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# The Influence of Institutional Capacity on the Implementation of Smart Villages in the Development of Village

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**ABSTRACT**

A smart village is a village whose people use technology and digital innovation in their daily lives. Implementing the smart village concept in rural development requires adequate village institutional capacity. Low institutional capacity causes an organization to lack the capacity to manage development and provide services. In general, the capacity of village organizations in almost all villages in Indonesia was relatively low, so the successful implementation of the bright village concept in village development requires more time. Regarding this problem, this study aimed to test whether or not village institutional capacity influences the implementation of smart villages in village development. The location of the study was chosen as *Sembalun Bumbung* Village, *Sembalun* District, East Lombok Regency, West Nusa Tenggara Province, Indonesia. This study used a quantitative approach with an associative research method, namely testing the influence of village institutional capacity variables on smart village implementation variables. Data collection techniques used questionnaires and literature studies. The research instrument has been tested through validity and reliability tests. The data analysis technique used analysis using the Pearson correlation test (product-moment). The study results showed that the village institutional capacity variable affects the smart village implementation variable with a determination coefficient of 74.30%, which indicates a strong relationship between the two variables. These results are crucial for understanding the dynamics of smart village implementation. The research results also found that several factors influenced the success of implementing smart villages: infrastructure, networking, and community participation.

## 1. Introduction

A smart village is "where people use technology and digital innovation in their daily lives, thereby improving the quality of life, public service standards, and better use of resources (Juan & McEldowney, 2021). The concept of a smart village has been in the spotlight for the last five years because it is considered the best solution for rural development. Since the agricultural policy reform, the smart village concept has received attention (Juan & McEldowney, 2021). A smart village is considered an alternative model of village development through environmental changes and technological advances (Ella & Andari, 2018). The rapid advancement of technology makes the application of smart villages significant in village development. The concept of a smart village has various definitions based on the researcher's perspective and background. One definition refers to the ability of the village to provide better services in the fields of social, economic, and environmental welfare for its residents so that the Community's quality of life improves (Agustiono, 2022). Each proposed definition depends on different communities' circumstances, social problems, and faces (Zavratnik et al., 2018).

Smart villages, defined as the use of technology and public services that were more effective and efficient, were not just about technology. They were about making smart decisions using Smart Technology and Services (Akshay et al., 2019; Anand, 2020; Somwanshi et al., 2016). Research on smart villages was increasing along with the development of research on smart cities. The current trend placed a relatively narrow focus on smart villages only on the use of technology, while the dimensions of society, services, and culture were relatively neglected. Based on the results of the literature review, the idea of a more dynamic conceptual model of the concept of a smart village was proposed, one that was based on community knowledge and centered on humans (Wang et al., 2022). This emphasis on community knowledge made the audience feel included and part of the solution. Experience in India, through green technology, has developed smart villages with 100% energy security and improvements in the quality of life marked by access to water, internet, employment opportunities, and improved quality of education (Bhattacharya & Sachdev, 2021). India launched a smart city project to create a sustainable environment through the use of Information and Communication Technology (ICT) ) (Khurana & Raj, 2021). Implementing the smart village concept in Nepal had implications for sustainable economic growth, reducing urbanization by reducing the rural-urban economic gap (Chaudhary, 2023). In the European Union, smart villages were relatively new in decision-making and policy-making to address development that exploited natural resources and improved local communities, economy, and quality of life (Górecka et al., 2021). A case study in Slovenia proposed the FabVillage concept, the development of a sustainable and resilient smart village by promoting the principles of a circular economy and the development of local resources (natural, cultural, social) and economic) (Zavratnik et al., 2018).

The concept of a smart village generally refers to the idea of a smart city only applied within the boundaries of the village environment (Susilowati et al., 2024). Researchers reported that a smart village system can be developed based on the smart city model. The components considered will vary from city to city, depending on the resources and opportunities available (Parmar et al., 2018; Somwanshi et al., 2016). The concept of a smart village was not as well established as that of a smart city. However, in recent years, the smart village concept has strengthened. It was important to implement a smart village in line with a smart city in order to foster a relationship between the two, encourage village independence, and help implement a smart city in a complementary manner by integrating digital services

and strengthening the local economy (Susilowati et al., 2024). A smart village refers to the concept of a smart city, which involves technical development and economic, social, and environmental goals (Kim et al., 2023; Albino et al., 2015; Batty et al., 2012; Lim et al., 2021; S'anchez-Corcuera et al., 2019).

The development of smart villages in Indonesia tends to be top-down, with initiatives from central and regional governments. Since 2018, Indonesia has initiated various smart village pilot projects. The success of smart villages was closely related to citizen science (Tosida et al., 2022). Research on smart villages in Indonesia has begun since a decade ago. Thematic analysis revealed that the three research topics that received the most attention from smart village research include application development, IT/IS management, Strategy, and Implications for Society (Agustiono, 2022). The dimensions of smart villages recommended to support smart cities in Indonesia consist of community resources, technology, institutions, and village potential (Susilowati et al., 2024). The development of smart villages in Indonesia is increasing, along with smart village research. Brilliant village research in Indonesia has begun with the proposal of basic models and concepts (Mishbah et al., 2018; Ella & Andari, 2018; Andari & Ella, 2021), socio-economic and political analysis (Santoso et al., 2019; Sutriadi, 2018), application of village geographic information systems (Afnarius et al., 2020; Adi & Suhartono, 2017; Marlintha et al., 2017), even the proposal of smart villages based on artificial intelligence and big data (Tosida, Herdiyeni, et al., 2020; Tosida, Suprehatin, et al., 2020). However, there has not been much research on smart villages that is linked to strengthening village institutions.

In building smart villages, the government has issued various policies to ensure villages develop into entities capable of driving national development. These policies range from policies to strengthen the capacity of local governments and improve the quality of human resources to provide adequate budgets for villages (Wahidah & Herdiana, 2023; Diah, 2020); Jaya et al., 2021; Timotius, 2018). Low capacity causes an organization not to have adequate capacity to collaborate with various parties, organize development, and provide public services (Sulili & Mengge, 2013), including implementing the concept of smart villages in sustainable rural development. In general, the capacity of village organizations in almost all villages in Indonesia is relatively low and has not received serious attention from the supra-village government (Jennifer I. R. Dhue & Tokan, 2021). The problems faced by village institutions in Indonesia are generally related to the poor quality of village apparatus and institutions, which have implications for the weak role of the village government in acting as a development implementer (Setiadi et al., 2020). Other institutional problems that can be identified are that the village is not autonomous from the existing supra-village institutions and cannot encourage participation and empowerment of village communities (Sri Nugroho, 2018). The village's institutional structure, position, and authority still cause ambiguity (Hadi, 2020). The weak capacity of village institutions is measured based on human resources, budget, policies, and bureaucratic structures (Tinov & Handoko, 2017). The low quality of human resources and the lack of institutional capacity to meet the needs of the village community (Siwiyanti et al., 2021). Not only are village government institutions weak, but village deliberative body institutions also have weak institutional capacity, marked by weakness in agreeing on village regulations, accommodating aspirations, and weak supervision of village performance (Romli, Ombi & Nurlia, 2017).

Strengthening village institutions was intricately linked to the smart village concept. The smart village concept could only be realized if village institutions have the necessary capacity. Village resilience could be fortified through an electronic-based government system (Nagara

& Maulana, 2025), essentially applying the smart village concept. Institutional capacity development fostered farmer independence and empowerment and opened the door for village communities to shape their development. Strong institutions could be harnessed for digitalization, paving the way for realizing smart villages. Applying the smart village concept equips farmers with high bargaining. Smart villages were not just about digitalization. It also offered opportunities for village communities to mold the potential and character to institutionalize (Hasan & Arista, 2025). The Smart Village approach advocated for policies at all institutional levels (Stojanova et al., 2021). This approach, which was synonymous with the use of technology, directed information technology in villages toward strengthening institutions (Muhtar et al., 2023).

Institutional capacity is important in improving the performance of the tasks and functions of regional government institutions in implementing various government policies and activities (Syahrir, 2019). The institutional capacity of regional governments affects vulnerable communities (Moises et al., 2024). However, there has not been much research that connects smart villages with strengthening institutional capacity. About this background, this study aims to (1) analyze the institutional capacity of the Village, (2) analyze the application of smart villages in village development, (3) test whether or not there is an influence of village institutional capacity on the success of implementing the smart village concept in village development.

