

Understanding smart village concepts: digital literacy and mobile technology

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ABSTRACT

This research investigates how a mobile-based archive application and digital literacy impact pre-service administrators' understanding of the smart village concept in rural governance. It uses a quantitative approach with a questionnaire given to 100 pre-service administrators to evaluate their attitudes towards these factors. Validity and reliability tests were conducted as part of the data analysis, and the data were assessed for normality assumption. The data were then analyzed using a multiple linear regression model. The coefficient of determination, which is 99.3%, suggests that nearly all variables related to the smart village concept can be explained through the archive application and digital literacy variables. Furthermore, the mobile-based archive application and digital literacy have a positive and significant impact on understanding the smart village concept, both simultaneously ($0.000 < 0.05$) and partially ($0.000 < 0.05$). We found a negative t value (-5.739) for the understanding of the smart village concept, which can be improved through the mobile-based archive application (9.299) and digital literacy (6.538) variables. The implications from these findings indicate that pre-service administrators in rural governance recognize the need for improvement in their understanding of the smart village concept.

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1. INTRODUCTION

The development of information and communication technology (ICT) brings every element of rural society towards a civilization change that leads to effectiveness and efficiency. One of these aspects is the service provided by rural governance, which is expected to bring effectiveness and efficiency to the community. Therefore, as pre-service administrators in rural governance who will become administrators in rural governance, they must be able to provide the best and maximum service to the entire village community to achieve the intended effectiveness and efficiency of services. To meet these needs, they must understand the concept of a smart village. Earlier experts stated that a smart village has the ability to manage available resources and meet the local community's needs through the rational use of both new and existing technologies [1]. This concept is popular but still in its early formulation [1], so it needs to be explored more deeply in various specific aspects and perspectives of multiple parties involved, such as rural governance administrative services. In the context of administrative services, the smart village concept is an adaptation of

ICT applied to the rural governance administrative service sector and the use of ICT by the community to access these services.

Therefore, the focus of the smart village concept in this research is on rural governance administrative services, which can be interpreted as smart governance, with the users of these services being considered smart citizens. Smart governance is built based on conventional governance and then applies the latest innovations with ICT integration [2]. The context of governance refers to institutions as forums or stakeholders involved. Meanwhile, the challenges in terms of economics, social, and environmental aspects are the contextual challenges. ICT, on the other hand, is a crucial factor in developing the smart governance concept [3]. In this regard, ICT includes internet penetration, social media, the development of devices, smartphones, various websites, and so on [4]–[6]. These contexts must be adjusted to the vision and implemented by regulations, including strategies and ideas, regulations and legislation, and organizational transformations [5]–[7]. While integrating ICT into rural governance administrative services presents a forward-looking approach to developing smart villages, it requires careful consideration of various factors, including technology accessibility, stakeholder engagement, regulatory frameworks, and the balance between innovation and traditional governance practices.

Next, smart communities. Communities in the smart communities concept are expected to have the knowledge and skills that support the formation of the smart village concept [8], [9]. Smart communities are educated human capital, both formally and informally, and they demonstrate themselves as innovative individuals or communities [10]–[12]. This is evident in the level of education and human resource development regarding technology understanding. The abilities that can be achieved in this concept are 21st-century skills, especially the ability to absorb information, social inclusion, and capacity strengthening for creativity [13], [14]. The smart communities concept presents a progressive vision of empowered, educated, and innovative communities vital for the success of smart villages, but it also poses significant challenges. These include ensuring educational accessibility, fostering an innovation-friendly culture, bridging the digital divide, and promoting social inclusion and creativity. Addressing these challenges effectively is critical to realizing the full potential of smart communities within the broader smart village framework. To obtain potential rural governance administrators who can support the development of a smart village, an understanding of the smart village concept is essential for pre-service administrators in rural governance. Considering that the smart village concept is still in its early formulation, as formulated by previous research [1], [15]–[17], there has been no specific investigation into the factors that influence the understanding of the smart village concept among pre-service administrators in rural governance, who are the future frontline of administrative services in rural governance. Therefore, research into this condition is urgently needed to provide understanding to educators and pre-service administrators in rural governance about the factors that influence the understanding of the smart village concept. The critical need for understanding the smart village concept among future rural governance administrators points out the challenges due to the concept's nascent stage, the lack of specific research on educational needs, and the dynamic nature of this field. Addressing these challenges through targeted research and adaptive educational strategies is critical to preparing effective administrators to implement smart villages successfully.

