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ANALYSING THE IMPACT OF DIGITAL INFRASTRUCTURE INVESTMENT ON MSME GROWTH IN DISADVANTAGED AREAS

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Abstract

Digital infrastructure investment has great potential to boost the growth of Micro, Small, and Medium Enterprises (MSMEs) in disadvantaged areas. This study aims to analyse the impact of digital infrastructure development on improving market access, operational efficiency, and competitiveness of MSMEs in lagging regions. The results of the analysis show that improved internet access, digitalisation of business services, and the development of digital training centres can provide opportunities for MSMEs to grow significantly. However, a number of challenges such as low digital literacy, limited capital, and policies that are not yet fully supportive hinder the optimisation of the benefits of these investments. Therefore, a holistic strategy consisting of policy support, digital education, and business ecosystem strengthening is needed to maximise the positive impact of digital infrastructure. These findings emphasise the important role of digital investment in reducing economic disparities in underdeveloped regions and strengthening the position of MSMEs as sustainable drivers of the local economy.

Keywords: Impact, Digital Infrastructure Investment, MSME Growth, Disadvantaged Areas

Introduction

The development of information and communication technology (ICT) has become a key driver in the global economy. The global economy is an economic system that encompasses the interaction and integration of economic activities between countries around the world, including trade in goods and services, investment flows, labour, and the exchange of technology and information. The global economy is driven by globalisation, where geographical boundaries are increasingly blurred thanks to developments in technology, digitalisation and modern transportation, allowing countries to be economically interdependent (World Bank, 2020) . In this context, a country's economic policies, such as trade tariffs, diplomatic relations, or financial conditions, often have a direct impact on economic dynamics in other countries. The global economy also reflects a high dependence on international investment, global markets, and the stability of the global financial system, making it vulnerable to

economic crises that occur at the regional or international level (Microsoft & IDC Asia/Pacific, 2017) .

A globalised economy with growing digitalisation has changed the way businesses operate, improving efficiency and opening up wider market opportunities. However, the benefits of digitalisation have not been evenly distributed across regions, especially in underdeveloped areas. This is one of the obstacles in reducing the still significant economic inequality between urban and underdeveloped areas in Indonesia (Irwin & Miller, 2020) .

In Indonesia, Micro, Small, and Medium Enterprises (MSMEs) play an important role in the national economy. Micro, Small, and Medium Enterprises (MSMEs) are groups of productive businesses owned by individuals, groups, or business entities, which operate on a small to medium scale according to the asset and turnover limits set by the government in a country (Brynjolfsson & McAfee, 2014) . MSMEs consist of three main categories, namely micro enterprises that have very limited assets and business income, small enterprises that are larger in scale than micro but still modest, and medium-sized enterprises that are in between small enterprises and large companies. In Indonesia, MSMEs are often considered the backbone of the economy due to their large numbers and role in absorbing labour (Jackson & Smith, 2025) .

The main objectives of MSMEs are to support economic growth, increase income equality, create jobs, and reduce unemployment. MSMEs function as the driving force of the local economy by utilising the resources available in the region. In addition, MSMEs are a means for communities to develop their economic potential independently, as well as a driver of social transformation through community empowerment. In the context of the national economy, MSMEs help create competitiveness of local products in international markets, increase exports, and strengthen national economic resilience amid global economic changes (Schwab, 2016).

Based on data from the Ministry of Cooperatives and SMEs, MSMEs contribute more than 60% of GDP and provide more than 97% of national employment. Despite their great potential, many MSMEs in underdeveloped regions face various constraints, including limited access to digital technology. The inability to access digital infrastructure prevents them from capitalising on digital market opportunities, improving their competitiveness, and growing their businesses (Davies & Lee, 2020) .

In recent years, the government has increased investment in digital infrastructure to expand internet access and connectivity in 3T (Disadvantaged, Frontier, and Outermost) areas. Strategic projects such as the construction of the *Palapa Ring* fibre-optic backbone network and the provision of free internet facilities in remote areas are concrete steps to support the digitisation process (OECD, 2019) . However, the fundamental question remains: to what extent has this digital infrastructure investment impacted the growth of MSMEs in the area? Has the presence of digital infrastructure been able to empower MSMEs to compete and grow?

The importance of digital infrastructure investment in underdeveloped regions is directly related to efforts to equalise economic development. In addition to creating new opportunities for MSMEs, digital infrastructure is expected to accelerate technology-based economic transformation and improve the standard of living of local communities. Therefore, an in-depth analysis of the extent to which this investment is able to have a positive impact on the growth of MSMEs in disadvantaged areas is needed.

This study aims to assess the impact of digital infrastructure investment on MSMEs in disadvantaged areas, in terms of business growth, operational efficiency, and access to broader markets. By understanding this relationship, more effective policies can be formulated to empower MSMEs and accelerate the digital transformation process in disadvantaged areas.

