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Digitization of Village Government as a Sustainable Development Strategy Towards the Realization of Smart Villages

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Abstract
Background. Digital transformation in rural government organizations is key to increasing the effectiveness of governance, transparency, and community participation in village development. The *Smart Village* concept presents an innovative approach integrating digital technology in public administration, community services, and village economic empowerment. The Indonesian government has established various policies, such as Law Number 6 of 2014 on Villages and the Digital Village program, to encourage the modernization of village government. However, its implementation is still faced with various challenges, such as the limitation of technological infrastructure, the readiness of human resources in village government organizations, and the lack of optimal policy synchronization at the central and regional levels.
Aims. Therefore, this study aims to explore how digitalization can strengthen village governance, identify supporting and inhibiting factors in implementing *Smart Villages*, and formulate policy strategies that can accelerate digital transformation in sustainable village development.
Methods. This research uses a qualitative approach with document analysis, obtaining data from various secondary sources, including the Citengah Village Medium-Term Development Plan (RPJMDes) 2019-2024, village digitalization policies, and relevant academic literature.
Result. The study results show that Citengah Village has initiated various digitalization programs, such as implementing an electronic-based administrative system and optimizing the village information system. However, the document study revealed that the implementation of *Smart Village* still experienced obstacles in village government organizations' capacity to manage digital systems, budget limitations, and weak cross-sector coordination in the development of digital infrastructure. From the perspective of sustainable development, digitalization in village government organizations has not fully supported digital-based economic empowerment, increased public service efficiency, and optimized technology use in village resource management.
Conclusion. This research is unique in linking the concept of Smart Villages with strengthening village government organizations in the context of sustainable development, which distinguishes it from previous studies that focused more on technological aspects without considering village institutional dynamics. The document analysis-based approach also provides a more systematic policy-based evaluation, allowing for secondary data-driven studies without relying on subjective opinions.
Implementation. This research is also expected to produce an organizational and contextual village digitalization strategy model, which can be used as a reference in formulating policies to increase the effectiveness of technology-based village government. Therefore, although village digitalization has great potential in improving the quality of public services and village economic competitiveness, its success is highly dependent on the readiness of village government organizations, strengthening the

capacity of human resources, and harmonizing digitalization policies at the national and regional levels.

Keywords: Smart Village, Government Digitalization, Village Government Organization, Sustainable Development, Citengah Village

INTRODUCTION

Village development is a strategic priority in realizing equitable distribution of welfare and sustainably improving the community's quality of life. With more than 74,000 villages spread across Indonesia, the effectiveness of village governance plays a crucial role in supporting inclusive and efficient development. Along with the development of information and communication technology, *the Smart Village* concept emerged as an innovative approach in the modernization of village government, which aims to improve administrative efficiency, accelerate the delivery of public services, and strengthen community participation in development decision-making. The Government of Indonesia has shown its commitment to developing *Smart Villages* through various policies, such as Law Number 6 of 2014 concerning Villages, which gives broad authority to villages in managing resources and development policies. In addition, the Digital Village program initiated by the Ministry of Communication and Digital (Komdigi) aims to encourage village digital transformation through the provision of internet infrastructure, increasing the digital literacy of village officials, and digitizing the village government administration system. However, despite the various policies that have been launched, the implementation of *Smart Villages* in Indonesia still faces various challenges, especially in terms of limited technological infrastructure, low human resource capacity, and lack of regulatory harmonization between the central, regional, and village governments.