## 2. Methods

This study used a quantitative approach with an associative research method. This method was used to explain evidence of causal relationships between one variable and another. The variables that were influenced and those that were not can be known. The associative research method connected one variable with another variable. In this study, we aimed to test the correlation between institutional capacity and the implementation of smart villages, a topic of increasing importance in public administration and government sociology.

This research was located in *Sembalun Bumbung* Village, *Sembalum* District, East Lombok Regency. Sembalun Bumbung Village was chosen as the research location because it has the potential to implement smart villages, assessed from the aspects of natural resources, socio-culture, and community participation. As a tourism area, this village showed initial readiness to utilize digitalization. However, from an institutional aspect, it still faces challenges in the form of limited human resource capacity and governance. This reason was the basis for examining how strengthening institutional capacity could support the implementation of smart villages.

The population in this study was the population of Sembalun Bumbung Village, totaling 7943 people. The respondents in this study were the people of Sembalun Bumbung Village. Respondents were selected from the population using random sampling techniques. Using the Slovin formula with a margin of error of 10%, a sample of 99 people was obtained. However, only 82 people could be respondents in this study, based on the following criteria: (1) knowing the concept of a smart village, (2) having received services from the village so that they could assess the institutional capacity of the village.

This study's data collection techniques were questionnaires and literature studies on the influence of institutional capacity on the implementation of smart villages. The questionnaire used a Likert scale that produced interval data. The questionnaire was designed to refer to the theory of strengthening institutional capacity (De Vita et al., 2001) and the theory of smart villages (Parmar et al., 2018; Somwanshi et al., 2016). Furthermore, the questionnaire was

tested through validity and reliability tests. The validity test technique used the Pearson Bivariate correlation (Pearson Product Moment) with the help of SPSS-29. A reliability test is a measurement test of an instrument that produces the same data when used several times to measure the same object. In this study, the reliability test uses Cronbach Alpha. A variable is reliable if Cronbach's Alpha value is > 0.70 (Ghozali, 2018). A construct or variable is trustworthy if it provides a Cronbach Alpha value of > 0.60. Then, it can be said that the instrument used is reliable (Arikunto, 2006).

For the literature study, the dimension website was used, with the keyword strengthening institutional capacity for implementing smart villages, filtering which references were suitable for this study.

Data analysis was conducted in two stages:

1. Descriptive analysis was conducted to analyze the first and second research objectives, namely, to describe institutional strengthening and smart village implementation. Using the Weight Mean Score (WMS) formula, the average score of each research indicator was sought and then interpreted into three criteria: High, medium, and low. The research score used in the questionnaire was 1 to 5. The interval value determined the research criteria: finding the highest score minus the lowest score divided by three criteria. The result was 1.33, so the low criterion was the average score between 1-2.33, the medium score between 2.34-3.66, and the high criterion was the average score between 3.67-5.
2. Inferential analysis was used to test the research hypothesis, namely whether institutional strengthening influenced the implementation of smart villages. Hypothesis testing was carried out by testing the product-moment coefficient to determine whether the independent variable (X = institutional capacity) affected the dependent variable (Y = smart village implementation). Correlation was considered significant at the 0.01 level (2-tailed).

This study used a reference theory on institutional capacity and a theory on implementing smart villages. Institutional capacity included five factors as an analytical tool to examine the institutional capacity of villages in implementing the smart village concept. Institutional capacity comprises five factors: vision and mission, leadership, resources, networks/partnerships, and services and products (De Vita et al., 2001). The theory of smart villages was taken from the concept of village development. The concept of smart villages was broken down into several dimensions representing several themes related to aspects of village development (Susilowati et al., 2024). Developing a smart village could be done with several components: (1) Economic Component, (2) Environmental Component, (3) Social Component (Parmar et al., 2018; Somwanshi et al., 2016).

## 3. Results and Discussion

This research is limited to three research scopes: analyzing village institutional capacity, analyzing the success of smart village implementation in village development, and testing the influence of village institutional capacity variables on the success of smart village implementation in village development.

### 3.1. Results

#### *3.1.1. Respondent Identity*

The respondents of this study amounted to 82 people, a composition of 37 men and 45 women. Regarding education, the most significant number of respondents had a high school education or equivalent; 25.6% of male respondents had a high school education, and 29.26%

of female respondents had a high school education. Of the 82 respondents, only one did not graduate, and 4 had an elementary school education. However, there were also 16 respondents with a bachelor's degree (19.5%) consisting of 4 village officials, two farmers, one regional head, two homemakers, five integrated health post cadres, and two honorary teachers.

*3.1.2. Institutional Capacity of Sembalun Bumbung Village*

Institutions in the context of this study are village governments. Village government capacity is needed to support development planning activities to be successful (Jennifer I. R. Dhue & Tokan, 2021). Village institutional capacity is measured through 5 (five) dimensions, namely: (1) vision and mission, (2) leadership, (3) resources, (4) networks, and (5) services/products. The vision and mission dimensions are measured based on the following indicators: (a) Ownership of a clear vision and mission that its residents can understand; (b) The village vision and mission support the implementation of the Smart Village concept in development; (c) The village government involves the Community in the preparation and evaluation of the vision and mission. The results can be seen in Table 1.

Table 1 Recapitulation of average indicator scores in the vision and mission dimensions

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| **1** | Indicator (a) | 37 | 4,16 | High | 45 | 3,57 | Medium | 82 | 3,84 | High |
| **2** | Indicator (b) | 37 | 3,97 | High | 45 | 3,51 | Medium | 82 | 3,72 | High |
| **3** | Indicator (c) | 37 | 4,27 | High | 45 | 3,80 | High | 82 | 4,0 | High |
| | **Average Score** | | 4,14 | High | | 3,63 | Medium | | 3,86 | High |

Male respondents' responses had higher scores than female respondents' responses. It was because male respondents were more involved in the village, especially in formulating its vision and mission. The level of community understanding of the clarity of the vision and mission can be seen from the score of indicators: (a) where the understanding of male respondents is higher than that of female respondents. Likewise, with an indicator (b) regarding respondents' knowledge regarding the vision and mission of the village supporting the implementation of the Smart Village concept in village development, the score of female respondents was lower than that of male respondents. In indicator (c), the difference was not too striking. Both male and female respondents stated that the village government involved the Community in preparing and evaluating the village's vision and mission.

The leadership dimension was measured through the following indicators: (a) The village head was open to aspirations from the Community; (b) The village head supported innovation and the use of technology in village development; (c) The village government encouraged active community participation in village activities. The research results for the leadership dimension can be seen in Table 2.

Table 2 Recapitulation of average indicator scores on leadership dimensions

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| **1** | Indicator (a) | 37 | 4,46 | High | 45 | 3,75 | High | 82 | 4,07 | High |
| **2** | Indicator (b) | 37 | 4,22 | High | 45 | 3,71 | High | 82 | 3,93 | High |
| **3** | Indicator (c) | 37 | 4,16 | High | 45 | 4 | High | 82 | 4,07 | High |
| | **Average Score** | | 4,28 | High | | 3,82 | High | | 4,03 | High |

Based on Table 2, it was known that the responses of male respondents had higher scores than female respondents. However, both are at the same high level when viewed from the interpretation criteria. This means that the leadership of the village head was considered very good by the Community, measured based on openness to aspirations from the Community, support for innovation and utilization of technology in village development, and encouragement of active community participation in village activities. Although seen from the aspect of education, the Village Head was only educated up to high school, while many village officials have graduated with a Bachelor's degree (S1). However, it did not reduce the enthusiasm of the Village Head to make his village a smart village.

The resource dimension was measured based on the following indicators: (a) Village communities have high knowledge and education; (b) The budget for development is sufficient and managed transparently; (c) Facilities and infrastructure in the village support the implementation of Smart Village. The research results are presented in Table 3.

