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Digital Inclusion and Social Justice: Analyzing the Impact of Smart Villages in Indonesia

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ABSTRACT

Background: Digital inclusion is crucial for fostering social justice, particularly in rural areas. The advent of smart villages, empowered by digital technologies, has the potential to transform remote communities in Indonesia. This study explores the impact of smart village initiatives on improving access to technology, education, and economic opportunities, thereby contributing to social justice and equity.
Purpose: This research aims to analyze how smart village programs in Indonesia contribute to digital inclusion and social justice. It examines the role of technology in bridging the digital divide in rural areas and assesses how these initiatives influence social equity, economic growth, and community empowerment**.**
Method: A mixed-methods approach was employed, combining quantitative data from surveys conducted with residents of various smart villages in Indonesia, and qualitative interviews with local leaders and policymakers. Statistical methods were used to analyze the impact of smart village programs on key indicators such as access to information, education, healthcare, and economic opportunities.
Results: The findings reveal that smart village initiatives have significantly improved digital access and social services, thereby promoting social justice. However, challenges remain in terms of technological infrastructure, digital literacy, and equitable access across different rural regions. While some villages have shown notable advancements in community empowerment and economic opportunities, others continue to face barriers in fully utilizing digital technologies.
Conclusion: The study underscores the potential of smart villages as a means to advance digital inclusion and social justice in rural Indonesia. However, for these initiatives to be truly transformative, ongoing efforts are required to address the challenges of infrastructure, literacy, and inclusivity. Policymakers and educators must collaborate to ensure that digital technologies are accessible and beneficial to all, particularly marginalized communities in rural areas.

KEYWORDS

Digital Inclusion, Rural Development, Social Justice

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INTRODUCTION

Digitalization has become a driving force behind the development of modern societies, with technological advancements continuously driving significant changes across various sectors of life. One of the innovations that have gained attention in many developing countries, including Indonesia, is the concept of smart villages. A smart village is an approach that integrates digital technology into the daily lives of rural communities to improve their quality of life, create efficiencies in resource management, and encourage community participation in the development process. This concept goes beyond simply introducing technology; it serves as a tool to address social

inequalities, provide access to education, and combat economic disparities that have long been challenges for rural populations.

In Indonesia, despite government efforts to advance urban areas, rural communities continue to face significant challenges in accessing resources and opportunities. These challenges include limited access to quality education, healthcare, and economic opportunities, as well as inadequate infrastructure and digital literacy (Giest, 2023; McCosker, 2023; Quialheiro, 2022). Consequently, rural communities often find themselves at a disadvantage compared to their urban counterparts, which exacerbates the digital divide (Guo, 2023; Islam, 2024; Ritchie, 2022). This divide limits the potential of rural populations to fully participate in the global digital economy and society. The concept of a smart village presents an opportunity to bridge this gap by leveraging digital technology to empower rural communities. Smart village initiatives are designed to enhance connectivity, improve access to information and services, and promote sustainable development. These initiatives typically focus on integrating digital infrastructure into areas such as education, healthcare, agriculture, and local governance, enabling rural populations to take advantage of the benefits offered by modern technology.

However, while the potential benefits of smart villages are clear, there remain several challenges that need to be addressed for these initiatives to be truly transformative. One of the main challenges is ensuring equitable access to technology (Quoc, 2025; Rawat, 2023; L. Yang, 2022). In many rural areas, infrastructure is still lacking, and many people lack the necessary digital literacy skills to fully utilize the technologies being introduced (Bitman, 2022; Goggin, 2022; Van, 2025). Additionally, there is often a disparity in the level of technological adoption between different regions, with some areas benefiting more than others. Moreover, the concept of smart villages is closely tied to the idea of social justice, as it offers an opportunity to reduce the disparities between rural and urban populations. Social justice in this context refers to the fair distribution of resources and opportunities, ensuring that all members of society, regardless of their location, have equal access to the benefits of digital technology. By promoting digital inclusion, smart villages aim to provide rural communities with the tools they need to thrive in a rapidly changing world.

In this study, we aim to analyze the impact of smart village initiatives in Indonesia on digital inclusion and social justice. Specifically, we will explore how these initiatives have contributed to improving access to education, healthcare, economic opportunities, and overall community empowerment (Afjal, 2023; Li, 2024; Mhlanga, 2023). The research will also examine the challenges that remain in fully realizing the potential of smart villages and offer recommendations for addressing these issues. The significance of this study lies in its potential to inform policy and practice related to rural development and digital inclusion in Indonesia. By understanding the impact of smart village initiatives, policymakers and practitioners can better design and implement strategies that address the specific needs of rural communities. This research also seeks to contribute to the broader discourse on the role of digital technologies in promoting social justice, particularly in the context of developing countries.