Citengah Village, Sumedang Regency, is one of the villages that has included a digitalization program in the 2019-2024 Village Medium-Term Development Plan (RPJMDes) as part of the village government's modernization strategy. Some of the initiatives that have been designed include the implementation of digital-based administration, village information management through online platforms, and increasing internet access to support the economic development of village communities. However, in practice,

The implementation of *Smart Villages* in this village still faces challenges in terms of the capacity of village government organizations in managing digital systems, budget limitations in the development of technological infrastructure, and suboptimal cross-sector coordination in supporting village digitalization. The main challenges in village digital transformation include several main aspects, including the limitations of digital infrastructure, which is still an obstacle for many villages, including Citengah Village, which faces limited, stable, and equitable internet access, as well as the lack of adequate technological tools to support a digital-based administration system. In addition, the capacity of village government organizations that are not fully ready to adopt digital systems is an obstacle to optimizing technology-based public services. Village officials are still experiencing obstacles in managing the digital system and using technology to improve administrative and participatory services.

Not only from a technical perspective, but the lack of integration of policies and regulations is also an obstacle to the implementation of *Smart Villages*. The Digital Village Program, initiated by the central government, is still not optimally integrated with regional policies and internal village regulations, so its implementation is often limited to administrative aspects without regulatory support that strengthens participation and transparency. Furthermore, budget limitations and a lack of financial support are the main obstacles to accelerating village digitalization. Village governments are still heavily reliant on village funds and regional budget allocations, which often do not prioritize digital infrastructure development. The absence of a structured funding mechanism for the development of *Smart Villages* has caused many villages to have difficulty in implementing digital transformation in a sustainable manner.

Based on the above problems, this study aims to analyze the implementation of digitalization in village governance with a case study in Citengah Village, Sumedang Regency, identify supporting and inhibiting factors in the implementation of *Smart Villages*, and formulate policy strategies that can accelerate the digital transformation of villages in a sustainable manner. Using a qualitative approach through document analysis, this study will examine national policies and regulations related to village digitalization, including the 2019-2024 Citengah RPJMDes, as well as examine the extent to which the integration of Smart Villages in village government organizations can increase the effectiveness of public services and more sustainable village development. This research is expected to make an

academic contribution to developing policy models. Village digitalization that is more inclusive and adaptive to local conditions serves as a reference for policymakers in optimizing strategies to strengthen digital infrastructure, improving the technological literacy of village officials, and harmonizing cross-sector policies to accelerate the digital transformation of village government in Indonesia.

LITERATURE REVIEW

The *Smart Village* concept was developed to respond to the need to modernize village governance by integrating information and communication technology (ICT) in public services, government administration, and community empowerment. In various pieces of literature, smart villages are seen as an extension of the concept of smart cities, adapted to the countryside's social, geographical, and cultural context. The main goal of this approach is to create villages that are independent, efficient, and able to access information and services digitally to improve the welfare of their citizens.

Previous research has shown that the implementation of *smart governance* is an important pillar in forming digital-based villages, especially through optimizing community participation and improving the quality of public services (Aditya & Ramdani, 2025). On the other hand, other studies have also found that the biggest obstacles in applying digital technology in villages come from low digital literacy and the dominance of conventional bureaucratic culture, so digital adaptation does not run effectively (Eldo & Inzana, 2022).

Studies on the use of the *Village Information System (SID)* in other areas show that the appropriate use of technology can build synergy between the village government and the community in transparent decision-making and resource management (Sulistyowati et al., 2021). In addition, the success of digitalization is largely determined by the leadership factors and social network capacity that villages have, which are important elements in community-based smart governance (Eno Novita Maharania & Dewi Sekar Kencono, 2021).

The *Smart Village approach* is also linked to strengthening the village economic sector, emphasizing the importance of integration between *the smart economy* and *smart living* in encouraging the productivity and welfare of village communities (Oktaviana, 2024). However, as stated by Cahyani (2023), the success of this approach is highly dependent on the community's understanding of technology and the availability of regulations and infrastructure.

Adequate. When this is not met, digitalization initiatives tend to be symbolic and do not significantly impact village governance (Cahyani & Santoso, 2023).

Efforts to develop village service applications also prove that an application-based internal digital system can cut service time and improve the accuracy of administrative data (Agung Saputra & Rahman Isnain, 2021). Another study emphasizes the importance of the involvement of all village apparatus in the management of digital information systems so that the system is not only a formality but really supports the efficiency of village management (Wardhani & Mawansyah, 2025).

