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Systematic Study: Data and Information Management in Management Information Systems in the Digital Era

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ABSTRACT
The development of information technology in the digital era has revolutionized the way organizations manage data and information. Management Information Systems (MIS) are a strategic solution for improving the efficiency, accuracy, and security of information management through the integration of modern technologies such as cloud computing, big data analytics, artificial intelligence (AI), and the Internet of Things (IoT). This study uses a Systematic Literature Review (SLR) method on six selected articles to identify the benefits, challenges, and strategies for implementing MIS. The study results show that a well-managed MIS can provide real-time, relevant, and error-free information, thus supporting strategic decision-making. Key obstacles include the digital divide, cybersecurity issues, low digital literacy, and infrastructure limitations. This study recommends a sustainable strategy that includes improving digital literacy, technological updates, data protection policies, and human resource training. With proper management, MIS has the potential to create an adaptive, secure, and highly competitive digital ecosystem.

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INTRODUCTION

The rapid advancement of information technology in the 21st century has brought about fundamental changes in the way humans manage, process, and utilize information. The digital era is characterized by the integration of computer technology, internet networks, and smart devices, enabling rapid and widespread data access, storage, and distribution. One of the main implications of this progress is the transformation of information systems, which now play a vital role in supporting

Strategic decision-making in various fields, including government, business, education, and public services. Today, information systems are no longer simply used for simple data processing, but have evolved into integrated platforms that integrate the latest technologies, such as cloud computing, big data analytics, artificial intelligence (AI), and the Internet of Things (IoT). This innovation drives increased operational efficiency, service quality, and adaptability to market changes and dynamic user needs. Furthermore, the use of digital-based information systems supports flexible and collaborative work execution without distance or location constraints.

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In Indonesia, the digitalization of information systems is accelerating along with increasing internet penetration and technology adoption by the public and businesses. A report by the Indonesian Internet Service Providers Association (APJII) shows an annual upward trend in the number of internet users, providing a strong foundation for the development of digital information systems. This trend is further strengthened by government policies accelerating digital transformation through various initiatives, such as Smart City, e-Government, and the digitization of public services. However, these developments also present challenges that must be addressed, such as cybersecurity, personal data protection, and the gap in technology access. Therefore, both government agencies and private companies are required not only to adopt technology but also to ensure that the information systems implemented have a high level of security and reliability. An in-depth study of information system developments in the digital era is crucial for identifying opportunities, benefits, and potential risks, as well as formulating effective and sustainable implementation strategies.

In today's digital era, data is viewed as a strategic asset that plays a crucial role in determining the competitiveness and sustainability of an organization. Transforming raw data into relevant and valuable information requires a planned, structured management process supported by modern technology. In this context, Management Information Systems (MIS) play a crucial role because they are able to integrate technology, human resources, and business procedures to produce accurate and timely information as a basis for decision-making.(Laudon & Laudon, 2022). According to(Chen et al., 2023)Advances in information technology, including big data analytics, cloud computing, the Internet of Things (IoT), and artificial intelligence (AI), have created new opportunities for organizations to quickly manage massive volumes of data from diverse sources. Utilizing these technologies strengthens the capabilities of Management Information Systems (MIS) in providing predictive analytics, tailoring services to user needs, and improving operational efficiency. However, increasing data complexity also presents significant challenges. Issues related to data security and privacy, cross-system integration, and maintaining data quality are key obstacles in data and information management processes.(Gartner, 2023)If not supported by an appropriate management strategy, poor data management has the potential to pose risks to an organization's operations and reputation.(Rahman & Nugroho, 2021).

While technological advancements offer numerous opportunities, they also present new challenges. The increasing complexity of data necessitates a well-planned management strategy, encompassing cybersecurity protection, privacy protection, information quality maintenance, and system integration capabilities. Without adequate management, potential problems such as data leaks, analytical errors, and operational disruptions can hinder the achievement of organizational goals. Therefore, effective digital infrastructure management is crucial for maximizing the benefits of Management Information Systems (MIS) in the digital age. Beyond technical factors, the digital era also demands changes in organizational culture. Both leaders and employees must possess sufficient digital literacy to optimize system utilization. Solid collaboration, continuous learning, and a readiness to adapt to technological

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developments are key requirements for maintaining organizational sustainability and competitiveness amidst global competition.

