Key findings were compared across sectors such as manufacturing, healthcare, finance, retail, government, and smart city management to identify recurring patterns, benefits, implementation barriers, and governance requirements. This synthesis enabled the study to develop a comprehensive review of how AI-driven MIS supports operational efficiency, consumer engagement, organizational responsiveness, and long-term socio-economic sustainability.

3. Results

3.1 Scope of AI Driven Management Information Systems

Artificial Intelligence Driven Management Information Systems (AI Driven MIS) is the application of Artificial Intelligence (AI) technologies to the existing Management Information Systems (MIS) for enhancing the management of information, decision support, operational efficiency and organizational performance [8]. Unlike traditional MIS, which is used for gathering, processing, storing and disseminating information for managerial decision making, AI can be used for intelligent data analysis, predictive modeling, automation, and adaptive learning. Technologies like machine learning, deep learning, natural language processing, computer vision and intelligent automation can help businesses turn massive amounts of information into actionable insights and facilitate quicker, more accurate and data-driven decision making [9]. AI Driven MIS is not limited to information management, but rather is a holistic ecosystem that unites people, processes, technologies, and smart algorithms. These systems can help to store, analyse, share, protect and govern digital information, as well as automate repetitive tasks and inform operational and strategic decisions. AI-powered MIS is being used in a variety of business sectors such as finance, marketing, human resources, supply chain management, production, healthcare, education, and government [10]. It also features modern applications such as AI-enabled computing environments, which include dedicated AI hardware and optimized software for running AI workloads, contributing to increased productivity, security, and organizational agility. AI Driven MIS is an indication of the evolution of Management Information Systems from simple transaction processing and data collecting systems to sophisticated decision support systems, Executive Information Systems, Enterprise Analytics and Intelligent Business Platforms [11]. From predictive analytics to AI-driven recommendation engines, from conversational interfaces to automated workflows, these are the clever tools that power contemporary systems to streamline business operations, boost customer interactions, maximize resource usage, and drive company competitiveness. The most important goals are to work more efficiently, to cut costs, to maximize return on investment, to provide better service, to enable sustainable growth of the organization. Governance and security are key elements of the AI Driven MIS architecture [12]. To implement effectively, robust data governance policies, cyber security measures, access control mechanisms, regulatory compliance, transparency of the models, continuous monitoring of performance and ethical AI practices are essential. This encompasses data quality, algorithmic accountability, privacy protection and operational resilience throughout the AI lifecycle [13]. By continuously monitoring data pipelines, model performance, system reliability, and infrastructure efficiency, organizations can ensure the trustworthiness and explainability of AI-driven decision support systems, while also ensuring sustainability. AI Driven MIS is an intelligent enterprise ecosystem that integrates cutting-edge analytics, scalable infrastructure, secure information management, and automated decision-making capabilities into a single platform [14]. These systems can significantly boost operational efficiency, customer satisfaction, strategic decision-making, and long-term economic and social value, thanks to their ability to leverage AI throughout the information management lifecycle.

3.2 Optimization Dimensions of AI Driven Management Information Systems

Optimization in AI Driven Management Information Systems is a multi-dimensional process involving operational performance, intelligent decision making, data management and sustainability, all aimed at maximizing the value creation of the organization [15]. Modern optimization techniques take into account the interplay between productivity, quality, customer satisfaction, resource utilization, financial performance and environmental responsibility, rather than concentrating on one only measure. By leveraging AI, companies can process vast amounts of information, uncover inefficiencies, automate repetitive tasks, and continuously optimize their processes with real-time data and predictive insights [16]. One of the key things of optimization is its measurement with integrated key performance indicators. Measures of productivity, availability, quality, customer responsiveness and financial results are becoming common yardsticks for organisations to gauge their success. Equipment Effectiveness (OEE) is an important metric in manufacturing and production systems because it is a single indicator of productivity that encompasses the availability of the equipment, the performance of the equipment, and the quality of the product [17]. OEE should be used to comprehend business performance, however, this is only part of the picture, and interpreting OEE alongside other organizational indicators, including throughput, energy use, operational costs, customer satisfaction and profitability, is a key component to effective optimization. Existing enterprise systems are complemented by AI to aid in optimization, not replace them. AI algorithms connect with ERP, CRM, MES, DSS, and industrial control platforms to use operational data to make predictions, recommendations, and decisions about the best way to optimize operations (Table 1) [18]. This multi-layered integration enables organisations to both make more efficient use of the processes and eliminate repetitive tasks, allocate resources more optimally, and make decisions in real time without having to replace their technological infrastructure entirely. Joined by AI powered analytics continuously monitoring production processes, equipment performance, inventory levels, workforce activities and customer demand, AI can pinpoint bottlenecks and inefficiencies [19]. Predictive maintenance, intelligent scheduling, demand forecasting, inventory optimization and automated quality control increase capacity utilization, minimize energy consumption, reduce down time, waste and unnecessary energy use (Figure 1). A unified performance dashboard gives managers real-time visibility into the organization's performance, allowing them to respond quickly to operational issues and shifts in business conditions [20]. Optimization in AI Driven Management Information Systems is a comprehensive and integrated approach that encompasses intelligent data analysis, enterprise system integration, data infrastructure scalability, ongoing performance monitoring, and responsible governance of AI. By managing these dimensions in an effective and coordinated manner, organisations can advance towards operational efficiency, bolster strategic decision making, create better customer experiences, optimise resource usage and bring about long term economic, environmental and social sustainability.

