

The Role of Managed Service in The Village Digitalization Program

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Abstract— With over 70,000 villages spread across Indonesia, the digitalization of rural areas represents a monumental task and a significant opportunity for telecommunications providers. This paper examines the vital role of managed services in the successful implementation of village digitalization programs. The challenges are considerable, including the vast geographical diversity, infrastructure limitations, and the need for scalable and sustainable solutions. However, managed services offer a pathway to overcoming these challenges by providing tailored connectivity, robust network management, and ongoing support. The paper also explores the potential benefits of digitalization for these villages, such as improved access to education, healthcare, and economic opportunities. Through an analysis of current initiatives and strategic frameworks, this paper highlights how managed services can be a cornerstone in bridging the digital divide in Indonesia's rural communities.

Keywords— village digitalization, managed services, telecommunications.

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I. INTRODUCTION

THE digitalization of rural areas, particularly in a vast and diverse country like Indonesia, presents both a significant challenge and a promising opportunity. With over 70,000 villages spread across its archipelago, the task of bringing these communities into the digital age is monumental. However, it is also a critical endeavor for fostering inclusive growth and ensuring that the benefits of digital technology reach even the most remote corners of the nation. The drive to bridge the digital divide is not just about providing connectivity but also about enabling these villages to access vital services such as education, healthcare, and economic opportunities.

At the heart of this ambitious undertaking is the concept of managed services. Managed services, which involve outsourcing the management of IT systems and networks to specialized providers, play a crucial role in the successful implementation of village digitalization programs. These services offer tailored solutions that can be scaled according to the specific needs of each village, ensuring that even those in the most challenging environments can be brought online efficiently and sustainably.

The challenges of rural digitalization in Indonesia are multifaceted. The country's geographical diversity, including remote islands, mountainous regions, and dense forests, presents significant obstacles to infrastructure development. Additionally, economic and social barriers can hinder the adoption of digital technologies in rural communities. Managed services offer a strategic approach to overcoming these challenges. By providing robust network management, security, and continuous support, these services ensure that the digital infrastructure remains reliable and effective, even in the face of such obstacles.

The potential benefits of village digitalization are substantial. For instance, improved access to education through digital platforms can help bridge educational disparities between urban and rural areas. Similarly, digital healthcare solutions can bring essential medical services to remote communities, improving overall health outcomes. Moreover, by enabling e-commerce and other digital economic activities, these villages can participate more fully in the broader economy, leading to increased income and development opportunities.

This paper explores the critical role that managed services play in the digitalization of Indonesia's villages. It examines the various challenges associated with this process and how managed services can address these issues by providing customized, scalable, and sustainable solutions. Additionally, the paper delves into the broader impact of digitalization on rural communities, highlighting the transformative potential of technology in enhancing education, healthcare, and economic development. Through an analysis of current initiatives and strategic frameworks, the paper aims to demonstrate how

managed services can serve as a cornerstone in bridging the digital divide in Indonesia's rural areas, ensuring that no village is left behind in the digital age.

II. LITERATURE STUDY

The digitalization of villages, particularly in developing countries like Indonesia, has garnered significant attention in recent years. Various scholars have examined the challenges, opportunities, and impacts of these efforts, offering a comprehensive understanding of the complexities involved in implementing digital village initiatives.

The concept of the "smart village" has been pivotal in the discourse on rural digitalization. Putri et al. (2024) highlighted the challenges of implementing the Smart Village Program in Indonesia, noting that while the program aims to integrate modern digital technologies into village governance, it faces substantial obstacles related to infrastructure, community readiness, and financial resources.^[6] These challenges are echoed by Susano (2023), who emphasized the need for optimizing digital villages in public services, particularly in the face of technological disruption. His case study in Bergas Village, Central Java, illustrated how digital tools could enhance service delivery but also underscored the importance of tailored solutions to address local needs.^[8]

The role of managed services in supporting these initiatives is increasingly recognized. Agusta (2023) discussed the importance of managed services in sustaining digital villages, arguing that professional management of digital infrastructure is crucial for long-term success.^[1] He pointed out that managed services could help overcome the technical and operational challenges that often hinder rural digitalization efforts. This perspective is supported by Handayani et al. (2023), who explored the role of digitalization in improving financial reporting and accountability in village fund management,

suggesting that managed services could enhance these processes, thereby contributing to the achievement of sustainable development goals (SDGs) in rural areas.^[2]

