

The Digital Revolution in Small and Medium Enterprises (SMEs): Boosting Operational Efficiency with Information Technology

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Abstract

The rapid development of information technology has transformed the way many businesses operate, including small and medium-sized enterprises (SMEs). This article explores the impact of implementing information technology on operational efficiency in SMEs. Through case studies and surveys of various SMEs in Indonesia, particularly in Tangerang Raya, data was collected on the use of information technology and changes in operational efficiency. The research results show that process automation is a key factor in improving efficiency, optimizing resource management, reducing operational costs, increasing the speed and accuracy of decision-making, and implementing information technology in SME business processes. This technology enables SMEs to optimize and reduce operational costs, as well as increase customer satisfaction. In addition, this study also found several challenges faced by SMEs in implementing information technology, including limited skilled human resources, high initial costs, and data security issues. Nevertheless, the benefits gained from the use of information technology are much greater than the existing challenges. This article provides recommendations for SME owners and policymakers to support the adoption of information technology, including the provision of training and subsidies for technology investment. In this way, SMEs can become more competitive and contribute more significantly to the national economy.

Keywords: Information technology, operational efficiency, small and medium-sized enterprises, SMEs, digital revolution.

INTRODUCTION

The development of information technology has brought significant changes across various economic sectors, including small and medium enterprises (SMEs). In this digital era, the ability to adopt and utilize information technology has become crucial for SMEs to enhance operational efficiency and compete in an increasingly competitive market. However, not all SMEs can fully optimize this technology due to various challenges they face (Hidayah *et al.*, 2024). The role of MSMEs (Micro, Small, and Medium



Enterprises) in supporting Indonesia's economy is immensely important. These enterprises represent a vital part of the national economy, emphasizing self-reliance and holding great potential to improve community welfare. According to the Indonesian Chamber of Commerce and Industry, the number of MSMEs in 2023 reached approximately 66 million, contributing around 61% to Indonesia's Gross Domestic Product (GDP), equivalent to IDR 9,580 trillion, and creating employment for about 117 million people (Nurhayati., 2024). MSMEs are considered the backbone of the community's economic sector and are expected to continue improving in quality. Government support is crucial for business owners to face future economic challenges and to sustain and strengthen the national economic structure.

Society 5.0 is a concept introduced in Japan that illustrates the evolution of society alongside technological advancements. The development of technology in the digital era has triggered significant transformations, bringing rapid, profound, and impactful changes to various aspects of human life (Nabilah., 2023). The importance of technological innovation, business digitalization, smart city development, and connected healthcare services in the era of Society 5.0 is expected to help us navigate the future more wisely. By doing so, we can mitigate risks and maximize the benefits of ever-evolving technological advancements. The Society 5.0 era presents numerous opportunities and challenges in the economic, business, and healthcare sectors (Mardiana *et al.*, 2024). From an economic perspective, society is expected to harness advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), and big data to enhance operational efficiency, drive innovation in products and services, and create new industries.

MSMEs face various challenges, one of which involves technology adoption. Rogers (2003), in his book *Diffusion of Innovations*, provides insights into how the innovation adoption process occurs in society, shedding light on why MSMEs often lag in implementing digital strategies and technologies. Meanwhile, Porter (1998), in *Competitive Advantage*, emphasizes the importance of differentiation strategies through branding as a source of competitive advantage (Henirsa *et al.*, 2023). Unfortunately, many MSMEs lack an understanding of branding concepts and face limitations in applying them effectively.

The digital revolution is expected to bring significant changes to MSMEs, including a shift in consumer behavior from offline to online shopping (Saputra *et al.*, 2024). Therefore, it is crucial for prospective MSME actors and small-scale entrepreneurs to possess adequate knowledge to leverage technological advancements effectively (Ndraha., 2024). The Fourth Industrial Revolution, often referred to as the digital revolution, is characterized by the proliferation of computers and automation across various sectors. Automation and connectivity in one area can drive substantial changes in the industrial world, leading to a competitive landscape that is no longer linear.

RESEARCH OBJECTIVE

This research focuses on several key questions. First, it aims to determine the relationship between the use of Management Information Systems (MIS) and operational efficiency in Micro, Small, and Medium Enterprises (MSMEs). Second, this study also seeks to understand how the implementation of information technology can enhance operational efficiency in MSMEs. Additionally, the research aims to explore the challenges faced by MSMEs in adopting information technology and find solutions to address these challenges.

