

# Analysing the Role of Technological Innovation in Improving the Operational Efficiency of MSMEs

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## ABSTRACT

MSMEs play an important role in a country's economy. They are one of the pillars of the economy that contribute significantly to economic growth, job creation, and improving people's welfare. However, MSMEs often face various challenges, including limited human resources, capital, and adequate infrastructure. This study aims to analyse the role of technological innovation in improving the operational efficiency of MSMEs. The current research type is qualitative. Data collection techniques include listening and recording important information to conduct data analysis through data reduction, data display, and conclusion drawing. The study results state that technology plays a crucial role in facing various challenges faced by MSMEs. Technological innovation provides opportunities to improve production processes, inventory management, marketing, and customer reach. In addition, technology also facilitates more efficient financial management, internal operations, and data analysis. All these efforts can help MSMEs reduce operational costs, improve product and service quality, and enhance their competitiveness in the global market.

**Keyword:** Technological Innovation, Operational Efficiency, MSMEs

## INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are of significant importance in the economic landscape of a nation (Ausat et al., 2023). Small businesses are integral components of the economy, making substantial contributions to economic expansion, employment generation, and the enhancement of societal well-being (Sutrisno, Ausat, et al., 2023). Nevertheless, MSMEs frequently encounter a range of obstacles, such as constraints in terms of human resources, financial capital, and sufficient infrastructure (Ausat & Suherlan, 2021). Hence, it is imperative to undertake initiatives aimed at enhancing the operational efficiency of MSMEs in order to enhance their competitiveness within a progressively competitive marketplace.

In the context of contemporary global interconnectedness and the advent of the fourth industrial revolution, the imperative of technological innovation has emerged as a pivotal strategy for addressing issues and fostering novel prospects (Wahyoedi et al., 2023). Technological innovation is applicable not only to giant corporations (Harahap, Kraugusteeliana, et al., 2023), but also to MSMEs. The integration of novel technologies within the operations of MSMEs has the potential to yield substantial advantages, such as enhanced efficacy in manufacturing processes, inventory management, marketing strategies, and customer relations (Prastyaningtyas et al., 2023).

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Some technological innovations that may be implemented by MSMEs include, but are not limited to:

1. **Production and Inventory Management System:** The use of production and inventory management software can help MSMEs to monitor inventory, predict demand, and optimise production cycles (Alam et al., 2023). Thus, wastage can be avoided and operational efficiency improved.
2. **Digital Marketing:** Adopting digital marketing strategies such as social media, websites, and online advertising campaigns opens up opportunities for MSMEs to reach a wider market at a more affordable cost compared to traditional marketing methods (Gadzali et al., 2023) and (Sudirjo, Ausat, et al., 2023).
3. **Cloud Computing:** Utilising cloud computing technology allows MSMEs to access software, data storage, and other IT resources in a flexible and scalable manner as per their needs (Attaran & Woods, 2019).
4. **Internet of Things (IoT):** IoT technology enables automatic collection and exchange of data between devices and systems, which can improve operational efficiency and assist in monitoring and analysing business processes (Alahi et al., 2023).
5. **Cyber Security:** Protecting customer data and business information is a top priority. Implementing cyber security measures helps prevent cyber threats that can damage business reputation and disrupt operations (Kala, 2023).

Several studies have also shown that MSMEs that properly implement technological innovations can achieve higher operational efficiency. (Ahmad & Siregar, 2020) investigated the effect of technological innovation implementation on operational efficiency in MSMEs. The research sample consisted of 200 MSMEs in various industrial sectors. Data collection was conducted through a survey using a structured questionnaire. The results showed that MSMEs that implement technological innovation well have higher operational efficiency compared to MSMEs that adopt less innovative technology. Factors such as automation of production processes, implementation of information technology-based management systems, and e-commerce integration significantly contribute to improving the operational efficiency of MSMEs. (J. Lee et al., 2018) also conducted a study with the aim of examining the relationship between technological innovation and operational efficiency in MSMEs. The researchers collected data from 150 MSMEs in various industrial sectors through surveys and interviews. They focused on various types of technological innovations that have been adopted by MSMEs, such as information technology-based management systems, e-commerce, production automation, and the use of cloud-based software. The results show that MSMEs that implement technological innovations well tend to achieve higher operational efficiency than those that adopt less innovative technologies. Technological innovation helps increase productivity, reduce production costs, speed up business processes, and improve customer service. In addition, the study also found that MSMEs that have a strong innovation orientation and a good understanding of the potential of technology tend to achieve higher operational efficiency. Technological innovations may include the use of more sophisticated software, business process automation, better system integration, or the adoption of digital platforms to improve marketing efficiency and product distribution.

