Publik (Jurnal Ilmu Adminsitrasi)
Vol. 14 No. 1 Tahun 2025
DOI: http://dx.doi.org/10.31314/pjia.14.1.77-95.2025
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*ISSN: 2301-573X E-ISSN: 2581-2084*

# Contributing Factors of Smart Village Implementation in Rural Area: A Systematic Literature Review

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**Abstract.** This study aims to analyze what factors support the successful implementation of Smart Villages in rural Indonesia. The research method used was a systematic literature review (SLR), by analyzing 16 selected articles from the Scopus database using strict inclusion-exclusion criteria and the PRISMA procedure. The results of the study show that five main factors drive the success of Smart Villages, namely: the provision of digital technology and infrastructure, social participation and the improvement of people's digital literacy, village digital economy transformation, leadership and adaptive governance, as well as sustainability characteristics such as precision agriculture, renewable energy, sharing economy, and social innovation. The discussion emphasized that smart village development must be based on multi-actor collaboration with a technological approach tailored to the local context. The conclusion of this study is that the success of Smart Villages depends on a combination of technological, social, economic, and institutional factors. However, the limitations of this study lie in the non-use of primary field data and the limited sources of literature in Indonesian. For further research, it is recommended to conduct field studies in various village contexts, as well as the development of integrative models that combine social, cultural, and technological approaches to support the sustainability of Smart Villages.

**Keywords:** Rural Areas; Smart Villages; Digitalization

***Received:**10-12-2024* ***Revised**:29-05-2025* ***Accepted**:22-06-2025*

## INTRODUCTION

Rural areas face unique challenges such as high levels of urbanization, inequality, lack of budgets, and inadequate strategies and collaborations (Darmawan et al., 2023). These challenges require innovative solutions to promote sustainable development and improve the quality of life in the region. The concept of Smart Villages is a rural development approach that leverages digital technology and local resources to create sustainable and self-reliant communities. This concept has been promoted by the European Union and other regions as a means to meet the diverse needs of rural areas (Ayodyani et al., 2023; Darmawan et al., 2023; Wolski & Wocik, 2019).

The success of Smart Villages relies heavily on the active participation and empowerment of local communities, including local governments, service providers, and residents (Li & Zhong, 2022; Wolski & Wocik, 2019). This bottom-up approach ensures that development initiatives are tailored to the specific needs and characteristics of each rural area.

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Smart Villages have the potential to significantly improve the economic and social conditions of rural communities by improving public services, promoting sustainable agriculture, and fostering local businesses (Pělucha, 2019; Tosida et al., 2022b). Understanding the impact of these initiatives through research can provide valuable insights for policymakers and stakeholders. Strong local governance and active community participation are essential to create the right conditions for the development of Smart Villages (Darmawan et al., 2023; Malik et al., 2022; Wolski & Wocik, 2019). High-quality infrastructure, including reliable internet connectivity and access to digital technology, is a fundamental element for Smart Villages (Malik et al., 2022; Pělucha, 2019). The use of local economic and social capital, such as local businesses and community networks, can increase the sustainability and effectiveness of Smart Village projects (Arun et al., 2021). Combining sustainable practices and technologies, such as renewable energy and precision agriculture, can help address environmental challenges and promote long-term resilience (Ayodyani et al., 2023; Bielska et al., 2021; Darmawan et al., 2023).

The implementation of Smart Villages in rural areas is a promising approach to address the various challenges faced by these communities. However, there is an urgent need for research to develop comprehensive strategies, integrate advanced technologies, and understand the economic, social, and environmental impacts of these initiatives. By addressing this research gap, stakeholders can better support the sustainable development of rural areas through the concept of Smart Villages.

Successful smart village initiatives require the participation and active involvement of local communities. This includes raising awareness and involving local stakeholders in the planning and implementation process (Anastasiou et al., 2021; Muhtar et al., 2023). Improved education and healthcare services are essential to improve the quality of life in rural areas. These services are a fundamental component of smart village projects, contributing to human development and overall social inclusion (Mohanty et al., 2020). Addressing issues such as depopulation, population ageing, and spatial vulnerability is critical. Smart village initiatives aim to foster collective well-being and social inclusion, which are essential for sustainable rural development (Anastasiou et al., 2021; Muhtar et al., 2023).

