

Challenges and Solutions in the Implementation of Digital Technology in MSMEs: Perspectives from Entrepreneurs and Consumers

Ratna Handayati^{1*}, Ahmad Syaifur Rozaq², Firman Nur As'adi³, Mohammad Zaky Dwi Saputra⁴, Mochammad Miftachul Ubaidillah⁵

^{1,2,3,4,5} Universitas Islam Lamongan, Jawa Timur, Indonesia

ARTICLE INFO

Article history:

Received: 07 July 2024

Revised: 09 July 2024

Accepted: 11 July 2024

DOI:

10.61100/tacit.v2i2.211

Keywords:

Challenges and Solutions, Digital Technology, MSMEs, Entrepreneurs, Consumers



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ABSTRACT

Technological advancements bring enormous benefits. Nonetheless, many MSMEs experience significant obstacles in the application of this technology. This research aims to provide a comprehensive literature review on the challenges faced by MSMEs in adopting digital technology and the solutions that can be implemented from both entrepreneurs' and consumers' perspectives. The study employs a literature review method with a qualitative approach and descriptive analysis. Research data were sourced from Google Scholar, covering publications from 2020 to 2024. The findings indicate that the implementation of digital technology in MSMEs in Indonesia encounters several significant challenges, including a lack of knowledge and technical skills, high implementation costs, and inadequate infrastructure. Other notable challenges include resistance to change, data security issues, misalignment of technology with the specific needs of MSMEs, and insufficient technical support and consultation. Nevertheless, various solutions can be applied to overcome these obstacles, such as enhancing education and training, providing financial incentives, improving infrastructure, offering technical support, and developing data security solutions. Real-world case studies of MSMEs like "Warung Sederhana," "Toko Sari Rasa," and "Kios Digital" illustrate the relevant challenges and solutions in the context of digital technology adoption.

ABSTRAK

Kemajuan teknologi membawa manfaat yang sangat besar. Meskipun demikian, banyak UMKM mengalami kendala signifikan dalam penerapan teknologi ini. Penelitian ini bertujuan untuk memberikan tinjauan pustaka yang komprehensif mengenai kendala yang dihadapi oleh UMKM dalam penerapan teknologi digital serta solusi yang dapat diimplementasikan dari perspektif pengusaha dan konsumen. Penelitian ini menggunakan metode tinjauan pustaka dengan pendekatan kualitatif dan analisis deskriptif. Data penelitian diambil dari Google Scholar dengan rentang waktu publikasi dari tahun 2020 hingga 2024. Hasil studi menunjukkan bahwa penerapan teknologi digital pada UMKM di Indonesia menghadapi berbagai kendala signifikan, termasuk kurangnya pengetahuan dan keterampilan teknis, biaya implementasi yang tinggi, dan infrastruktur yang tidak memadai. Kendala lain yang signifikan adalah resistensi terhadap perubahan, masalah keamanan data, ketidaksesuaian teknologi dengan kebutuhan spesifik UMKM, serta kurangnya dukungan teknis dan konsultasi. Meskipun demikian, terdapat berbagai solusi yang dapat diterapkan untuk mengatasi kendala ini, seperti peningkatan pendidikan dan pelatihan, insentif finansial, peningkatan infrastruktur, dukungan teknis, dan pengembangan solusi keamanan data. Studi kasus nyata dari UMKM seperti "Warung Sederhana", "Toko Sari Rasa", dan "Kios Digital" mengilustrasikan tantangan dan solusi yang relevan dalam konteks adopsi teknologi digital.