In the context of sustainable development, other research shows that structured village digitalization is able to encourage the creative economy of village communities, but classic problems such as budget limitations and low digital competence are still the main obstacles to realizing a village *smart economy* at large (Mardiansyah, 2022)

Overall, various previous studies have shown that the success of the *implementation of Smart Villages* cannot be separated from four main pillars, namely the readiness of digital infrastructure, the quality and capacity of human resources, the availability of integrated policies from the central to village levels, and the active participation of the community in the digitalization process. However, most existing research still tends to focus on purely technical and technological aspects, such as the availability of internet access or the development of village service applications, without giving sufficient emphasis to how the structure and function of village government organizations adapt to digital transformation.

This research is here to fill this gap, by placing village government organizations as the main subject in the digitalization adoption process. The focus is not only on the extent to which technology is used, but even more deeply on how village organizational systems, including task sharing, administrative workflows, work culture, and coordination mechanisms between departments, adapt in the digital context. This approach is important because, without adequate institutional readiness, even the most advanced technologies cannot be implemented optimally. In addition, this study also offers updates in the form of testing the alignment between the policies contained in village planning documents (such as *RPJMDes)* and the reality of the capacity of village organizations to carry out digitalization.

By raising the case study of Citengah Village, which has explicitly included the digitalization agenda in the 2019–2024 RPJMDes, this study not only reconstructs how digitalization is practiced, but also examines the potential incompatibility between the planning vision and the reality of implementation at the village government organizational level. This is where the *novelty* of this research lies: it examines not only digitalization as a technological phenomenon, but as a complex institutional process, which requires integration between technological aspects, policies, and the readiness of local organizational structures.

METHOD

This study uses a descriptive qualitative approach with document analysis methods as the main technique in data collection and processing. This approach was chosen to examine how the digitalization process is applied in village government organizations, especially in the context of Smart *Village development* in Citengah Village, Sumedang Regency. This study focuses on identifying the compatibility between the policies designed in the village planning document and the institutional practices that take place in the field.

This study's data sources are official documents directly related to village digitalization policies and programs. The main document analyzed is the Citengah Village Medium-Term Development Plan (RPJMDes) for 2019–2024, which contains the vision, mission, direction of development policies, and village strategic programs, including public service digitization programs and strengthening village information systems. In addition to the RPJMDes, this research also refers to national policy documents such as Law Number 6 of 2014 concerning Villages and other supporting documents such as village profiles, APBDes realization reports, and academic publications or relevant research from reliable sources.

The analysis technique used is *content analysis*. Through this approach, the researcher examines the policy narrative, organizational structure, and strategic activities in the available documents, then categorizes the content of the document into main themes such as:

(1) Readiness of village government organizations in carrying out digitalization
(2) Technology-based program planning
(3) Structural challenges in digitalization implementation

(4) Synergy between central and village policies.

The researcher identifies how the organizational structure of village government is displayed in the RPJMDes and other supporting documents, as well as how aspects of digitalization are framed in the context of managerial and public services.

To maintain the validity and accuracy of the analysis, the researcher uses source triangulation by comparing the content of village planning documents with national policies and relevant academic literature, especially the results of previous research that have been reviewed in the literature review section. This is done to ensure that the interpretations made are inseparable from the normative and theoretical context that underlies the development of digital villages in Indonesia.

With this method, it is hoped that the extent to which the digitalization policy in the village planning document truly reflects the readiness and ability of the village government organization to adopt the *Smart Village* model, as well as how the mismatch between the policy vision and institutional capacity can be systematically identified, can be determined.