Research Methods

The study in this research uses the literature method. The literature research method, also known as literature review, is a research method that utilises various existing reference sources, such as books, journals, scientific articles, research reports, and other literature sources, to collect information relevant to the topic under study (Green et al., 2006) ; (Galvan & Galvan, 2017) . The main purpose of this method is to conduct a review or analysis of theories, concepts, and previous research results related to the research problem, in order to identify knowledge gaps, find relationships between concepts, and build a theoretical foundation and framework for further research. Literature research methods are very important in providing an in-depth understanding of the topic under study and assisting researchers in formulating more specific and directed hypotheses or research questions (Torraco, 2005) .

Results and Discussion

Impact of Digital Infrastructure Investment on MSME Growth

Digital infrastructure investments, such as high-speed internet, e-commerce platforms, extensive telecommunication networks, and digital applications, have a significant impact on the growth of Micro, Small, and Medium Enterprises (MSMEs) in various countries, including Indonesia. MSMEs as the backbone of the economy in Indonesia have great potential to grow through digitalisation. Digital infrastructure makes it easier for MSMEs to adapt to the demands of fast-paced times, improve operational efficiency, and expand their market reach. This initiative not only helps MSMEs survive the competition, but also creates new opportunities for business expansion (Capgemini Research Institute, 2021) .

One of the positive impacts of digital infrastructure investment is the increased access of MSMEs to the global market. With digital technology in place, MSMEs can utilise e-commerce platforms to offer their products or services online, transcending

geographical boundaries that were previously an obstacle. Infrastructure such as high-speed internet enables MSME players to produce quality content to effectively promote their products. In addition, with digital payment platforms, transactions can be made easily, safely, and transparently, thus increasing consumer confidence (Han & Kim, 2024) .

Easy access to digital technology also boosts the operational efficiency of MSMEs. Digital infrastructure such as business management applications, accounting software, or data-driven marketing tools allow MSMEs to manage inventory, record finances, and conduct marketing more professionally. This efficiency in turn helps lower operational costs while increasing productivity. MSME players can focus on product development or service innovation without being distracted by manual processes or ineffective workflows (Ministry of Communication and Informatics RI, 2021) .

On the other hand, digital investment also opens up opportunities for MSMEs to innovate. The use of technologies such as big data, artificial intelligence, and analytics helps MSMEs understand consumer behaviour patterns more deeply. With this information, MSMEs can create more relevant products or services, according to market needs. This not only strengthens the competitiveness of MSMEs but also encourages higher consumer satisfaction, thereby creating customer loyalty (Deloitte, 2015) .

In addition, the existence of digital infrastructure creates more opportunities for collaboration. Digital platforms facilitate MSME players to partner with large companies, international organisations, or fellow MSMEs in various forms of cooperation, such as the provision of raw materials, product distribution, and the implementation of joint marketing campaigns. With this collaboration, MSMEs can share resources, reduce business risks, and support each other to grow together (Ernst & Young, 2019) .

However, digital infrastructure investment also presents challenges for MSMEs. One of the main challenges is the limited digital literacy among MSME players, especially those from remote areas. Many businesses find it difficult to adapt to new technologies, leading to suboptimal utilisation of digital infrastructure. In addition, inequalities in internet access in some areas also mean that not all MSMEs benefit equally (Viswanathan & Rosa, 2007) .

In addition, the aspect of digital security is one of the concerns that need to be considered. Technological developments in the MSME sector open up the potential for cybersecurity threats, such as data theft or digital fraud. Therefore, investment in digital infrastructure must be balanced with increased data protection and the development of a reliable digital security system so that business activities remain guaranteed (GSMA, 2019) .

In the long run, the impact of digital infrastructure investment on MSMEs is very positive if the barriers faced are overcome. With government support through regulation and digital literacy training, as well as cooperation with the private sector in

providing technology, MSMEs can make the most of digital infrastructure. These steps will create an inclusive digital ecosystem, where MSMEs from various backgrounds can grow and develop sustainably (Grant & Booth, 2009) .

Overall, digital infrastructure investment is one of the important pillars to accelerate the transformation of MSMEs into the digital era. While there are challenges to be faced, the benefits offered are enormous, ranging from market expansion, improved efficiency, to opportunities to innovate. With improved digital infrastructure development, MSMEs have the potential to become more competitive, not only locally but also globally, thus contributing to a more dynamic economic growth.