Table 3 Recapitulation of average indicator scores in the resource dimension

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| **1** | Indicator (a) | 37 | 3,84 | High | 45 | 3,58 | Medium | 82 | 3,69 | High |
| **2** | Indicator (b) | 37 | 4,19 | High | 45 | 3,40 | Medium | 82 | 3,76 | High |
| **3** | Indicator (c) | 37 | 3,73 | High | 45 | 3,35 | Medium | 82 | 3,52 | Medium |
| | **Average Score** | | 3,92 | High | | 3,44 | Medium | | 3,66 | Medium |

The responses to each indicator in this dimension showed significant differences between male and female respondents. Male respondents consist of village heads, village officials, regional heads, BPD, and farmers, while female respondents consist of homemakers, cadres, honorary teachers, and entrepreneurs. Generally, female respondents are housewives, although there were also homemakers with a bachelor's degree. The respondents' answers and interviews showed that the number of highly educated men was greater than that of women. Some women who have earned Bachelor's degrees do not use their knowledge to work; they only become homemakers. Other jobs for these female graduates are as honorary teachers. For indicator (b), the development budget was sufficient and managed transparently, and the responses differed for male and female respondents. Women rated it moderate, while men rated it high. Women were not very involved in village activities, so they could not assess budget transparency precisely. Some female respondents did not even know how much of the budget the village receives for village development.

Regarding indicator (c), namely facilities and infrastructure in the village supporting the implementation of Smart Village, male respondents responded positively, but female respondents still expressed many shortcomings. For example, there was still no free internet, and even this village's internet signal was not smooth. Only certain providers had a strong internet signal, and the rest of the internet signal went up and down.

The network dimension is measured through the following indicators: (a) The village government is active in building a network of cooperation with other villages to share experiences in technological innovation; (b) Villages partner in developing technology and the village economy with academics and the private sector; (c) The village cooperation network contributes positively to the implementation of Smart Village. The study results regarding respondents' responses to this dimension can be seen in Table 4.

Table 4 Recapitulation of average indicator scores on network dimensions

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| **1** | Indicator (a) | 37 | 3,97 | High | 45 | 3,60 | Medium | 82 | 3,77 | High |
| **2** | Indicator (b) | 37 | 3,84 | High | 45 | 3,42 | Medium | 82 | 3,61 | Medium |
| **3** | Indicator (c) | 37 | 3,92 | High | 45 | 3,40 | Medium | 82 | 3,63 | Medium |
| | **Average Score** | | 4,08 | High | | 3,47 | Medium | | 3,67 | Medium |

There is a significant difference between male and female respondents' responses. The results of the responses of male respondents for all indicators were included in the high criteria, while the responses of female respondents were in the medium criteria. However, the interview results showed that indicator (a), namely the village government's active involvement in building a network of cooperation with other villages to share technological innovation experiences, had been done but had not been documented. No MOU or MOA had been built together between villages, academics, or the private sector (indicator b.) There was no documented cooperation, but the practice had already existed; for example, cooperation with the Muhammadiyah University of Jakarta in providing nutritious food for toddlers or with the private sector, Kalbe Afarma, has entered this village. Only all cooperation was documented in the form of MOU or MOA. Indicator (c), the cooperation network, contributes positively to implementing smart villages but has not been measured yet. Still, the opinions of respondents and interview results indicated that a positive influence already existed but has not been optimally implemented to make changes in the form of creating digital platforms or updating public service systems that utilize technology.

The service/product dimension is measured based on the following indicators: (a) The village government provides fast and efficiently accessible administrative services based on information technology; (b) The village's superior products are developed and promoted through the use of information technology; (c) The village has a mechanism to assess community satisfaction with the services provided. The research results on the service or product dimensions can be seen in Table 5.

Table 5 Recapitulation of average indicator scores in the service/product dimension

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| **1** | Indicator (a) | 37 | 4,24 | High | 45 | 3,42 | Medium | 82 | 3,79 | High |
| **2** | Indicator (b) | 37 | 3,94 | High | 45 | 3,51 | Medium | 82 | 3,71 | High |
| **3** | Indicator (c) | 37 | 4,05 | High | 45 | 3,56 | Medium | 82 | 3,78 | High |
| | **Average Score** | | 4,08 | High | | 3,49 | Medium | | 3,76 | High |

The study results relating to the service/product dimension, as seen in Table 5, show different responses from male and female respondents. Indicator (a), namely, the village government provides fast and efficiently accessible administrative services based on information technology, was responded to very positively by male respondents so that the average score for indicator (a) is included in the high assessment criteria, while the results of the female respondents' responses are in the moderate category. It could be different because male respondents interact more with the village government to obtain public services. The application widely used in the village is the village information system (SID) (sid.kemendesa.go.id). SID is an application used to facilitate villages in compiling digital data

and information about objective village conditions, compiling village development plans based on detailed and accurate data, directing village development work systematically, measurably, and sustainably, and focusing priorities on the use of village funds according to the needs of residents and village areas to accelerate the achievement of SDGs. Indicator (b), namely superior village products developed and promoted through information technology, responded with a very positive response from male and moderate from female respondents. *Sembalun Bumbung* Village already has a website (*https://www.sembalunbumbung.com/),* the Official Website of *Sembalun Bumbung* Village, which shares information related to village management, empowerment, development, and others. This website already contains a village profile including village potential, namely offering natural beauty in mountain views, Cultural Tourism, the Sasak Tradition, *Rinjani* Trekking in the form of a climbing route, and Culinary in the form of *Ayam Taliwang*. This information is contained on the official website of *Sembalun Bumbung* Village. Although it already has a website, the information shared is incomplete, especially regarding products/services that have not been promoted through information technology, in this case, the website. Indicator (c), namely, the village has a mechanism to assess public satisfaction with the services provided, in which male respondents responded with excellent responses and women responded moderately. The interview results showed that the village had not conducted an official survey. Still, at the district government level, an evaluation has been carried out regarding the use of technology to support public services towards a smart city in 2017-2022.

Based on Tables 1 and 5, the average score for the institutional capacity variable for male respondents is 4.06, with high criteria, and 3.57, with medium criteria, for female respondents. If calculated as a whole, the average score for the institutional capacity variable is 3.79 out of a score of 5 with high criteria. It means that village institutions are considered to have adequate capacity.

### *3.1.3. Implementation of Smart Village in Sembalun Bumbung Village*

The implementation of smart villages was measured using several components: (1) economic, (2) environmental, and (3) social. These three components are included in the principles of sustainable development and need to be balanced, as Elkington (Triple Bottom Line) stated. They must also be continuously encouraged and adapted to village development governance (Widianingsih et al., 2024).

The economic component was measured based on the following indicators: local administration, governance model, availability of adequate bandwidth, mobility, cloud computing, and entrepreneurship (Parmar et al., 2018). However, in this study, the economic component was measured based on only five indicators that have been adjusted to the testing needs in the Sembalun Bumbung Village area, namely indicators (a) The application of digital technology has helped improve the economy of village communities, (b) The village government supports the development of digital-based micro, small and medium enterprises (MSMEs), (c) superior village products are promoted through digital platforms to expand the market, (d) The Community has access to training and mentoring in digital entrepreneurship, (e) Technology has been used to increase agricultural productivity and other economic sectors. The results of respondents' responses to the dimensions of the economic component can be seen in Table 6.

Table 6 Recapitulation of average indicator scores in the economic component dimension

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| 1 | Indicator (a) | 37 | 3,89 | High | 45 | 3,58 | Medium | 82 | 3,72 | High |
| 2 | Indicator (b) | 37 | 4,03 | High | 45 | 3,87 | High | 82 | 3,94 | High |
| 3 | Indicator (c) | 37 | 3,86 | High | 45 | 3,53 | Medium | 82 | 3,68 | High |
| 4 | Indicator (d) | 37 | 3,84 | High | 45 | 3,56 | Medium | 82 | 3,68 | High |
| 5 | Indicator (e) | 37 | 3,97 | High | 45 | 3,53 | Medium | 82 | 3,73 | High |
| | Average Score | | 3,92 | High | | 3,61 | Medium | | 3,75 | High |

The five indicators above obtained the highest score on indicator (b), namely the Governance model, with an average score of male respondents 4.03 and a score of female respondents 3.87, so a total score of 3.94 was obtained with high interpretation criteria. It showed that the village government supports the development of digital-based micro, small and medium enterprises (MSMEs). In addition to having outlets for MSME products, marketing of MSME products has also used digital marketing media through social media. Some of the superior products in *Sembalun Bumbung* Village are potato chips and snacks made from chickpeas. The smart village was considered successful, as measured by its financial component. The use of technology for community economic activities has been carried out and has given positive results.

