

Implementation of IoT Based Management Information System in MSMEs: Literature Review Analysis

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Abstract

This study aims to analyze the implementation of the Internet of Things (IoT) in management information systems in Micro, Small, and Medium Enterprises through a literature review approach. The research method used is a systematic search by reviewing relevant journals published between 2020 and 2024, then five articles were selected to be reviewed. The articles used discuss various aspects of IoT implementation in MSMEs in various ways. The results of the study show that the implementation of IoT provides significant benefits for MSMEs, such as operational cost savings, optimization of resource use, and increased digital connectivity that helps MSMEs reach a wider and more competitive market. However, there are several major obstacles in the implementation of IoT, including high initial costs, limited technological infrastructure, low digital literacy, and issues of risk, security and data confidentiality that need to be addressed properly. This study recommends the need for support from the government, technology providers, and training institutions in the form of subsidies, capacity building programs, and digital infrastructure development. The implications of this study provide important insights for policy makers, academics, and business actors to design sustainable and relevant digital transformation strategies for MSMEs in the global era.

Keywords: internet of things, management information system, MSMEs, digital.

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) have a strategic role in supporting the global economy, especially in creating jobs, increasing gross domestic product, and strengthening local economic resilience (Pandya et al., 2024). In addition, MSMEs also open up opportunities to run businesses and create innovations, especially for marginalized groups and individuals with limited resources. Despite their important role, MSMEs often face quite complex challenges. Some of the main challenges include low operational efficiency, ineffective marketing, difficulties in inventory management, and slow adaptation to increasingly developing digital technology (Aliudin et al., 2024). These challenges often make it difficult for MSMEs to compete, especially in the midst of an increasingly competitive global market, where innovation and technological adaptation are the main keys to maintaining the competitiveness and relevance of MSMEs. The implementation of the Internet of Things (IoT)

can be used as one of the innovative solutions to overcome these obstacles. IoT provides the ability to integrate smart devices and digital technologies, which allows real-time data management between physical and digital systems, business process automation, effective marketing, and better decision making (Maheshwari et al., 2021; Mohammad & Husien, 2024).

Previous studies have discussed the literature review of the evaluation of the implementation of management information systems using cloud computing in small and medium enterprises providing operational efficiency, flexibility, and data security, although challenges such as infrastructure and digital literacy are still obstacles (Rahmawati et al., 2024). The use of Enterprise Resource Planning (ERP) in MSMEs is able to integrate business functions and support decision making, but high costs and training needs are major obstacles (Hasanah et al., 2024). The implementation of IoT in technology companies in Jakarta increases the efficiency of decision making with real-time data, although constrained by infrastructure and data security (Judijanto et al., 2024). IoT, Artificial Intelligence (AI), and robotics in manufacturing companies increase production efficiency and predictive analysis, but face challenges in workforce skills and cybersecurity (Putra Pratama et al., 2024).

Discussions related to the implementation of IoT in MSME management information systems are still limited, so researchers are interested in examining in more depth how the application of IoT can be implemented effectively in management information systems for MSMEs. This study aims to analyze the implementation of IoT in management information systems in MSMEs. The approach used is a literature review, this study explores the application of IoT in MSMEs, the challenges faced, and implementation strategies that are relevant to MSMEs. The results of this study are expected to provide a clearer picture of how IoT can support the digital transformation of MSMEs, as well as being a reference for business actors, academics, and policy makers in encouraging the development of sustainable digital technology for MSMEs.

METHOD

This study was conducted using a systematic literature review method to collect and analyze relevant previous research. Journal articles used in this study were obtained from platforms such as Google Scholar, ProQuest, and Scopus using keywords such as Internet of Things (IoT), Management Information System, Micro, Small and Medium Enterprises (MSMEs). The literature criteria used include articles published in the last five years, namely from 2020 to 2024, as well as full texts with various research methods without limitations on certain types of methods. The screening process was carried out thoroughly on the full text to ensure compliance with the research topic and keywords. After the selection process, the researcher selected journals or articles that were considered relevant and in accordance with the focus of the discussion, namely the application of IoT in management information systems in MSMEs to increase the growth and sustainability of MSMEs, especially in Indonesia.

RESULT AND DISCUSSION

Data collection in this article is based on several previous studies on the relationship between IoT and MSMEs. The compilation of data in previous studies is seen based on research objectives, research methods, research participants, and findings obtained in previous studies.

Table 1. Short Conclusion of Previous Research

Authors Name	Title	Objective	Method	Result
Maheshwari et al (2021)	Internet of Things for Perishable Inventory Management Systems: An Application and Managerial Insights for Micro, Small and Medium Enterprises	Analyze the impact of IoT implementation and show how investing in the use of technology can reduce inventory costs while increasing product shelf life.	This study uses two case studies that use a mathematical approach with a fractional programming model that is solved using the particle swarm optimization method in MATLAB software.	IoT implementation significantly reduces inventory costs and extends product shelf life. A positive relationship was found between IoT adoption and improved inventory management performance.
Shah et al (2024)	Factors Influencing The Adoption of Industrial Internet of Things for The Manufacturing and Production Small and Medium Enterprises in Developing Countries	To explore the factors influencing the adoption of Industrial Internet of Things (IoT) in achieving manufacturing excellence.	The study used a quantitative survey approach with data collected from manufacturing managers in various companies. The data were analyzed using Structural Equation Modeling (SEM) to understand the relationship between external and internal factors.	Technology readiness, management support, and perceived benefits play a critical role in IoT adoption. Barriers such as initial costs and data privacy risks are major deterrents. Companies that adopt IoT strategically are able to increase productivity.
Aliudin et al (2024)	Utilization of the Internet of Things for the Development of Palm Sugar MSME	This study aims to develop an Internet of Things (IoT) based business strategy to	The method used is participatory observation, supplemented with training	The implementation of the Internet of Things (IoT) has succeeded