1. INTRODUCTION

The application of digital technology in micro, small, and medium enterprises (MSMEs) has become a central

* Corresponding author, email address: ratnahandayati@gmail.com

topic in the development of the digital economy in Indonesia. With rapid technological advancements, MSMEs face the challenge of adopting and utilizing digital tools to enhance operational efficiency, expand market reach, and improve competitiveness (Hariyanti & Desi Kristanti, 2024). Digital technology can encompass various aspects, from cloud-based inventory management systems and e-commerce platforms to digital marketing through social media. However, despite its potential benefits, many MSMEs encounter significant obstacles in implementing this technology. This research aims to provide a comprehensive literature review on the challenges faced by MSMEs in adopting digital technology and the solutions that can be implemented from both entrepreneurs' and consumers' perspectives.

In the context of MSME entrepreneurs, one of the main challenges is the lack of knowledge and skills related to digital technology. Many MSME entrepreneurs still have limited understanding of how to leverage digital technology for their business needs (Ausat & Peirisal, 2021). This is often due to limited access to adequate training or technical support. Additionally, the cost of implementing digital technology, such as hardware, software, and training expenses, is often seen as a significant expenditure for MSMEs, which typically have limited budgets. This leads to delays or even resistance in adopting digital technology, ultimately hindering their business growth and development.

From the consumers' perspective, the main challenges in the adoption of digital technology by MSMEs also include issues of accessibility and convenience. Consumers often face difficulties using digital platforms that are not user-friendly or have complex interfaces (Chang & Chen, 2008). These issues can decrease consumer satisfaction and reduce their loyalty to MSMEs utilizing digital technology. Furthermore, the lack of integration between various digital platforms used by MSMEs can cause friction in transaction processes, such as errors in order processing or inaccuracies in product information. These problems can potentially damage the reputation of MSMEs and diminish consumer trust.

One potential solution to overcome these challenges is to enhance training and education programs for MSME entrepreneurs. Such training can help entrepreneurs understand the benefits of digital technology and how to implement it effectively. Support from the government, educational institutions, and non-governmental organizations in the form of training, mentoring, and consultation can accelerate the adoption of digital technology by MSMEs (Sutrisno et al., 2023). Additionally, financial incentives or subsidies for the purchase of digital hardware and software can help alleviate the cost burden borne by MSMEs.

To improve the consumer experience, MSMEs need to focus on intuitive and user-friendly interface design. Applying good design principles in developing digital platforms can enhance consumer comfort and satisfaction. Furthermore, better system integration between different digital platforms can reduce friction in transaction processes and increase the accuracy and reliability of product information (Rangaswamy et al., 2020). Consumer feedback is also crucial to identify areas for improvement and optimize the user experience.

The challenges and solutions in the implementation of digital technology in MSMEs vary greatly and depend on the specific context of each MSME and the characteristics of the market they serve. This research will review various relevant studies and literature to understand the challenges and solutions from the perspectives of both entrepreneurs and consumers. Consequently, the findings of this research are expected to provide valuable insights for policymakers, industry practitioners, and researchers in designing more effective strategies to support the adoption of digital technology in the MSME sector.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Challenges and Solutions

Challenges are obstacles, hindrances, or issues that block processes or the achievement of specific goals (Zick-afoose et al., 2024). In the context of implementing digital technology in micro, small, and medium enterprises (MSMEs), challenges encompass various difficulties or limitations that impede MSMEs from adopting and utilizing digital technology effectively. These challenges can be internal (such as limited knowledge or resources) or external (such as infrastructure problems or costs). Solutions, on the other hand, are methods or steps taken to overcome existing challenges or issues (Leal Filho et al., 2017). Solutions are designed to mitigate or eliminate the impact of these challenges so that processes or goals can be achieved more effectively. In this case, solutions involve strategies, actions, or interventions that can help MSMEs overcome various challenges faced in the implementation of digital technology. In other words, challenges are the problems that obstruct progress, while solutions are the efforts to overcome or eliminate these problems.