The primary objective of this study is to identify the impact of information technology implementation on operational efficiency in MSMEs. The research also aims to determine which types of information technology are most effective in improving operational efficiency in MSMEs. Furthermore, the study will analyze the challenges MSMEs face in implementing information technology and develop recommendations for MSME owners and policymakers to support the adoption of information technology in the MSME sector.

This research is expected to provide benefits for various parties. For MSMEs, the findings can offer practical guidance on applying information technology to improve operational efficiency and enhance competitiveness in the market. For policymakers, this study will provide useful information in designing policies and programs that can support the adoption of information technology in the MSME sector. For academics and researchers, this research will contribute to the literature and references on the impact of information technology on MSMEs, as well as open opportunities for further research in this field. Lastly, for the general public, this research aims to provide insights into the importance of information technology in driving economic growth through improved operational efficiency in MSMEs.

LITERATURE REVIEW

A. Information Technology

MSMEs in Utilizing Information and Communication Technology (ICT), Particularly the Internet, for Marketing with a Global Market Target, Create Significant Opportunities for MSMEs to Increase Exports (Alamin *et al.*, 2022). According to Internet World Stats, in 2010, global internet users reached 1,245,268,000, while Indonesia had around 25 million users. China and the United States had the largest number of internet users, accounting for 61.3% of their populations. In recent years, the rapid growth of computer usage in marketing and sales has provided a significant boost to the digital marketing strategies of MSMEs (Primawanti., 2022). Utilizing technology, especially Information and Communication Technology (ICT), is crucial in efforts to improve the competitiveness of MSMEs. The focus is on managing information on the downstream

side (consumer/market), which is one of the reasons for the weak competitiveness of MSMEs, as well as on the upstream side (suppliers) [7]. One essential condition for implementing supply chain management is collaboration among all entities involved, such as partners in the supply chain system, including the MSMEs themselves, suppliers, and distributors. Therefore, collaboration between MSMEs is necessary to address challenges together.

Micro, Small, and Medium Enterprises (MSMEs) play an essential role in driving the economy. With the rapid growth of technology, business owners are required to innovate and adapt to changing times. The innovations implemented need to be supported by adequate technological capabilities to improve business process effectiveness and efficiency, especially in financial management (Premana *et al.*, 2020). Many MSME owners still lack an understanding of how to manage their businesses using technology or digital media. E-commerce platforms, such as marketing via WhatsApp, Facebook, Instagram, TikTok, and marketplaces, are increasingly used. However, many still record their financial management manually, which can lead to discrepancies between financial reports and available cash.

The use of information technology has enhanced services in shipping, communication, and the sale of goods and services, which in turn improves the performance of the studied organizations (Fachrurazi *et al.*, 2023). Information technology is a combination of two types of technology: computing, with the primary aim of transmitting information signal representations across distant locations. The implementation of information technology by small and medium industries can result in better organizational performance. Information Systems (IS) consist of several components capable of enhancing competitiveness and providing better information for decision-making. Therefore, organizations strive to implement information systems to increase their effectiveness and efficiency (Henirsa *et al.*, 2023). Information systems have now become a central function in business administration. Technology plays a vital role in helping companies transform and develop their businesses. Bain focuses on assisting clients who wish to begin growth or undergo significant change, which heavily relies on technology by identifying the optimal future state of information technology aligned with business needs and jointly designing the blueprint for its implementation (Sambodja *et al.*, 2024).

B. Operational Efficiency

Micro, Small, and Medium Enterprises (MSMEs) play a significant role in the economy of a country but often face challenges in managing their operations efficiently and productively. Operational management training is an effective solution to help MSMEs address these issues [15]. The training aims to provide understanding and skills to MSME owners to enhance the efficiency and productivity of their business operations. This training focuses on the basic concepts of operational management, identification and analysis of operational processes, inventory management, production, distribution, and

quality control. One of the areas discussed is inventory management [16] . MSME owners learn how to manage their inventory more effectively, including procurement, storage, and efficient usage. This helps prevent excess stock or inventory shortages that can disrupt the smooth operation of the business. By optimizing inventory management, MSMEs reduce storage costs and increase the efficiency of raw material or finished goods usage.

