

GOVERNMENT GOVERNANCE INNOVATION IN REALIZING A SMART VILLAGE BASED ON SOCIAL LITERACY AND EDUCATION

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ABSTRACT

Advances in digital technology are driving the transformation of governance towards a smart village model. This research aims to explain the form of village government governance innovation in realizing smart villages, analyze the role of social literacy and education in supporting the success of its implementation, and identify challenges and opportunities faced in the village digitalization process. This study uses a qualitative approach with a literature study method that refers to the perspective of public governance and sociology of education. Data sources come from journal articles, books, policy documents, and research reports obtained through databases such as Google Scholar, Scopus, and DOAJ. The data were analyzed thematically and narratively. The results of the study show that village governance innovations include the digitization of public services, the use of online platforms for transparency and participation, and the formation of digital village teams. However, the success of implementation is highly dependent on social literacy and public education, especially in understanding and utilizing technology. The main challenges faced include limited infrastructure, low digital literacy, and program fragmentation between levels of government. This research recommends strengthening community literacy and multi-stakeholder collaboration as the main strategy in building inclusive and sustainable smart villages.

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INTRODUCTIONS

In the context of global governance, the advancement of Information and Communication Technology (ICT) undoubtedly presents a major change in the way governments work. Traditional governance models are now starting to shift towards more innovative ones, such as *Smart Governance* and *Smart City*. In the era of the Industrial Revolution 4.0, the concept of *Smart Village* emerged as an important development, which allows villages to utilize digital technology to strengthen local governance and increase community participation.

Various international studies show that the application of clear indicators in smart city programs is helpful in designing more targeted government strategies, particularly in improving public services and citizen engagement. (Caird & Hallett, 2019; Ismagilova et al., 2019)

But in Indonesia, there is still an undeniable gap between urban and rural areas, especially in terms of access to education, technology, and infrastructure. Realizing this, the Indonesian government issued Law No. 6 of 2014 on Villages, which provides flexibility for village governments to innovate in governance and community empowerment. This legal framework is the basis for the emergence of various initiatives towards *Smart Villages*, which encourage the use of digital technology in the implementation of village government. The concept of smart villages is present as a solution to improve the quality of public services while building community social resilience. (Fuad Khalil et al., 2024) (Sitna et al., 2021)

The role of the village government has now shifted. No longer only carrying out instructions from the center, but also required to be a motor of innovation in the community. Participatory governance encourages villages to not only adopt technology, but also build community capacity to be able to use it effectively. This includes transparency in budget management, community involvement in the decision-making process, and improving the quality of public services which are all key factors in the success of *Smart Villages*. (Nur et al., 2023; Pereira et al., 2018)

However, the success of smart village programs does not only depend on digital infrastructure, but is also greatly influenced by the level of social literacy and education of the community. Without a sufficient understanding of technology and the role of society in society, digitalization programs risk not being utilized optimally or even rejected by the community. Therefore, a good literacy program is needed so that the community can actively and intelligently participate in village development. (Hämäläinen, 2020; Handoyo et al., 2023)

Studies in various countries also show that the direct involvement of citizens in digital governance has a positive impact, such as increased public trust and the effectiveness of programs. The experience of cities in Europe shows that the higher the level of citizen participation, the better the results of the *smart city* program that is implemented. This can be a valuable lesson for villages in Indonesia in building inclusive and adaptive governance through digital technology. (Cortés-Cediel et al., 2021) (Szarek-Iwaniuk & Senetra, 2020)

In addition to governance, improving connectivity and digital services also opens up opportunities for socio-economic progress in villages. A supportive digital environment has proven to be able to encourage investment, improve educational outcomes, and improve people's living standards. Digital technology can also be a bridge to accessing essential services such as health, education, and government services. (Apanaviciene et al., 2020; Borruso & Balletto, 2022; Ismagilova et al., 2019)