Digital Technology

Digital technology refers to the use of devices, software, and systems that process, store, and transmit information in digital form rather than analog (Harahap et al., 2023). This includes various tools and applications such as computers, smartphones, the internet, cloud computing, and software that enable electronic data processing. Digital technology utilizes binary representation (0s and 1s) to manipulate information, allowing for efficiency, speed, and ease in various aspects of life, from communication and business to entertainment and education. The use of digital technology has revolutionized how we work, interact, and access information, playing a crucial role in digital transformation across various sectors (Gadzali et al., 2023).

MSMEs

Micro, small, and medium enterprises are categories of businesses defined by their operational scale, number of employees, and asset size. Micro enterprises have the fewest employees and the smallest assets, while small and medium enterprises gradually have larger capacities. MSMEs play a crucial role in the economy, especially in developing countries like Indonesia, as they absorb a significant portion of the workforce, promote local entrepreneurship, and contribute to inclusive economic growth (Ausat et al., 2022). They often face challenges such as limited capital, market access, and inadequate infrastructure, yet they remain a vital pillar in the national economic structure (Subagja et al., 2022).

Entrepreneurs

Entrepreneurs are individuals who take the initiative to establish, manage, and develop businesses with the aim of generating profits (Sachdev, 2023). They are responsible for identifying business opportunities, planning strategies, making decisions, and managing various resources to achieve business success. Entrepreneurs often possess vision and the ability to take risks, leading teams or organizations to turn innovative ideas into valuable products or services (Chen, 2007). The role of entrepreneurs is critical in the economy as they drive economic growth, create jobs, and contribute to technological advancement and innovation.

Consumers

Consumers are individuals or groups who purchase, use, or consume goods and services offered by producers or service providers (Fuchs et al., 2022). They are the end-users in the supply chain and act as the beneficiaries of the products or services. Consumers make purchasing decisions based on various factors, including needs, preferences, price, and quality. In the economy, consumer behavior is important as it can influence market demand, consumption patterns, and industry trends. Consumers also provide valuable feedback to producers regarding their satisfaction, needs, and expectations (Patil & Rane, 2023).

3. RESEARCH METHOD

This research uses a literature review method with a qualitative approach and descriptive analysis. The purpose of this literature review is to examine and analyze relevant literature related to the research topic. The qualitative approach is used to gain an in-depth understanding of the challenges and solutions in the implementation of digital technology in MSMEs from the perspectives of entrepreneurs and consumers. Research data is sourced from Google Scholar, with a publication date range from 2007 to 2024. The data selection process begins with the collection of relevant articles from this database. Initially, 45 articles were identified and collected. However, after a rigorous selection process based on predetermined inclusion and exclusion criteria, the number of articles used in this research was reduced to 27 of the most relevant and high-quality articles. Descriptive analysis is conducted to describe and summarize findings from the selected literature, focusing on identifying patterns, themes, and relationships between variables related to the implementation of digital technology in MSMEs. Through this approach, this research aims to provide deep and comprehensive insights into the challenges faced and proposed solutions in the context of digital technology adoption by MSMEs.

4. DATA ANALYSIS AND DISCUSSION

The implementation of digital technology in MSMEs (Micro, Small, and Medium Enterprises) in Indonesia faces various challenges depending on the characteristics of the business and its operational environment. One of the main obstacles is the lack of technological knowledge and skills among MSME entrepreneurs. For instance, "Warung Sederhana," a small food business in Jakarta, struggles to adopt a digital inventory man-

agement system due to the owner's insufficient technical background. The inability to utilize digital technology in inventory management results in operational inefficiencies that affect their ability to manage stock effectively, ultimately impacting customer service and business profitability. Their manual processes still rely on conventional methods of stock recording and raw material ordering, leading to frequent errors and inaccuracies. As a result, Warung Sederhana faces issues such as delays in order fulfillment and an inability to respond efficiently to customer demands, which affects their reputation and customer satisfaction. This also hinders them from optimizing business potential and reaching a wider market.