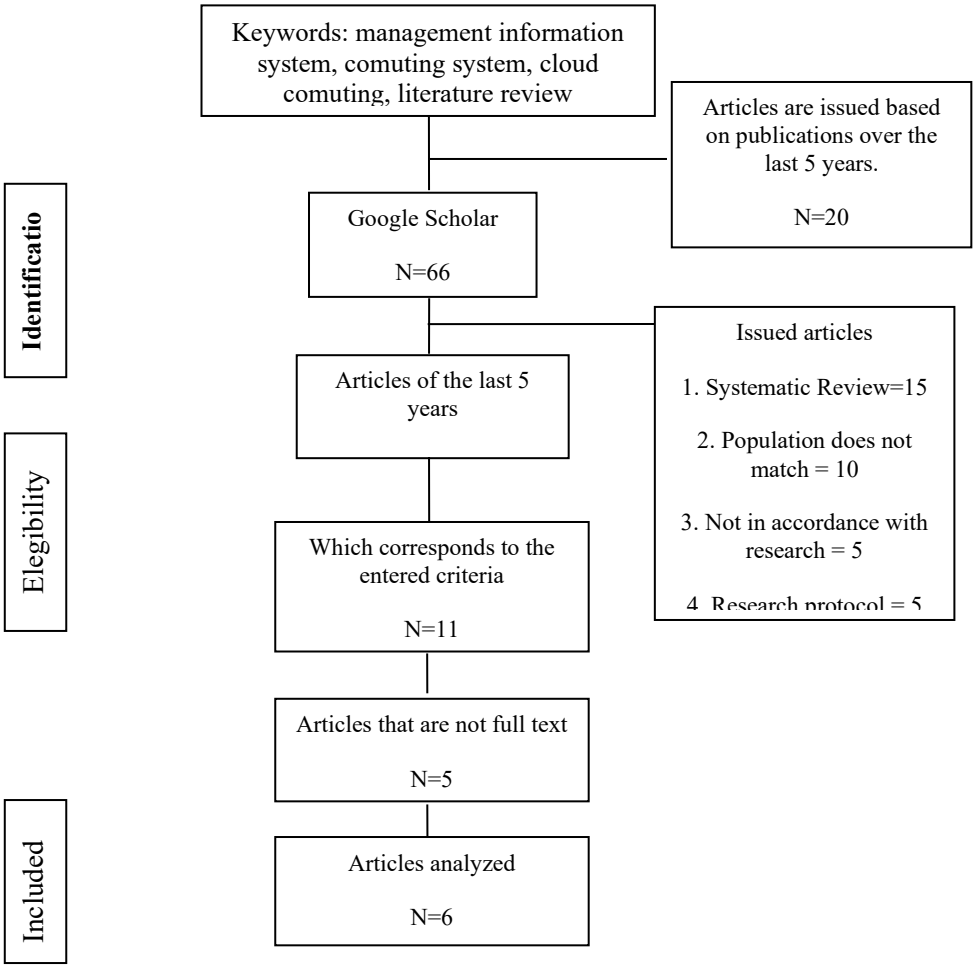
Thus, the digital era in MIS is not just a technological shift, but a comprehensive transformation encompassing strategy, business processes, human resource management, and information governance. A comprehensive understanding of these changes will help organizations maximize the potential of technology while mitigating potential risks.

METHODS

Research Design

This research uses a qualitative approach with a systematic literature review method.Stematic Literature Review (SLR)is a research method that is carried out in a structured manner to find, assess, and summarize all research that is relevant to a particular topic or research question.

Data Sources and Literature Selection Criteria



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RESULTS AND DISCUSSION

Articles that have been collected according to predetermined criteria can be presented as follows:

No	Title and Author	Journal Name	Research methods	Accreditation
1	Student Grade Data Management Information System (Febriani, 2023)	Information Systems Management	prototype method	Google Scholar
2	Strategies for Increasing Public Data and Information Awareness in the Digital Era(Syahputra et al., 2024)	Indonesian Journal of Community Service (Jpkmn)	Field survey	Google School
3	Optimizing Data Information Management to Improve Service Quality in the Digital Era(Shadani & Nasution, 2014)	Journal Of Infomatics And Business	qualitative approach with a focus on case studies	Google Scholar
4	The Impact of Data Processing with Management Information Systems Regarding Information Quality(Amananti, 2024)	Multidisciplinary Journal of Science and Technology	qualitative methods with descriptive approach	Google Scholar
5	Design of Management Information System in Personnel Data Management at the North Sumatra Provincial Plantation Service Office	Scientific Journal of Informatics and Electrical Engineering (JITEK)	Web Design	Google Scholar