Nevertheless, it is important to ensure that the implementation of smart villages in Indonesia remains attentive to local values and the needs of local communities. Policies must be adjusted to the character and potential of each village so that the program is not just a symbol of digitalization, but really becomes a tool for community empowerment. Thus, big goals such as the achievement of the Sustainable Development Goals (SDGs) will be easier to realize. (Fuad Khalil et al., 2024; Nooringsih & Susanti, 2022)

The flow towards *Smart Villages* in Indonesia is not only about technology, but also actively building a participatory culture, increasing community literacy, and strengthening innovative governance. Learning from international practices and adapting them contextually at the local level will be key to success. Villages in Indonesia have great potential to become independent, smart, and resilient regions in the digital era. (Abu-Rayash & Dincer, 2023; Riki et al., 2020)

Most studies on *the concept of Smart Villages* tend to focus on technology and infrastructure aspects, thus ignoring other important dimensions such as village government governance innovations and social literacy and community education. Research that comprehensively links these three elements in the context of smart village development in Indonesia is still minimal. For example, studies by show that smart village development in Indonesia is often top-down, where more initiatives come from central and local governments, and notes that a lack of initiative from communities results in an unpreparedness to support the implementation of smart villages. The research

underscores the importance of understanding the role of literacy in the development of innovative village governance, which should encourage collaboration between village officials and communities in formulating responsive policies. This means that social literacy, which includes the ability of communities to actively participate in governance processes, becomes a key driver for innovation in village governance, thereby increasing the chances of successful smart village development. That is why further research is needed to explore how the interaction between village officials and the community, in the context of adequate social literacy, can contribute to governance innovation and the achievement of sustainable smart village development. (Susilowati et al., 2025) (Susilowati et al., 2025) (Wijaya et al., 2023) (Wijaya et al., 2023) (Annshori et al., 2024; Primasari et al., 2023) (Fatimah et al., 2020; Manar et al., 2021)

This research aims to explain the forms of governance innovations carried out by village governments in an effort to realize *Smart Villages* in Indonesia. In addition, this study is also intended to analyze the role of social literacy and education as the main supporting factors in the successful implementation of smart villages, as well as identify various challenges and opportunities faced by village governments in carrying out an inclusive and literacy-based digitalization process.

Method

This research is qualitative with a literature review method that focuses on the perspective of public governance, sociology of education, and technology-based village development. As a literature study, this study does not collect primary data from the field, but focuses on tracing, selection, and analysis of scientific documents relevant to the theme of village government innovation, digitization of public services, social literacy and education, and the implementation of the Smart Village concept in the context of rural Indonesia.

The main objective of this study is to identify forms of innovation in village government governance that support the creation of smart villages, analyze the role of social literacy and education in supporting the success of village digitalization, and understand the challenges and opportunities that arise in the transformation process. In addition, this study aims to fill the conceptual gap in the literature that is still minimal discussing the integration between community literacy and digital village governance contextually in Indonesia.

The data sources in the research were obtained from various scientific literature such as journal articles, academic books, research reports, policy documents, and conference proceedings that discussed issues related to digital villages, village governance, community literacy, digital transformation, and sustainable development in rural areas. The literature is collected through systematic searches on academic databases such as Google Scholar, Scopus, Web of Science, and DOAJ. The keywords used include: "smart village", "village governance innovation", "rural digitalization", "social literacy and education", "e-government in rural areas", and "community-based governance".

The literature selection is focused on publications in the last two decades (2018–2024) to ensure linkages with contemporary issues in digital governance and village empowerment. However, some relevant classical literature remains used as a conceptual foundation. The inclusion criteria include literature that explicitly discusses the integration of technology in village governance, the role of literacy in digitalization, and participatory approaches in village development. Meanwhile, literature that only highlights the technical aspects of digitalization without linking it to governance or community empowerment was excluded from this study.