Implementation costs often become a significant barrier for MSMEs in adopting new technology, especially when budgets are limited (Hendrawan et al., 2024). For example, "Toko Sari Rasa," a retail store located in Surabaya, faced serious challenges when attempting to purchase and install a digital point-of-sale (POS) system. The costs required for this technology far exceeded their budget, forcing them to delay implementation. As a result, the store experienced a decline in operational efficiency because transaction processes still relied on slower manual methods prone to human error. This directly impacted customer satisfaction and their potential business growth. In competition with retail stores that had already adopted advanced technology, "Toko Sari Rasa" lagged in terms of service speed and transaction accuracy, further worsening their competitive position in the market. The financial constraints they face make it increasingly difficult to catch up with the latest technology adoption, causing them to struggle to adapt to the increasingly advanced and high-tech market developments.

Lack of adequate infrastructure also poses a major obstacle, especially in remote areas that often lag in technology access (Onitsuka et al., 2018). "Kios Digital," an MSME operating in villages in Bali, is a prime example of this issue. They face significant difficulties in obtaining stable internet access and the necessary hardware to effectively run an e-commerce platform. The inability to access quality internet hinders them from taking advantage of important digital marketing opportunities in the current era of electronic commerce. Additionally, hardware limitations hamper their daily operational processes, such as stock management and ordering. Without adequate infrastructure support, their operational costs increase, and the potential for their business growth significantly decreases. Dependence on poor infrastructure can cause MSMEs like "Kios Digital" to be unable to compete with competitors located in areas with better technology access, limiting their market expansion and profits.

Resistance to change is a psychological barrier that often hampers technology adoption among MSMEs (Hubbart, 2023). "Pternakan Rakyat," a small farming business in Central Java, clearly exemplifies this phenomenon. Entrepreneurs at this farm refuse to adopt online weather monitoring technology that could improve their crop yields, preferring to continue using traditional methods that have been used for years. Despite the new technology offering various benefits such as more accurate weather predictions and more efficient planning, the entrepreneurs feel more comfortable with familiar methods. This resistance is often caused by uncertainty about the outcomes and a lack of understanding of the potential benefits of new technology. This attitude can hinder the possibility of innovation and productivity improvements that could be obtained from modern technology. Delays in adopting new technology can cause "Pternakan Rakyat" to fall behind compared to other farming businesses that are more open to change and new technology.

Data security and privacy are major issues faced by many MSMEs, as seen in the case of "E-Shop Indonesia," a small e-commerce platform. E-Shop Indonesia experienced a data breach due to inadequate security systems, leading to a loss of customer trust and potential sales decline. The inability to protect sensitive data impacts business reputation and poses significant financial risks. This data breach incident highlights the importance of having strong security systems and effective data protection procedures. Without adequate security measures, MSMEs like E-Shop Indonesia face significant risks to the integrity of their customer data, which can damage their reputation and cause substantial financial impacts. Awareness of the importance of data protection is crucial for MSMEs to maintain customer trust and ensure business continuity in an increasingly competitive and digital market (Prastyanti & Sharma, 2024).

The mismatch between existing technology and the specific needs of MSMEs is also an important obstacle (Nareswari et al., 2023). For instance, "Fashion Trend," an MSME in the fashion sector, faces difficulties in integrating a digital inventory management system with their e-commerce platform. This mismatch causes errors in order processing and inaccuracies in stock levels. In this context, an inventory management system that is not aligned with the e-commerce platform can lead to real-time stock information that is not updated, resulting in delays in order processing and potential sales loss. For example, if the inventory system

is not synchronized with the e-commerce platform, customers may experience issues when making purchases because the displayed stock is inaccurate, or even the orders received by the store do not match the items available in the warehouse. Solutions to this problem often require system adjustments or the development of custom solutions to address unique business needs, such as customized software integration or the development of additional modules that can bridge the gap between existing technology and specific business needs. These adjustments can involve additional investment and time for implementation, which poses challenges for many MSMEs that often have limited resources.