Nevertheless, despite the potential advantages offered by technological innovation, numerous MSMEs encounter challenges when it comes to embracing and using technology. The factors contributing to this issue encompass a deficiency in understanding appropriate technological solutions, restricted financial resources allocated for technological investments, and apprehensions over the safeguarding of data security and customer privacy.

The purpose of this study is to do a comprehensive assessment of existing literature in order to examine the utilisation of technological innovation within the framework of MSMEs. The primary focus will be on investigating the impact of technological innovation on enhancing the operational efficiency of these enterprises. Furthermore, the primary objective of this study is to ascertain the difficulties encountered by MSMEs while incorporating technology advancements into their operations. Additionally, this research seeks to investigate potential strategies for surmounting these barriers.

The anticipated outcomes of this study are poised to offer significant contributions to various stakeholders, encompassing MSME proprietors, governmental bodies, and business support organisations. These insights will aid in the development of policies and programmes that facilitate the integration of technological breakthroughs, hence enhancing the operational efficacy of MSMEs.

## LITERATURE REVIEW

### Technological Innovation

Technological innovation refers to the introduction or application of new ideas, products or processes involving technology to improve or change the way we do things (S. M. Lee & Trimi, 2018). Technological innovation includes the development and application of new technologies, as well as the creative use of existing technologies to create more efficient, productive or impactful solutions in various areas of life (Fayomi et al., 2019). Technological innovation covers various aspects and fields, such as:

1. **Products:** The development of new products or the improvement of existing products by utilising the latest technology. Examples of product innovation include the invention of smartphones, electric cars, drones, or the latest application software.
2. **Process:** The change or optimisation of processes used to create or deliver products or services. Process innovation aims to increase efficiency, reduce production costs, or improve product quality. Examples of process innovation include the use of robotics in production lines, the automation of certain tasks, and the application of new methods in supply chain management.
3. **Business Model:** The use of technology to change or create new business models that are more innovative and customised to market needs. Examples of business model innovation include e-commerce, subscription-based services, and sharing economy platforms.
4. **Services:** The application of technology to improve the quality and convenience of services provided to customers. Examples of service innovations include digital banking applications, e-learning platforms, and the latest technology-based medical devices.
5. **Social and Environmental:** The use of technology to address social and environmental issues, such as renewable energy solutions, waste management technologies, or applications to support healthcare access in remote areas.

Technological innovation holds significant importance as it serves as a catalyst for progress and advancement across diverse sectors (Khan et al., 2021). The use of this technology has the potential to generate employment opportunities, enhance operational effectiveness and efficiency, elevate the overall standard of living, and effectively address intricate problems confronting the global community (Sutrisno, Kuraesin, et al., 2023). Technological advancements frequently emerge as a result of extensive research and development efforts conducted by various entities, including commercial enterprises, academic institutions, and governmental bodies (Harahap, Ausat, et al., 2023). Furthermore, the facilitation of collaboration and the exchange of knowledge across diverse stakeholders also holds significant importance in promoting sustainable technological innovation.

### Operational Efficiency

Operational efficiency pertains to the degree of productivity and optimisation in the execution of activities or business processes inside an organisation or organisation (Madapusi & D'Souza, 2012). The objective of attaining operational efficiency is to optimise outcomes by effectively utilising the resources at hand (Ahsan et al., 2019). Operational efficiency holds significant importance within the realm of MSMEs, since these entities must effectively manage their limited resources and capital in order to attain commercial success and ensure continuity (Tambunan et al., 2022). There are several important aspects associated with operational efficiency:

1. **Resource Utilisation:** Operational efficiency involves using resources such as labour, raw materials, equipment and time in an optimal manner. Identifying and eliminating wastage in business processes helps improve efficiency and reduce costs.

