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Adopting Cloud Computing to Improve Business Sustainability An Information Systems Perspective

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ABSTRACT

This study aims to examine how the adoption of cloud computing technology can improve business sustainability from an information system perspective, especially for micro, small and medium enterprises (MSMEs) in Surabaya. Cloud computing offers operational efficiency, reduced infrastructure costs, and supports more environmentally friendly business practices. This research method uses a qualitative approach with in-depth interviews with several MSMEs that have implemented this technology. The findings of the study indicate that the implementation of cloud computing helps MSMEs reduce the use of physical resources, increase access to information, and accelerate decision making. In addition, this technology also increases flexibility and collaboration between parties. However, a number of challenges such as limited understanding of technology, implementation costs, and training needs are still obstacles to wider adoption. This study provides insight for MSME owners and stakeholders, especially the government, regarding the potential of cloud computing to create more efficient and sustainable businesses.

INTRODUCTION

In the midst of rapid technological advancements, digitalization has become a critical element in enhancing business effectiveness, efficiency, and sustainability. One of the most impactful innovations in this transformation is cloud computing. This technology enables enterprises, including Micro, Small, and Medium Enterprises (MSMEs), to access online-based services flexibly, optimize resource utilization, reduce operational costs, and focus on business development without the burden of managing complex IT infrastructures. In an era of global competition and dynamic market shifts, cloud computing serves as a strategic solution to enhance the competitiveness of MSMEs.

However, the adoption of cloud computing among Indonesian MSMEs continues to face significant barriers. Recent studies have revealed that while many MSME actors acknowledge the importance of digital technology, a large proportion remain uncertain about which technologies are most suitable for their business

needs (Mastercard Center for Inclusive Growth, 2024). Key obstacles include limited digital literacy, affordability issues related to implementation, unstable internet infrastructure, and lack of training or technical assistance. A report by AWS (2023) found that only 29% of Indonesian MSMEs currently utilize basic cloud services such as storage and email, highlighting a persistent digital divide that must be addressed. This issue is also evident in Surabaya, one of Indonesia's major cities and economic centers. Despite having significant MSME growth potential, the adoption of cloud-based technology in this area remains suboptimal. A study by Syairudin and Nabila (2024) emphasizes the need for tailored cloud computing adoption models that align with the unique characteristics of MSMEs to support the implementation of Industry 4.0 strategies. Furthermore, Ruslaini and Rizal (2024) argue that technological readiness and an organizational learning culture are critical success factors in digital transformation, both of which continue to be challenging for MSMEs.

Unfortunately, most prior research has focused on large-scale enterprises or applied quantitative approaches that fail to capture the lived experiences of small business actors. Scholarly attention to cloud computing adoption from an information systems perspective, especially as it relates to business sustainability in urban MSMEs like those in Surabaya, remains scarce. This forms a clear **research gap** that the present study aims to address. The **novelty** of this research lies in its in-depth qualitative exploration of the experiences, perceptions, and challenges faced by MSMEs in adopting cloud computing, offering a rich narrative that previous studies have largely overlooked.

Based on the aforementioned conditions, this study poses the following **research questions**: (1) How do MSMEs in Surabaya experience the adoption of cloud computing in supporting business sustainability? (2) What are the key challenges faced by MSMEs in Surabaya in adopting cloud computing technology? and (3) How can information systems play a role in facilitating the adoption of cloud computing by MSMEs amidst national digital market competition? The answers to these questions are expected to provide both theoretical and practical contributions to the development of inclusive and sustainable technology adoption strategies for MSMEs in Indonesia.

LITERATURE REVIEW

Cloud Computing and Business Sustainability

Cloud computing has become a rapidly growing technology and has had a significant impact on the way companies manage their IT infrastructure. According to Zhang, L., & Chen, X. (2024), cloud computing offers various advantages, such as cost savings, flexibility, and scalability, which allow companies to focus more on developing their core business. This technology also helps companies reduce their carbon footprint by optimizing energy usage and reducing the need for physical resources (Kumar, A., & Singh, R., 2024). Cloud computing also improves operational efficiency, which can strengthen the competitiveness of companies and create opportunities for sustainable business.

Cloud Computing in Small and Medium Enterprises (SMEs)

The application of cloud computing in micro, small and medium enterprises (SMEs) is still developing despite the many benefits offered. SMEs often face challenges in adopting new technologies due to limited resources and technological knowledge (Sari, T. L., 2024). However, research shows that cloud computing can provide a solution for SMEs by enabling them to access previously unaffordable technologies, without requiring large investments in infrastructure Zhang, L., & Chen, X. (2024). This technology helps SMEs increase efficiency, reduce operational costs, and respond to market changes faster.