Productivity within a company context is the comparison between output and input. Output refers to all the produced goods that have been sold, while input refers to all the resources required to produce those outputs (Saputra *et al.*, 2024). Productivity is a ratio that requires clear measurements for both input and output data that are measurable (tangible). Although intangible inputs and outputs need to be identified, such data cannot be quantified. According to the classical definition, productivity plays a central role in a company because the productivity of each unit (natural resources, labor, and capital) directly impacts the cumulative competitiveness of the company compared to its competitors.

In the business world, risks always exist due to uncertainties that cannot be predicted in advance, which can lead to losses for a company (Putra *et al.*, 2023) This also applies to small and medium enterprises (SMEs), where limited capital backgrounds can lead to risks that impact operational disruptions, financial losses, and even bankruptcy . Although risks vary and are unavoidable in the industrial world, these risks can be detected early so that potential impacts can be anticipated (Ndraha *et al.*, 2024). Risk management, which aims to prevent risks from disrupting operations, is commonly known as risk management. Therefore, managing risk to reduce and minimize losses is crucial for small businesses, given the variety of risks faced by small and medium-sized industries.

Customer satisfaction and the intention to repurchase are key interrelated variables in marketing. Marketers recognize that making customers the focal point of all marketing strategies is essential. Therefore, entrepreneurs and marketers must consistently and continuously strive to improve customer satisfaction. Customer satisfaction refers to the extent to which customer needs, desires, and expectations are met, which in turn motivates them to make repeat purchases (Ndraha *et al.*, 2024). According to Kotler & Armstrong (2019), customer satisfaction is the level of feeling experienced by an individual after receiving a product or service, as well as the comparison between the performance of the received product or service and their expectations. The level of customer satisfaction can vary between individuals, depending on their perceptions, desires, and needs, which ultimately affects the long-term use of the product or service (Fachrurazi *et al.*, 2023). This suggests that the higher the level of customer satisfaction, the greater the likelihood of increased customer loyalty.

METHODS

This study adopts a mixed-methods approach using surveys and in-depth interviews to analyze the impact of information technology on the operational efficiency of SMEs. The research materials include questionnaires, interview guidelines, and secondary data from journals and industry reports to provide a comprehensive understanding.

Research Methodology

This study employs a mixed-methods approach that integrates quantitative and qualitative methods to gain a comprehensive understanding of the impact of information technology on the operational efficiency of SMEs. This approach was chosen because it allows researchers not only to statistically measure the relationships between variables but also to delve deeper into the experiences and perceptions of SME practitioners. Quantitative data was collected through a survey targeting 150 SME practitioners in the Greater Tangerang area, focusing on sectors with high potential for adopting information technology. Meanwhile, qualitative data was obtained through in-depth interviews and focus group discussions (FGDs) with 15 SME owners and several experts in information technology.

Research Design and Procedure

The research process was carried out in three main stages: data collection, data analysis, and results validation. In the first stage, a survey was conducted using a questionnaire designed to measure variables such as the level of technology adoption, operational efficiency, implementation challenges, and perceived benefits. The questionnaire combined closed-ended and open-ended questions, providing respondents with the opportunity to express their views. After completing the survey, in-depth interviews were conducted to explore the practical experiences and strategic insights of SME practitioners. FGDs were also organized to reinforce preliminary findings and gather input from various perspectives.

Data Analysis Methods

The collected data was analyzed using descriptive statistical methods for quantitative data, while qualitative data was analyzed thematically. Quantitative analysis involved calculating frequency distributions, averages, and basic relationships between variables. Qualitative data from interviews and FGDs were transcribed, coded, and organized into key themes relevant to the research objectives. This approach ensures that the study findings comprehensively cover both numerical and narrative dimensions.

Secondary Data Sources

In addition to primary data, this study utilized secondary data from various sources, such as academic journals, industry reports, and government policies related to SME

digitalization. This literature review provides a theoretical framework and strengthens the interpretation of research findings. Secondary data was used to compare empirical findings with global trends and to offer additional perspectives on the challenges and opportunities of digitalization in the SME sector.