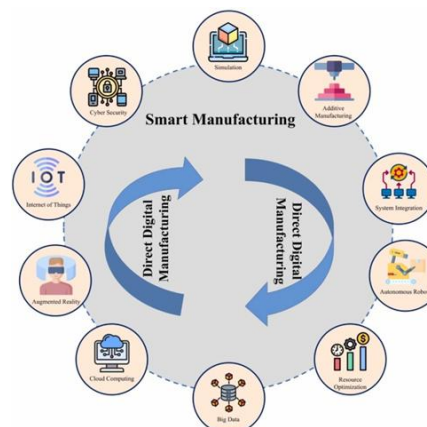


Figure 1. AI-driven optimization techniques for smart sustainable manufacturing [52].

Table 1. Major Components and Functions of AI-Driven Management Information Systems.

Component	Primary Function	AI Technologies Applied	Organizational Benefits	References
Management Information System (MIS)	Collects, processes, stores, and distributes organizational information	Data analytics, intelligent reporting	Improved managerial decision-making and information accessibility	[1], [2], [8]
Enterprise Resource Planning (ERP)	Integrates enterprise-wide operational data	Machine learning, predictive analytics	Resource optimization, process automation, operational efficiency	[4], [18], [31]
Customer Relationship Management (CRM)	Manages customer interactions and lifecycle	Recommendation systems, NLP, customer analytics	Customer personalization, satisfaction, and retention	[6], [32]
Decision Support System (DSS)	Supports strategic and operational decisions	Predictive modeling, AI optimization	Faster and more accurate decision making	[5], [27]
AI Analytics Platform	Processes structured and unstructured organizational data	Machine learning, deep learning, NLP	Forecasting, anomaly detection, intelligent automation	[9], [16], [41]

3.3 Performance Evaluation, MIS Evolution, and Implementation Practices

Comprehensive performance evaluation, continuous optimization, and structured implementation methodologies are all important for successful implementation of Artificial Intelligence Driven Management Information Systems (AI Driven MIS) [21]. The performance indicators for modern AI powered MIS include technical, operational, business and user centred metrics, reflecting system effectiveness, decision quality, operational efficiency, customer engagement and organizational value. AI evaluation frameworks guarantee the accuracy of predictions and recommendations, as well as strategic goals, sustainability, and long-term organizational performance. The first step in performance evaluation is to measure the effectiveness and usability of the system [22]. The effectiveness of an AI-enabled information system is judged by the extent to which users can do what they set out to do when interacting with the AI. Some of these common metrics are Tasks Completed, Accuracy, Errors, Response Time, and User Satisfaction. These measure user problems, inefficiency in workflow and possibilities for improvement of the system [23]. When the task completion rate is high and the error frequency is low, it is an indication that the information system is effective for organizational goals and user needs. Business oriented evaluation is not only based on performance but also on results of the organization (Figure 2) [24]. The most common metrics used to assess AI Driven MIS are operational efficiency, productivity, customer retention, revenue growth, cost reduction, resource utilization, employee performance, and decision quality. Other metrics used to gauge the value of an organization include user engagement via measures like system usage, frequency of interaction with the service, user satisfaction, and service responsiveness [25]. Together, these indicators guide organisations to assess the value and effectiveness of their AI investments in relation to their strategic goals, and their impact on economic, environmental and social sustainability. The development of AI Driven MIS is a staged optimization process, which is executed gradually to enhance the level of intelligence and automation of the organization [26]. The first phase is about building a solid data infrastructure through the connectivity of enterprise databases, operational systems, cloud platforms, sensors and