Discussion

No	Article Title	Author Name and Year of Publication	Research result
	Student Grade Data Management Information System	Riri Febriani ER, Sharipuddin (2023)	The existing student grade data management information systemAt SMA Negeri 12, Jambi City, simple computerization (Microsoft Excel) is still used, so it is vulnerable to data redundancy and inconsistency. Development of a web-based student grade data processing information systemUsing the prototype method can help the value input process to be faster, more precise and accurate. The newly designed system is capable of producing report card grades effectively and

No	Article Title	Author Name and Year of Publication	Research result
			efficiently, while reducing the potential for errors in presenting information.
2	Strategies for Increasing Public Data and Information Awareness in the Digital Era	Rizki Agam Syahputra, Noer Octaviana Maliza, Kasmawati, Cut Widy Aulia Putri (2024)	This community service activity successfully raised public awareness of the importance of digital literacy and data security in the digital age. Before the training, participants tended to have difficulty distinguishing between valid information and hoaxes. After participating in interactive workshops and case studies, participants' understanding of information verification, privacy protection, and cyber threats such as phishing, malware, and identity theft improved. Strategies used included awareness campaigns, technical training, data security education, and advanced skills development. Evaluations showed significant improvements in participants' ability to filter information and maintain personal data security.
3	Optimizing Data Information Management to Improve Service Quality in the Digital Era	Dery Shadani, Muhammad Irwan Padli Nasution (2024)	This research demonstrates that optimal data information management is key to improving service quality in the digital era. Optimization efforts are carried out through a comprehensive evaluation of technology infrastructure to identify deficiencies and opportunities for improvement, followed by investment in appropriate technologies such as big data analytics, cloud computing, and distributed data management systems that can improve efficiency, scalability, and security. Data management policies and procedures are established to ensure data collection, storage, processing, access, and disposal comply with privacy regulations. Data literacy is enhanced through training in the use of analytical tools, interpretation of results, and the implementation of data security best practices for all personnel. Risk management focuses on implementing strict access controls, encryption, and continuous security monitoring to maintain data integrity. Descriptive, predictive, and prescriptive data analytics are utilized to identify patterns and

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			trends that inform strategic decision-making. Technology support such as Artificial Intelligence (AI), the Internet of Things (IoT), and Blockchain also strengthens data management. The Tech Solutions Inc. case study demonstrates that this strategy can improve operational efficiency, service quality, regulatory compliance, and drive product innovation.
4	The Impact of Data Processing with Management Information Systems Regarding Information Quality	Widya Ayu Utami Lubis, Muhammad Irwan Padli Nasution (2024)	This study found that the implementation of a Management Information System (MIS) significantly improves the quality of information produced by companies. A well-managed MIS produces accurate, timely, relevant, and error-free information, thus supporting effective decision-making. Data processing through MIS has also been shown to minimize the risk of human error in the presentation and distribution of information, while increasing operational efficiency. Data from previous studies indicate that the implementation of MIS is in the very good category with a value interval of 1345–1600, indicating that most companies have implemented MIS in a structured manner. Improved information quality has a positive impact on user satisfaction, which in turn drives individual performance and the achievement of organizational goals. This study emphasizes the importance of continuous evaluation of technological infrastructure, human resource training, and operational procedures to optimize the benefits of MIS in producing high-quality information.
5.	Design of Management Information System in Personnel Data Management at the North Sumatra Provincial Plantation Service Office	M. Farhan Darkani & Rizki Muliono (2023)	This study found that the implementation of a Management Information System (MIS) significantly improves the quality of information produced by companies. A well-managed MIS produces accurate, timely, relevant, and error-free information, thus supporting effective decision-making. Data processing through MIS has also been shown

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The development of digitalization in Indonesia has driven rapid progress in various fields, but at the same time, a number of challenges have emerged that require serious attention. One major issue is the persistently high digital divide, particularly between urban areas and the 3T (Frontier, Remote, and Underdeveloped) regions, which has resulted in unequal access to education, information, and economic opportunities. Furthermore, cybersecurity and personal data protection have come under scrutiny as increasing incidents of hacking, data theft, and online fraud threaten public trust in digital services. Another challenge is the widespread circulation of hoaxes and disinformation on social media, which has the potential to trigger social tensions and influence public decision-making. Digital transformation has also changed the employment landscape, with the application of automation and artificial intelligence replacing a number of traditional jobs, placing low-skilled workers at increased risk of losing their livelihoods. Heavy reliance on foreign digital platforms also poses a threat to digital sovereignty and control over national data. From a socio-cultural perspective, the use of digital media for cyberbullying, hate speech, and other forms of exploitation has negatively impacted public mental health. Meanwhile, limited digital infrastructure and less adaptive regulations often cannot keep pace with the pace of technological development, so that policy implementation and law enforcement in the digital realm still face various obstacles.