2. **Business Processes:** Ensuring business processes are well organised and run seamlessly is an integral part of operational efficiency. Efficient business processes should be designed to avoid duplication of tasks, reduce bottlenecks, and minimise errors.
3. **Inventory Management:** MSMEs need to manage their inventory carefully to avoid overstocking or understocking. Proper inventory management will avoid unnecessary costs and ensure the availability of the right items when needed.
4. **Technology and Automation:** The use of technology and automation in operational processes can improve efficiency by reducing human involvement in routine tasks and speeding up business processes.
5. **Labour Management:** Ensuring that the workforce is organised at a high level of productivity and placed in positions that match their skills will help improve operational efficiency.

The advantages associated with attaining operational efficiency encompass heightened production, diminished expenses, enhanced client happiness, and an improved capacity to compete effectively inside the marketplace. Operational efficiency has the potential to enhance an organization's competitive advantage, enhance adaptability to market fluctuations, and establish a more robust platform for corporate expansion. Continuous optimisation of operational efficiency is crucial for MSMEs in order to sustain competitiveness within the dynamic business landscape. In order to attain consistent and enduring growth, it is imperative for organisations to incorporate the systematic assessment and enhancement of operational processes into their overarching business strategy.

### MSMEs

Micro, Small, and Medium Enterprises (MSMEs) refer to a business sector comprised of small and medium-sized businesses that share certain characteristics in terms of operational scale, number of employees, and asset value. The following are definitions and general characteristics of MSMEs (Ayodya, 2020):

1. **Micro Enterprises:** Micro enterprises are small-scale businesses that usually have very limited assets or capital. The commonly used criteria to classify a business as micro is that it has assets of up to IDR 50 million or has less than 5 employees.
2. **Small Business:** Small businesses are larger in scale than micro businesses, but are still classified as small. The general criteria for classifying a business as small is to have assets between IDR 50 million and IDR 500 million or employees between 5 and 19 people.
3. **Medium-sized Enterprises:** Medium-sized enterprises are larger in scale compared to micro and small enterprises. The usual criteria for identifying a business as medium-sized is that it has assets between IDR 500 million and IDR 10 billion or employees between 20 and 99 people.

Common characteristics of MSMEs include:

1. **Limited Resources:** MSMEs generally have limitations in terms of capital, human resources, and technology. These are the main challenges that MSMEs have to face in developing and managing their businesses.
2. **Significant Economic Role:** Despite belonging to the small and medium category, MSMEs play an important economic role in many countries. They contribute to economic growth, job creation, and community empowerment.
3. **Engagement in Multiple Sectors:** MSMEs operate in various sectors of the economy, including trade, manufacturing, services, agriculture, and creative sectors.
4. **Flexibility and Innovation:** MSMEs are often more flexible in adjusting to market changes and creating innovations in their businesses due to their smaller size.

The government and various agencies support MSMEs with various programmes, training and financial facilities to help them overcome challenges and improve their business performance. In many countries, MSMEs are recognised as an important pillar in achieving sustainable and inclusive economic development.

### RESEARCH METHOD

This study aims to analyse the role of technological innovation in improving the operational efficiency of MSMEs. In this study, researchers conducted library research so that they did not need

to go directly to the field during the data collection process, but instead reviewed various reference sources that supported this research. The literature was obtained from online media and databases from journal portals that are in accordance with the keywords related to this discussion, namely the analysis of the role of technological innovation in improving the operational efficiency of MSMEs. The author does not focus on specific journal portals or online media in determining relevant reference sources such as referring to the Emerald Insight, ResearchGate, and Elsevier journal portals, but is more flexible. In this article, with a focus on analysing the role of technological innovation in improving the operational efficiency of MSMEs, the author makes these keywords the focus of the search so as not to widen the main discussion. The search for journals, articles and publications is mostly in the range of articles published between 2012 and 2023. Not all articles, journals and publications that appear in the search results will be used, but only those related to the analysis of the role of technological innovation in improving the operational efficiency of MSMEs.

This research is a type of qualitative research. Data collection techniques include listening and recording important information to conduct data analysis through data reduction, data display, and conclusion drawing to obtain a picture of the conclusions regarding the literature study that will be developed in this study. Data validation uses triangulation of data sources.

## RESULTS AND DISCUSSION

MSMEs play a very important role in a country's economy. They contribute significantly to economic growth, job creation, and improving people's welfare (Hernita et al., 2021). However, MSMEs also face various challenges, especially in terms of operational efficiency. Technological innovation has emerged as one of the potential solutions to improve the operational efficiency of MSMEs (Larios-Francia & Ferasso, 2023). In this analysis, we will take an in-depth look at the role of technological innovation in improving the operational efficiency of MSMEs.