real time monitoring technologies. Accurate and timely data is collected, preprocessed, subjected to quality assurance and is available in a visual form for decision makers to use for operational monitoring or analytical purposes. In the second stage, intelligent decision support is highlighted. AI models use past and current organizational data to detect trends, predict future events, notice anomalies, and suggest the best actions to take [27]. Interactive dashboards, benchmarking tools, predictive analytics and simulation models help managers test and consider alternative strategies while ensuring that they have human oversight on key decisions. During this advisory stage, organizations can test AI recommendations and ensure they are suitable and effective. In the final, the most intelligent automation and closed loop optimization phase is the last. Verified AI models are now increasingly used to automatically generate decisions which continuously evaluate the organizational performance and adapt processes based on pre-defined goals and limitations [28]. It is still important to have oversight to make decisions ethically and account for exceptions. These monitoring, anomaly detection, adaptive learning, and feedback abilities empower AI systems to enhance operational efficiency, cut down on waste, minimize downtime, optimize resource usage, and contribute to sustainable growth within an organization.

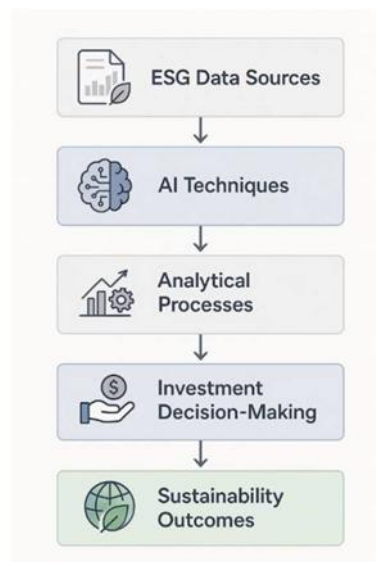


Figure 2. Sequential framework for AI-driven sustainable investing [53].

3.4 Challenges, and Risk Considerations of AI Driven Management Information Systems

Artificial Intelligence Driven Management Information Systems (AI Driven MIS) have revolutionized the way organizations handle information, optimize systems, and help them make strategic decisions in various sectors [29]. AI Driven MIS empowers organizations to boost productivity, foster customer engagement, strengthen resilience, and promote sustainable development by combining intelligent analytics, automation, and real-time data processing. From manufacturing, healthcare, finance, education, retail, government, logistics to smart city projects, these systems are making an impact on every facet of industry, enhancing the operational efficiency of the industry while facilitating data driven innovation [30]. In a business context, AI Driven MIS can be used to automate repetitive processes in the organization through Transaction Processing Systems, Enterprise Resource Planning systems, Customer Relationship Management systems, and Decision Support Systems. These enterprise-wide solutions streamline tasks like inventory management, payroll processing, procurement, financial reporting, production scheduling and order fulfillment [31]. These systems are enhanced by artificial intelligence features such as predictive analytics, intelligent forecasting, anomaly detection, process optimization, and decision support automation, which helps organizations to stay efficient, lower costs, and boost productivity.

One of the most impactful usage of AI Driven MIS is in CRM. AI can be leveraged to understand customer behavior, buying habits, age, and the nature of interactions, and make tailored product recommendations, marketing campaigns, customer service, and sales predictions (Table 2) [32]. AI-driven MIS is now widely being used in healthcare organizations to enhance clinical decision making, patient management, medical diagnostics, and healthcare management. Healthcare information systems, when equipped with intelligence, are able to efficiently process EHRs, medical images, laboratory test data, and patient history to help clinicians make diagnoses, predict diseases, plan treatments, and provide personalized care [33]. AI-driven virtual health assistants, telemedicine solutions and automated administrative systems further enhance the accessibility, efficiency and engagement of healthcare. AI Driven MIS can further help with data management and enterprise analytics by consolidating data across various sources in your organization into comprehensive decision support solutions. Data engineers, system analysts, business analysts, and information managers work together to design databases, develop analytical models, evaluate software solutions, and to implement enterprise applications to match technological capabilities to organizational objectives [34]. Cloud computing, big data platforms and integrated analytics can help companies turn big data into actionable business intelligence, empowering them to make both operational and strategic business decisions.

Table 2. Benefits, Challenges, and Future Directions of AI-Driven MIS.