The analysis process is carried out with a thematic and narrative approach, through the identification of the main recurring themes in the literature, such as village innovation models, digital literacy barriers, community participation in digital governance, and technology access gaps. The analysis was carried out by referring to participatory governance theory, community-based development, and sociological approaches to digital transformation. This framework is used to interpret how village policy innovations and community literacy levels influence each other in realizing inclusive and sustainable smart villages.

By combining thematic approaches and socio-policy theory, this research builds a conceptual narrative that explains how community governance and literacy practices play a role in the village digitalization process, as well as

formulating a strategic direction for Smart Village development that is adaptive to local needs and promotes social justice in rural development.

RESULT AND DISCUSSIONS

Forms of Village Government Governance Innovation

Village government governance innovations in Indonesia are growing, especially in the context of digitizing public services that aim to improve efficiency and transparency in village administration. One form of innovation that is currently rampant is the use of administrative service applications that include correspondence, citizen complaints, and *e-budgeting* systems. Research conducted by Yulianita shows how the "*Smart Village*" application functions to improve population administration services in Sidomulyo Village, through the use of information technology to provide faster and more responsive public services. This is in line with the government's efforts to develop a more integrated and user-friendly village information system, which is expected to increase community participation in village administration. (Yulianti et al., 2020)

In addition, the implementation of village information websites or platforms is a significant step in facilitating transparency and access to public information. The village website not only serves as a medium for conveying information about village government programs, but also as a platform for the community to provide input and suggestions. Research by Mandasari notes that good governance includes the application of open government principles, where village governments seek to establish two-way communication with citizens through digital platforms. This is important in order to stimulate active participation from the community in decision-making at the village level. (Mandasari, 2023)

Online-based financial reporting systems are another form of innovation that is being implemented. With this system, the management of village funds becomes more transparent and accountable. Research by shows that village governments that implement digital systems in financial management are better able to answer the challenges of transparency and accountability in village fund management. It also allows the community to participate in the supervision of the use of the village budget, thereby reducing the potential for cases of abuse of authority. (Mahyudin et al., 2022) (Mahyudin et al., 2022)

The village deliberation forum held virtually or hybrid also shows innovation efforts in village governance. Easy access to technology allows face-to-face meetings that were once limited to be expanded through digital platforms. This was revealed in a study by Rohmanu et al., which emphasized the importance of community participation in village deliberations, and how technology can be a bridge to increase such participation even in a pandemic situation. With this forum, people can more actively participate in formulating policies related to their daily lives. (Rohmanu et al., 2023)

The alignment of the *Smart Village* program with local policies is another important aspect of village government governance innovation. The ability of the village government to align the Village Medium-Term Development Plan (RPJMDes) with the digitalization program creates a profitable synergy in village development. Mandasari also noted the importance of synchronization between local policies and proposed initiatives to achieve more measurable improvements in various areas. (Mandasari, 2023)

Institutional innovation through the formation of digital village teams is a strategic step in supporting the implementation of digitalization programs. The formation of this team aims to develop the capacity of village apparatus in managing and utilizing information technology to the fullest. Research by Hasudungan et al. shows that the success of innovation is not only determined by access to technology, but also by the ability of human resources at the village level to adapt to existing changes. The digital village team is expected to be the driving force in this transformation process. (Hasudungan et al., 2024)

The implementation of all these innovations is impossible apart from the challenges that must be faced by the village government. Limited human resources and knowledge about information technology are the main obstacles in achieving the optimization of public services. Therefore, training and assistance for village officials need to be

carried out continuously to ensure that all aspects of technology are implemented effectively and efficiently. The results of the study by Yulianti et al. show that local government support is very important in increasing the capacity of human resources in villages. (Yulianti et al., 2020)

In a broader context, the implementation of this governance innovation is expected to encourage sustainable village development and empower the community. By utilizing information technology, villages can be more independent and competitive, and able to manage local potential to the maximum. A study by Kartika said that good practices in one village can be adapted and applied in other villages, thereby increasing interaction and knowledge exchange between villages. This creates a strong collaborative network to build smart villages in Indonesia. (Kartika, 2018)

Overall, innovative forms of village government governance in Indonesia create a strong foundation to face new challenges in the digital age. Through the digitization of public services, institutional capacity building, and active community participation, villages can achieve success in inclusive and technology-based development. This success will also depend heavily on collaboration between all relevant parties, both from the government, community, and the private sector, in realizing a sustainable and competitive smart village.