DISCUSSION

Based on the results of an in-depth analysis of the Citengah Village Medium-Term Development Plan (RPJMDes) document for 2019–2024, it was found that the Citengah Village Government has a development vision that explicitly reflects the aspiration to become a technology-based village. The vision is stated in the formulation "*the realization of an advanced, competitive, and technology-based Citengah Village in supporting the welfare of the community that is just and sustainable*." This vision is then elaborated into several missions: "increasing *the capacity and effective and efficient governance of villages through the use of information technology*."

This commitment is reflected in several priority programs, including:

1. Development of a website-based Village Information System (SID),
2. Digitization of population administration and correspondence,
3. Information technology training for village officials,
4. The use of social media and applications for public services, as well as
5. Upgrading the internet network to support digital-based services.

However, after further study, these programs have not been prepared as a clear and measurable roadmap. For example, there are no annual implementation stages, specific output targets, or evaluations based on key performance indicators (KPIs) that can be used to measure the achievement of digitalization implementation quantitatively or qualitatively. In this aspect, RPJMDes tend to be declarative rather than operational.

Furthermore, the document does not outline the organizational structure of the village government that will be responsible for the management of the digitalization program. It is not clear whether a new technical unit will be formed (e.g., the village IT management team) or whether the task of managing technology will be assigned to existing devices, such as the Head of TU and General Affairs, or the Village Secretary. The absence of this supporting structure is an institutional gap that can have an impact on the low effectiveness of the implementation of village digitalization, as also revealed by Maharani and Kencono (2021), that the organizational structure must be adjusted to the direction of technology-based public service transformation.

From the budget aspect, the RPJMDes does contain digitalization programs, but detailed financing plans for each activity do not accompany it. For example, the "procurement and management of SID" activities are listed without including cost estimates, funding sources (e.g., Village Funds, BUMDes, or assistance from third parties), and the scheme for implementing these activities on an annual basis. In related APBDes documents, digitalization programs are often mixed in the posts of physical development activities or capacity development in general, making it difficult to trace the concrete realization of the planned digitalization policy.

Furthermore, in terms of increasing the capacity of human resources (HR), the RPJMDes includes training activities for village officials and the community in the use of information technology. However, as with any problem with program planning, the details of the training substance are not explained. Does the training include the management of the population database, the use of administrative software, or simply an introduction to basic computers? The absence of this information shows that human resource development policies have not been seen as a strategic foundation in the success of digitalization programs.

This condition strengthens the argument that low digital literacy of village officials is the main challenge in digital transformation, especially when digitalization efforts are not

accompanied by increased institutional capacity (Eldo & Inzana, 2022).

The study stated that many village officials felt they did not have a significant role in implementing digital technology because they were never involved in planning, training, or decision-making.

To clarify the position of the relationship between the elements that are the focus of this study, the following is a conceptual scheme that describes the flow of the influence of digitalization in the village organizational structure on sustainable development towards the formation of Smart Villages:

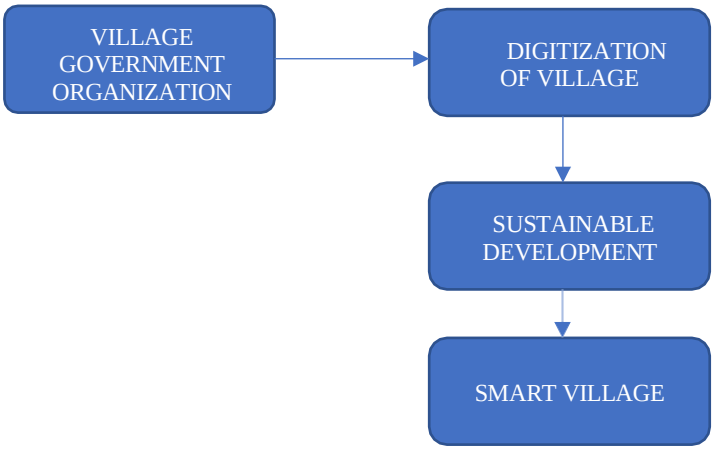

Figure 1. Visual Conceptual Charts

As seen in the chart, the digitalization of village government is positioned as the primary variable that drives the transformation towards sustainable development. In this case, sustainable development does not stand as a direct result, but as an intermediate process that connects the digitalization strategy with the final achievement in the form of a Smart Village. On the other hand, the readiness of the village government organization is an important foundation that determines the success of the process. In other words, without strong institutional support, technology adoption will not significantly impact the quality of services and overall village governance.

