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Management Information Systems in the Era of Artificial Intelligence and Cloud Computing: A Comprehensive Review of Their Purpose, Benefits, and Implementation Barriers

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Abstract

Objectives: Management Information Systems are very important for businesses today because they help people make better decisions by bringing together people, technology, and business processes in a way that works. This study looks at what Management Information Systems (MIS) are, how they have changed over time, and why they are important. It also talks about how MIS helps operations run more smoothly, how it helps with long-term planning, and how it helps managers make smart decisions. **Methods:** This research is founded on an analysis of the literature concerning Management Information Systems (MIS). Previous studies have shown that MIS is supposed to collect, process, store, and share information that helps managers make quick and smart decisions. MIS is very helpful because it helps the organisation work better together, be more productive, and do better overall. However, it can be less effective because of issues like high implementation costs, staff resistance, and the need for regular maintenance. **Findings:** This study investigates the proper design, adoption, and management of MIS are critical for modern organizations to benefit fully from the system. **Novelty:** literature from 2020 to 2025 has been analyzed for the transformation of traditional MIS into modern version in today organization.

Keywords: Management information system (MIS); Strategic planning; Enhanced productivity; Operational efficiency; Managerial decisions

1 Introduction

Management Information Systems (MIS) is an integrated arrangement of personnel, technology, and processes that facilitate organisational decision-making⁽¹⁾. MIS comprises of systems, hardware, procedures, and people working together to generate organisational information⁽²⁻⁸⁾. The development of MIS has moved them from simple data-recording tools to sophisticated, technology-driven platforms integrating artificial intelligence, cloud computing, big-data analytics, and real-time decision support. During the past ten years, especially from the year 2020 onwards organizations in all industries have embarked on rapid digital transformation^(9,10). This has ushered in a newer generation of MIS that are becoming increasingly intelligent, automated, and integrated. This addition has, in turn, dramatically influenced and improved organizational planning, resource allocation, risk assessment, and strategic decision-making. Primary focus of earlier research on management information systems (MIS) was with respect to traditional components of an MIS, such as the hardware, software, procedures, and the basic flow of information. Although these early research efforts established many of the classical principles of MIS, they do not address the dramatic changes in technology occurring after 2020. Changes resulting from new MIS, including artificial intelligence (AI) enhancements, cloud-based MIS integration, real-time analytic dashboards and ICT-related organizational restructuring, were not anticipated or addressed in earlier research reviews. In addition to being primarily descriptive, earlier literature reviews were concentrated within a specific discipline (for example, education or healthcare) with no cross-sector comparisons and inadequate updated evidence⁽¹¹⁾.

Recent advances in technology have created additional opportunities and challenges for organizations which were not addressed in earlier research reviews. Specifically, earlier research reviews do not include the integration of AI and machine learning in the MIS architecture, the growing dependence on remote and digital operations (in a post-pandemic environment), the rising potential for cybersecurity violations with the use of cloud-based MIS, the gap between developing and developed nations for skills and willingness to adopt MIS, and the unevenness of the implementation of MIS across developing and developed regions.

The emergence of these new challenges demonstrates a significant need for the literature surrounding MIS to produce an updated comprehensive review of the research produced between 2020 and 2025. The limited number of comparative sectors and the lack of analysis as to the influence of technology on MIS architecture, design, effectiveness, and outcome have restricted previous literature reviews. Therefore, the present study is necessary to:

Consolidate recent MIS advances, identify gaps created by new technological developments, compare findings across sectors, and provide an updated understanding that is informed by research of the barriers and opportunities to MIS implementation.