Smart village initiatives can drive economic growth by modernizing agricultural practices through digital agriculture, which increases productivity and economic returns for farmers (Chowdhury et al., 2023). Adequate funding and investment are needed to support the infrastructure and technological advancements required for smart villages. This includes securing financial resources for connectivity, energy management, and other essential services

(Darmawan et al., 2023). By establishing small-scale industries and promoting local entrepreneurship, smart villages can create job opportunities, reduce economic vulnerability and prevent rural-urban migration (Mohanty et al., 2020).

In addition, several environmental factors are needed to improve smart villages with key considerations in smart village initiatives. Projects often focus on ecological conservation, sustainable resource management, and mitigation of negative environmental impacts (García Fernández & Peek, 2023; Rachmawatie, 2024). Addressing climate impacts and increasing the resilience of rural areas to environmental change is essential. Smart village initiatives often include adaptive strategies to address climate-related challenges (García Fernández & Peek, 2023). Reliable and robust network infrastructure is essential for the digital transformation of rural areas (Malik et al., 2022).

The success of smart village initiatives in rural areas is greatly influenced by social, economic, and environmental factors. Active community engagement, economic investment, and environmental sustainability are critical components that need to be addressed through a holistic and adaptive approach to ensure the long-term success and resilience of smart villages. Integrating smart technologies in rural communities can offer many benefits that contribute to sustainable development. These benefits cover a wide range of domains, including agriculture, healthcare, energy management, and overall quality of life.

Technologies such as IoT devices, AI, and cloud computing can significantly improve agricultural productivity and sustainability. Smart irrigation systems, farm monitoring, and livestock management can help farmers increase crop yields, reduce waste, and improve resource management (Gebresenbet et al., 2023). The use of digital tools for data collection, analysis, and sharing can lead to better decision-making and innovative agricultural business models, which ultimately improves the competitiveness and resilience of the agricultural sector.

Smart technology enables remote healthcare, which is especially important for rural areas with limited access to medical facilities. Lot devices and telehealth services can provide essential healthcare, improving the overall health and well-being of rural populations (Trenerry et al., 2021). Improved connectivity through smart technology can reduce isolation and provide access to essential services, improving the quality of life in rural areas (Pasupuleti, 2025). Implementing smart energy management systems, such as smart grids and renewable energy technologies, can promote environmental sustainability and energy security. These systems help manage energy resources efficiently, reduce carbon footprints and support the transition to a low-carbon economy (Darby, 2019; Shi et al., 2024). Smart technologies facilitate the integration of

renewable energy sources, which are critical to achieving environmental and economic stability in the midst of climate change. In summary, integrating smart technologies in rural communities offers substantial benefits for sustainable development, including increased agricultural productivity, improved healthcare, efficient energy management, and economic growth. However, addressing the challenges of infrastructure, funding, and the digital divide is critical to realizing these benefits (Ayodyani et al., 2023; Gebresenbet et al., 2023; Gómez-Carmona et al., 2023; Malik et al., 2022; Shi et al., 2024).

The implementation of smart villages in rural Indonesia involves the integration of digital technology and innovative strategies to improve the quality of life, economic efficiency, and sustainability of these communities. Here are the key aspects and findings of the study: ICT is essential for the development of smart villages, enabling better management of local resources and improving economic prospects (Tosida et al., 2020, 2022b). The presence of ICT can stimulate rural transformation, shifting the economy from the agricultural sector to the non-agricultural sector.

Active involvement of local stakeholders and community support is critical to the success of smart village projects (Tosida et al., 2022a). Collaboration with the private sector, local governments, and communities promotes smart economy and overall village development. Smart village models often include dimensions such as governance, technology, resources, village services, housing, and tourism (Aziiza & Susanto, 2020). Some of the villages in Indonesia that have implemented smart villages are Banyuwangi with a Smart Village program that focuses on government, economic, and tourism services, which reflects the broader trend of smart villages (Jayanthi et al., 2022). Jatisura Village's smart village architecture leverages ICT initiatives to promote digital inclusion and employment opportunities (Arista & Purabaya, 2024).