Domain	Major Applications	Benefits	Major Challenges	References
Manufacturing	Predictive maintenance, production scheduling, quality control	Increased productivity and reduced downtime	Integration complexity and infrastructure costs	[17], [19], [49]
Healthcare	Clinical decision support, patient management, telemedicine	Improved diagnosis and personalized healthcare	Privacy, ethics, explainability	[33]
Finance	Fraud detection, credit assessment, investment analysis	Faster risk assessment and improved financial decisions	Data security and regulatory compliance	[50]
Retail and Marketing	Personalized recommendations, demand forecasting, CRM	Customer engagement and revenue growth	Consumer privacy and algorithmic bias	[32]
Government and Smart Cities	Digital governance, traffic management, public health surveillance	Efficient public services and resource allocation	Governance, transparency, cybersecurity	[30], [50]

3.5 Future Directions and Research Opportunities

Advancements in responsible governance, interdisciplinary collaboration, continuous organizational adaptation, and intelligent technologies will influence the future development of Artificial Intelligence Driven Management Information Systems (AI Driven MIS). Future studies should focus the development of intelligent information systems that are more transparent, adaptable, secure, human-centered, and are a help for sustainable economic and social development as AI starts to play an active role in enterprise decision making [35]. Another research focus is to

create a longitudinal and mixed-method study to explore the long-term implications of AI implementation on the organisational, economic, and workforce levels. Future research should be conducted in order to combine quantitative performance indicators with qualitative feedback from employees, managers, customers and policy makers to gain a deeper understanding of how AI impacts organizational structure, job roles, decision making processes, and employee well-being over time [36]. These will help inform the design of workforce planning, organizational change management, and lifelong learning plans. Additionally, there is a need to increase focus on sector specific applications of AI Driven MIS. Industries have distinct technology, operational, regulatory, and organizational challenges, and AI solutions adapted to the healthcare, manufacturing, finance, education, agriculture, transportation, government, and smart city sectors are essential [37]. Comparative analysis of the various sectors can be used to identify good practices, barriers to implementation and effective governance models that enhance organizational performance and meet industry-specific needs. With the advancement of AI technology, governance and regulatory studies will gain greater significance. Further research is needed to analyze and design all-encompassing governance structures that integrate legal compliance, ethical principles, cyber security, risk management, and organizational accountability in AI-driven information systems [38]. International cooperation between government, industry, researchers and regulators will help to develop harmonized standards to promote responsible innovation, and safeguard the interests of the organization and society. The future of AI Driven Management Information Systems is about creating intelligent, ethical, explainable, secure, and sustainable enterprise ecosystems that leverage advanced analytics, responsible governance, human-centric design, and continuous organizational learning [39]. AI Driven MIS will continually improve decision making, operational efficiency, customer engagement, organizational resilience, and long term socio economic sustainability in various sectors through continuous research, technological innovation and interdisciplinary collaboration.

4. Discussion

One of the most important developments in the modern organizational management is the evolution of Artificial Intelligence Driven Management Information Systems (AI Driven MIS). The Traditional Management Information Systems (MIS) are mainly meant to gather, process, store and distribute organizational information to support managerial decision making [40]. Although these systems had a major impact on the administrative efficiency in the workplace, they tended to be descriptive, offering historical reports and aiding with everyday work. AI has revolutionized this position, providing predictive analytics, intelligent automation, adaptive learning, and real-time decision support [41]. AI Driven MIS has thus moved from being merely a repository of data to a platform that serves as an active tool for organizational intelligence, enabling informed decision-making, optimizing operations, and ensuring sustainable business growth. It is also evident from the discussion that AI Driven MIS goes beyond mere organizational functions and is now applicable to various aspects of an organization. It is rather an integrated ecosystem of enterprise systems that allows you to connect ERP, CRM, SCM, Business Intelligence, MES and DDS in a single digital space [42]. This integration enhances data consistency, removes data silos and fosters collaboration across departments. Managers can thus get in-depth organizational information from a single dashboard for all operations, financial, customer and market data. This business-wide visibility improves coordination, increases response time, and builds business resilience in a more dynamic business landscape. Another key theme throughout this review was operational optimization [43]. By continuously monitoring business processes, AI Driven MIS identifies operational inefficiencies and suggests corrective measures, helping to prevent issues from spiraling out of control. Artificial Intelligence (AI) can help improve organizational performance while cutting down on operational costs and wastage, examples of this include predictive maintenance, demand forecasting, inventory optimization, production scheduling, fraud detection, and resource allocation. AI technologies don't