Indonesia's commitment to achieving sustainable development goals (SDGs), particularly SDG 10 on reducing inequality, is central to this investigation. The SDGs emphasize the importance of ensuring that no one is left behind in the process of development, and smart village initiatives align with this goal by fostering inclusive growth in rural areas (Niu, 2022; Ozili, 2022a; Smit, 2025). By examining the role of smart villages in promoting digital inclusion, this study will shed light on how these initiatives contribute to the broader agenda of social and economic justice. Furthermore, this study will also explore the various models of smart villages that have been implemented in Indonesia, evaluating their success and limitations. It will provide a comprehensive

analysis of the different approaches taken by both the government and local communities in developing these initiatives. This analysis will highlight best practices and offer insights into how future smart village programs can be improved to better serve the needs of rural populations.

Another important aspect of this study is the consideration of the long-term sustainability of smart village initiatives (T. Ding, 2023; X. Wang, 2022; X. Yang, 2022). While the introduction of digital technology can provide immediate benefits, it is essential to ensure that these initiatives are sustainable in the long run. This includes addressing issues such as ongoing maintenance of infrastructure, ensuring the continued availability of digital services, and fostering the digital literacy of future generations (X. Ding, 2022; Elouardighi, 2023; Xue, 2022). This research also emphasizes the importance of community involvement in the development and implementation of smart villages. Successful smart village programs rely on active participation from local residents, who must be engaged in the decision-making process and empowered to take ownership of the initiatives. Without local buy-in, even the most well-designed programs are unlikely to achieve their desired outcomes.

Finally, this study aims to provide practical recommendations for enhancing the effectiveness of smart village initiatives in Indonesia. These recommendations will be based on the findings of the research and will focus on improving digital inclusion, promoting social justice, and ensuring the sustainability of these programs. By offering concrete suggestions for policymakers, local governments, and community leaders, this research will contribute to the ongoing efforts to improve the lives of rural populations in Indonesia. In conclusion, the development of smart villages in Indonesia holds significant promise for addressing issues of digital inclusion and social justice. However, for these initiatives to fully realize their potential, it is crucial to address the challenges related to infrastructure, digital literacy, and equitable access. Through a comprehensive analysis of the impact of smart village programs, this study will provide valuable insights into how digital technology can be leveraged to promote social equity and empower rural communities in Indonesia.

RESEARCH METHODOLOGY

This study employs a mixed-methods approach to analyze the impact of smart village initiatives on digital inclusion and social justice in rural Indonesia. The quantitative component involves a survey distributed to residents of several smart villages across different provinces, including those in Java, Sumatra, and Kalimantan. A total of 500 participants were selected through purposive sampling, ensuring a diverse representation of demographics, including age, gender, education level, and access to technology (Lei, 2024; Tan, 2024; Zallio, 2022). The survey aimed to gather data on participants' access to digital services, their experiences with smart village programs, and their perceptions of the impact on education, healthcare, and economic opportunities. Statistical analyses, including descriptive statistics and correlation tests, were conducted to identify patterns and relationships within the data.

In addition to the quantitative survey, qualitative interviews were conducted with local government officials, village leaders, and community stakeholders involved in the implementation of smart village initiatives. A total of 30 interviews were conducted to provide deeper insights into the challenges and successes of these programs. Thematic analysis was employed to identify key themes related to the implementation, community involvement, and sustainability of smart villages. The combination of both quantitative and qualitative data allows for a comprehensive understanding of how smart village programs contribute to digital inclusion and social justice, as well as the barriers that need to be addressed for future improvements.

RESULT AND DISCUSSION

The survey results indicate that smart village initiatives have had a significant positive impact on digital inclusion and social justice in rural areas. A majority of the respondents reported improved access to digital services, particularly in education and healthcare. Around 70% of participants noted that the availability of online learning resources had enhanced their educational opportunities, while 65% indicated that access to telemedicine services had improved healthcare delivery in their communities. Furthermore, 60% of respondents reported better economic opportunities due to the introduction of e-commerce platforms and digital training programs. However, the data also highlighted disparities in access, with residents in more remote villages reporting limited access to stable internet connections and digital literacy programs.