Figure 1 explains the mapping of smart villages in Indonesia, based on previous research. The implementation of smart villages in rural Indonesia is a multifaceted approach that requires ICT integration, big data analytics, community engagement, and sustainable practices. Addressing challenges related to infrastructure, education, and funding is critical to the successful development of smart villages, which can significantly improve the quality of life and economic prospects of rural communities (Darmawan et al., 2023; Gebresenbet et al., 2023; Maskur et al., 2024; Muhtar et al., 2023; Tosida et al., 2020, 2022b).

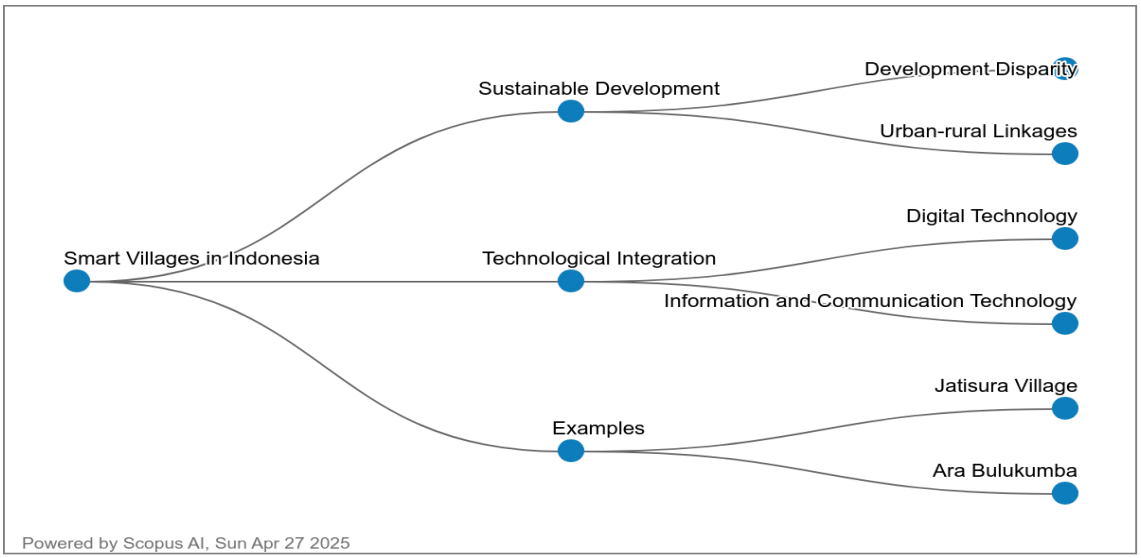



**Figure 1. Mapping Smart Village in Indonesia**
Source: Scopus AI, 2025

The urgency of this research lies in several things including, Despite its potential benefits, the implementation of Smart Villages faces several obstacles, including a lack of a clear strategy, inadequate collaboration, and limited knowledge of effective practices (Darmawan et al., 2023; Pělucha, 2019). Research is needed to develop a comprehensive strategy that addresses these issues and facilitates the successful implementation of Smart Villages. The integration of Information and Communication Technology (ICT), such as high-speed internet, AI, IoT, and GIS, is essential for the development of Smart Villages. However, many rural areas lack the necessary infrastructure and technological capabilities (Ayodyani et al., 2023; Malik et al., 2022; Pělucha, 2019). Research can help identify the best practices for integrating these technologies in rural environments. Furthermore, this study aims to identify and analyze the factors that drive the successful implementation of *smart villages* in rural Indonesia through a literature study approach.

## METHODS

The approach of this research is a systematic literature review (SLR) to analyze how the implementation of smart villages in rural areas in Indonesia (Page et al., 2021; Snyder, 2019). This method was chosen because of its systematic, reproducible, transparent, and repeatable nature (Mengist et al., 2020). This approach provides an objective basis for selecting relevant research while excluding unrelated works (Xiao & Watson, 2019). The Scopus database is used as the search material for the articles to be analyzed. Scopus is known as one of the largest peer-reviewed literature databases in the world, used for its extensive collection of articles from leading publishers (Perevochtchikova et al., 2019).

The research procedure follows the PRISMA 2020 guidelines recommended by Page (Page et al., 2021), including checklists, explanations, and elaborations, along with the utilization of flowcharts. This approach ensures a structured and comprehensive methodology for the study. Initially, keyword searches are done in a database to identify the research article. The sample set is then systematically extracted using predefined inclusion and exclusion criteria. The initial phase involves searching databases for relevant studies. During this stage, specific criteria are used to include or exclude research. The inclusion criteria include different types of studies from all sources, focusing on the keywords "smart village", "rural digital transformation", "village digitalization", and "smart village success factor", “Indonesia”. In addition, the period of the year of issue is determined from 2013 to 2025 taking into account novelties. In addition, several inclusion and exclusion criteria have been set in the article screening process. These criteria are contained in table 1.