The Role of Social Literacy and Education in the Implementation of *Smart Villages*

The role of social literacy and education in the implementation of *Smart Villages* in Indonesia is fundamental, considering that this country has a big challenge in improving the quality of life of village communities through the use of digital technology. Technology literacy among village officials and the community is a must so that public services can run well. According to Irwansyah's research, increasing the capacity of village officials in managing digital platforms is an important first step, because village officials must be well educated in the use of technology to provide effective services to their citizens Irwansyah (2021). Without a strong understanding, the use of technology can actually cause confusion and inefficiency in service management.

However, major challenges still remain, especially related to the mastery of technology by the community, especially the elderly or those with low education. As revealed in a study by Isabella et al., the low level of digital literacy among the community has the potential to hinder them from actively participating in *Smart Village* initiatives (Isabella et al., 2024). Increased understanding of digital technologies is crucial to ensure that all villagers, not just the highly educated, can participate in the digital development process in their villages. It emphasizes the need for more inclusive and community-based interventions to improve digital literacy among these groups.

The role of non-formal education and community training is also very important in supporting technology literacy in villages. Information and Communication Technology (ICT) training activities held by village partners such as universities and NGOs have proven effective in improving the community's knowledge and technical skills. In research by Kurniawati et al., the existence of these trainings has a positive influence on the community's ability to use digital tools for daily activities, including dealing with village administration and participating in village deliberations (Kurniawati et al., 2018). Through this non-formal education, people not only learn to use technology, but also gain an understanding of their rights and obligations in using digital services.

In addition, community-based digital literacy campaigns can be an effective means to expand digital knowledge in rural communities. Research by Dewanto et al. shows that programs that involve active participation of the community as well as educating them about the needs and processes of digitalization can increase critical awareness and citizen involvement in decision-making (Dewanto et al., 2024). This effort not only allows for an increase in participation rates, but also encourages people to be more critical of the information they receive online and reduce the risk of exposure to propaganda or disinformation.

Strengthening critical awareness and social participation among the community through social literacy can direct their active involvement in village decision-making. Education that emphasizes the importance of citizens' rights and access to digital services is crucial. According to Isabella and Nofrima's research, increasing people's understanding of the right to digital services can help encourage their participation in village digital development

policies and ensure that their aspirations are taken into account in the process (Isabella & Nofrima, 2024). This is not only important to create inclusive governance but also to build trust between the government and the public.

Basically, social literacy and education must be integrated in every aspect of *the Smart Village* program. A comprehensive approach to teaching digital and social literacy to the community can involve alignment between formal and non-formal education, as well as collaboration with those with expertise in the field of technology and education. Research by Mahendra et al. highlights that policies that focus on improving digital literacy should be part of the sustainable development agenda (SDGs) in Indonesia (Mahendra et al., 2022). This shows how important literacy is as a key driver for creating competitive and self-reliant smart villages.

The success of the *Smart Village* implementation is highly dependent on the literacy scheme offered. This requires continuous initiatives supported by the government, NGOs, and educational institutions to organize training programs that are accessible to all groups, especially vulnerable groups. In closing, the challenge of improving social literacy and education requires serious attention and cross-sectoral cooperation to create an *inclusive and sustainable* smart village ecosystem.