RESULTS AND DISCUSSION

The main focus of this research is to understand how the implementation of information technology can help small and medium enterprises (SMEs) operate more efficiently. Several patterns and trends relevant to today's business world are highlighted through literature reviews, case studies, and operational data.

Impact of Information Technology on the Operational Efficiency of Small and Medium Enterprises (SMEs)

One of the key focuses of this research is identifying how information technology can enhance the operational efficiency of SMEs. The findings show that the adoption of information technology has become a key factor in improving productivity and reducing inefficiencies that often hinder company growth.

a) Automation of Processes as a Key Factor

The research found that using information technology for process automation has significantly improved operational efficiency. The use of technologies such as project management software, financial management applications, and automated scheduling systems has greatly assisted SMEs in completing daily tasks more quickly and accurately. For example, accounting software allows real-time tracking of financial transactions, eliminating the need for time-consuming and error-prone manual data entry.

b) Efficiency in Resource Management and Reduction of Operational Costs

Information technology has also made resource management, including labor and raw materials, more efficient. SMEs can use human resource management (HRM) systems to schedule work shifts, monitor employee performance, and manage payroll more effectively. Moreover, technology-based inventory management systems enable SMEs to reduce waste, enhance production efficiency, and optimize raw material use. Reducing operational costs is a major benefit of adopting information technology. Cloud computing has allowed SMEs to cut technology infrastructure costs by using flexible and scalable cloud-based resources. Additionally, information technology enables SMEs to save money by automating tasks that previously required human intervention.

c) Increased Speed and Accuracy in Decision-Making

Furthermore, the use of information technology has helped SMEs make faster, data-driven decisions. For instance, business owners can use analytics

software to analyze market trends, monitor customer behavior, and make more effective strategic decisions.

Impact of Information Technology on Overall Business Performance

In addition to improving operational efficiency, information technology also contributes to enhancing the overall performance of small and medium enterprises (SMEs). The findings show that businesses that successfully integrate information technology into their operations tend to perform better than those that do not.

a) Increased Market Competitiveness

Small and medium enterprises (SMEs) can now compete with larger businesses in the global market, thanks to information technology. By utilizing technologies such as e-commerce, social media, and digital marketing, they can reach a wider customer base without having to invest in expensive physical infrastructure. This has opened up new opportunities for SMEs to grow and expand their market share.

b) Impact on Product and Service Innovation

The study also shows that information technology plays a crucial role in driving product and service innovation in SMEs. By utilizing technologies such as data analytics and artificial intelligence (AI), SMEs can develop new products that better meet customer needs and improve the quality of services they offer. For example, SMEs can use AI-powered chatbots to provide faster and better customer service.

c) Risk Management and Information Security

In addition to the benefits mentioned above, information technology also plays a role in enhancing risk management and information security in SMEs. With the increasing threats to cybersecurity, SMEs that adopt information security technologies such as data encryption and intrusion detection systems are better able to protect their sensitive data and reduce the risk of data loss. This not only protects businesses from potential financial losses but also increases customer trust in their operations.

Digital Transformation and the Future of Small and Medium Enterprises (SMEs)

This research also explores how digital transformation, driven by the adoption of information technology, can shape the future of SMEs. Digital transformation is not only changing the way SMEs operate but also influencing their business models, marketing strategies, and how they interact with customers.

a) Operational Digitalization

Operational digitalization means using digital technologies to make business processes more automated and optimized. For instance, SMEs that use digital platforms for supply chain management can monitor the flow of goods in real-time, improve shipping efficiency, and reduce logistics costs. The study shows that SMEs adopting operational digitalization tend to be more efficient, adaptive, and responsive to market changes.

b) Adaptation to Technological Changes

In a rapidly changing business environment, the ability to adapt to technological changes is a key factor for success. The findings of this research suggest that SMEs that are more open to adopting new technologies tend to be more successful in addressing challenges and seizing opportunities. Technologies such as big data, predictive analytics, and blockchain have started to be adopted by SMEs looking to remain competitive in the global market.

c) Challenges of Digital Transformation

However, digital transformation also brings its own set of challenges for SMEs. Some of the challenges identified in this research include budget limitations for technology investment, lack of technical expertise within the organization, and resistance to change from employees. Nevertheless, SMEs that successfully overcome these challenges by developing solid digital strategies tend to gain significant long-term benefits.