**Table 1. Inclusion Criteria and Exclusion Criteria**

| Kriteria Inklusi | Exclusion Criteria |
|---|---|
| Articles published in 2013-2025 | Articles published outside the year |
| Document type in the form of articles | Document types in the form of blog editorial, book chapter, conference paper |
| Articles in English | Non-English articles |
| Fully accessible article | Articles are not accessible |
| Articles with focus/topics on smart villages | Off-topic articles |
| Articles with case studies in developing countries | Articles outside of the case study |
| Articles relevant to smart village topics | Irrelevant articles |
| There is no duplication of the same | Duplication of the same publication |

Source: Processed by researcher, 2025

Based on these criteria, the results will later be forwarded to the eligibility process. Where eligibility is the final stage to determine whether the article is suitable for use as a data analysis in answering research questions. The authors identify the relationships between ideas and combine relevant concepts to create a broader theme, culminating in a comprehensive understanding of the topic. Based on these stages, the results of 16 relevant articles were obtained and will be analyzed to answer research questions. The process of searching for articles with PRISMA can be seen in figure 2.

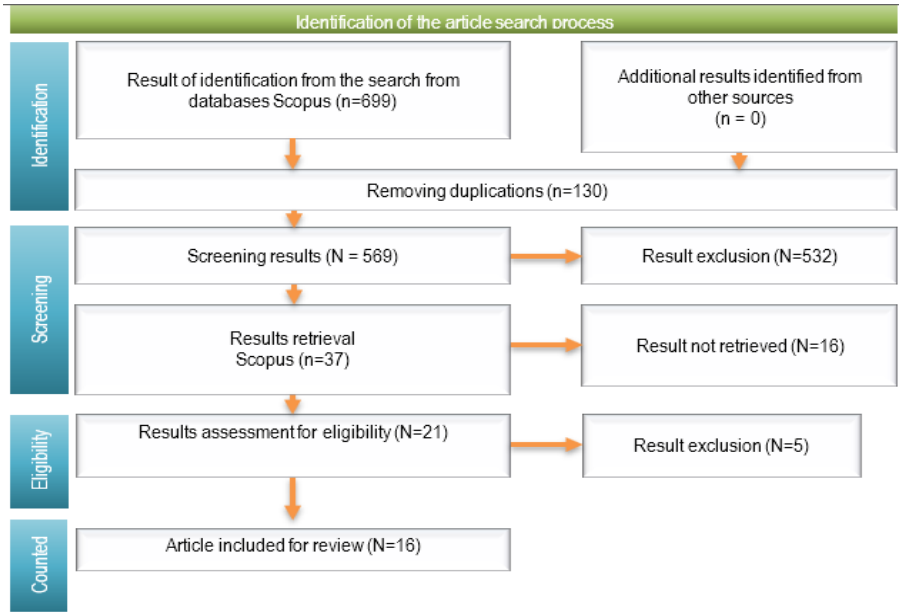



**Figure 2. PRISMA search flow chart**
Source: Researcher, 2025

## RESULTS AND DISCUSSION

Based on the findings on the PRISMA search flow chart, the study found 16 relevant articles to analyze. Based on the findings of the article, the researcher mapped the findings described in this study.

### Technology as a Transformative Foundation

Technology is a fundamental factor in building *a smart village*. The availability of access to the internet and digital infrastructure is considered the most vital, even the construction of Smart Villages is considered to be successful only when this is met (García Fernández & Peek, 2023). Technology acts as a catalyst in social and economic reconstruction at the village level that integrates villages with cities. digital infrastructure creates an interactive space for innovation at the local level (Paniagua, 2023). The existence of devices such as computers, wireless networks, sensors, and energy panels supports the development of village information systems (Muhtar et al., 2023), digital health services (Pathak & Deshkar, 2023), financial systems (Afnarius et al., 2020; Jayanthi et al., 2022) application-based, to village spatial maps that facilitate planning and services (Afnarius et al., 2020; Muhtar et al., 2023). This then becomes the main tool for building villages, increasing business growth that can create jobs and improve the quality of life of rural communities (García Fernández & Peek, 2023).