1. **Improved Production Process:** Technological innovations can help MSMEs improve efficiency in their production processes. Through the use of automation devices and smart manufacturing systems, production processes can be automated, reducing reliance on manual labour (Lu et al., 2020). For example, advanced robotics and machinery can be used to optimise production flow and speed up the production of goods and services. As such, MSMEs can increase their output without increasing production costs.
2. **More Effective Inventory Management:** Efficient inventory management is key in the success of MSMEs. With the adoption of technologies such as cloud-based inventory management systems, RFID (Radio Frequency Identification), and data analytics, MSMEs can track their inventory in real-time, avoid excessively high or low stocks, and optimise their expenses. Thus, technological innovations can help reduce inventory costs and improve cash flow (Beladi et al., 2021).
3. **Increased Marketing and Customer Reach:** The role of technological innovation in expanding marketing and customer reach is significant for MSMEs. Through social media, websites, and e-commerce platforms, MSMEs can expand their footprint in the global market without having to incur huge costs (Subagja et al., 2022). A well-targeted digital marketing campaign can increase the visibility of MSME brands and products, attract new customers, and retain existing ones (Harini et al., 2023).
4. **Simplification of Financial Transactions:** Technological innovations have also changed the way MSMEs manage their financial transactions. The use of electronic payment systems, digital wallets, and mobile banking apps has simplified the payment process and overall financial management (Almaududi Ausat et al., 2021). Moreover, blockchain technology also offers security and transparency in financial transactions, which is an added advantage for MSMEs looking to avoid potential fraud and theft.
5. **Optimisation of Internal Operations:** Implementing technological innovations in the internal aspects of MSMEs can also improve their overall operational efficiency. Cloud-based human resource management systems, team collaboration platforms, and task management applications can help optimise employee performance, ease internal communication, and ensure all teams work synergistically towards a common goal (Fitria et al., 2023).

6. Access to Data and Analytics: Technological innovations allow MSMEs to collect and analyse data better. With proper data analysis, MSMEs can understand customer behaviour, market trends, and product preferences (Sudirjo, Diantoro, et al., 2023). This knowledge allows MSMEs to adjust their business strategies, develop products that match market demand, and make smarter decisions based on data evidence.
7. Reduction of Operational Costs: Apart from increasing efficiency, technological innovations can also help MSMEs reduce their operational costs. The use of cloud computing services reduces the need for expensive physical IT infrastructure (Kraugusteeliana et al., 2022). Efficient use of energy, sustainable waste management, and implementation of green business practices can also help reduce operational costs and create a positive impact on the environment.

This investigation has demonstrated the significant impact of technological innovation on enhancing the operational efficiency of MSMEs. Technological advancements provide a diverse range of advantages to MSMEs, encompassing enhanced manufacturing processes, efficient inventory management, and extended marketing and consumer outreach (Danaher & Sætra, 2022). By embracing appropriate technological advancements, MSMEs have the potential to enhance their competitiveness within a dynamic market and augment their total economic impact. The adoption of creative ideas and remaining receptive to technology improvements is crucial for MSMEs in order to attain sustained success in the long run.

Technological innovation is a significant factor in enhancing the security and safeguarding of data pertaining to MSMEs. The advent of technological progress brings up novel obstacles in the realm of cybersecurity. Nevertheless, by incorporating cutting-edge security solutions like data encryption, firewalls, and network security, MSMEs may safeguard their sensitive information from cyber threats and mitigate the risk of potential data breaches. The advent of technology has significantly transformed the manner in which customers engage with brands and organisations (Dwivedi et al., 2021). By utilising chatbots, AI-powered customer care, and various online support services, MSMEs have the potential to enhance and improve the customer experience by offering increased responsiveness and efficiency (Harahap, Junianto, et al., 2023). Enhanced customer interaction has the potential to foster client loyalty, mitigate customer attrition, and enhance the overall perception of the business. Technological innovation enables MSMEs to cultivate novel and enhanced products and services. The utilisation of advanced technologies such as Computer-Aided Design (CAD), simulation, and 3D printing has the potential to expedite the product development process and concurrently lower the expenses associated with prototyping. This capability empowers MSMEs to promptly adapt to shifts in the market and offer inventive products that effectively meet the demands of their customers (Rajapathirana & Hui, 2018).