The implementation of a Management Information System (MIS) in data management is a highly relevant strategic step amidst the current development of digitalization. Digital transformation has shifted the paradigm of information management from manual methods that tend to be slow, error-prone, and have limited access, to integrated systems that are able

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to present information in real time, accurately, and have a higher level of security. In this study, the development of a web-based MIS aims to overcome the obstacles that arise in conventional methods, such as the use of separate spreadsheets that trigger data redundancy, delays in information updates, and a high potential for human error.

The digital era demands that organizations manage data with optimal speed, accuracy, and security. This is in line with findings(Ammirato et al., 2022)which states that digitizing information management processes through an integrated platform can improve operational efficiency while significantly reducing the likelihood of human error. The system developed in this study supports faster data input, expands access to information, and facilitates the preparation of reports that can be used as references in strategic decision-making. In addition to technical factors, the successful implementation of a Management Information System (MIS) depends heavily on the digital literacy level of its users. Research by(Bisri et al., 2023)This study demonstrates that in the context of digital transformation, effective leadership and ongoing training for system users are crucial elements for success. Although the system has been designed with an easy-to-use interface, skills development for operators and staff is still necessary to maximize its utilization. This is crucial considering that low digital literacy has the potential to hinder technology optimization, even if the supporting infrastructure is well-established. With the advancement of big data and analytics technology, today's information systems function not only as a medium for storing and presenting data, but also as a tool for analyzing patterns and trends that can predict future needs and challenges.(Sundaram & Berleant, 2022)emphasized that integrating automation and data analytics into information management can accelerate the data synthesis process and provide deeper insights for decision-makers. Therefore, the developed system has the potential to be further developed by leveraging predictive analytics and machine learning to generate automated recommendations that benefit management.

The implementation of Management Information System (MIS) in this study has a strong fit with the case study.(Tech Solutions Inc, 2021)which integrates Artificial Intelligence (AI), the Internet of Things (IoT), and Blockchain technologies in information management. The use of AI enables automated data validation processes, while IoT plays a role in collecting data from various interconnected devices. On the other hand, Blockchain technology guarantees data security and integrity through a permanent and unchangeable recording mechanism. By adopting these technologies, the quality, security, and transparency of information generated by MIS can be significantly improved. The development of MIS proposed in this study is also aligned with the vision of digital transformation in the public and education sectors, where the use of integrated systems facilitates more efficient, transparent, and accountable administrative processes. The integration between web-based systems and cloud computing allows flexible data access anytime and anywhere, supporting the principle of information mobility that is characteristic of today's digital era.

Taking these various aspects into consideration, it can be concluded that the developed SIM not only addresses technical issues in data management but also represents a strategic step in building an adaptive digital ecosystem. Going forward, the main challenge will be ensuring the system's continued use through ongoing user training, regular technology

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updates, and the implementation of data security policies that comply with applicable regulations.

CONCLUSION

The results of this study demonstrate that the implementation of Management Information Systems (MIS) in the digital era significantly contributes to improving information quality, operational efficiency, and data security. The integration of cutting-edge technologies such as big data analytics, cloud computing, AI, and IoT enables large-scale data processing in real time with a high degree of accuracy. This advantage supports faster and more precise strategic decision-making while minimizing the risk of human error. However, the success of SIM is not solely determined by technical aspects. Challenges such as the digital divide between urban and 3T areas, increasingly complex cybersecurity issues, low digital literacy among users, and limited digital infrastructure remain significant obstacles. To overcome these challenges, a comprehensive strategy is needed that includes strengthening digital literacy through ongoing training for all system users, updating and maintaining technology to ensure the system remains relevant and secure, implementing data security policies that adapt to regulations and evolving cyber threats, and integrating predictive and prescriptive technologies to support analytics-based decision-making. With this approach, SIM can function not only as an operational tool, but also as a strategic foundation in building a responsive, transparent, and highly competitive digital ecosystem amidst the dynamics of global technological developments.

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