replace current Management Information Systems, instead adding to them by providing advanced analysis capabilities that boost productivity without necessitating enterprise-wide technology changes [44]. This gradual strategy will minimize the implementation expenses and make the transfer of implementation easier for organizations. The review also highlights that the role of data infrastructure in successful implementation of MIS using AI is a base. High-quality, well-structured, and up-to-date data platforms are essential for artificial intelligence systems to make accurate predictions and recommendations [45]. These technologies, including enterprise databases, cloud platforms, data warehouses, data lakes, feature stores and streaming technologies, build a scalable architecture that can power advanced analytics. As important is strong data engineering processes that deliver data quality, consistency, data governance, and data accessibility throughout an organization's units. Even the most advanced AI systems can generate misinformation and bias if they are not properly managed, impacting the decision-making process of the organization [46]. Another critical component of AI Driven MIS is its ability to measure performance. The results suggest that comprehensive assessment frameworks should be developed, which include technical, operational, financial and user centered indicators. The accuracy of the system is not enough to measure the value of the organization. However, effectiveness should also be evaluated using the criteria of usability, decision quality, customer engagement, operational efficiency, business performance and long term organizational impact [47]. Together, the quality of the recommendations, the accuracy of the predictions, the time it takes to respond, the satisfaction of the user, and business outcomes give a well-rounded view of system performance. Ongoing monitoring and assessment further allow organisations to retrain AI models, enhance the accuracy of their analysis, and adjust to changing organisational needs. The first step in implementing integrated data infrastructures is normally to create integrated data infrastructures, and the first step in introducing advisory analytics and predictive decision support is normally to introduce integrated data infrastructures [48]. Evolutionary approach brings technological innovations in line with organizational readiness and strategic priorities. AI Driven MIS's versatility is further highlighted by the wide variety of industrial applications. Intelligent information systems are used in manufacturing organizations for optimizing the production process, quality assurance and predictive maintenance [49]. AI is used by financial institutions to identify fraud, assess credit risk, and make investment decisions. AI Driven MIS is used by healthcare organizations for clinical diagnosis, patient management, personalized healthcare, and hospital administration. Retail stores enhance the experience of their customers by recommending their products, smart marketing, and forecasting the demand. AI Driven MIS are being adopted by public sector organizations more and more for digital governance, smart city management, public health surveillance, disaster response, and resource allocation [50]. The versatility of these applications highlights how AI Driven MIS has become a key technological tool essential for organizations' competitiveness and public service. In the future, AI Driven MIS will be even smarter, more self-serving, and more interdependent. New technologies like generative AI, digital twins, edge computing, blockchain, IoT devices, federated learning and explainable AI will continue to drive improved enterprise decision support and operational optimization [51]. The review has shown that AI Driven Management Information Systems are becoming a fully-fledged organizational intelligence solution that can revolutionise decision-making, operations, customer engagement, and socio economic sustainability. They rely on cutting-edge technologies, but also on the quality of the data, good governance, interdisciplinary cooperation, ethical duty and ongoing organizational learning. Companies that can successfully embed these technical, managerial and societal aspects will be better prepared to become long-term competitive, resilient, innovative and sustainable in the smart digital economy.

5. Conclusion

Artificial intelligence-driven management information systems have transformed traditional information management into intelligent, data-driven decision support ecosystems that improve

operational efficiency, customer engagement, and organizational sustainability. By integrating advanced analytics, automation, and real-time intelligence, AI-driven MIS enhances productivity, resource utilization, and strategic decision-making across diverse sectors. Despite significant opportunities, successful implementation requires high-quality data, ethical governance, transparency, and continuous workforce development. Future advancements in explainable AI, cloud computing, and integrated enterprise platforms will further strengthen organizational resilience and innovation. Responsible adoption of AI-driven MIS will be essential for achieving sustainable, efficient, and competitive organizations.