Environmental components include indicators: clean technology, public transportation, alternative green spaces, smart growth, climate change, and resources and infrastructure (Parmar et al., 2018). However, in this study, only five indicators were used and have been modified to suit the conditions of the smart village at the research location, namely indicators (a) The village has implemented environmentally friendly technology in managing natural resources, (b) The waste management system in the village is based on local technology or innovation, (c) The Community is encouraged to use renewable energy in everyday life, (d) The village government develops environmental policies that support the Smart Village concept, (e) Technology is used to monitor and maintain the sustainability of the village environment. The results of respondents' responses to the dimensions of the environmental components can be seen in Table 7.

Table 7 Recapitulation of average indicator scores on the environmental component dimension

| **No** | **Indicator** | **Male** | | | **Female** | | | **Total** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Score | Criteria | X | Score | Criteria |
| **1** | Indicator (a) | 37 | 3,97 | High | 45 | 3,67 | Medium | 82 | 3,80 | High |
| **2** | Indicator (b) | 37 | 4,03 | High | 45 | 3,82 | High | 82 | 3,91 | High |
| **3** | Indicator (c) | 37 | 3,78 | High | 45 | 3,47 | Medium | 82 | 3,61 | Medium |
| **4** | Indicator (d) | 37 | 3,78 | High | 45 | 3,33 | Medium | 82 | 3,54 | Medium |
| **5** | Indicator (e) | 37 | 3,92 | High | 45 | 3,47 | Medium | 82 | 3,67 | High |
| | **Average Score** | | 3,89 | High | | 3,55 | Medium | | 3,71 | High |

Based on Table 7, the responses of male respondents for all indicators were higher than those of female respondents. In indicators (c) The Community was encouraged to use renewable energy in everyday life, and (d) The village government developed environmental policies that support the Smart Village concept, both men and women had the lowest scores compared to other indicators in the environmental component dimension. Indicator (c) on the

use of renewable energy has not yet been fully implemented. However, an explanation of this has been socialized. It was just that in its implementation, it had not. Included in indicator (d), the village government developed environmental policies but only socialized environmental policies, which were central policies, such as the policy on smart cities regulated in the East Lombok Regent Regulation Number 46 of 2022 concerning Smart Cities (smart cities) of East Lombok Regency. The regulation stated that a smart city is city management that uses resources effectively and efficiently to solve various city problems using innovative, integrated, and sustainable solutions to provide infrastructure and city services that can improve the quality of life of its citizens. From the definition of a smart city put forward in the regent's regulation, it contained environmental components. The East Lombok Regency smart city includes six components: smart governance, smart economy, smart society, smart branding, smart living, and smart environment. The smart environment was an environmental component. Smart environment is a concept that pays attention to balancing physical infrastructure development with environmentally friendly and sustainable facilities and infrastructure. Therefore, all villages in East Lombok Regency must support the realization of a smart city, so smart villages must be implemented in village development.

The Social Component includes indicators: community life, participatory democracy, social innovation, and environmental services (Parmar et al., 2018). However, in this study, the indicators for the social component dimension have been modified to suit the conditions at the research location, namely into five indicators, as follows: (a) The Community has easy access to digital-based village administration services, (b) Technology is used to increase community participation in village decision-making, (c) The village government provides a digital platform to convey information and public services, (d) The application of technology has increased social interaction and togetherness between villagers, (e) Community access to health and education services has increased with the support of technology. The respondents' responses to the social component dimensions can be seen in Table 8.

Table 8 Recapitulation of average indicator scores in the social component dimension

| No | Indicator | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Score | Criteria | X | Skor | Criteria | X | Score | Criteria |
| 1 | Indicator (a) | 37 | 4,05 | High | 45 | 3,51 | Medium | 82 | 3,75 | High |
| 2 | Indicator (b) | 37 | 3,97 | High | 45 | 3,20 | Medium | 82 | 3,55 | Medium |
| 3 | Indicator (c) | 37 | 3,84 | High | 45 | 3,13 | Medium | 82 | 3,45 | Medium |
| 4 | Indicator (d) | 37 | 4,10 | High | 45 | 3,67 | Medium | 82 | 3,86 | High |
| 5 | Indicator (e) | 37 | 4 | High | 45 | 3,60 | Medium | 82 | 3,78 | High |
| | Average Score | | 3,99 | High | | 3,42 | Medium | | 3,68 | High |

The research results in Table 8 show that male respondents' responses are higher than female respondents' for all indicators. However, after being added up, there are only two indicators that have moderate criteria, namely indicator (b) Technology is used to increase community participation in village decision-making with an average score of 3.55 moderate interpretation criteria and indicator (c) The village government provides a digital platform to convey information and public services with an average score of 3.45 with moderate interpretation criteria. It showed that in village decision-making, not all use technology. Likewise, the village specifically created no digital platform to provide services. The village still uses the platform from the center (SID) and the Regency. Several applications introduced by the Regency and used by all villages are the applications (digital platforms), BAKSO

(Create population administration online), and E-SAKIP (E-System for Accountability of Government Agency Performance).

In general, the variable of smart village implementation in village development obtained an average score of 3.94 for male respondents' responses with high interpretation criteria and a score of 3.53 for female respondents' responses with moderate interpretation criteria. In total, the average score for the variable of smart village implementation in village development is 3.71, with high interpretation criteria.

### *3.1.4. The Influence of Village Institutional Capacity on the Implementation of Smart Village in Village Development.*

Two stages were carried out to test the research hypothesis: village institutional capacity influences the implementation of smart villages in village development. The first stage tested the validity and reliability of the research instrument. If the results are valid and reliable, the second stage continues, testing the hypothesis using SPSS-29.

Validity and Reliability Test**.** SPSS_29 was used to test the research instrument's validity. First, the validation value was determined. It was said to be valid if it was more significant than 0.05. The results of the validity test of the institutional capacity variable can be seen in Figure 1.

| | | Item_1 | Item_2 | Item_3 | Item_4 | Item_5 | Item_6 | Item_7 | Item_8 |
|---|---|---|---|---|---|---|---|---|---|
| Total | Pearson Correlation | .817** | .691** | .717** | .602** | .583** | .874** | .664** | .719** |
| | Sig. (2-tailed) | <,001 | <,001 | <,001 | <,001 | <,001 | <,001 | <,001 | <,001 |
| | N | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | Valid | Valid | Valid | Valid | Valid | Valid | Valid | Valid |

| | | Item_9 | Item_10 | Item_11 | Item_12 | Item_13 | Item_14 | Item_15 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Total | Pearson Correlation | .797** | .753** | .579** | .618** | .503** | .585** | .682** | 1 |
| | Sig. (2-tailed) | <,001 | <,001 | <,001 | <,001 | .005 | <,001 | <,001 | |
| | N | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | Valid | Valid | Valid | Valid | Valid | Valid | Valid | |

Figure 1 Validity test results for the village institutional capacity variable

According to Fig 1, the validity test results for all items (items 1 to 15) have a significance value of more than 0.05. Thus, all question items in the village institutional capacity variable research instrument are declared valid. The results of the validity test of the smart village implementation variables can be seen in Figure 2.

| | | Item_1 | Item_2 | Item_3 | Item_4 | Item_5 | Item_6 | Item_7 | Item_8 |
|---|---|---|---|---|---|---|---|---|---|
| Total | Pearson Correlation | .817** | .691** | .717** | .602** | .583** | .874** | .664** | .719** |
| | Sig. (2-tailed) | <,001 | <,001 | <,001 | <,001 | <,001 | <,001 | <,001 | <,001 |
| | N | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | Valid | Valid | Valid | Valid | Valid | Valid | Valid | Valid |

| | | Item_9 | Item_10 | Item_11 | Item_12 | Item_13 | Item_14 | Item_15 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Total | Pearson Correlation | .797** | .753** | .579** | .618** | .503** | .585** | .682** | 1 |
| | Sig. (2-tailed) | <,001 | <,001 | <,001 | <,001 | .005 | <,001 | <,001 | |
| | N | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | Valid | Valid | Valid | Valid | Valid | Valid | Valid | |

Figure 2 Results of the Validity Test of the Smart Village Implementation Variables

Based on Figure 2, it was known that all question items from item 1 to item 15 have a significance value greater than 0.05, so they were said to be valid. It means that all question items can be used to measure the variables of smart village implementation in village development.