Moreover, the potential of digitalization to empower rural economies has been well-documented. Sulaksono et al. (2023) explored the digitalization of the creative economy through village-owned enterprises (BUMDes) in Wirokerten Village, illustrating how digital tools could unlock local economic potential.^[7] Similarly, Utomo (2024) emphasized the role of digitalization in fostering equitable economic growth through BUMDes, suggesting that managed services could play a critical role in supporting these enterprises by providing necessary technical expertise and resources.^[10]

In addition to economic impacts, digitalization has the potential to improve access to essential services such as education and healthcare. Made and Kurniawan (2021) discussed how digital villages can facilitate easier access to public services, thereby improving the quality of life in rural communities.^[4] Their findings align with those of Sutangsa and Reviyanti (2023), who examined a community empowerment digitalization program in West Bandung Regency, noting that digital tools have significantly enhanced service delivery in tourism and other sectors.^[9]

Finally, the importance of strategic frameworks and government support in the successful implementation of digital village programs cannot be overstated. Ilham et al. (2023) and Murtinah et al. (2023) both emphasized the need for collaborative governance in the development of digital villages. Their studies suggest that partnerships between government, private sector, and local communities are essential for overcoming the challenges associated with rural digitalization and ensuring that the benefits of these initiatives are widely distributed.^{[3][5]}

Table 1 Literature

Theme	Key Points	Author(s), Year, Reference
Challenges in Implementing Smart Villages	Discusses the challenges in implementing the Smart Village Program in Indonesia, particularly infrastructure, community readiness, and financial resources.	Putri et al., 2024, [6]
	Highlights the need for optimizing digital villages in public services, focusing on tailored solutions to meet local needs.	Susano, 2023, [8]
Role of Managed Services in Digital Villages	Emphasizes the importance of managed services in sustaining digital villages by providing professional management of digital infrastructure.	Agusta, 2023, [1]
	Explores how managed services can enhance digitization efforts in village financial management, contributing to sustainable development goals (SDGs).	Handayani et al., 2023, [2]
Economic Empowerment through Digitalization	Discusses the digitalization of the creative economy through village-owned enterprises (BUMDes) and its potential to unlock local economic opportunities.	Sulaksono et al., 2023, [7]
	Highlights the role of digitalization in fostering equitable economic growth through BUMDes, with a focus on managed services' contribution.	Utomo, 2024, [10]
Improvement in Public Services through Digitalization	Explores how digital villages facilitate access to public services, improving the quality of life in rural communities.	Made & Kurniawan, 2021, [4]
	Examines the enhancement of service delivery through community empowerment digitalization programs, especially in tourism and other sectors.	Sutangsa & Reviyanti, 2023, [9]
Strategic Frameworks and Governance for Digital Villages	Discusses the importance of collaborative governance in the development of digital villages, emphasizing partnerships between government, private sector, and local communities.	Ilham et al., 2023, [3]
	Highlights the need for strategic frameworks to ensure the successful implementation and sustainability of digital village programs.	Murtinah et al., 2023, [5]

III. THE ROLE OF MANAGED SERVICES IN VILLAGE DIGITALIZATION

A. Definition and Scope of Managed Services

Managed services refer to the outsourcing of specific functions, often related to IT infrastructure, to third-party providers who take responsibility for the ongoing management, maintenance, and support of these services. In the context of village digitalization, managed services encompass a wide range of activities, including network setup, data management, cybersecurity, and technical support. These services are crucial in ensuring that digital infrastructure in rural areas operates efficiently and securely. Managed service providers (MSPs) typically offer tailored solutions that are scalable to meet the unique needs of different villages, considering local conditions and requirements.

B. Importance of Managed Services in Rural Digitalization

Managed services play a pivotal role in rural digitalization by bridging the gap between technology and local communities. They provide the necessary expertise and resources to implement and sustain digital infrastructure in areas where local knowledge and technical skills may be lacking. By ensuring reliable connectivity, managed services enable the integration of digital tools into everyday village operations, thereby improving access to services such as education, healthcare, and government support. Additionally, managed services help mitigate risks associated with cybersecurity and data management, ensuring that the digitalization efforts are both effective and secure.

C. Case Studies and Examples in Indonesia

Several case studies in Indonesia illustrate the significant impact of managed services in village digitalization. In some regions, MSPs have successfully implemented and maintained robust digital networks that support a range of services from e-governance to telemedicine. For example, in remote areas where connectivity was previously unreliable, managed services have enabled continuous access to the internet, allowing villagers to participate in digital economies and access essential information. These examples demonstrate how managed services can be tailored to meet the specific needs of rural communities, providing them with the tools necessary to thrive in a digital world.