This study makes a timely contribution to the field of management information systems (MIS) research and practice by bringing together results from the last five years. Recent studies indicate that management information systems have evolved beyond the functionalities of basic assistive tools. They are now very important for making sure that the right information is used, helping things run more smoothly, and helping with strategic decision-making in many different fields. From 2020 to 2025, it will be easier to keep an eye on things, make predictions, and work with other people in an organisation if you use more information and communication technology (ICT)-enabled management information systems (MIS). Because cloud-based management information systems are now much more scalable and accessible, businesses can now work from almost anywhere. This flexibility was very helpful during and after the COVID-19 pandemic, when it was very important to keep the business running. Research indicates that cloud-based management information systems can help both public and private companies save money, make decisions faster, and protect their data. AI-driven management information systems (MIS) have made data processing and prediction faster and more accurate. This is especially true in fields like education, healthcare, and finance. An increasing number of studies are also showing that using management information systems (MIS) has benefits for the whole organisation. MIS speed up administrative work by making it easier for information to flow and cutting down on the number of times people must do the same thing by hand. Management information systems (MIS) based on information and communications technology (ICT) help schools manage students, plan lessons, keep track of performance, and make budgets more effectively. This leads to better and more efficient overall school administration. This study contributes to the field of management information systems (MIS) research and practice by compiling data from the previous five years. Recent studies have shown that management information systems have grown beyond being just simple helping tools. They are very important right now because they help make sure that the right information is used, that things go more smoothly, and that strategic decision-making is easier in a variety of fields. Management information systems (MIS) that use information and communication technology (ICT) will be used more often between 2020 and 2025. This will make it much easier to keep an eye on things, make plans, and work with other people in an organisation. Cloud-based management information systems are much more scalable and accessible than traditional systems, which means that businesses can now work from almost anywhere. It was very important to keep the business going during the COVID-19 outbreak, and this flexibility was very helpful both during and

after the epidemic. Recent studies show that cloud-based management information systems can help businesses, both public and private, save money, make decisions faster, and keep their data safe without losing its integrity.

In business environments, MIS has been identified to facilitate competitive advantage through formulating data-driven strategies. On the other hand, the literature also discloses some persistent barriers that affect MIS effectiveness, including high implementation and maintenance costs, technical problems in the integration of a system, resistance of the staff to digital systems, deficiencies in training, cybersecurity risks, and unreliable data quality. According to Gupta & Kumar and Stoykova generally, organizations of developing countries face infrastructural limitations and a shortage of MIS specialists.

Despite this developing body of work, recent literature often calls for more comparative, cross-sector analyses and stresses that the rapid introduction of AI, machine learning, and remote technologies requires updated frameworks for evaluation. Hence, literature supports the need for a modern integrated review that captures the evolving role of MIS in the post-2020 technological landscape.

In⁽¹²⁾, examined the rapid digital transition in emerging economies during the COVID-19 pandemic using a combination of quantitative and qualitative methods. Focusing on Ukraine, the study shows that digitalisation became a top priority across multiple sectors, with substantial growth projected between 2021 and 2025. At the same time, the authors highlighted the ongoing barriers to digital transformation, including complex regulations, limited resources, and gaps in digital skills within the workforce. The findings offer practical insights for managers in the real economy and contribute to the academic discussion on digital transformation in times of crisis.

2 Review Methodology

2.1 Databases Consulted

The following academic and professional databases were systematically searched to capture recent MIS developments between 2020-2025: Scopus, Web of Science, Google Scholar, IEEE Xplore, ScienceDirect, and SpringerLink. These databases have been considered because of their wide coverage of MIS, cloud computing, AI in organizations, digital transformation, and ICT/IT-governance research.

2.2 Inclusion and Exclusion Criteria

Inclusion Criteria:

- Peer-reviewed journal articles and high-quality conference proceedings published between January 2020 and December 2025.
- Studies on Management Information Systems, or systems incorporating cloud computing, AI/machine learning, big-data analytics, real-time data, ICT-driven organizational workflows, or digital transformation.
- Specifically, this will entail empirical studies, conceptual frameworks, and systematic reviews that discuss implementation, effectiveness, outcomes, challenges, or adoption factors of modern MIS.
- Quantitative or qualitative studies with transparent methodology and documented findings.

Exclusion Criteria:

- Publications before 2020, unless cited as providing historic or foundational context.
- Sources that are non-peer in nature include opinion editorials that are theoretically rigorous.
- Studies that mainly focus on low level infrastructure, hardware and narrow technical aspects that are not directly linked to MIS.

2.3 Conceptual Parameters for Synthesis

According to previous literature, the linkage between them is as follows in their own parameters in Table 1.

3 Overview

Table 2 shows the overview of the related study findings.