Furthermore, the results of the analysis of the Citengah RPJMDes document show that although there is a normative commitment to technology integration in development planning, institutionally, there is no adequate system to support sustainable digital transformation.

From the perspective of supervision and evaluation, RPJMDes Citengah has not shown the existence of a special monitoring and evaluation system for the digitalization

program. There are no performance indicators or reporting systems that regulate the extent to which digital services are used, who accesses them, and what the public feels. Even though the success of *Smart Villages* is not only measured by the existence of a technological system, but also by the level of citizen involvement and the effectiveness of technology's use in daily village life (Sulistyowati et al., 2021).

This gap between planning and implementation is the main highlight of this study. Normatively, Citengah Village has shown progressive policy intentions by prioritizing digitalization for medium-term development. However, the planning document has not substantively supported the entire institutional transformation.

Table 1. Analysis of the Content of the 2019–2024 Citengah RPJMDes Document in the Perspective of Smart Village

Aspects	Findings in RPJMDes	Evaluation
Digitalization Vision & Mission	There is an explicit statement about the goal towards governance-based technology	Political commitment is quite strong, but it is still general and has not been relegated to Operational Strategy
Digitalization Strategic Program	- SID Development - Digitization of administration - IT Training - Improved internet network	The program is aligned with Smart Village approach, but not equipped with clear implementation stages
Implementing Organization Structure	There is no mention of a technical unit for technology management	Showing the organization's unpreparedness in managing Digital Transformation
Budgeting and Resources	It is not described in detail in the RPJMDes or APBDes	Indicates weakness Fiscal support for the village digitalization program
Increasing Human Resources Capacity	There is a training plan, but the materials, methods, and targets are not explained The Target	Training has not been designed as a reinforcement strategy Technology-based institutions
Monitoring & Evaluation System	No performance indicators or Digitalization Program Reporting Mechanism	Creating difficulties in assess the effectiveness of Smart Village implementation
Synchronization with National Policies	Mentioning the Village Law as a reference, but not visible Integration of national programs (Digital Village)	Policy synchronization is not optimal, at risk of happening Duplication or overlapping policies

The lack of integration between program planning and organizational structure readiness, targeted budget support, and the lack of attention to monitoring makes digitalization vulnerable to symbolism. To clarify the incompatibility between the vision of

the digitalization policy and the structural readiness of the village government, Table 1 presents an analysis of the content of the Citengah RPJMDes document based on key aspects in the *Smart Village approach.*

These findings show that the digitalization of village government is not only about procuring applications or hardware but also about reforming the organization and management of village government. Thus, *the Smart Village approach* must be understood as an agenda for institutional change, not just a technology project.

CONCLUSION

This research shows that village government digitalization has great potential to strengthen sustainable development strategies and realize Smart Villages. Based on an analysis of the 2019–2024 Citengah RPJMDes document, the digitalization orientation has been explicitly stated in the village's vision, mission, and strategic programs. However, the digitalization program still faces many structural and managerial challenges in its implementation.

First, the planning document lacks a clear *roadmap*, an organizational structure, and monitoring and evaluation mechanisms. Second, budgeting and human resource capacity building have not been comprehensively described. Third, the connection between village policies and national policies related to digitalization is still declarative and has not shown concrete integration.

This condition emphasizes that digitalization cannot be separated from the institutional readiness of the village government. This means that the success of Smart Villages does not only depend on the availability of technology but also on the adaptation of village organizational systems to absorb and manage digital innovations in a sustainable manner. Therefore, the Smart Village approach needs to be understood as an institutional reform agenda, not just a technology initiative.