IV. CHALLENGES IN IMPLEMENTING VILLAGE DIGITALIZATION

A. Geographical and Infrastructure Challenges

The geographical diversity of Indonesia, with its vast archipelago and remote mountainous regions, presents significant challenges to village digitalization. Many villages are in areas that are difficult to access, lacking the basic infrastructure required for digital connectivity, such as electricity and reliable internet. These physical barriers make the installation and maintenance of digital infrastructure costly and complex. Additionally, the diverse topography can hinder the deployment of traditional communication networks, necessitating innovative solutions such as satellite-based systems, which can be expensive and require specialized expertise.

B. Economic and Social Barriers

Economic and social factors also play a critical role in the challenges of village digitalization. Many rural communities in Indonesia face economic constraints that limit their ability to invest in the necessary technology and infrastructure. The high costs associated with digitalization efforts, including purchasing hardware, software, and accessing training programs, can be prohibitive for these communities. Social barriers, such as low levels of digital literacy and resistance to change, further complicate the adoption of new technologies. These challenges are often compounded by a lack of local expertise, making it difficult for villages to fully utilize and sustain digital solutions.

C. Technological Limitations

Technological limitations are another major hurdle in the implementation of village digitalization. The rapid pace of technological change can make it difficult for rural areas to keep up with the latest developments, resulting in outdated or incompatible systems. Additionally, the lack of access to reliable and affordable technology in remote areas can limit the effectiveness of digitalization efforts. Issues such as limited bandwidth, inadequate hardware, and a lack of technical support can undermine the success of digital initiatives, leading to frustration and disengagement among users. Overcoming these technological barriers requires not only investment but also a strategic approach that considers the specific needs and constraints of rural communities.

V. MANAGED SERVICES AS A SOLUTION

A. Customization and Scalability

Managed services offer a high degree of customization and scalability, making them an ideal solution for village digitalization. These services can be tailored to meet the unique needs of each village, taking into account factors such as population size, geographical location, and existing infrastructure. Customization ensures that digital solutions are relevant and effective, while scalability allows for the gradual expansion of services as the community grows and its needs evolve. Managed service providers can adjust the scope of their services to match the village's development, ensuring that the digital infrastructure remains relevant and up-to-date.

B. Network Management and Security

Network management and security are critical components of any digitalization effort, particularly in rural areas where technical expertise may be limited. Managed services provide comprehensive network management, ensuring that digital infrastructure operates efficiently and securely. This includes regular monitoring, updates, and troubleshooting to prevent and address any issues that may arise. Moreover, managed service providers implement robust security measures to protect against cyber threats, safeguarding sensitive data and maintaining the integrity of the digital systems. By entrusting these responsibilities to managed service providers, villages can ensure the continuous and secure operation of their digital infrastructure.

C. Continuous Support and Maintenance

Continuous support and maintenance are essential for the sustainability of digital infrastructure in rural areas. Managed services provide ongoing technical support, ensuring that any issues are quickly resolved and that the digital systems remain operational. This support includes regular maintenance, software updates, and user training, helping to keep the infrastructure running smoothly and efficiently. Additionally, managed service providers offer a proactive approach to maintenance, identifying potential problems before they can disrupt services. This continuous support is crucial for maintaining the reliability and effectiveness of digital solutions in rural communities, enabling them to fully benefit from the opportunities of digitalization.

VI. IMPACT OF DIGITALIZATION ON RURAL COMMUNITIES

A. Enhancing Access to Education

Digitalization has the potential to revolutionize education in rural communities by providing access to a wealth of online resources and learning platforms. Through digital tools, students in remote areas can access the same quality of education as their urban counterparts, reducing educational disparities. E-learning platforms enable students to participate in virtual classrooms, access educational content, and connect with teachers and peers from across the country. Additionally, digitalization facilitates lifelong learning opportunities for adults, enabling them to acquire new skills and knowledge that can improve their employability and quality of life.

B. Improving Healthcare Delivery

The digitalization of healthcare services in rural areas offers significant improvements in the accessibility and quality of care. Telemedicine, enabled by robust digital infrastructure, allows rural residents to consult with healthcare professionals remotely, overcoming the challenges posed by geographical barriers. This is particularly important in areas where access to healthcare facilities is limited. Digital health records and mobile health applications also enhance the efficiency of healthcare delivery, enabling better tracking of patient histories and more timely interventions. As a result, digitalization contributes to improved health outcomes and a higher standard of living in rural communities.