REFERENCES

- [1] L. D. Hollebeek, C. Menidjel, M. Sarstedt, J. Jansson, and S. Urbonavicius, "Engaging consumers through artificially intelligent technologies: Systematic review, conceptual model, and further research," *Psychol. Mark.*, vol. 41, pp. 880–898, 2024, doi: 10.1002/mar.21957.
- [2] T. Dogru *et al.*, "Generative artificial intelligence in the hospitality and tourism industry: Developing a framework for future research," *J. Hosp. Tour. Res.*, vol. 49, pp. 235–253, 2025, doi: 10.1177/10963480231188663.
- [3] N. M. Sang, "Bibliometric insights into the evolution of digital marketing trends," *Innov. Mark.*, vol. 20, pp. 1–14, 2024, doi: 10.21511/im.20(2).2024.01.
- [4] M. Sharfuddin and S. K. Papia, "Management Information Systems Driven Green Marketing Intelligence for Sustainable Consumer Engagement," *Journal of Primeasia*, vol. 4, no. 1, pp. 1–7, 2023, doi: 10.25163/primeasia.4110496.
- [5] M. Shaik, "Impact of artificial intelligence on marketing," *East Asian J. Multidiscip. Res.*, vol. 2, pp. 993–1004, 2023, doi: 10.55927/eajmr.v2i3.3112.
- [6] H. N. D. Şenyapar, "Artificial intelligence in marketing communication: A comprehensive exploration of the integration and impact of AI," *Tech. Soc. Sci. J.*, vol. 55, pp. 64–81, 2024, doi: 10.47577/tssj.v55i1.10651.
- [7] J. van Doorn *et al.*, "Customer engagement behavior: Theoretical foundations and research directions," *J. Serv. Res.*, vol. 13, pp. 253–266, 2010, doi: 10.1177/1094670510375599.
- [8] C. Braun, V. Batt, M. Bruhn, and K. Hadwich, "Differentiating customer engaging behavior by targeted benefits—An empirical study," *J. Consum. Mark.*, vol. 33, pp. 528–538, 2016, doi: 10.1108/JCM-02-2016-1711.
- [9] M. Sharfuddin and P. Choudhury, "Enhancing Data Reliability in Management Information Systems through Artificial Intelligence Driven Validation and Error Detection Models," *Journal of Ai ML DL*, vol. 1, no. 1, pp. 1–8, 2025, doi: 10.25163/ai.1110442.
- [10] K. Żymkowska, J. Perek-Białas, and G. Humenny, "The effect of product category on customer motivation for customer engagement behaviour," *Int. J. Consum. Stud.*, vol. 47, pp. 299–316, 2023, doi: 10.1111/ijcs.12837.
- [11] K. K. F. So, H. Kim, and C. King, "The thematic evolution of customer engagement research: A comparative systematic review and bibliometric analysis," *Int. J. Contemp. Hosp. Manag.*, vol. 33, pp. 3585–3609, 2021, doi: 10.1108/IJCHM-04-2021-0470.
- [12] S. Shawky, K. Kubacki, T. Dietrich, and S. Weaven, "A dynamic framework for managing customer engagement on social media," *J. Bus. Res.*, vol. 121, pp. 567–577, 2020, doi: 10.1016/j.jbusres.2020.03.030.
- [13] V. Wirtz *et al.*, "Managing brands and customer engagement in online brand communities," *J. Serv. Manag.*, vol. 24, pp. 223–244, 2013, doi: 10.1108/09564231311326978.
- [14] O. S. Itani, A.-N. Kassar, and S. M. C. Loureiro, "Value get, value give: The relationships among perceived value, relationship quality, customer engagement, and value consciousness," *Int. J. Hosp. Manag.*, vol. 80, pp. 78–90, 2019, doi: 10.1016/j.ijhm.2019.01.014.
- [15] K. Papia, M. Sharfuddin, and K. Begum, "Integrating Management Information Systems in Marketing: A Survey-Based Analysis of Consumer Engagement and Business Growth through Data