Reliability test of village institutional capacity variable. According to (Ghozali, 2018), a variable was said to be reliable if Cronbach's Alpha value was more significant than 0.70. The reliability test results for the village institutional capacity variable were 0.917, meaning that this variable was reliable. The results of the reliability test for the village institutional capacity variable can be seen in Figure 3.

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .917 | 15 |

Figure 3 Results of the Reliability Test of the Village Institutional Capacity variable

The reliability test results for the village institutional capacity variable showed that Crombach's Alpha value was 0.917. This variable was reliable because it exceeded 0.70, which was used as a guideline for the reliability value limit. Figure 4 shows the reliability test results for the smart village implementation variable in village development.

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .937 | 15 |

Figure 4 Reliability Test Results of The Smart Village Implementation Variable in Village Development.

The reliability test results for the smart village implementation variable showed that Cronbach's Alpha value is 0.937, meaning that this variable was reliable because it exceeds 0.70, which was used as a guideline for the reliability value limit.

**Hypothesis test.** The working hypothesis of this study was that village institutional capacity influences the implementation of smart villages. This hypothesis was derived from a statistical hypothesis: Ho (Null Hypothesis): The village institutional capacity variable did not influence the smart village implementation variable in village development. Ha (Alternative Hypothesis): The village institutional capacity variable influences the smart village implementation variable in village development. The statistical test results using SPSS-w29 obtained correlational test results, as seen in Table 9.

Table 9 Correlational test results of the institutional capacity variable on the smart village implementation variable with the Pearson product-moment formula (Pearson correlation)

| **Correlations** | | Village institutional capacity | Implementation of smart village in village development |
|---|---|---|---|
| Village institutional capacity | Pearson Correlation | 1 | .862** |
| | Sig. (2-tailed) | | <,001 |
| | N | 82 | 82 |
| Implementation of smart village in village development | Pearson Correlation | .862** | 1 |
| | Sig. (2-tailed) | <,001 | |
| | N | 82 | 82 |

**. Correlation is significant at the 0.01 level (2-tailed).

The results of the hypothesis test using SPSS 29 show a significant correlation between village institutional capacity variables and the implementation of smart villages. The Pearson correlation significance value is 0.862.

## 3.2. Discussion

The discussion section is intended to interpret the study's findings in accordance with the theories used and not merely describe the foundation. It must be enriched by referring to the results of previous studies published in scientific journals.

### *3.2.1. Village Institutional Capacity*

Institutional capacity is generally defined as the ability or competence of an institution, which includes individual, group, and organizational abilities in the context of resources and governance (Lestari & Wicaksono, 2019; Nugraha, 2004). Institutional capacity was a system consisting of various elements with their respective tasks and roles, which were interconnected and aimed at moving institutions to achieve planned goals (Wahidah & Herdiana, 2023).

One key aspect of sustainable and resilient village development was empowering local communities to actively participate in the development process and increasing the village governments' capacity to manage village development (Widianingsih et al., 2024). In this case, village government capacity was the organizational ability to increase the accountability of government agency performance, which was revealed from aspirations, strategy, organizational skills, systems and infrastructure, human resources, organizational structure, and culture (Syahrir, 2019).

Capacity always works on three interrelated levels, namely: (1) capacity at the individual level, which is constantly in touch with how to improve individual skills and quality consisting of job descriptions, motivation, and work attitudes; (2) capacity at the institutional/ organizational level, namely how to improve the ability of institutions with organizational structures, work processes and work culture; (3) capacity at the system level, namely how to determine conditions that enable and limit the government to interact and adapt in the internal and external environment of the organization that continues to change over time (Rosaki & et al., 2005) Capacity in this study was at the institutional level, which is measured based on five dimensions: vision, mission, leadership, resources, networks, and products/services (De Vita et al., 2001).

The vision of *Sembalun Bumbung* Village was to establish good and clean village governance to realize a just, prosperous village. The mission of *Sembalun Bumbung* Village was:

1. Reforming the performance system of the Village Government Apparatus to improve services to the community community;
2. Running a village government based on society and integrated based on religious norms, customs, and culture by the following Regulations;
3. Expanding the involvement of youth and youth organizations in the planning and implementation of sustainable village development;
4. Exploring the strategic potentials of the environment and village communities, especially in agriculture, tourism, and culture, to expand employment opportunities and create a more prosperous Society.

Based on the explanation of the vision and mission above, the vision and mission of *Sembalun Bumbung* Village already contained the meaning of good governance and clean

government. However, there was no explicit mention of the use of information technology in public services or village development. The words e-government, competent government, smart village, and support for the realization of East Lombok Regency as a Smart City have not been explicitly written in the vision and mission of *Sembalun Bumbung* Village. The vision of East Lombok Regency as the government above the village was "East Lombok Regency to become a smart city that utilizes new ideas and products to solve problems (innovative), provides results to improve public services and the digital economy of the communities (productive), while still prioritizing the spirit and soul of nationality, religious and cultured (character) by utilizing Information and Communication Technology. "Although in the vision of *Sembalun Bumbung* Village, there was no explicit concept of a smart village because *Sembalun Bumbung* Village was in the administrative area of East Lombok Regency, the application of the smart village concept towards a smart city cannot be avoided.

The institutional strengthening variable research results based on five dimensions can be explained as follows. The vision and mission dimension showed high criteria with a score of 3.86, indicating a strong performance. High criteria on the vision and mission dimensions of the institutional strengthening variable indicated that village-level institutions had clear directions and goals that local stakeholders understood. Vision and mission elements were essential factors in village development. Leadership dimensions showed high criteria, with a score of 4.03. High criteria on the leadership dimension of the institutional strengthening variable indicated that the Community considered the role and quality of leadership in village institutions very well. The village head was considered capable of directing, motivating, and building synergy in effectively carrying out village institutional functions and was able to build participation and trust.

The resource dimension showed medium criteria, with a score of 3.66. Medium criteria indicated that the availability and utilization of resources in village institutions were pretty good, but several limitations needed improvement. For instance, resource capacity was not optimal, and there were issues with governance and distribution of resources. Technology is a resource whose existence is not yet optimal. The technology used by the village government to provide public services was limited to the village information system and population administration services using WA so that people do not need to go back and forth to the village for one service. However, technological development was still ongoing, along with other activities. This village did not have a prominent IT expert, but the Village Secretary carried out all IT-related matters.

The network dimension, with medium criteria and a score of 3.67, suggests that the relationship or partnership of village institutions with external parties is in its early stages. While collaboration is still sporadic, and the entire Community has not fully experienced the network's benefits, there is significant potential for growth. Strengthening the capacity of village institutions, especially in establishing cooperation with various parties, can lead to more robust networks in the future. The service/product dimension, with high criteria and a score of 3.76, is a testament to the quality of services provided by village institutions. These institutions have been able to deliver quality services, ensure accessibility and ease of service, and respond to community service needs. This dimension is a key aspect of village development and should be maintained and improved upon. Based on the discussion above, the study's results showed an average score of 3.79 out of 5 with high criteria in dimensions 1 to 5. It could indicate that the institutional capacity variable already exists and is good but still needs improvement to achieve optimal capacity, especially in the network aspect, which is considered the lowest (score of 3.66).

*3.2.2. Smart Village Implementation*

A smart village is a set of integrated services for rural communities and business groups to address the demographic deficit and achieve inclusive growth goals more effectively and efficiently (Jayanthi et al., 2022). Expanding internet access accelerated village development through the smart village approach (Tosida et al., 2022). Smart villages were even considered a solution to poverty alleviation (Tosida et al., 2022). Meanwhile, others define smart villages as a way to develop independent and self-sufficient villages. In this case, villages were expected to provide better services to their communities while maintaining the quality of their natural assets (Mohanty et al., 2020). Smart villages were also expected to help improve disaster resilience in rural areas (Freeman & Hancock, 2017). Smart villages were a rural development strategy to support the sustainable development agenda (Adamowicz & Zwolińska-Ligaj, 2020; Jayanthi et al., 2022). Smart village development was the ninth SDG for achieving village infrastructure and innovation needs (Iskandar, 2020; Tosida et al., 2022).