Table 1. Parameters

Parameter	Purpose / Rationale
Technology Integration	Identify how advances (AI, cloud, big-data, real-time analytics) shape modern MIS design and capabilities ⁽¹³⁾
Sector Coverage	Examine adoption and outcomes across different sectors (e.g., education, healthcare, public administration).
Organizational Outcomes	Assess effects on efficiency, cost, decision-making, resource allocation, competitive advantage.
Barriers & Challenges	Highlight obstacles such as cost, cybersecurity, skills gap, resistance to change, and infrastructure limitations.
Emerging Trends & Future Directions	Identify areas under-explored or promising for future research (e.g., AI-MIS governance, cyber-resilience, cross-sector comparisons).

Table 2. Study findings overview

Ref-er-ence	Key finding/contribution	Tech focus
(14)	Reported that AI-enhanced MIS implementations across 150 organizations yielded $\approx 35\%$ increase in process efficiency and $\approx 42\%$ improvement in predictive analytics accuracy; cost reductions and improved decision-making were also documented	MIS + AI
(15)	Found that cloud-based MIS adoption increased operational efficiency by $\approx 40\%$, reduced operational costs by $\approx 35\%$, and increased competitive advantage by $\approx 25\%$; also noted that there was improved scalability and greater user satisfaction	Cloud MIS
(16)	The critical factors influencing the adoption of cloud, such as technology readiness, top management support, relative advantage, compatibility, and security, provide an overall framework for understanding cloud/MIS adoption	Cloud computing
(17)	Highlighted how AI and BI integrated within MIS improve organizational risk management through the enhancement of predictive risk detection, decision speed, and response capabilities	AI+BI in MIS and ORM

3.1 Common Benefits and Organizational Outcomes

Recent studies show that modern Management Information Systems, especially those that use cloud platforms and artificial intelligence to make them better, are good for businesses. They help teams work faster, make better choices, and respond more quickly to changes in the business world.

3.1.1. *More efficiency and lower costs.*

Cloud-based MIS helps businesses make better use of their resources by using shared infrastructure, allowing remote access, and cutting down on the number of unnecessary hardware systems. This method cuts down on both the initial investment and the ongoing operating costs by a large amount. It also makes the system more reliable and faster. Literature shows that these efficiency gains are especially important for small and medium-sized businesses that can't afford to keep traditional on-premises systems⁽¹⁸⁾.

3.1.2. *Better Ability to Make Decisions and Predict Things.*

By integrating AI into Management Information Systems, businesses can analyze large volumes of data in real time. Machine learning and predictive analytics help organizations plan more effectively, anticipate risks, and make stronger strategic decisions. Recent research shows that AI-enabled MIS are reshaping decision-making by shifting it from reacting to past events to acting on data-driven insights and forecasts. As a result, organizations can respond faster and adapt more easily to rapidly changing business conditions⁽¹⁹⁾.

3.1.3. *Flexibility and Scalability in the Organisation.*

Cloud and hybrid MIS architectures let businesses change their computing resources as needed without having to pay a lot of money up front. This flexibility allows people to work from home or in a hybrid setting, which became important after the epidemic during the digital revolution. Recent studies show that this kind of scalability helps businesses stay open and encourages growth through new ideas⁽²⁰⁾.

3.1.4. *Continuity of Operations and an Edge Over Competitors.*

Modern MIS have made organisations more agile and better equipped to respond to changing market conditions. With the integration of AI and cloud technologies, MIS now provide real-time insights, automate routine processes, and support faster, more informed strategic decisions. This shift enables organisations to rely on data-driven approaches to sustain long-term competitive advantage. Studies published between 2020 and 2024 consistently show that higher levels of MIS maturity are linked to stronger organisational performance and improved competitiveness⁽²¹⁾.

3.2 Persistent Challenges and Barriers to MIS Adoption

Recent studies indicate a variety of enduring challenges that hinder the efficient implementation of AI- and cloud-based Management Information Systems, notwithstanding the evident advantages these technologies provide.

Security, privacy, and data governance concerns: Organisations are more vulnerable to cyber threats, privacy risks, and regulatory problems because they are using more cloud platforms and AI systems. Since 2020, studies have shown that businesses have a hard time keeping sensitive information safe and following the law without good data governance. This is especially true when AI systems automatically process and analyse large datasets. Concerns about security and privacy are still some of the most common reasons people don't use cloud and AI^(22,23).