Implications of Digital Transformation on Business Strategies

Digital transformation has changed the way many small and medium enterprises (SMEs) operate. This section discusses the implications of digital transformation on business strategies for SMEs, including how they can gain a competitive advantage by using information technology.

a) Adaptation to Technological Changes

A key factor for success in digital transformation is the ability to adapt to technological changes. SMEs that can quickly adapt to technological changes tend to be more successful in facing emerging challenges and opportunities in the market. This discussion will focus specifically on flexibility and adaptability in SMEs' business strategies.

b) Challenges and Solutions in Technology Implementation

Additionally, SMEs face numerous challenges when it comes to digital transformation. Some of these include budget constraints for technology investments, a lack of technical knowledge, and resistance to change. However,

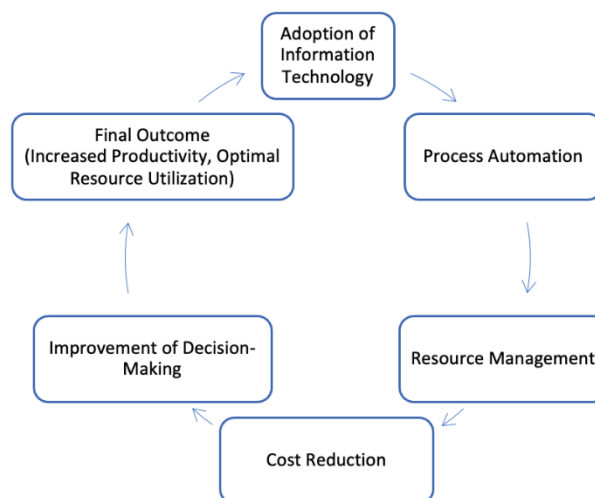
SMEs that manage to overcome these challenges by developing robust digital strategies are likely to gain significant long-term benefits.

c) Building Strategic Partnerships

SMEs should establish strategic partnerships with technology providers and other companies with relevant expertise to maximize the benefits of information technology. These partnerships enable SMEs to access knowledge, resources, and technologies that they may not be able to develop on their own. The importance of collaboration in SMEs' business strategies will be discussed in this section.

Flowchart Visualization (Manual)

Information technology has become a key factor in improving the operational productivity of SMEs. SMEs can leverage the right technology to automate business operations, manage resources more effectively, and ultimately reduce operational costs while making better decisions. This section outlines how SMEs can enhance their efficiency and competitiveness in an increasingly competitive market by systematically implementing information technology. Below is the flowchart visualization:



Gambar 1. Flowchart Visualization

The flow of the impact of information technology on operational efficiency in SMEs is explained below:

1. **Adoption of Information Technology:** SMEs begin to use information technology to support their business operations, such as accounting software or inventory management systems.
2. **Process Automation:** With the help of information technology, SMEs can automate various business processes, including data processing, inventory management, and order processing, which were previously done manually.

3. Resource Management: SMEs can manage their resources—whether time, raw materials, or labor—more efficiently and effectively by using the right technology.
4. Cost Reduction: Automation and better resource management can help SMEs reduce operational costs as they no longer need to rely heavily on manual labor and can minimize waste.
5. Improvement of Decision-Making: With more accurate and real-time data available through information technology, management can make quicker and data-driven decisions.
6. Final Outcome: All these steps enhance productivity, optimize resource utilization, reduce operational costs, and enable faster and more accurate decision-making. Ultimately, this makes SMEs more competitive in the market.

CONCLUSION

This study found that the use of information technology (IT) significantly aids small and medium-sized enterprises (SMEs) in improving their operational efficiency. By gaining access to better data, SMEs can automate various business processes, manage resources more effectively, and reduce operational costs. Small and medium-sized businesses (SMEs) should continue to use IT and make it a part of their business strategy due to its numerous benefits, such as increased competitiveness and the ability to innovate. This holds true despite challenges such as limited technical expertise and investment costs. Overall, SMEs can ensure sustainable growth and future success by continuing to use IT, as IT is not just an additional tool but a vital component that helps them operate efficiently, maintain competitiveness, and thrive in the market.

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