In the context of the SDGs, village development policies were essentially aimed at improving the quality of life, livelihoods, and welfare of the Community, invoking empathy towards rural communities (Annahar, Widianingsih, Paskarina, et al., 2023; Annahar, Widianingsih, Muhtar, et al., 2023). According to Law Number 6 of 2014 concerning Villages, the target of village development was to improve the welfare of village communities and the quality of human life and poverty alleviation through the fulfillment of basic needs, development of village facilities and infrastructure, development of local economic potential, and sustainable utilization of natural resources and the environment (Widianingsih et al., 2024).

Smart Village was a concept of village development based on digital technology and innovation that aimed to improve the Community's quality of life, environmental sustainability, and resource management efficiency (Jayanthi et al., 2022). Smart Village emphasizes the application of technology and collaboration between government, communities, and the private sector to create innovative solutions relevant to local needs. A complex collaborative governance process involving many elements (Liu et al., 2024). Collaborative governance was considered a comprehensive engineering system, requiring open and diverse stakeholder participation in decision-making and implementation across sectors, hierarchical levels, and regions.

The smart village concept utilizes information and communication technology (ICT) to accelerate village social, economic, and environmental transformation. The use of digital technology in rural development was inevitable. Given that advances in digital technology have increasingly influenced many aspects of people's daily lives at various geographic levels (Jayanthi et al., 2022). However, some experts provided different smart village components. The IEEE Smart Village (ISV) project paid special attention to equitable access to electrification through the use of renewable energy, as well as sustainable education and entrepreneurship (Anderson et al., 2017; Kamal et al., 2018; Mackenzie, 2019); (Jayanthi et al., 2022). This study measured the smart village components used as analytical tools from economic, environmental, and social components (Parmar et al., 2018; Somwanshi et al., 2016).

Specifically, *Sembalun Bumbung* Village has built a technology infrastructure to support the implementation of this smart village, which is still limited. Still, about the infrastructure built by the Regency Government to realize a smart city, including a smart village, there is a Command Center, a 28 km Fiber Optic Network with centralized control at Diskominfo, Dedicated Data Center, Utilization of the National Data Center, Centralized OPD Website,

Digital Regional Tax Services, Open Data Portal, Complaint Services and Public Service Mall. All East Lombok Regency residents, including *Sembalun Bumbung* Village residents, utilize these infrastructures.

In the quick win program of the Regency, which must also be followed by the village, in the smart living indicator, several programs have been created by utilizing technology, namely (1) Prevent Stunting Srikandi PKK, (2) *Sembalun Damri* Route, (3) Family Class at Risk of Stunting. In the smart economy indicator, there are several programs, namely: (1) PERIRI 9 Independent SPPT check), (2) East Lombok Job Fair, and (3) IKM (small and medium industry) empowerment program. Support smart branding; several programs have been carried out, as follows; (1) Tourism events, (20 Pokdarwis (tourism awareness groups), and (3) RTP Pancor (Public Open Space (RTP) former Pancor market) known as Taman TGKH Muhammad Zainuddin Abdul Majid, is now a new icon of East Lombok Regency. In the smart society indicator, East Lombok Regency has created related programs: (1) a community political education program, (2) Inter-loan story books (Pintar Bung), and (3) a CCTV Surveillance System in public places. In the innovative environment, related programs have been created: (1) Regional Regulation on Plastic Waste Restrictions, (2) Waste banks, and (3) mangrove planting. All programs to realize this smart city are also distributed to all villages that have implemented smart villages. Hence, several programs at the Regency level are also at the Village level.

Considering that smart villages are an integral part of the smart city objectives, the evaluation results for applying the smart city concept on a Regency scale can be a reference for the assessment standards for applying the smart village concept on a village scale. The evaluation assessment of smart city implementation is seen from the baseline aspect (weight 10%) in using digital technology for development purposes and the availability of regulations, smart city activities, and program realization. From the output aspect (weight 20%), the formation of a foundation for implementing the smart city program is needed to assess the extent to which the Regency government prepares policies, institutions, information security, and budgets for smart cities. The impact aspect (weight 20%) includes the benefits felt by the Community from implementing the smart city program to measure the benefits and improvements in public services for the Community, emphasizing the importance of community involvement and the sustainability of ongoing programs. Outcome (weight 30%) includes implementing plans in the smart city master plan to assess the extent to which the local government implements each plan. The acceleration program aspect/quick win (weight 20%) includes the level of innovation in the smart city acceleration program to assess the creativity and innovation of the Regency government. The evaluation results of the five assessment indicators for East Lomboom Regency obtained a baseline value with a score of 3.08, output with a score of 1.85, outcome with a score of 2.33, impact with a score of 2.51, quick win with a score of 2.13, collaboration program with a score of 1, The final value obtained a score of 2.17, with an improvement level of 0.31, included in the National Priority Tourism Area (KPPN). If the value for the implementation of the smart city is still low, then the value of the implementation of the smart village will also not be far from the national smart city assessment.

The research results regarding the application of smart villages in village development seen from 3 dimensions can be stated as follows. The economic component dimension shows a score of 3.75 with high criteria. High criteria in the financial dimension indicated that the application of digital technology has had a significant positive impact on improving the economy of rural communities. The "high" category refers to the range of scores that reflect

the perception or reality that most respondents feel the benefits of the indicator in real terms. High meaning indicated that there was positive acceptance by the Community towards the application of the smart village concept measured from the economic aspect, Increased access and efficiency, Changes in economic behavior where the Community has started using digital platforms to market their products, Infrastructure readiness and community capacity have been sufficient in using digital for financial activities. In other words, digital technology has been functionally integrated into the Community's economic activities.

The environmental component dimension shows a score of 3.71 with high criteria. High criteria on the environmental component dimension of the Smart Village implementation variable indicated that ecological conservation and management efforts in the village have been running well and were considered to have a positive impact on the Community. Observation results show that community awareness and participation in the environment were excellent, environmental conditions were relatively well maintained, and there were also local innovations in environmental management. The social component dimension showed a score of 3.68 with high criteria. High criteria indicate that the social aspect of technology-based village development has been running well and providing tangible benefits to the Community. There is community involvement in village programs, good communication between the village government and the Community, and tolerance and social cohesion.

Based on the discussion above, the variable of smart village implementation in village development obtained an average score of 3.71 in total. Implementing the smart village concept, measured by three components, has been quite successful in the village community. However, some evidence of technology utilization did not come entirely organically from *Sembalun Bumbung* Village but from the impact of its innovative city programs in East Lombok Regency.

### *3.2.3. The Influence of Village Institutional Capacity on the Implementation of Smart Villages*

The results of the hypothesis test using SPSS 29 showed a significant correlation between the village institutional capacity variable and the implementation of smart villages. The Pearson correlation significance value is 0.862. The magnitude of this influence can be seen from the determination coefficient value of 74.30%. Thus, the alternative hypothesis (Ha) is proven, namely that the village institutional capacity variable influences the smart village implementation variable in village development. The study's results found that in addition to the influence of village institutional capacity, there is another influence on the success of the implementation of smart villages in village development, namely the participation factor. Two factors are considered weak based on the study's results: innovation technology infrastructure and cooperation network. In addition to the institutional strengthening factor, other factors influence the success of implementing smart villages, namely community participation. However, further research was considered to test whether community participation as an independent variable influences the success of implementing smart villages.