	Entrepreneurship.	increase the competitiveness and market share of palm sugar MSMEs in Arenta, Pandeglang Regency.	and mentoring for the implementation of IoT. The research sample involved 15 palm sugar producers and 3 MSMEs actors. The research focused on the production and marketing sections, with steps such as technology creation, training, and implementation mentoring.	in reducing the production costs of palm sugar, as well as increasing the efficiency of communication and online marketing for MSMEs in Arenta. Although it has a positive impact on the economy and the competence of MSMEs actors, social challenges such as reduced direct interaction and the impact on family labor require further attention.
Aji (2024)	Smart Garden Design with AI and IOT Technology on Mobile Applications to Support Agricultural MSME Productivity	This research aims to design and develop a mobile application based on Artificial Intelligence (AI) and Internet of Things (IoT) to create a Smart Garden that can increase the efficiency and productivity of the MSME agricultural industry.	This study uses a mixed approach, namely qualitative and quantitative approaches. Qualitative data were obtained through interviews with MSME farmers to understand their needs and challenges, while quantitative data were obtained through direct	This study found that the application of IoT and AI technology has great potential to improve the efficiency and productivity of MSME agriculture. The Arduino Uno-based Smart Garden system and AI IoT mobile application enable automation of watering

			observation in the field. The Smart Garden system was developed using the Agile Software Development model, which involves repeated iterations in planning, design, implementation , testing, and feedback.	processes and real-time soil moisture monitoring, thereby reducing dependence on manual labor and improving resource efficiency.
Batara & Yosephine (2024)	IoT-Based Stock Detector for MSMEs with Ultrasonic and Infrared Sensors	This research aims to develop an IoT-based stock detection tool using ultrasonic and infrared sensors to improve the efficiency of MSME warehouse management, with a focus on a system that is easy to implement and low cost.	The research involved the design and development of a digital prototype using Arduino Uno, ultrasonic sensors, infrared sensors, and LCD for real-time stock monitoring. The system was tested using Cronbach's Alpha and Intraclass Correlation Coefficient (ICC).	The results of the study show that this IoT-based system is effective in monitoring and managing stock accurately. The tool is able to detect stock in real-time, sending data to Google Sheets for storage and analysis.

From the five articles, it can be concluded that the implementation of the Internet of Things (IoT) in Micro, Small, and Medium Enterprises has a significant positive impact in increasing efficiency, productivity, and competitiveness. IoT allows MSMEs to manage various operational data in real-time, accelerate decision-making, and automate business processes that were previously carried out manually (Malik, 2024). Utilizing IoT in MSMEs can increase accuracy in resource management, reduce waste, and maximize efficiency in the

use of time and costs (Ding et al., 2023). Another impact of the implementation of IoT is its ability to integrate MSMEs into a wider digital ecosystem. This technology opens up opportunities for MSMEs to adapt to market changes through accurate and real-time data monitoring. This not only helps MSMEs improve operational processes but also makes it possible to expand business networks and improve customer experience.

However, despite the enormous potential benefits of IoT, its implementation in the MSME sector often faces several challenges that cannot be ignored. One of the main obstacles is the relatively high implementation costs, especially for MSMEs with limited capital. In addition, inadequate infrastructure, especially in remote areas, is another obstacle that slows down the adoption of IoT as a whole. Low digital literacy among MSMEs is also a significant problem, because operating IoT technology requires certain knowledge and skills. On the other hand, data security is an important concern because IoT involves the collection, storage, and transmission of sensitive data, which can increase the risk of cyber-attacks (Tariq et al., 2023). To overcome these challenges, support from various parties is needed. The government, technology providers, and training institutions need to play an active role in providing technology subsidies, developing digital infrastructure, and providing training for MSMEs to improve their digital literacy (Alfarizi et al., 2024). Collaboration between MSMEs and technology partners can help ensure IoT implementation is more affordable and relevant to business needs. Overall, the implementation of IoT in MSMEs has great potential to drive sustainable digital transformation. The right approach to IoT can be a very important tool for MSMEs to increase competitiveness in the global market, improve operational efficiency, and support long-term business sustainability. Although challenges remain, a targeted implementation strategy and adequate support can ensure that MSMEs can maximize the potential of IoT for growth and innovation in the digital era.

CONCLUSION

The implementation of the Internet of Things (IoT) in Micro, Small, and Medium Enterprises (MSMEs) has been proven to provide significant benefits, such as increased operational efficiency, productivity, and real-time data-based decision making. IoT supports the integration of digital systems and automation of business processes that help MSMEs become more adaptive to market dynamics. Adopting IoT requires careful planning, including budget allocation for technology investment, increasing workforce capacity through training, and strengthening data security systems and digital infrastructure. The government and technology providers can play an active role by providing subsidies, developing digital infrastructure, and technology literacy programs to support the implementation of IoT. With this support, IoT can be a strategic solution that drives digital transformation and sustainability of MSMEs amidst global competition.

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