Challenges of Smart Village Implementation

The implementation of *the Smart Village* program in Indonesia is faced with various challenges, one of which is the limitation of technology and internet infrastructure which is still a major problem in many rural areas. Based on research by Mukti et al., in Tosari District, Pasuruan Regency, there are still many villages that do not have adequate internet access. This condition is a lesson for the public in accessing information and digital services that are increasingly meaningful in the modern era. These limitations create gaps in connectivity between rural areas, where villages with better infrastructure can leverage technology to improve public services, while other villages are left behind. (Mukti et al., 2025)

The connectivity gap is also a serious challenge that hinders the development of *Smart Villages*. Research by Yanto et al. shows that despite efforts to increase community participation through digital platforms, unequal access to the internet is a major barrier limiting its effectiveness and impact. Isolated areas often do not receive sufficient support from the government or internet service providers, and reduce the self-reliance potential of the village itself. (Yanto et al., 2024)

In addition, the low level of digital and social literacy in some regions is also a barrier. The lack of understanding of the benefits of technology in public services has caused people to look skeptical of *Smart Village* initiatives. Research by Soerjono et al. highlights that resistance to digital change often arises from ignorance about how technology is able to improve their quality of life. This lack of understanding creates a big challenge for the village government in educating the community about the potential and benefits of applying technology in daily life. (Soerjono et al., 2024)

Social resistance to digital change is also exacerbated by a lack of support in the form of proper education and training. Efforts to increase digital literacy must be balanced with the provision of relevant training for the community to optimize the use of technology. Rumestri et al. noted that program fragmentation and lack of inter-agency collaboration can hinder efforts in providing education and training focused on the needs of rural communities. It is important for stakeholders to synergize and create holistic and inclusive training programs, considering the diversity of educational and social backgrounds of rural communities. (Rumestri et al., 2023)

Furthermore, the lack of integration between central, provincial, and village programs is also a glaring challenge. Separate development policies without good coordination among different levels of government can lead to waste of resources and suboptimal results. According to research by Diah, synergy between government programs is needed to ensure the success of rural development initiatives. Without good coordination, these programs cannot run effectively and sustainably. (Diah, 2020)

The challenge of coordination between village officials, district offices, and the community is also an obstacle in the implementation of *Smart Villages*. Research by Akbar and Nisa shows that lack of communication and

community involvement in the decision-making process often leads to program failure. This is due to the lack of awareness from the village apparatus that the active participation of the community is the key to the success of development programs, including (Akbar & Nisa, 2024) *the Smart Village* initiative.

Along with the existing challenges, more effective strategies are needed to overcome resistance to change. The qualitative approach discussed in the study by Muadifah et al. indicates that open and transparent communication is one of the keys to overcoming resistance in the adoption of new technologies. By getting closer to the community and actively involving them in every stage of program planning and implementation, resistance can be minimized. (Muadifah et al., 2024)

In closing, the challenges of implementing *Smart Villages* in Indonesia are very complex and interrelated, ranging from limited infrastructure, access gaps, to social resistance to change. To overcome this problem, collaborative efforts from all stakeholders, namely the government, society, and third parties such as NGOs and universities, are actually inevitable. By creating synergies and focusing on improving social and digital literacy, Indonesia can develop sustainable and inclusive smart villages, which ultimately improves the quality of life of rural communities.

Strategic Opportunities and Best Practices

Innovative villages provide strategic opportunities that can be used as models in the implementation of *Smart Villages* in Indonesia, especially in integrating digital public services and citizen participation. For example, the case study of Permisan Village in Jabon District shows how the implementation of online-based public services can increase public access to government information and services. Through various digital platforms, people can be directly involved in the decision-making process, accelerate responses to local needs, and encourage transparency in administration. The implementation of this initiative also proves that when citizens are involved in every stage, the results are very positive for the quality of public services provided. (Putri et al., 2024)