Some rural areas in Indonesia are still experiencing obstacles due to limited access to information, markets, and basic services. The development of information and communication technology creates opportunities for villages to open themselves up from isolated conditions and build village communities' access to social and economic exchanges with surrounding cities

(García Fernández & Peek, 2023; Hanninger et al., 2021; Jayawinangun et al., 2024). Through *e-commerce systems*, social media, and collaborative platforms, business actors in the village can expand the market, build brand reputation, and even attract investors from outside the region.

One of the real examples of the application of technology can be seen in Batik Village, Kemang, Bogor Regency. In this village, simple communication technologies such as WhatsApp are used effectively to form an all-channel communication pattern between the village government, MSME actors, academics, and the community. This pattern encourages information disclosure, accelerates decision-making, and strengthens cross-sector collaboration. In addition, digitalization is also applied in training on online store creation, the use of online marketplaces, and digital business management. The community is trained to manage the batik business professionally, both in terms of production, marketing, and digital financial management (Tosida et al., 2022a).

Technology in more remote villages can also be used for spatial-based mapping of areas. This mapping of the area can be used as a tool in connecting accommodation between buildings, as well as providing information for tourists about tourist destinations and the location of public services available in the area. One of the applications that is often used is the *Geographic information system* (GIS) application. GIS in the implementation *of smart villages* in Indonesia is generally used to digitally map village areas, support development planning, and provide accurate spatial information for the government and the community. GIS helps identify and organize the location of houses, public facilities, agricultural land, and tourist destinations, making it easier to prepare public service programs, tourism promotion, and integrated population data management. In addition, GIS is also used to accelerate aid distribution, local economic planning, and village spatial planning (Afnarius et al., 2020; Muhtar et al., 2023).

The role of technology in building *smart villages* not only serves as an auxiliary tool, but also as a key driver that facilitates efficiency, transparency, and community participation (Jayanthi et al., 2022; Pathak & Deshkar, 2023; Susanti et al., 2023). Technology also encourages the creation of *a Sustainable Information Society* (SIS), where people not only adopt technology but also use it to support economic, social, and environmental sustainability. One of the implementations of technology-based information systems for governance through the Village Financial System (SISKEUDES). This system is used for planning, budgeting, administration, and village financial reporting (Ariyanto et al., 2022). The implementation of SISKEUDES is in line with the principles of SIS by facilitating efficiency, transparency, and community participation in village financial management. The use of this system also supports the dimensions of economic

sustainability through budget optimization, social through community empowerment, and the environment through the digitalization of processes that reduce dependence on paper (Jayanthi et al., 2022; Pathak & Deshkar, 2023).

In addition to providing digital infrastructure, the success of smart village development also depends heavily on public acceptance of technology. This acceptance is reflected in the readiness and willingness of the village community to learn, adopt, and utilize technology in their daily lives. Factors such as the quality of the information systems used, the relevance and reliability of the information provided, and the level of public trust in technology are the main determinants in building such acceptance (Ariyanto et al., 2022). When people accept and feel comfortable with the use of technology, their level of active participation in various village development programs will increase, strengthening village transformation towards a smarter and more sustainable direction (Arista & Purabaya, 2024; Susanti et al., 2023).

Based on the above explanation, there are five aspects to encourage the success of *smart villages* through technology. The provision of digital infrastructure and internet access is a prerequisite for connectivity and village involvement in the digital economy and information. Second, the digitalization of public services, including governance, population administration, social assistance management, health services, and distance education, all of which are facilitated by web-based information systems and applications that are easily accessible to the public. Third, the use of technology for accurate and credible mapping of areas, development planning, and the provision of relevant spatial information for public services and tourism. Fourth, strengthening the digital economy through training on marketplace use, online store management, and digital promotion of local products. Fifth, the formation of a village virtual identity, where the village builds its existence through digital media and online platforms as part of a wider economic and social network

**Social Participation and Digital Literacy as Drivers**

The success of Smart Villages is not only determined by the presence of technology, but also by the extent to which the community is involved in planning, implementing, and utilizing the technology (Muhtar et al., 2023; Susanti et al., 2023). Social participation is the active involvement of the community in the decision-making, planning, and implementation process of development in their area. The success of *Smart Villages* requires social participation because technology-based development without social support is likely to fail.