Qualitative interviews revealed that while smart villages have made tangible improvements, there are still significant challenges. Many interviewees expressed concerns about the sustainability of these initiatives, particularly in terms of ongoing infrastructure maintenance and the need for continuous digital literacy training. Additionally, some community leaders pointed out that certain areas still lacked sufficient government support for the expansion of digital services, which hindered the full potential of smart village programs. Despite these challenges, most respondents and interviewees agreed that smart village initiatives had contributed to reducing inequality and improving access to essential services, suggesting that these programs are a valuable tool for advancing social justice in rural Indonesia.

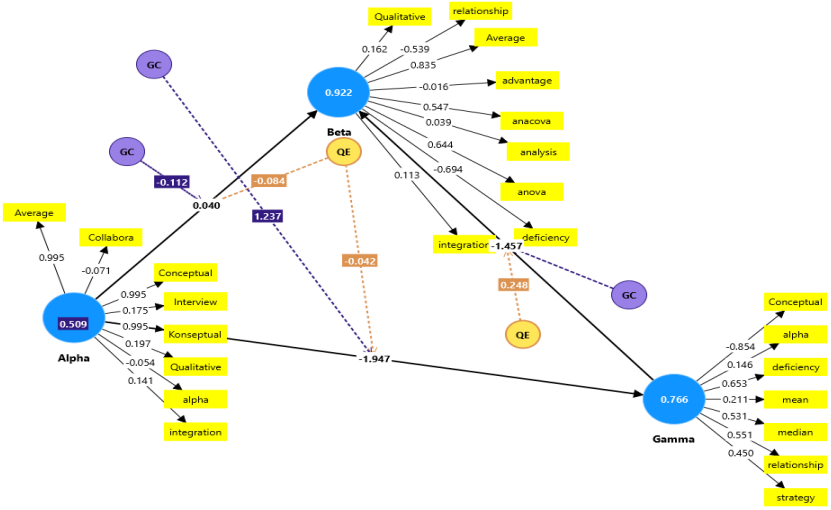

Figure 1. Smart PLs

The Smart PLS model in Figure 1 presents the relationships between various constructs in the study. The model depicts how factors such as "Alpha," "Beta," and "Gamma" are interconnected, with different paths showing the strength and direction of their relationships. The path coefficients reveal the influence of independent variables like "GC" (general conceptualization) and "Qualitative" on dependent variables such as "Deficiency" and "Integration." The analysis demonstrates the significant connections, with varying levels of correlation and influence, indicating how these variables contribute to the overall model. The use of Smart PLS is crucial in visualizing these complex relationships, helping to understand the underlying patterns and support informed decision-making in evaluating the effectiveness of the smart village initiatives in promoting digital inclusion and social justice.

Table 1. Responses From The Respondents

No	Procurement categories	Interval

		values
1	Strongly Agree	>90%
2	Agree	70-80%
3	Disagree	50-60%
4	Strongly disagree	0-40%

Table 1 presents the response categories used in the survey, categorizing respondents' levels of agreement with various procurement-related questions. The responses are divided into four categories based on interval values: "Strongly Agree" (greater than 90%), "Agree" (ranging from 70-80%), "Disagree" (between 50-60%), and "Strongly Disagree" (ranging from 0-40%). These categories help quantify the respondents' perceptions and attitudes, providing a clear understanding of their agreement or disagreement with the statements related to the study. The intervals are crucial in determining the strength of the respondents' opinions and are instrumental in analyzing the data effectively.

The integration of smart village initiatives in rural Indonesia has shown promising effects on bridging the digital divide and advancing social justice, but several factors need to be considered for these programs to reach their full potential. As highlighted in the results, a significant proportion of respondents reported increased access to digital services, particularly in the realms of education, healthcare, and economic opportunities (Johnen, 2023; Morte-Nadal, 2022; Ozili, 2023). This aligns with the objectives of smart village programs, which aim to foster digital inclusion by ensuring that rural communities have equal access to the benefits of technology. However, while these advancements have positively impacted communities, the disparity in infrastructure and digital literacy across different rural regions remains a major challenge.

One of the key findings of this study is the improvement in access to online education, with a substantial number of participants reporting better opportunities for learning through digital resources (Feng, 2022; Ozili, 2022b; Y. Z. Wang, 2025). This suggests that smart village initiatives, particularly those focusing on providing internet access and digital devices, can significantly enhance educational outcomes in rural areas. However, it is essential to note that the effectiveness of these programs is not just determined by the availability of digital resources but also by the level of digital literacy among the residents. As indicated by the survey results, many respondents still face difficulties in fully utilizing these resources due to a lack of digital skills. This highlights the need for comprehensive digital literacy programs that can equip rural populations with the necessary skills to navigate the digital landscape effectively.