Based on the results and discussions that have been described, a policy direction is needed that not only emphasizes the procurement of technological devices in villages but also pays attention to strengthening the organizational structure of village government as a prerequisite for the success of digital transformation. The central and regional governments need to adopt an integrative approach that links the digitalization program with the village's medium-term development plan and develop standard operating procedures (SOPs) that can be used as a reference by each village in running technology-based services.

In addition, the policy of strengthening the capacity of village apparatus must be directed at developing digital competencies thematically and sustainably. This is not enough through basic ceremonial training; it needs to be based on analyzing the needs and potential roles of each part of the village organization. The government is also recommended to develop institutional guidance for digital villages, including new work structures, internal oversight mechanisms, and performance-based incentives for villages that successfully integrate digitalization into public service systems.

Finally, digital village development policies should use a gradual approach based on village typology to accommodate differences in capacity between regions. Villages with infrastructure and human resource readiness can become pilot projects connected to surrounding villages through a digital cluster system. In contrast, villages with limitations can be focused on strengthening the institutional foundation first. In the long term, this approach will create a digital village ecosystem that is not only fair and adaptive but also sustainable in facing the dynamics of technology-based development in the digital era

IMPLEMENTATION

Epistemological research strengthens the base concept of the importance of digitizing village government as a strategic instrument in accelerating sustainable development, especially in the framework of *Smart Village*. Thus, its main contribution is not only to strengthening the academic substance, but also in filling in the room empty deep literature about relationship between Village Government Institutions and Digital Transformation in the Context of Rural Areas in Developing Countries. In the world of education, the findings can potentially enrich academic studies at the university level, especially in the fields of public administration, rural development, and digital governance. It can also be used as a case study-based learning reference to relate development administration theory to village digitalization policy practices in the field. In addition, the document analysis approach offers a methodological alternative that can be developed in advanced research in an academic environment.

Socially, the digitalization process is understood not just as a system modernization, but as an instrument that can reconstruct the pattern of relations between the village government and the community. In this context, digitalization is not only a tool for administrative transformation, but also catalyzes changing the relationship between the village government and the community. This can encourage a stronger culture of citizen

participation in decision-making and accelerate the shift from manual bureaucracy to more transparent and responsive public services.

Regarding regional impact, the case study of Citengah Village shows that the integration of digitalization in development planning must be developed across sectors and villages to create synergies between regions that can strengthen connectivity and service efficiency. Thus, this finding is relevant to be used as a reference in developing bright village clusters (*smart regions*) based on local potential and comparative advantages, which also broadly have implications for the direction of village development planning and rural areas.

In terms of national policy, the research results provide critical input on the implementation of Law Number 6 of 2014 concerning Villages and the Digital Village program that the central government has launched. The gap between the planning narrative and institutional readiness found in this study shows the need to strengthen technical regulations, especially related to the restructuring of village organizations in the digital era. The results of this study are also important as input in the preparation of indicators of the success of the Smart Village program nationally, which have still been macro and have not considered institutional dynamics at the grassroots level.

In the international community, the academic contribution of research lies in its contribution to the global discourse on technology-based village development in developing countries. This study shows that the success of *Smart Villages* cannot be replicated directly from developed countries, but must be through a contextual approach based on local institutional adaptation. Therefore, this journal can be an important reference in the international discourse on digital village governance, especially in the Global South region's sustainable development framework. These findings also have the potential to open up space for collaboration between countries in developing village information systems, exchange of good practices, and evidence-based policy formulation in the rural sector.

Finally, as part of the long-term research agenda, this study recommends that further exploration be carried out on the internal dynamics of village government organizations in managing digitalization programs, either through more in-depth qualitative approaches, such as organizational ethnographic studies, or through a comparative approach between regions. Thus, this research does not only stop at a descriptive level, but can be the starting point to develop a more holistic, contextual, and sustainable village digitalization policy model.

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