Compatibility with Old Systems and Technical Integration: It is very difficult from a technical point of view to combine AI-enabled and cloud-based MIS with older systems. Problems like bad data quality, system architectures that don't work together, and limited interoperability often slow down implementation and make the system less useful. Recent empirical studies indicate that insufficient change management and ineffective integration strategies are significant factors contributing to the failure of Management Information Systems (MIS) projects⁽²⁴⁾.

Problems with People and Organisations: People and organisations are still the most important factors in how well MIS is adopted. A lack of skilled workers, a reluctance to change, a lack of training, and a lack of support from top management often make it hard to implement a plan successfully. Research conducted from 2020 to 2023 demonstrates that technological readiness alone is inadequate without concurrent investments in human capital and leadership commitment⁽²⁵⁾.

3.3 New Directions for the Future and Emerging

Based on the gaps found in the literature and the new trends, there seem to be a few promising paths for future work and MIS development:

AI→Governed MIS with Embedded Cyber→Defence: Frameworks that combine AI, big data analytics, and cloud infrastructure with adaptive governance to improve cybersecurity and resilience. For instance, research has proposed meta-synthesis models in which AI-MIS oversees threat detection and automated response.

Cross-Sector Comparative Studies: These studies look at how Management Information Systems are used in a variety of fields, including education, healthcare, small and medium-sized businesses, and large companies. The research compares these settings to show how MIS is used differently in each one, how well it works in each one, and what problems organisations have when they set up and run these systems.

Ethics in MIS Design: If we want AI and MIS to grow in a way that is good for society, we need to think about more than just technology. This means paying for training for employees, dealing with users who don't want to change, and making sure there are clear rules for how to protect, control, and use data in an ethical way.

Architectures for MIS that use both microservices and the cloud: Cloud platforms, AI, and analytics tools are examples of modern MIS tools that are more flexible, easier to use, and easier to add to existing systems because they use microservices and other modular and scalable designs.

Many empirical studies examine the impact of MIS on organisational performance, risk, workforce resilience, and strategic outcomes over time. These studies are known as longitudinal and outcome-oriented research.

4 Conclusion

4.1 Novelty and Contribution of This Review

This study examines research published between 2020 and 2025 to show how Management Information Systems (MIS) have evolved from basic data-recording tools into platforms that leverage artificial intelligence and cloud technologies. By analysing evidence across different sectors, technologies, and organisational settings, it provides a comprehensive view of how MIS have developed over time, their key strengths and limitations, and the direction they are likely to take in the future.

What sets this review apart is its focus on real challenges organisations are currently facing, rather than simply describing systems or concentrating on a single dimension. It addresses critical issues such as security, system integration, and the growing need for flexibility in modern MIS environments.

4.2 Limitations

This study focuses only on peer-reviewed research published in English. As a result, it may not capture relevant work published in other languages or in industry white papers. In addition, direct quantitative comparisons across studies are difficult because researchers rely on different methodologies, settings, and performance measures. Keeping the review fully up to date is also challenging, as areas such as artificial intelligence, cloud technologies, and regulatory frameworks evolve rapidly, particularly beyond 2025.

4.3 Future Research Directions

Future research ought to juxtapose countries and industries to enhance the comprehension of how contextual factors affect the adoption and efficacy of Management Information Systems. The level of economic development in a country and the size of an organisation are two very important things that need to be looked at more closely. Clearer comparisons between developing and developed areas, as well as between small and medium-sized businesses and big companies, would build on what has already been done and give us more useful and important information.

It is also important to consider AI-based and cybersecurity-aware MIS frameworks that strengthen system stability, protect data privacy, and ensure regulatory compliance while enabling advanced analytics. Beyond the technical dimension, future studies should place greater emphasis on the human side of MIS adoption. User training, organizational transformation, governance, and technology acceptance are critical for encouraging adoption and for addressing the ongoing skills gaps that continue to emerge.

Lastly, future research should investigate hybrid and microservice-oriented MIS designs that allow for flexibility, growth, and long-term viability. Longitudinal studies would be especially useful for showing how improvements in MIS have long-term effects on an organization's performance, strategic decision-making, and digital maturity.

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