Challenges in Adopting Cloud Computing in SMEs

Despite the many advantages offered, the adoption of cloud computing by MSMEs faces several obstacles. Patel, S., & Sharma, V. (2024) stated that the main problems in the adoption of cloud computing in MSMEs are initial costs, lack of understanding of technology, and issues related to privacy and data security. In addition, the management and integration of existing systems with cloud technology is also a

major challenge for MSMEs that do not have sufficient IT staff. Research by Zhu et al. (2010) also shows that fear of the risk of dependence on cloud service providers often hinders MSMEs' decisions to adopt this technology.

Cloud Computing and Environmental Sustainability

One of the main advantages of cloud computing in the context of sustainability is its impact on the environment. Cloud services allow companies to share resources, leading to reduced energy consumption and carbon emissions (Johnson, M., & Davis, T., 2024). Cloud data centers are often more energy efficient than traditional IT infrastructure, as they can optimize the use of servers and other devices (Patel, S., & Sharma, V., 2024). By using cloud computing, companies can reduce their carbon footprint and contribute to global sustainability goals.

Information Systems Perspective in Cloud Computing Adoption

Information systems play a crucial role in the adoption of cloud computing by companies. According to Lee, J., & Park, S. (2024), the success of cloud computing implementation depends on how companies design and manage their information systems. An effective information systems approach ensures smooth integration between cloud technology and existing business processes, so that companies can maximize their benefits. Well-managed information systems also help companies monitor and evaluate the sustainability impacts generated by the use of cloud computing.

Related Research in Surabaya

Surabaya, as a major business center in Indonesia, provides a significant opportunity to study the adoption of cloud computing among MSMEs. Several local studies have shown that although MSMEs in Surabaya have started to use new technologies, their understanding and training on cloud computing are still limited Gupta, P., & Desai, A. (2024). This study aims to provide deeper insight into the experiences of MSMEs in Surabaya in implementing cloud computing and the challenges they face in adopting this technology to support business sustainability.

This literature review reveals that cloud computing has great potential to improve business sustainability, especially in terms of operational efficiency and reducing environmental impacts. Despite offering various benefits, the adoption of cloud computing among MSMEs is still hampered by several obstacles, such as cost, understanding of technology, and system integration. This study aims to close the existing gap by studying how cloud computing affects MSMEs in Surabaya and the challenges they face in the process of adopting this technology (Santoso, H., & Yuliana, R., 2024).

RESEARCH METHODS

This study adopts a qualitative descriptive approach to deeply explore the experiences, challenges, and the role of information systems in the adoption of cloud computing by MSMEs in Surabaya, particularly in relation to their business sustainability. This approach is chosen to capture the social dynamics and real-life contexts faced by MSME actors, which cannot be adequately represented through quantitative methods. Data were collected through semi-structured interviews with MSME actors selected through purposive sampling, ensuring a diverse representation of experiences in both adoption and non-adoption of cloud computing. Informants were chosen based on criteria such as business sector, level of technological adoption, and involvement in the digitalization process. This approach allows the researcher to gain broad and in-depth perspectives aligned with the research focus.

The interviews focused on key aspects such as understanding of cloud computing technology, perceived benefits, implementation challenges, and the strategic contribution of information systems in facilitating technology adoption. The data were analyzed using a thematic analysis method, which involved coding, identifying patterns, and synthesizing main themes that reflect the actual experiences and challenges of MSMEs. To ensure data validity and credibility, the study employed triangulation of sources and methods, as well as member checking by confirming the interpretation of findings with the participants. The research

also adhered to essential ethical principles, including obtaining informed consent, maintaining participant confidentiality, and ensuring that participation was entirely voluntary.

RESULT AND DISCUSSION

Cloud Computing Usage Experience by MSMEs

The results of interviews with five MSMEs that have adopted cloud computing indicate that most of them feel this technology has helped improve operational efficiency and reduce costs. They believe that cloud computing facilitates faster and more flexible access to data and business applications without the need for expensive IT infrastructure. One respondent, who operates a retail business in Surabaya, mentioned that cloud computing helps manage inventory and transactions in real-time, which speeds up decision-making and enhances customer service. Similar findings have been observed by Gupta and Desai (2024), who argue that cloud computing significantly enhances business sustainability by streamlining operations and cutting costs. However, several MSMEs also cited challenges in adopting this technology. The main obstacles reported include a lack of technical knowledge and data security concerns. Some MSMEs worry about the risk of data breaches and their dependency on cloud service providers. Despite these concerns, they still believe the benefits outweigh the challenges, a sentiment echoed in studies by Kumar and Singh (2024), who highlight that the advantages of cloud adoption often surpass the initial implementation barriers.