This approach to building social participation can be done with *a co-production* approach. *Co-production* is a form of results-oriented collaboration between public administration,

professional service providers, and citizens, where there is direct input from citizens during the service production phase. Empirically, *the co-production* approach involves citizens, the government, and the private sector together. As a result, *co-production* helps the success of digital village transformation in the *Smart Village Nusantara project* (Susanti et al., 2023).

Social participation can also be built through initiatives such as *Digitales Dorf* in Germany emphasizing the importance of a "*bottom-up*" approach where digital innovations and solutions are directed by the real needs of the community. The implementation of the bottom-up approach began with the formation of the concept of living labs, which are pilot villages that are used as living laboratories to develop and test various digital solutions. Close collaboration was built between villagers, scientists from the Deggendorf Institute of Technology, the village government, and the private sector. To manage this interaction, a *core team* is formed in each village, consisting of the village head, a team of scientists, and an on-the-spot caretaker. *Caretakers* have a central role as a liaison between the needs of the community and the technical team that ensures that the aspirations of the residents are truly the basis for innovative development. Before the project was fully operational, *a large public kick-off* event was held involving all walks of life of the village community and state government officials. This event aims to build collective awareness and a shared commitment to the digital transformation process. Furthermore, various working groups were formed based on certain themes such as health services, transportation, public services, and local economic development. This working group is tasked with identifying specific problems facing villages and designing digital-based solution ideas (Hanninger et al., 2021).

This participation also needs to be encouraged by people's digital literacy. High digital literacy allows people not only to be passive users, but also as active actors in the village digital ecosystem. People who have digital skills can create innovative solutions to overcome geographical and economic limitations. Digital literacy, in this case, is an empowerment tool that increases the competitiveness of villages at the regional and national levels (García Fernández & Peek, 2023; Hanninger et al., 2021; Jayanthi et al., 2022). Digital literacy is built through various activities such as training, collective learning, and community involvement in managing digital platforms. Increased digital literacy has been shown to encourage more active community participation in digital public services, technology-based village economies, and the use of internet-based applications (Cāne, 2021).

**Digital Economy Transformation at the Village Level**

Digital economy transformation at the village level has been implemented in several regions of Indonesia. The *Smart Village* program in Banyuwangi shows how the village economy is starting to shift towards digital. One of the main transformations is the integration of the use of e-commerce platforms, social media, and digital applications to help village micro, small and medium enterprises (MSMEs) in marketing their products. Local products such as handicrafts, traditional foods, and tourist services are now easier to reach by a wide range of consumers through the internet. In addition, villages in Banyuwangi built digital databases that contain information about the population, economic potential, and other social data. This data is not only used for development planning, but also to strengthen the development of a digital-based economy, such as identifying beneficiaries of MSME assistance programs and mapping digital skills training needs. (Jayanthi et al., 2022; Jayawinangun et al., 2024; Susilowati et al., 2024).

Digital economy transformation is also applied to the *Smart Village Nusantara* project which is carried out using digital platforms. Village communities develop *a smart economy* through village marketplaces, digital payment systems, local business service applications, and online-based village tourism promotion (Susanti et al., 2023). Meanwhile, in the development of smart villages in Jatisura, Indramayu, digital economy transformation is also sought through increased innovation, competitiveness, and the development of technology-based village business models. The adoption of digital technology encourages increased productivity, efficiency of public services, and transparency in village economic management (Arista & Purabaya, 2024). The adoption of technology in community macro businesses is also carried out at Batik Village in Kemang. This transformation is reflected through the strengthening of community microbusinesses in producing and marketing batik products online. The training provided not only focuses on production technical skills, but also covers business management, digital marketing strategies, and marketplace use (Jayawinangun et al., 2024).

The transformation of the digital economy also opens up opportunities to realize a circular and sustainable economy. One concrete example can be seen in the initiatives carried out against Batik Business actors in Tegal. In this program, batik artisans are not only facilitated to increase their production capacity through the use of digital technology but also given special training in production waste management. This shows that the transformation of the digital economy in villages encourages behaviors that pay attention to the social dimension. Rural communities are not only users of technology, but also agents of change who pay attention to the

balance between economic, social, and ecological interests (García Fernández & Peek, 2023; Jayanthi et al., 2022; Jayawinangun et al., 2024).