C. Economic Empowerment and Development

Digitalization empowers rural communities economically by providing new opportunities for entrepreneurship, access to markets, and financial inclusion. E-commerce platforms enable rural entrepreneurs to reach a broader customer base, while digital payment systems facilitate secure and efficient transactions. Additionally, digital tools help to bridge the information gap, providing farmers and small business owners with real-time data on market prices, weather conditions, and best practices. This access to information enhances productivity and competitiveness, leading to greater economic development and improved livelihoods for rural residents.

VII. STRATEGIC FRAMEWORK FOR SUCCESSFUL IMPLEMENTATION

A. Government Policies and Support

The success of village digitalization initiatives is heavily dependent on government policies and support. Governments must create an enabling environment by developing and implementing policies that promote digital infrastructure development, provide financial incentives, and support capacity-building efforts. Public investments in digital infrastructure, such as broadband networks and digital literacy programs, are crucial for overcoming the barriers to digitalization in rural areas. Additionally, government support in the form of subsidies or grants can help reduce the cost burden on rural communities, making digitalization efforts more accessible and sustainable.

B. Collaboration with Telecommunications Providers

Collaboration between governments and telecommunications providers is essential for the successful implementation of village digitalization programs. Telecommunications providers play a key role in deploying the necessary infrastructure and ensuring reliable connectivity in rural areas. Partnerships between public and private sectors can accelerate the rollout of digital infrastructure, optimize resource allocation, and foster innovation. By working together, these stakeholders can develop tailored solutions that address the specific needs of rural communities, ensuring that digitalization efforts are both effective and sustainable.

C. Monitoring and Evaluation Mechanisms

To ensure the success and sustainability of village digitalization programs, it is critical to establish robust monitoring and evaluation mechanisms. These mechanisms enable stakeholders to track progress, assess the effectiveness of interventions, and identify areas for improvement. Regular monitoring helps to ensure that the digital infrastructure remains functional and meets the needs of the community, while evaluation provides insights into the long-term impact of digitalization on rural development. By continuously assessing the outcomes of digitalization efforts, stakeholders can make informed decisions and adjust strategies as needed to achieve the desired results.

VIII. CONCLUSION AND RECOMMENDATIONS

The digitalization of rural communities in Indonesia presents a transformative opportunity to bridge the digital divide and enhance the quality of life for millions of people living in remote areas. Managed services play a crucial role in this process, providing the expertise, resources, and support necessary to implement and sustain digital infrastructure in rural villages. By addressing the unique challenges of geographical diversity, economic constraints, and technological limitations, managed services enable rural communities to fully participate in the digital economy and access vital services such as education, healthcare, and financial tools.

The impact of digitalization on rural communities is profound. It enhances access to education, providing students in remote areas with the same opportunities as those in urban centers. Through e-learning platforms and digital resources, rural students can overcome the barriers of distance and gain the skills and knowledge necessary to compete in a globalized world. For adults, digital literacy programs and online training opportunities offer pathways to personal and professional development, leading to improved livelihoods and economic empowerment.

In the healthcare sector, digitalization facilitates the delivery of essential services to rural populations. Telemedicine and mobile health applications enable residents of remote areas to receive timely medical advice and care, reducing the need for travel and making healthcare more accessible. The digitization of health records also enhances the efficiency and accuracy of healthcare delivery, leading to better health outcomes and a higher quality of life for rural communities.

Economically, digitalization empowers rural entrepreneurs and small business owners by providing access to new markets and financial services. E-commerce platforms and digital payment systems enable rural businesses to expand their reach and operate more efficiently. Additionally, access to real-time information on market conditions and best practices enhances productivity and competitiveness, driving economic growth and development in rural areas.

To achieve the full potential of village digitalization, a strategic framework is essential. Government policies and support are critical in creating an enabling environment for digitalization. This includes public investments in digital infrastructure, as well as initiatives to promote digital literacy and capacity building. Collaboration with telecommunications providers is also vital, as these companies possess the expertise and resources needed to deploy and maintain the necessary infrastructure. Public-private partnerships can accelerate the rollout of digital services and ensure that they are tailored to the specific needs of rural communities.

Finally, monitoring and evaluation mechanisms must be established to track progress and assess the impact of digitalization efforts. Continuous monitoring allows stakeholders to identify challenges and adjust strategies as needed, while evaluation provides valuable insights into the long-term outcomes of digitalization on rural development. By incorporating these elements into a strategic framework, stakeholders can ensure the successful and sustainable implementation of village digitalization programs.

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