Lack of support and technical consultation is also a significant issue for MSMEs. For example, "Kopi Nusantara," a local coffee business, does not have access to adequate technical support to implement new technology in their coffee processing. Without guidance from technology experts, they face difficulties in selecting and implementing the right solutions. The limitations in technical support cause difficulties in leveraging technology that could improve their efficiency and product quality. For instance, they may face challenges in adopting automation systems in the coffee roasting process or software for supply chain management. This hampers potential innovation and business growth, as the right technology can provide a competitive advantage, improve production processes, and enhance product quality. Good technical support, including consultation and training, can help MSMEs overcome technological challenges by providing the necessary guidance to select and implement appropriate solutions, and ensure successful implementation by leveraging technology optimally (Arjang et al., 2023).

Integration of systems is another significant challenge. The "Gadget Center," an electronics store in Bandung, uses various digital systems that are not well-integrated, leading to data inaccuracies and issues in stock management. The inability to effectively integrate different digital systems can result in problems in monitoring inventory, managing transactions, and ensuring consistent data across the systems used. For instance, if their POS (Point of Sale) system is not connected to the inventory management system, sales data cannot be automatically updated in the inventory records, causing inaccuracies in stock reports and potential errors in goods management. This issue can also affect customer service, as staff may not have access to accurate stock information when assisting customers. Solutions to this challenge often involve system upgrades or the development of custom integrations, such as using ERP (Enterprise Resource Planning) software that can unify various functions on one platform to enhance coordination between existing systems. Although these solutions require a significant initial investment, the long-term benefits include improved operational efficiency and better customer service quality.

To address these challenges, several solutions can be implemented. First, enhancing education and training on digital technology is crucial. For example, training programs conducted by the "Ministry of Cooperatives and SMEs" in Indonesia have successfully improved the digital skills of small and medium-sized entrepreneurs, accelerating technology adoption, and helping them leverage digital technology to enhance efficiency and competitiveness. These training programs often involve hands-on training on using digital tools, guidance on implementing the latest technology, and support in developing effective digital strategies. The goal of these programs is to provide practical understanding and skills in using digital technology relevant to their business needs, thereby helping them overcome existing knowledge and skill barriers. With adequate training, SMEs can be better prepared to face technological challenges and utilize digital tools to improve their overall business performance, including aspects such as inventory management, digital marketing, and customer relationship management (Rahayuningsih et al., 2024).

Financial incentives from the government or financial institutions play a crucial role in reducing the cost burden borne by SMEs, particularly in terms of digital technology adoption (Ausat & Suherlan, 2021). Hardware and software subsidy programs, such as the "SME Digitalization Program" launched by the local government in Yogyakarta, provide significant assistance to SMEs in overcoming cost barriers. Through this program, SMEs receive financial assistance for purchasing equipment, training subsidies, and technical support necessary to facilitate the technology implementation process. With these incentives, SMEs can access the required technology without facing heavy cost burdens. This accelerates technology adoption and enables SMEs to remain competitive in an increasingly digital-dependent market. Financial support like this is essential to ensure that SMEs can take advantage of digital opportunities without having to make large initial investments, which often pose the main obstacle for many small and medium-sized businesses.

Improving infrastructure, especially in remote areas, also plays a crucial role in supporting the digital technology adoption by SMEs. Investment in providing better internet access and more affordable hardware,

as seen in the "Digital Village" program in NTB, shows significant positive impacts. This program has successfully enhanced digital technology access and reduced the digital divide between urban and rural areas. With better digital infrastructure, SMEs in remote areas can expand market reach and improve their operational efficiency. Additionally, better access to technology allows them to seize business opportunities previously unavailable, increasing their competitiveness in a broader market. This investment benefits SMEs and contributes to local economic development by opening up access to technology that supports growth and innovation (Kuleh et al., 2023).