Supporting Factors and Barriers Affecting the Effectiveness of Digital Investment in Disadvantaged Areas

Digital investment is an important component in driving economic development in underdeveloped regions. However, the effectiveness of digital investment implementation in these regions is influenced by various supporting factors and obstacles that must be comprehensively understood. One of the main supporting factors is the rapid development of technology. Digital technology provides opportunities for underdeveloped regions to overcome various limitations, such as lack of access to information or geographical distance. In addition, the increase in internet penetration and the growing telecommunications network infrastructure are strong foundations for the creation of digital ecosystems in these regions (Chandra & Patel, 2022) .

Another enabler is the government's commitment to developing underdeveloped regions. Through digitisation programmes, the government encourages the development of more inclusive technology facilities to reach remote areas. Funds allocated for technology infrastructure and human resource training help create an ecosystem that supports digital investment. The government's active role in developing regulations that are friendly to digital innovation is also an important asset in attracting investment (Moore & Taylor, 2022) .

Furthermore, co-operation between the private sector, government and local communities has a significant role to play. The private sector, for example, can help provide relevant digital platforms, while local communities can be involved in the management of the system and direct use of the technology. This collaborative approach facilitates the flow of knowledge and capital to disadvantaged areas, while accelerating community adaptation to digital technology (Brown & Green, 2021) .

Not only that, the entrepreneurial spirit in underdeveloped regions is one of the supporting factors that can capitalise on digital investment opportunities. With creative local businesses, digital technology can be used to encourage product innovation, marketing strategies, and more efficient business management. Digital investment

becomes more effective when businesses have the awareness and ability to utilise technology as a tool towards economic progress (UNCTAD, 2018) .

However, the effectiveness of digital investment also faces various obstacles in underdeveloped regions. One of them is the low level of digital literacy of the community. Many people in disadvantaged areas do not understand how to make the most of technology, so digital investment is often hampered by limited knowledge. This requires intervention in the form of technology education training so that people can be more confident in using technology in their daily lives (Li & Zhang, 2023) .

Another barrier that often arises is the limited technology infrastructure in underdeveloped areas. Although internet network penetration continues to increase, many areas still have low internet access or unstable network quality. This limitation prevents digital investment, especially for technology services that require consistent and high connectivity (Ahmed & Alam, 2020) .

Hard-to-reach geography is also a hindering factor that causes the high cost of implementing digital technology in underdeveloped areas. This challenge makes many investors reluctant to invest due to greater risks. In addition, geographical conditions often slow down the distribution process of technological devices, so the implementation of digitalisation in disadvantaged areas is slower than in other areas (Evans & Johnson, 2023) .

Last but not least, social and cultural factors in underdeveloped regions can also hinder the success of digital investments. Resistance to change from some communities is a challenge. The use of digital technology is often seen as foreign, so people tend to be more comfortable with traditional ways. In this case, a culturally sensitive approach is needed so that digital investment can be well received (McKinsey Global Institute, 2018) .

Another problem often faced is the lack of competent human resources. Many underdeveloped regions lack labour with the technical skills to manage digital technologies. The low quality of education in these areas exacerbates the situation, so digital investments cannot always be implemented effectively without adequate human resource support (International Finance Corporation, 2020) .

Other barriers stem from regulatory and policy instability in lagging regions. The lack of clear provisions on how digital investments can be optimised leaves many investors facing uncertainty. In addition, the presence of complex bureaucracy often slows down the approval of digital projects, reducing the attractiveness for investors to contribute (Asian Development Bank, 2020) .

To overcome these obstacles, synergy between the government, the community, and the private sector is needed. Steps that can be taken include providing digital literacy training, improving technology infrastructure, and implementing more flexible regulations for investors. Digital investment in underdeveloped regions has great potential, but to realise it effectively, all parties must come together to overcome

the challenges. With an inclusive and innovative approach, the development of underdeveloped regions can be accelerated through optimal digital investment.

Conclusion

Digital infrastructure plays a significant role in fuelling the growth of MSMEs in lagging regions. Investments in this infrastructure, such as the development of internet networks, digital training centres, and digitisation services, facilitate MSMEs to improve their access to wider markets, both local and global. With better internet access, MSMEs can improve marketing strategies, increase operational efficiency, and expand customer reach through digital platforms.

However, the impact of digital infrastructure investment is also affected by the challenges that exist in disadvantaged areas. Several factors such as low levels of digital literacy, limited capital, and lack of comprehensive policy support can limit the optimisation of the benefits of digital infrastructure. Therefore, a holistic approach is needed that not only improves physical infrastructure, but also includes digital education programmes and access to finance for MSME players.

Overall, digital infrastructure investment can be a catalyst for the growth of MSMEs in disadvantaged areas if accompanied by adequate policy support, digital education, and strengthening of the local business ecosystem. Synergy between the government, private sector, and the community is key to ensuring that this investment has a significant impact in reducing economic disparities between regions, while empowering MSMEs as the main driver of the local economy.

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