Experience of MSMEs That Have Not Used Cloud Computing

In contrast, interviews with five MSMEs that have not adopted cloud computing revealed that they are hesitant to switch due to concerns about the initial costs and difficulties in understanding the technology. Many continue to rely on manual systems or traditional software, which require more intensive maintenance and management. Despite knowing the potential benefits of cloud computing, they are reluctant to adopt it due to the monthly subscription fees and the need for staff training. One respondent from the food and beverage sector remarked, "We are more comfortable with the existing system even though it is sometimes less efficient." Similarly, Lee and Park (2024) note that SMEs often remain reliant on outdated systems due to perceived high upfront costs and concerns over technological complexity. However, several MSMEs expressed willingness to adopt cloud computing in the future, provided they gain a better understanding of how to use it and see tangible benefits. They are interested in the cost reductions and increased flexibility offered by cloud computing, although they still feel the need for reassurance regarding data security and adequate training, a concern similarly raised in the work by Patel and Sharma (2024).

The Impact of Cloud Computing on Business Sustainability

The results from both groups of MSMEs demonstrate that the use of cloud computing has a positive impact on business sustainability. For MSMEs that have adopted the technology, they reported increased efficiency, reduced costs, and ease in centralized data management. Cloud computing also offers them greater flexibility in responding to market changes and enhances competitiveness by providing access to the latest technologies. This aligns with findings by Hasan (2024), who discusses how cloud computing enables SMEs to remain agile and responsive to market demands, thus fostering long-term business sustainability. On the other hand, MSMEs that have not adopted cloud computing still face limitations in terms of operational efficiency and the use of more advanced technologies. While they are able to continue operating manually, this approach makes them less efficient and at risk of losing competitiveness. Putra (2024) also highlights that the failure to adopt cloud computing may hinder an SME's ability to thrive in a rapidly evolving digital economy.

Comparison between the Two Groups

Comparing the two groups reveals that cloud computing adoption offers significant advantages in terms of operational efficiency, flexibility, and cost reduction. However, obstacles such as high initial costs, lack of technical knowledge, and concerns about data security remain significant barriers. MSMEs that have not yet adopted cloud computing tend to be apprehensive about the risks associated with the technology, despite recognizing the substantial potential benefits, as similarly pointed out by Johnson and Davis (2024), who emphasize the importance of clear understanding and proper implementation for successful adoption.

Discussion

Overall, this study shows that cloud computing has great potential to support the sustainability of MSME businesses. Although there are challenges in adopting this technology related to costs, knowledge, and security, the benefits gained in terms of operational efficiency and flexibility are much greater. To encourage the adoption of cloud computing, further efforts are needed in terms of training, understanding, and socialization regarding the advantages of this technology, as well as providing assurance regarding data security.

However, there are challenges in adopting this technology, such as initial costs, concerns about data security, and limited technical knowledge. MSMEs that have not utilized cloud computing generally still feel hesitant because of these factors, even though they are aware of the potential benefits of this technology. Therefore, in order for more MSMEs to adopt cloud computing, more intensive efforts are needed in training, socialization, and improving data security assurance.

This study also shows that cloud computing can play an important role in supporting the sustainability of MSME businesses, especially in increasing efficiency, flexibility, and competitiveness. Although challenges in adopting this technology still exist, the benefits gained are much greater, especially in terms of cost reduction and operational improvement. To encourage wider adoption of cloud computing among MSMEs, there needs to be a collaborative effort between the government, cloud service providers, and MSME players in providing adequate training, counseling, and security solutions, so that MSMEs can utilize this technology to achieve long-term success.

CONCLUSIONS

Based on the results of this study, it can be concluded that the use of cloud computing has a significant impact on the sustainability of MSME businesses. MSMEs that have adopted cloud computing experience increased operational efficiency, reduced costs, and increased flexibility and competitiveness. With cloud computing, they can access data faster, manage information in a more structured way, and adapt more easily to market changes, all of which contribute to the sustainability of their businesses.

Overall, cloud computing has great potential to support the sustainability and competitiveness of MSMEs, especially in facing business challenges in the digital era. Support from various parties, such as the government, cloud service providers, and educational institutions, is essential to accelerate the adoption of this technology, so that MSMEs can maximize their business potential and achieve long-term success.

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