## 4. Conclusion

Institutional capacity was an essential factor influencing the success of smart village implementation to support smart cities. The results of the study indicated that the institutional capacity of Sembalun Bumbung Village was relatively high in terms of vision, mission, leadership, and service aspects. However, it required resource improvement, especially regarding technology infrastructure and cooperation networks with other parties. It showed that village institutions have been assessed as having adequate capacity. Likewise, the smart

village implementation variable in village development showed relatively successful economic, environmental, and social results, although it was still in a limited scope. The hypothesis test results obtained data on a significant correlation between the village institutional capacity variable and the implementation of smart villages. Thus, the influence of village institutional capacity on the success of smart village implementation in village development was very high. However, several factors need to be considered to get more attention: infrastructure, network, and participation factors. These three factors indicated that the success of implementing the smart village concept was not solely related to technology but also needs to take into account the human aspect of how the Community was involved in village development, utilizing technology to provide convenience in human life and establishing harmonious cooperation with other institutions that could accelerate the implementation of smart villages.

## References

Adamowicz, M., & Zwolińska-Ligaj, M. (2020). The "Smart village" as a way to achieve sustainable development in rural areas of Poland. *Sustainability*, *12*, 6503. https://doi.org/10.3390/su12166503

Adi, S., & Suhartono, J. (2017). Smart village geographic information system (GIS) development in Indonesia and its analogous approaches. *2017 International Conference on Information Management and Technology (ICIMTech)*, 65–70.

Afnarius, S., Syukur, M., Ekaputra, E. G., Parawita, Y., & Darman, R. (2020). Development of GIS for buildings in the customary village of minangkabau koto gadang, west Sumatra, Indonesia. *ISPRS International Journal of Geo-Infor- Mation*, *9*(6), 365.

Agustiono, W. (2022). Smart Villages in Indonesia in the Light of the Literature Review. *9th International Conference on ICT for Smart Society: Recover Together, Recover Stronger and Smarter Smartization, Governance and Collaboration, ICISS 2022*, 1–5. https://doi.org/10.1109/ICISS55894.2022.9915061

Akshay, K., Madhav, K., Prabhu, A., & Ajit, B. (2019). Case Study of Smart Village and Local Village. *International Research Journal of Engineering and Technology (IRJET)*, *6*(5), 7505–7510.

Albino, V., Berardi, U., & Dangelico, R. M. (2015). Smart cities: Definitions, dimensions, performance, and initiatives. *J. Urban Technol.*, *22*(1), 3–21. https://doi.org/10.1080/10630732.2014.942092

Anand, A. (2020). Planning for Smart Village in Rural Development. *International Journal of Science and Research (IJSR)*, *9*(2), 731–733. https://doi.org/10.21275/ART20204535

Andari, R. N., & Ella, S. (2021). *Smart Village Model To Build Advanced Indonesia*. Syah Kuala University Press.

Anderson, A., Loomba, P., Orajaka, E., Johnson, J., Janko, S., Johnson, N., Saha, S., Podmore, R., & Larsen, R. (2017). Empowering smart communities: Electrification, education, and sustainable entrepreneurship in IEEE smart village initiatives. *IEEE Electrification Magazine*, *5*(2), 6–16.

Annahar, N., Widianingsih, I., Muhtar, E. A., & Paskarina, C. (2023). The road to inclusive decentralized village governance in Indonesia. *Sustainability*, *15*(11), 8616. https://doi.org/10.3390/su15118616

Annahar, N., Widianingsih, I., Paskarina, C., & Muhtar, E. A. (2023). A bibliometric review of inclusive governance concept. *Cogent Soc. Sci.*, *9*(1), 2168839. https://doi.org/10.1080/23311886.2023.2168839

Arikunto, S. (2006). *Prosedur Penelitian Suatu Pendekatan Praktik*. PT Rineka Cipta.

Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., Ouzounis, G., & Portugali, Y. (2012). Smart cities of the future. *Eur. Phys. J.: Spec. Top.*, *214*(1), 481–518. https://doi.org/10.1140/epjst/e2012-01703-3

Bhattacharya, S., & Sachdev, B. K. (2021). Smart Village: A new dynamic to end rural urban gap and move towards sustainable development for all. *International Journal of Multidisciplinary Research and Growth Evaluation*, *2*(6), 110–113. https://doi.org/10.54660/anfo.2021.2.6.7

Chakraborty, T., & Lohawala, N. (2021). *Women, Violence and Work: Threat of Sexual Violence and Women's Decision to Work*.

Chaudhary, D. (2023). The implication of 'Smart Village' in Nepal: Sustainable rural development perspective. *Journey for Sustainable Development and Peace Journal*, *1*(1), 1–20. https://doi.org/10.3126/jsdpj.v1i1.52595

De Vita et al. (2001). Determinant of FDI and Portofolio Flows to Developing Countries: A Panel Cointegration Analysis. *European Journal of Economic, Finance and Administrative Sciences*, 13.

Diah, M. P. (2020). Pembangunan Pedesaan Untuk Mengurangi Kesenjangan Antara Desa dan Kota di Indonesia: Peluang dan Tantangan. *Public Administration Journal of Research, 2(2), 2*(2), 165–173. http://dx.doi.org/10.33005/paj.v2i2.45

Ella, S., & Andari, R. N. (2018). Developing a Smart Village Model for Village Development in Indonesia. *International Conference on ICT for Smart Society (ICISS)*, 1–6. https://doi.org/10.1109/ICTSS.2018.8549973

Freeman, J., & Hancock, L. (2017). Energy and communication infrastructure for disaster resilience in rural and regional Australia. *Regional Studies, 51*(6), 933–944.

Ghozali, I. (2018). *Aplikasi Analisis Multivariate Dengan Pogram IBM SPSS (Edisi Sembilan)*. Badan Penerbit Universitas Diponegoro.

Górecka, A., Jezic, Z., & Kardum, B. (2021). Smart Villages and Rural Development. *Acta Scientiarum Polonorum. Oeconomia*, *20*(2), 39–46. https://doi.org/10.22630/aspe.2021.20.2.14

Hasan, N., & Arista, N. I. D. (2025). From tradition to modernity: The role of smart villages in reshaping agricultural communities and sustainable development. *HJTAS, Holistic: Journal of Tropical Agriculture Sciences*, *2*(2), 69–83.

Iskandar, A. H. (2020). *Village SDGs Accelerate Achievement of Sustainable National Development Goals*. Yayasan Pustaka Obor Indonesia.

Jaya, B., Muhtar, E. A., & Darto. (2021). Perencanaan Strategis Pembangunan Desa Dalam Rangka Pengembangan Potensi Ekonomi Lokal. *Jurnal Sains Sosio Humaniora*, *5*(2), 1061–1076. https://doi.org/10.26618/kjap.v7i3.6343.

Jayanthi, R., Dinaseviani, A., Indraprahasta, G. S., & Sitompul, R. F. (2022). Digital technology and smart village development in Banyuwangi, Indonesia: An exploratory

study. *Bulletin of Geography. Socio-Economic Series*, *57*(57), 79–91. https://doi.org/10.12775/bgss-2022-0024

Jennifer I. R. Dhue, & Tokan, F. B. (2021). Penguatan Kapasitas Pemerintah Merencanakan Pembangunan Desa Di Desa Oben Kabupaten Kupang. *Jurnal Pemerintahan *, *2*(2), 335–356.

Juan, A. M., & McEldowney, J. (2021). Smart villages: Concept, issues and prospects for EU rural areas. In *Service, European Parliamentary Research*.

Kamal, T., Tuli, F. J., Hassan, M., Rupam, T. H., & Habib, B. W. (2018). Information, Innovation and Implementation Center (IIIC): Concept towads smart village. *Paper Presented at the 2nd International Conference on Sustainable Development (ICSD), 15-17 February 2018, United International University, Dhanmondi, Dhaka*.

Khurana, N., & Raj, M. (2021). Smart Villages And Smart Cities: A Sustainable Need Of Emerging India: Case Study Analysis. *International Journal of Creative Research Thoughts (IJCRT)*, *9*(5), 530–540.

Kim, J., Lee, J. M., & Kang, J. (2023). Smart cities and disaster risk reduction in South Korea by 2022: The case of Daegu. *Heliyon*, *9*(8), e18794. https://doi.org/10.1016/j.heliyon.2023.e18794

Lestari, A. W., & Wicaksono, D. B. (2019). Pengembangan Kapasitas Kelembagaan (Capacity Building) Dalam Upaya Meningkatkan Kinerja Pegawai (Studi Pada Kantor Pelayanan Perbendaharaan Negara/KPPN Kudus). *Reformasi*, *9*(1), 76–81. https://doi.org/10.33366/rfr.v9i1.1325.