**Leadership and Governance as Determinants of Sustainability**

The Smart Village program in Banyuwangi shows that the success of digital transformation cannot be separated from the central role of regional heads. Abdullah Azwar Anas, as the Regent of Banyuwangi, encourages the digitization of public services, village bureaucratic reform, and the implementation of technology-based transparency systems such as E-Village Budgeting (EVB) and E-Village Monitoring (EVM). This leadership ensures that technological innovation goes hand in hand with the principles of accountability and responsive public service.

Adaptive and participatory governance structures at the village level are the main pillars of digital innovation sustainability. Digitalization is not only focused on providing infrastructure, but also on building data-based management systems that are able to improve efficiency, transparency, and decision-making speed at the local level (Jayanthi et al., 2022; Muhtar et al., 2023). Jatisura Village in Indramayu developed a similar approach. Village heads act as the main sponsors of digital transformation projects, while village units serve as implementers of transformation programs. Each unit is responsible for ensuring the implementation of projects in accordance with village development goals, while encouraging community participation in each stage of change (Arista & Purabaya, 2024).

The sustainability of smart *villages* depends on how well digital innovations are integrated into the village's institutional structure. The application of technology must be institutionalized in the daily practice of village government, through strengthening the capacity of apparatus, preparing digital-based work procedures, and cultivating an open management system. Strong leadership and governance models not only accelerate technology adoption, but also prevent dependency on specific individuals. The success of smart villages can only be achieved if digital transformation runs as a collective, systematic, and sustainable process within a solid institutional framework.

**Success of Smart Villages in Rural Areas**

A successful Smart Village has eight main characteristics according to Fernández & Peek (2023) namely precision agriculture, digital platforms, sharing economy, circular economy, bio-based economy, renewable energy, rural tourism, and social innovation. Precision farming refers to the application of data-driven technology in the agricultural sector to optimize the use of resources such as water, fertilizers, and pesticides. Technologies such as Internet of Things (IoT) sensors, drones, and satellite-based mapping allow farmers to manage their land more accurately

and efficiently. This approach not only increases agricultural productivity, but also strengthens the resilience of villages to climate change. Studies on technology-based training programs in Banyuwangi show that there are efforts to increase agricultural capacity with a digital approach, although it has not yet fully adopted precision agriculture in its entirety (García Fernández & Peek, 2023; Jayanthi et al., 2022).

Digital platforms are the main pillars in building village connectivity with the outside world. The platform includes services such as e-government, e-commerce, e-health, and distance education, which allow rural communities to access public services and economic opportunities without geographical restrictions. In Banyuwangi, the existence of digital applications for payments such as Osing Pay and an online-based administrative service system shows how digital infrastructure in the village has served as the backbone of public services and the local economy (García Fernández & Peek, 2023; Hanninger et al., 2021; Jayanthi et al., 2022; Susanti et al., 2023; Susilowati et al., 2024).

The shared economy in the context of Smart Villages refers to a system of sharing resources to increase efficiency and strengthen social solidarity. This model includes practices such as sharing farm tools, collective transportation, or shared workspaces between citizens. The practice of sharing in the context of the local economy is seen in the development of digital cooperatives and MSME forums in several villages, where small businesses share resources, knowledge, and markets through integrated online platforms (García Fernández & Peek, 2023; Jayanthi et al., 2022; Paniagua, 2023).

Renewable energy is the foundation for energy-independent villages that are resistant to fluctuations in global energy supply. The use of renewable energy sources such as solar panels, biomass, or microhydro allows villagers to reduce their dependence on fossil energy. Although the document discusses more digital infrastructure, the importance of clean energy innovation remains an integral part of the Smart Village development framework, especially to strengthen public services and technology-based local production (García Fernández & Peek, 2023; Jayanthi et al., 2022; Moise et al., 2023; Muhtar et al., 2023; Paniagua, 2023; Sobczak-Malitka & Drejerska, 2024).

Rural *tourism* prioritizes the development of tourism based on culture, nature, and local wisdom as a new source of income. This model introduces the identity of the village to the world and encourages sustainability-based economic growth. Banyuwangi with the Smart Village program and tourism development training is an example of how villages optimize their cultural

and natural potential to strengthen the local economy while maintaining local values (García Fernández & Peek, 2023; Muhtar et al., 2023).