- Analytics," *Pathfinder of Research*, vol. 3, no. 1, pp. 60–72, 2022, doi: 10.69937/pf.por.3.1.79.
- [16] K. Żymkowska, *Customer Engagement in Theory and Practice. A Marketing Management Perspective*. Cham, Switzerland: Palgrave Macmillan, 2019, doi: 10.1007/978-3-030-11677-4.
- [17] C. M. Harmeling, J. W. Moffett, M. J. Arnold, and B. D. Carlson, "Toward a theory of customer engagement marketing," *J. Acad. Mark. Sci.*, vol. 45, pp. 312–335, 2017, doi: 10.1007/s11747-016-0509-2.
- [18] A. Alvarez-Milán, R. Felix, P. A. Rauschnabel, and C. Hinsch, "Strategic customer engagement marketing: A decision making framework," *J. Bus. Res.*, vol. 92, pp. 61–70, 2018, doi: 10.1016/j.jbusres.2018.07.017.
- [19] S. F. M. Beckers, J. van Doorn, and P. C. Verhoef, "Good, better, engaged? The effect of company-initiated customer engagement behavior on shareholder value," *J. Acad. Mark. Sci.*, vol. 46, pp. 366–383, 2018, doi: 10.1007/s11747-017-0539-4.
- [20] P. Choudhury and M. Sharfuddin, "Management Information Systems in Contemporary Business: Prospects, Strategic Advantages, and Future Challenges," *Business and Social Sciences*, vol. 1, no. 1, pp. 1–7, 2023, doi: 10.25163/business.1110509.
- [21] N. Kshetri, Y. K. Dwivedi, T. H. Davenport, and N. Panteli, "Generative artificial intelligence in marketing: Applications, opportunities, challenges, and research agenda," *Int. J. Inf. Manag.*, vol. 75, p. 102716, 2024, doi: 10.1016/j.jinfomgt.2023.102716.
- [22] K.-B. Ooi *et al.*, "The Potential of Generative Artificial Intelligence Across Disciplines: Perspectives and Future Directions," *J. Comput. Inf. Syst.*, vol. 65, pp. 76–107, 2025, doi: 10.1080/08874417.2023.2261010.
- [23] A. M. Kaplan and M. Haenlein, "Users of the world, unite! The challenges and opportunities of social media," *Bus. Horiz.*, vol. 53, pp. 59–68, 2010, doi: 10.1016/j.bushor.2009.09.003.
- [24] Z. Xiang and U. Gredel, "Role of social media in online travel information search," *Tour. Manag.*, vol. 31, pp. 179–188, 2010, doi: 10.1016/j.tourman.2009.02.016.
- [25] C. Gurau, "Integrated online marketing communication: Implementation and management," *J. Commun. Manag.*, vol. 12, pp. 169–184, 2008, doi: 10.1108/13632540810881974.
- [26] R. T. Watson, F. P. Leyland, P. Berthon, and G. Zinkhan, "U-commerce: Expanding the universe of marketing," *J. Acad. Mark. Sci.*, vol. 30, pp. 333–347, 2002, doi: 10.1177/009207002236909.
- [27] P. Choudhury and M. Sharfuddin, "Optimizing Resource Allocation and Operational Efficiency in Management Information Systems Using Predictive Machine Learning," *Journal of Ai ML DL*, vol. 1, no. 1, pp. 1–8, 2025, doi: 10.25163/ai.1110443.
- [28] J. N. Sheth and A. Sharma, "International e-marketing: Opportunities and issues," *Int. Mark. Rev.*, vol. 22, pp. 611–622, 2005, doi: 10.1108/02651330510630249.
- [29] J. H. Kiedmann, K. Hermkens, I. P. McCarthy, and B. S. Silvestre, "Social media? Get serious! Understanding the functional building blocks of social media," *Bus. Horiz.*, vol. 54, pp. 241–251, 2011, doi: 10.1016/j.bushor.2011.01.005.
- [30] M. Petticrew and H. Roberts, *Systematic Reviews in the Social Sciences: A Practical Guide*. Oxford, UK: Blackwell Publishing, 2006, doi: 10.1002/9780470754887.
- [31] D. Moher, A. Liberati, J. Tedlaff, D. G. Altman, and The PRISMA Group, "Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement," *PLoS Med.*, vol. 6, p. e1000097, 2009, doi: 10.1371/journal.pmed.1000097.
- [32] L. Zorzela *et al.*, "PRISMA harms checklist: Improving harms reporting in systematic reviews," *BMJ*, vol. 352, p. i157, 2016, doi: 10.1136/bmj.i157.
- [33] M. S. Rahman *et al.*, "The new wave of AI-powered luxury brands online shopping experience: The role of digital multisensory cues and customers' engagement," *J. Retail. Consum. Serv.*, vol. 72, p. 103273, 2023, doi: 10.1016/j.jretconser.2023.103273.
- [34] M. S. Md Sharfuddin, P. C. Proggo Choudhury, and A. I. H. Ahamed Ismail Hossain, *Data-Driven Management Information Systems Leveraging Artificial Intelligence for Sustainable Business Performance and Operational Efficiency*, vol. 3, no. 1, pp. 1–11, 2025.
- [35] V. S. Diwanji, J. Lee, and J. Cortese, "Deconstructing the role of artificial intelligence in programmatic