Lim, C., Cho, G.-H., & Kim, J. (2021). Understanding the linkages of smart-city technologies and applications: Key lessons from a text mining approach and a call for future research. *Technol. Forecast. Soc. Change*, *170*, 120893. https://doi.org/10.1016/j.techfore.2021.120893

Liu, S., Wu, Y., Jiang, G., & Dong, J. (2024). System dynamics modeling of collaborative governance in smart cities: A case study of Dongguan, China. *Scientific Reports*, *14*(1), 1–19. https://doi.org/10.1038/s41598-024-82363-1

Mackenzie, D. (2019). IEEE smart village: Sustainable development is a global mission. *IEEE System, Man, and Cybernetics Magazine*, *5*(3), 39–41.

Marlintha, A. B., Irawan, B., & Latuconsina, R. (2017). Design and implementation of smart village mapping 804 geographic information system based Web in the cinunuk village. *2017 IEEE Asia Pacific Conference on Wireless and Mobile (APWiMob)*, 66–71.

Mishbah, M., Purwandari, B., & Sensuse, D. I. (2018). Systematic review and meta-analysis of proposed smart village conceptual model: Objectives, strategies, dimensions, and foundations. *2018 International Conference on In- Formation Technology*.

Mohanty, S., Mohanta, B., Nanda, P., Sen, S., & Patnaik, S. (2020). Smart village initiatives: An overview. In & M. S. M. (Eds. ) S. Patnaik, S. Sen (Ed.), *Smart village technology: Concepts and developments* (pp. 3–24). Cham: Springer.

Moises, D. R. J., Kgabi, N. A., & Kunguma, O. (2024). Policy implementation: Assessing institutional coordination and communication for flood warning in Namibia. *Jamba: Journal of Disaster Risk Studies*, *16*(1), 1–10. https://doi.org/10.4102/JAMBA.V16I1.1534

Muhtar, E. A., Abdillah, A., Widianingsih, I., & Adikancana, Q. M. (2023). Smart villages, rural development and community vulnerability in Indonesia: A bibliometric analysis. *Cogent Social Sciences*, *9*(1). https://doi.org/10.1080/23311886.2023.2219118

Nagara, A. S., & Maulana, R. I. (2025). Structuring and Strengthening Village Resilience: A Legal Review of the Implementation of an Electronic-Based Village Governance System. *Jurnal Pembangunan Hukum Indonesia*, *7*(1), 150–179.

Nugraha. (2004). Pengembangan Kapasitas (Capacity Building) dalam Mendukung Pelaksanaan Otonomi Daerah. *Jurnal Ilmu Administrasi*, *1*(3), 1–10. https://doi.org/10.31113/jia.v1i3.334. Rahayu

Parmar, H. U., Padhya, H. J., & Mevawala, J. P. (2018). Smart Village Development. *Journal of Advances in Civil Engineering and Management*, *6*(1), 22–33.

Rosaki, A., & et al. (2005). *Prakarsa Desentralisasi dan Otonomi Desa*. IRE Press.

S´anchez-Corcuera, R., Nu˜nez-Marcos, A., Sesma-Solance, J., Bilbao-Jayo, A., Mulero, R., Zulaika, U., Azkune, G., & Almeida, A. (2019). Smart cities survey: Technologies, application domains and challenges for the cities of the future. *Int. J. Distributed Sens. Netw.*, *15*(6). https://doi.org/10.1177/1550147719853984

Santoso, A. D., Fathin, C. A., Effendi, K. C., Novianto, A., & Sumiar, H. R. (2019). *Smart village: Policies transformation and rural development responding of industrial revolution 4.0 era*. UGM: Center for Digital Society.

Somwanshi, R., Shindepatil, U., Tule, D., Mankar, A., Ingle, N., Rajamanya, G. B. D. V., & Deshmukh, A. (2016). Study and development of village as a smart village. *International Journal of Scientific & Engineering Research*, *7*(6), 395–408.

Stojanova, S., Lentini, G., Niederer, P., Egger, T., Cvar, N., Kos, A., & Duh, E. S. (2021). Smart villages policies: Past, present and future. *Sustainability (Switzerland)*, *13*(4), 1–28. https://doi.org/10.3390/su13041663

Sulili, A., & Mengge, B. (2013). Peran Kelembagaan Lokal dalam Meningkatkan Keberdayaan Masyarakat Studi Kasus Peran Lembaga Pemberdayaan Masyarakat (LPM) di Kota Makassar. *SOCIUS: Jurnal Sosiologi*, *12*(Januari), 1–19.

Susilowati, A. P. E., Rachmawati, R., & Rijanta, R. (2024). Analysis of Smart Village Development in Supporting Smart City in Indonesia: A Systematic Review. *Forum Geografi*, *38*(3), 358–378. https://doi.org/10.23917/forgeo.v38i3.4790

Sutriadi, R. (2018). Defining smart city, smart region, smart village, and technopolis as an innovative concept in indonesia's urban and regional development themes to reach sustainability. *In IOP Conference Series: Earth and Environ- Mental Science (Vol. 202, No. 1)*, 012047.

Syahrir, S. (2019). Pengaruh Kapasitas Kelembagaan, Koordinasi, Dan Pengawasan Terhadap Akuntabilitas Kinerja Pemerintah Kota Bogor Provinsi Jawa Barat. *Jurnal Kebijakan Pemerintahan*, *2*(1), 1–22. https://doi.org/10.33701/jkp.v2i1.920

Timotius, R. (2018). Revitalisasi Desa Dalam Konstelasi Desentralisasi Menurut Undang-Undang Nomor 6 Tahun 2014 Tentang Desa. *Jurnal Hukum Dan Pembangunan*, *48*(2), 323–344. https://doi.org/10.21143/jhp.vol48.no2.1666

Tosida, E. T., Herdiyeni, Y., Marimin, & Suprehatin, S. (2022). Investigating the effect of technology-based village development towards smart economy: An application of

variance-based structural equation modeling. *International Journal of Data and Network Science*, *6*(3), 787–804. https://doi.org/10.5267/j.ijdns.2022.3.002

Tosida, E. T., Herdiyeni, Y., & Suprehatin, S. (2020). The Potential for Implementing a Big Data Analytic-based Smart Village in Indonesia. *2020 International Conference on Computer Science and Its Application in Agriculture (ICOSICA)*, 1–10.

Tosida, E. T., Suprehatin, S., Herdiyeni, Y., & Solihin, I. P. (2020). Clustering of Citizen Science Prospect to Construct Big Data-based Smart Village in Indonesia. *2020 International Conference on Informatics, Multimedia, Cyber and Information System (ICIMCIS)*, 58–63.

Tume, T. K. (2019). Yoruba folkore and Ifa narratives in Tunde Kelani's Agogo Eewo (2002) as cultural archetypes for national re-orientation. *Journal of African Films and Diaspora Studies*, *2*(1), 23.

Wahidah, I., & Herdiana, D. (2023). Kapasitas Kelembagaan Pemerintah Desa dalam Pengelolaan Badan Usaha Milik Desa di Kabupaten Sumedang. *MUKADIMAH: Jurnal Pendidikan, Sejarah, Dan Ilmu-Ilmu Sosial*, *7*(2), 298–308. https://doi.org/10.30743/mkd.v7i2.7128

Wang, Q., Luo, S., Zhang, J., & Furuya, K. (2022). Increased Attention to Smart Development in Rural Areas: A Scientometric Analysis of Smart Village Research. *Land*, *11*(8), 2–28. https://doi.org/10.3390/land11081362

Widianingsih, I., Abdillah, A., Hartoyo, D., Sartika, S., Putri, U., Miftah, A. Z., & Adikancana, Q. M. (2024). Increasing resilience , sustainable village development and land use change in Tarumajaya village of Indonesia. *Scientific Reports*, *14*(31831), 1–13.

Zavratnik, V., Kos, A., & Duh, E. S. (2018). Smart villages: Comprehensive review of initiatives and practices. *Sustainability (Switzerland)*, *10*(7), 1–14. https://doi.org/10.3390/su10072559