Social innovation emphasizes the creation of social change through creative, participatory, and community-based solutions. These innovations enable villagers to be actively involved in the decision-making process, strengthen social networks, and increase collective capacity to address development challenges. The study on Batik Village shows how the training of local MSMEs, the involvement of PKK mothers' groups, and the development of technology-based community forums have accelerated the social and economic transformation of the village (Arista & Purabaya, 2024; García Fernández & Peek, 2023; Jayanthi et al., 2022; Jayawinangun et al., 2024; Muhtar et al., 2023; Sobczak-Malitka & Drejerska, 2024; Susanti et al., 2023; Susilowati et al.. 2024).

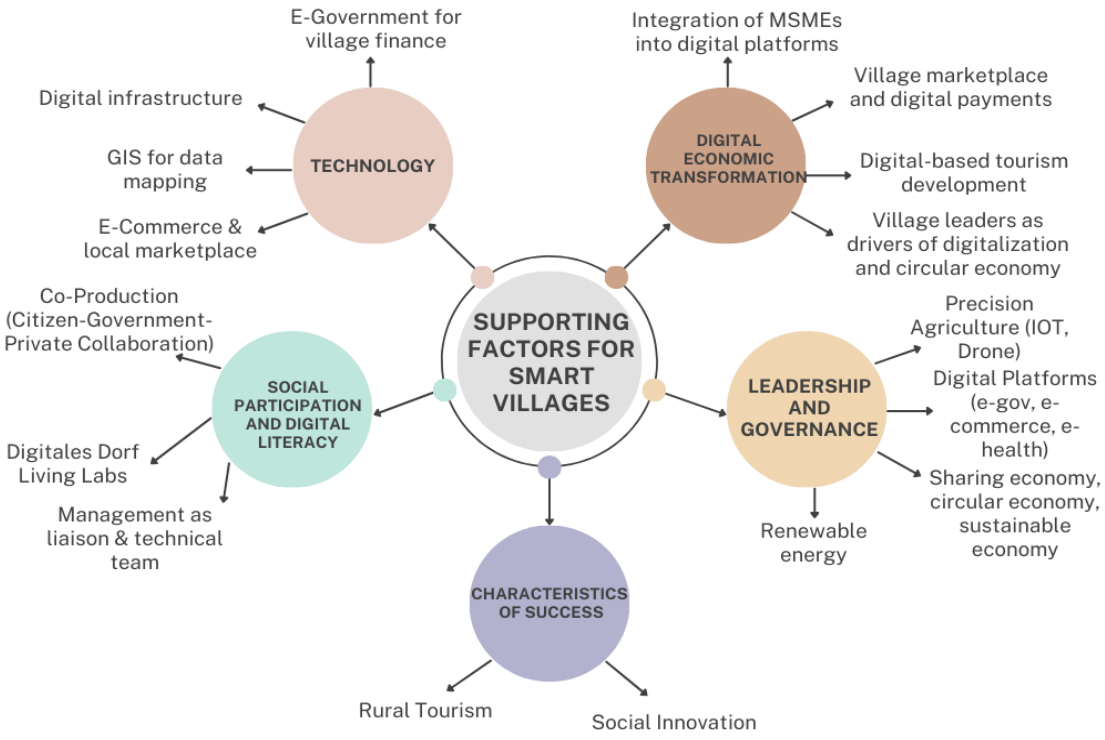



**Figure 3. Mapping Research Findings**
Source: Data processed by researchers, 2025

## CONCLUSIONS

This study identifies five key factors determining the success of Smart Village implementation in rural Indonesia: technology as a transformative foundation, social participation and digital literacy, digital economic transformation, adaptive leadership and governance, and

success characteristics such as precision agriculture, digital platforms, sharing and circular economies, renewable energy, and social innovation. The findings emphasize that beyond technology, active community involvement, institutional support, and sustainability are crucial. However, the study is limited by its reliance on a systematic literature review of English-language articles from the Scopus database (2013–2025) without field data. Future research should include empirical studies using mixed methods, integrate social, cultural, and environmental dimensions, and draw from local literature and development project reports to better inform strategies for sustainable Smart Villages.

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