Adequate technical support and consultation are vital in helping SMEs overcome the technical issues they may face. Mentoring programs, such as those provided by "Startup Indonesia," offer practical guidance and technical solutions designed to help SMEs effectively implement digital technology. These programs play a role in providing the necessary support to overcome technological challenges and select solutions that suit the specific needs of SMEs. With this guidance, SMEs can more quickly resolve technical difficulties and leverage technology for business growth. Adequate technical support enables SMEs to adopt technology faster and utilize its potential to the fullest, enhancing their ability to compete in the market (Loo et al., 2023).

Data security is an important aspect that must be considered in the implementation of digital technology. Developing affordable and easy-to-use security solutions, such as security software with advanced yet user-friendly data protection features, can help SMEs protect their sensitive information from cyber threats. Security solutions that are easy to implement and manage allow SMEs to maintain data protection without straining their budget. Good data protection preserves customer trust and prevents losses due to data breaches. With the right security solutions, SMEs can focus on business development without worrying about security risks that could disrupt their operations (Rawindaran et al., 2023).

Continuous evaluation and feedback from digital technology users are essential to ensure that the solutions implemented remain relevant and effective. Collecting feedback from entrepreneurs and consumers, as done by the "Digital SMEs Association," allows technology developers to make necessary improvements and adjustments. Ongoing evaluation processes help adapt technology to market needs and business changes. With regular feedback, digital technology can continue to provide maximum benefits to SMEs, ensuring that the solutions used truly meet their needs and help them remain relevant in an ever-evolving market (Subagja et al., 2023).

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The implementation of digital technology in SMEs in Indonesia faces several significant challenges, including a lack of knowledge and technical skills, high implementation costs, and inadequate infrastructure. Other notable challenges are resistance to change, data security issues, technology mismatch with specific SME needs, and lack of technical support and consultation. Nevertheless, various solutions can be applied to overcome these obstacles, such as enhancing education and training, providing financial incentives, improving infrastructure, offering technical support, and developing data security solutions. Real case studies of SMEs like "Warung Sederhana," "Toko Sari Rasa," and "Kios Digital" illustrate relevant challenges and solutions in the context of digital technology adoption.

The findings of this study have important implications for various stakeholders. For the government and policymakers, there should be an emphasis on providing financial incentives and affordable training programs for SMEs. Improving digital infrastructure in remote areas should be a priority to ensure equal access to technology. For financial institutions and technology providers, it is crucial to offer more affordable solutions and adequate technical support for SMEs. Finally, SME entrepreneurs should be recognized as active partners in the digitalization process, with a better understanding of the benefits and risks of digital technology.

To enhance the adoption of digital technology in SMEs, it is recommended that the government and non-governmental organizations expand digital training and education programs tailored to the needs of SMEs, encompassing both technical and managerial skills. Additionally, providing financial incentives or subsidies for purchasing hardware, software, and consultancy services can help reduce the cost burden of technology implementation. Improving digital infrastructure should also be a priority, with investments in better internet access and more affordable hardware, especially in remote areas. Institutions and organizations need to provide adequate technical support and consultation to help SMEs select and implement digital technology that meets their needs. Moreover, developing affordable and user-friendly data security solutions will enhance SMEs' confidence in digital technology. Lastly, it is important to conduct regular evaluations

and collect feedback from entrepreneurs and consumers to ensure that technology solutions remain relevant and effective in meeting SMEs' needs.

This research has several limitations that need to be noted. First, the data used is limited to articles sourced from Google Scholar, which may not cover all relevant literature available. Second, the case study examples provided may not fully represent the entire spectrum of SMEs in Indonesia, so there might be differences in experiences and challenges faced by other SMEs. Third, focusing solely on the perspectives of entrepreneurs and consumers might not include views from other involved parties, such as technology providers and policymakers. Lastly, this research relies more on literature studies than on empirically collected data, which may limit the depth of analysis and generalization of findings.

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