Furthermore, the integration of MSME supply chains is facilitated by technology innovation. By implementing cloud-based supply chain platforms and data sharing tools, MSMEs have the opportunity to enhance their collaborative efforts with suppliers, distributors, and other stakeholders in the business ecosystem. The integration of various components can enhance the overall efficiency of the supply chain, resulting in reduced lead times and mitigated non-conformance risks. Technological innovation plays a multifaceted function, extending beyond infrastructure and business processes, by enhancing the human capital of MSMEs (Sari et al., 2022). Digital learning platforms, such as online training, webinars, and other online resources, have the potential to facilitate the acquisition of novel skills and information among employees of MSMEs (Ausat et al., 2022). In the context of intensifying global competitiveness, MSMEs stand to benefit significantly from the presence of adept and continuously developing personnel. These individuals, possessing refined skills and a commitment to ongoing growth, hold the potential to become invaluable resources for MSMEs. The implementation of monitoring and quality control technology has the potential to enhance the quality and dependability of products produced by MSMEs. The analysis of data obtained from sensors and other monitoring equipment enables MSMEs to identify potential flaws and production difficulties at an early stage. In this manner, the resultant items exhibit superior quality and have the potential to foster customer confidence. Technological advancements have ultimately facilitated the opportunity for MSMEs to get access to global resources. E-commerce and crowdsourcing platforms offer MSMEs the potential to

explore business collaborations, secure funding, and pursue chances for international expansion. With the proliferation of interconnected technology, MSMEs have the potential to engage in global market competition without being constrained by geographical limitations (Gao et al., 2023).

The significance and complexity of technological innovation in enhancing the operational efficiency of MSMEs cannot be overstated. Technological innovation offers substantial advantages for MSMEs in addressing diverse business difficulties, encompassing enhanced production methods and superior product quality. The utilisation of technology enables MSMEs to effectively respond to fluctuations in the market, mitigate operational expenses, and enhance their overall competitiveness. Nevertheless, it is crucial for MSMEs to maintain a receptive stance towards embracing appropriate technological advancements and including their staff in these transformative processes. Through the strategic use of technological innovation, MSMEs have the capacity to attain sustainable growth and secure long-term success within an intensifying and fiercely competitive global marketplace.

## CONCLUSION

From the analysis of the role of technological innovation in improving the operational efficiency of MSMEs, it can be concluded that technology plays a crucial role in dealing with the various challenges faced by MSMEs. Technological innovation provides opportunities to improve production processes, inventory management, marketing, and customer outreach. In addition, technology also facilitates more efficient financial management, internal operations, and data analysis. All these efforts can help MSMEs reduce operational costs, improve product and service quality, and enhance their competitiveness in the global market. Here are some suggestions for MSMEs to optimally utilise technological innovations:

- a) Development of a Digital Transformation Plan: MSMEs must plan their digital transformation clearly and thoroughly. Identify areas where technological innovation can make a significant impact and set specific goals for each step of change.
- b) Employee Training and Education: The introduction of new technologies requires appropriate competencies from employees. MSMEs should invest time and resources in training their employees to use new technologies and understand their benefits.
- c) Collaboration with Technology Experts: Seeking an experienced technology partner or consultant can help MSMEs implement innovative solutions more efficiently. Collaboration with technology experts opens the door to a better understanding of business needs and appropriate technology solutions.
- d) Know Business Needs Deeply: Before adopting any new technology, ensure that MSMEs understand their business needs deeply. Not all technologies are suitable for all businesses, so make sure the adopted technology can add significant value.
- e) Adapt to Change: The world of technology continues to evolve rapidly. MSMEs must be ready to adapt to changes and keep abreast of the latest technology to stay competitive.
- f) Data Protection and Security: In the face of cybersecurity risks, it is important for MSMEs to keep customer data and information secure. Consider adopting adequate security technology and managing customer data carefully.
- g) Utilise Free Resources: There are many free or low-cost technology resources that can help MSMEs with operational challenges. For example, e-commerce and social media platforms can be used to expand market reach without huge costs.

By combining technological innovation with sound business strategies, MSMEs can achieve higher operational efficiency, adapt to market changes, and improve overall business performance. By remaining open to change and applying relevant technologies, MSMEs can continue to grow and contribute to a stronger economy.

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