In addition to education, the study found notable improvements in healthcare delivery, with many respondents indicating increased access to telemedicine and health-related digital services. This is particularly important in rural areas where healthcare facilities are often scarce, and residents have limited access to medical professionals (Chinoda, 2024; Lee, 2022; Mukalayi, 2023). Telemedicine, as a part of the smart village initiative, offers a solution to this issue by connecting rural residents with healthcare professionals remotely. However, the success of telemedicine programs depends on reliable internet access and the willingness of local healthcare providers to adopt digital technologies. As some respondents reported challenges related to internet connectivity, ensuring stable and affordable internet access remains a crucial aspect of the sustainability and success of smart village healthcare initiatives.

Economic empowerment is another area where smart villages have made significant strides. The introduction of digital platforms for e-commerce, online training, and digital banking services has provided rural residents with opportunities to engage in the broader economy. This is particularly relevant for small-scale farmers and local artisans, who can now access wider markets through online platforms. Additionally, digital training programs have enabled many individuals to acquire new skills, enhancing their employability and entrepreneurial potential. However, the extent to which these economic benefits are realized depends on the continued development of digital infrastructure and the integration of smart village initiatives into the local economy. Without ongoing support from both government and private sectors, these economic opportunities may remain limited.

Despite these advancements, the research also identifies several challenges that need to be addressed. One of the primary issues is the disparity in access to technology across different rural regions. While some areas have seen significant improvements in digital infrastructure, others still face considerable barriers, such as limited access to high-speed internet, insufficient power supply, and a lack of technical support. These disparities in infrastructure can lead to unequal access to the benefits of smart village programs, reinforcing existing social and economic inequalities. To address this, targeted interventions are needed to ensure that all rural communities, regardless of their location, have access to the necessary resources and support.

Furthermore, the long-term sustainability of smart village initiatives remains a concern. Many of the programs introduced are heavily reliant on government funding and external support, which can be unstable or short-term. For smart villages to achieve lasting success, it is essential to build local capacity and ensure that communities are empowered to maintain and manage these initiatives independently. This includes training local leaders, community members, and technicians to handle the technical and operational aspects of digital services. Additionally, there must be mechanisms in place to ensure the continued provision of digital services, including regular updates and maintenance of infrastructure.

Another critical aspect that emerged from the study is the importance of community engagement in the success of smart village programs. While government and external support are necessary for the initial implementation of these programs, it is the active participation of local communities that ensures their long-term success. Community leaders, village organizations, and local residents must be involved in the planning and execution of smart village initiatives to ensure that they meet the specific needs and priorities of the community. This participatory approach fosters a sense of ownership and responsibility, increasing the likelihood of successful implementation and sustainability.

In conclusion, while smart village initiatives in Indonesia have made significant progress in promoting digital inclusion and social justice, there are several areas that require further attention. Ensuring equitable access to digital resources, addressing infrastructure challenges, and providing continuous digital literacy training are essential steps in ensuring that these programs can truly transform rural communities. Moreover, fostering community involvement and building local capacity are critical to the long-term sustainability of smart village programs. By addressing these challenges and leveraging the potential of digital technologies, Indonesia can create a more inclusive and equitable future for its rural populations, promoting social justice and empowering communities to thrive in the digital age.

CONCLUSION

In conclusion, the implementation of smart village initiatives in rural Indonesia has shown promising results in advancing digital inclusion and promoting social justice. These programs have significantly improved access to essential services such as education, healthcare, and economic opportunities, contributing to a more equitable distribution of resources in rural areas. However, challenges remain, particularly in terms of infrastructure disparities, digital literacy, and the sustainability of these initiatives. The research underscores the need for targeted interventions to ensure that all rural communities, regardless of location, benefit equally from digital technologies.

To fully realize the potential of smart villages, it is crucial to address the gaps in digital infrastructure, particularly in remote regions, and to provide continuous digital literacy training. Additionally, empowering local communities and ensuring their active involvement in the planning and execution of these programs are vital for their long-term success. By focusing on these areas, smart village initiatives can become a sustainable tool for bridging the digital divide, fostering social justice, and enabling rural populations to thrive in the digital age. The findings of this study provide valuable insights for policymakers and practitioners working towards creating more inclusive and digitally empowered communities in Indonesia.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

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