- advertising: At the intersection of automation and transparency," *J. Strateg. Mark.*, vol. 32, pp. 947–964, 2024, doi: 10.1080/0965254X.2022.2148269.
- [36] E. Moriuchi, "Okay, Google! An empirical study on voice assistants on consumer engagement and loyalty," *Psychol. Mark.*, vol. 36, pp. 489–501, 2019, doi: 10.1002/mar.21192.
- [37] R. Perez-Vega, V. Kaartemo, C. R. Lages, N. Borghei Razavi, and J. Männistö, "Reshaping the contexts of online customer engagement behavior via artificial intelligence: A conceptual framework," *J. Bus. Res.*, vol. 129, pp. 902–910, 2021, doi: 10.1016/j.jbusres.2020.11.002.
- [38] A. Capatina *et al.*, "Matching the future capabilities of an artificial intelligence-based software for social media marketing with potential users' expectations," *Technol. Forecast. Soc. Change*, vol. 151, p. 119794, 2020, doi: 10.1016/j.techfore.2019.119794.
- [39] P. Choudhury, M. Sharfuddin, K. M. Ahmed, and K. Begum, "Artificial Intelligence Driven Management Information Systems for Enhancing Social Equity, Economic Sustainability and Managing Costs and Challenges," *Research Sustainability*, vol. 1, no. 1, pp. 37–50, 2024, doi: 10.69937/pf.rs.1.1.62.
- [40] M. Rowlinson, C. Harvey, A. Kelly, H. Morris, and E. Todeva, "Accounting for research quality: Research audits and the journal rankings debate," *Crit. Perspect. Account.*, vol. 26, pp. 2–22, 2015, doi: 10.1016/j.cpa.2013.05.012.
- [41] R. M. Wahid and M. Gunarto, "Factors driving social media engagement on Instagram: Evidence from an emerging market," *J. Glob. Mark.*, vol. 35, pp. 169–191, 2022, doi: 10.1080/08911762.2021.1956665.
- [42] K. Chauhan and A. Pillai, "Role of content strategy in social media brand communities: A case of higher education institutes in India," *J. Prod. Brand. Manag.*, vol. 22, pp. 40–51, 2013, doi: 10.1108/10610421311298687.
- [43] M. Yang, Y. Ren, and G. Adomavicius, "Understanding user-generated content and customer engagement on Facebook business pages," *Inf. Syst. Res.*, vol. 30, pp. 839–855, 2019, doi: 10.1287/isre.2019.0834.
- [44] M. Sharfuddin, P. Choudhury, and K. M. Ahmed, "Integration of Universal Management Information Systems in the Extended Organization Solving Fundamental Challenges," *Research Sustainability*, vol. 1, no. 3, pp. 1–12, 2024, doi: 10.69937/pf.rs.1.3.84.
- [45] S. M. B. Mustafa *et al.*, "The mediating role of social media marketing effectiveness in the relationship between customer engagement and brand loyalty: A study of Amazon as a retail brand store," *Uncertain. Supply Chain. Manag.*, vol. 12, pp. 2137–2152, 2024, doi: 10.5267/j.uscm.2024.7.002.
- [46] M. Zhang, M. Hu, L. Guo, and W. Liu, "Utilization and effectiveness of social media message strategy: How B2B brands differ from B2C brands," *J. Bus. Res.*, vol. 120, pp. 184–194, 2020, doi: 10.1108/JBIM-06-2018-0190.
- [47] C. Prentice and M. Nguyen, "Engaging and retaining customers with AI and employee service," *J. Retail. Consum. Serv.*, vol. 56, p. 102186, 2020, doi: 10.1016/j.jretconser.2020.102186.
- [48] T. Teepapal, "AI-driven personalization: Unraveling consumer perceptions in social media engagement," *Comput. Hum. Behav.*, vol. 165, p. 108549, 2025, doi: 10.1016/j.chb.2024.108549.
- [49] L. Meng, J. Chen, M. Yang, and Y. Wang, "Effects of customer inoculation on artificial intelligence service failure," *Int. J. Contemp. Hosp. Manag.*, vol. 37, pp. 444–461, 2025, doi: 10.1108/IJCHM-01-2024-0140.
- [50] P. Choudhury and M. Sharfuddin, "Strategic Healthcare Service Optimization and Overcoming Obstacles through Management Information Systems," *Journal of Primeasia*, vol. 3, no. 1, pp. 1–8, 2022, doi: 10.25163/primeasia.3110508.
- [51] D. Yin, M. Li, and H. Qiu, "Do customers exhibit engagement behaviors in AI environments? The role of psychological benefits and technology readiness," *Tour. Manag.*, vol. 97, p. 104745, 2023, doi: 10.1016/j.tourman.2023.104745.
- [52] M. Tian, J. Yan, and X. Li, "Anthropomorphism of service-oriented AI and customers' propensity for value co-creation," *Mark. Intell. Plan.*, vol. 43, pp. 50–72, 2025, doi: 10.1108/MIP-08-2023-0388.
- [53] J. Ge and U. Gredel, "Impact of humour on firm-initiated social media conversations," *Inf. Technol.*

Tour., vol. 18, pp. 61–83, 2018, doi: 10.1007/s40558-017-0097-0.