Multi-stakeholder collaboration, or often referred to as the pentahelix model, is essential in the sustainable development of smart villages. Partnerships between village governments, the private sector, academia, communities, and the media create strong synergies. Research by Muharam and Haviz shows that through this collaboration, villages can leverage a wide range of resources and knowledge to address existing challenges and enlarge local economic development opportunities. For example, cooperation with universities in information technology training and counseling can improve the digital literacy of rural communities, which is the first step in creating a society that is able to adapt to technology. (Muharam & Haviz, 2022)

The potential for replication of good practices from these innovative villages is expected to inspire nation-scale development. The context of success in one village can be adapted to be used in other villages, of course, by taking into account the local conditions of each. Waryadi and Hanriana noted in their study that the successful implementation of the Non-Cash Food Assistance (BPNT) program in Sukamaju Village can be a reference for other villages facing similar challenges, where the involvement of various parties such as government agencies and the community is the key to success. This suggests that the dissemination of good practices should be driven through network patterns that strengthen collaboration. (Waryadi & Hanriana, 2022)

The preparation of adaptive *Smart Village implementation guidelines or models* is also very important to standardize the steps that must be taken by villages throughout Indonesia. Andari and Ella mentioned that the development of *the Smart Village* model must be carried out with an inclusive and practical approach, which allows each village to innovate according to their local potential. This effort can involve the preparation of a guideline document based on field experience in areas that have successfully implemented it. This not only provides clear direction but also provides a framework for continuous evaluation and improvement. (Andari & Ella, 2019)

The integration of Sustainable Development Goals (SDGs) and the National Medium-Term Development Plan (RPJMN) is also a vital aspect in building smart villages. According to Rahmat and Apriliani, alignment between local policies and international goals can encourage villages to think more broadly, not only focusing on local needs

but also contributing to larger sustainable development goals. This integrated policy follow-up will have an impact on community empowerment and open up wider access to resources and development support. (Rahmat & Apriliani, 2023)

The support from the local and central governments is very strategic in ensuring the sustainability of this initiative. Diah emphasized the importance of the government's role in creating a conducive climate for the implementation of *Smart Villages* by providing support both from financial and coaching aspects. This will support the creation of better conditions for villages to apply technology and innovations that encourage economic and social growth. (Diah, 2020)

In this context, education and training are also aspects that should not be ignored. The success of the plan depends on increasing the capacity of human resources through formal and non-formal education that can accelerate community participation in village development. According to Yuliani et al., homestays and other local tourism sectors are concrete examples of how training can improve people's knowledge and skills, which in turn contributes to the improvement of the local economy. (Yuliani et al., 2024)

Innovative villages that successfully integrate digital public services and citizen participation have shown that with synergy between various parties, targeted policy support, and community education and empowerment, villages can become centers of empowerment and innovation. Therefore, looking at practical examples of these villages and applying them in various contexts, while still paying attention to local uniqueness, is a strategic step towards sustainable and inclusive development in Indonesia.

CONCLUSION

This research shows that village government governance innovation plays an important role in realizing *Smart Villages* in Indonesia. These innovations include digitizing public services, transparency in online-based village financial management, using two-way communication platforms, and the formation of village digital teams. All of these initiatives aim to improve efficiency, accountability, and community participation in the village governance process.

However, the success of the implementation of *Smart Villages* is not only determined by the sophistication of the technology used, but also by the level of social literacy and education of the village community. Digital and social literacy are the foundation for encouraging active citizen participation, reducing resistance to technology, and strengthening trust and collaboration between the government and the community. Low literacy levels are still a challenge in many areas, especially in the elderly or people with low education.

In addition, limited technology and internet infrastructure, policy fragmentation, and lack of collaboration between stakeholders are obstacles to the equitable implementation of smart villages. However, this study also found that various good practices from innovative villages can be replicated contextually, especially through multi-stakeholder collaboration (pentahelix) and the development of *adaptive and inclusive* Smart Village implementation models.

Thus, this study emphasizes the importance of integration between governance innovation, socio-educational literacy, and collaborative strategies to create sustainable and socially just smart villages.

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