Based on these studies, the smart village concept, which is still in the early formulation process by previous researchers [1], [15]–[17], is closely related to the use of new or existing technologies in a rational manner. Therefore, this research aims to investigate the influence of the mobile-based archive application developed by the researchers [18] and digital literacy on understanding the concept of smart village among pre-service administrators in rural governance. The hypotheses to be tested using multiple linear regression analysis techniques are as follows: i) mobile-based archive application and digital literacy have a positive and significant influence on the understanding of the smart village concept simultaneously, ii) mobile-based archive application has a positive and significant influence on the understanding of the smart village concept, and iii) digital literacy has a significant and positive influence on the understanding of the smart village concept. We hope that the results of this research can provide understanding and strengthen the concept of a smart village, which is still in its early formulation, for educators, students, and other researchers for the development and construction of the smart village concept, as well as other practical benefits related to the concept.

The importance examines the smart village concept, emphasizing its potential to revolutionize rural governance by integrating ICT. It highlights the pivotal role of pre-service rural governance administrators in implementing this concept, noting the challenges they face due to its nascent stage and the need for comprehensive understanding. Smart governance is introduced, signifying an advanced fusion of conventional governance with cutting-edge ICT to foster 'smart citizens' actively engaged in governance processes. The development of smart communities is also emphasized, focusing on educating individuals to be innovative and technologically proficient, embodying essential 21st century skills like information processing, social inclusion, and creative problem-solving. However, achieving this vision requires addressing challenges like the digital divide and ensuring inclusive, innovative environments. The passage

also outlines research objectives to investigate the impact of a mobile-based archive application and digital literacy on understanding the smart village concept, underscoring the importance of practical tools and digital literacy in comprehending and implementing these initiatives effectively.

2. LITERATURE REVIEW

This section discusses each variable, which is empirically examined by understanding it based on the created metadata and the indicators that constitute the variable. The influence of the independent variables on the dependent variable with the stated hypotheses needs to be empirically proven through field research. This illustrates that the main objective of this study is to test the three hypotheses formulated based on this theory shown in Figure 1.

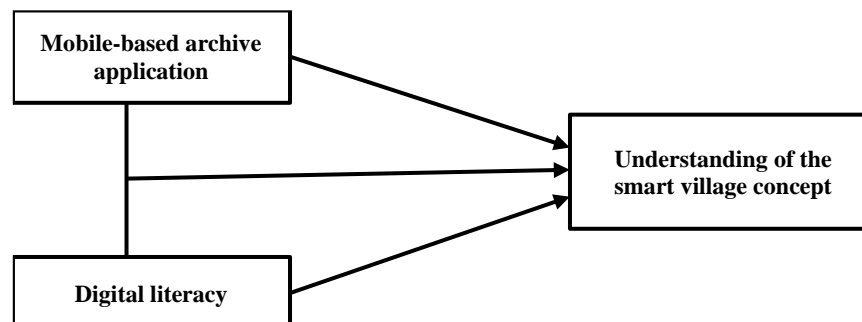


Figure 1. The hypotheses tested

2.1. The understanding of the smart village concept

Smart villages pose challenges for the modern government service sector. Several aspects of smart village include smart infrastructure, smart service delivery, smart institutions, and smart technology and innovation [1], [19], [20]. Adopting innovative concepts for the intellectual development of both agricultural and non-agricultural sectors in rural economies, including creating modern “smart villages” and appropriate “smart specialization” in production, can provide vital support to rural areas [9]. Given the potential of the smart village concept to reduce disparities between rural and urban areas and contribute to efficient, adaptive, and resilient communities, this article shifts the discussion from smart city to smart village [21].

The interconnection between rural and urban areas, including the role of smart city in creating smart village and the importance of regional connectivity in achieving smart and sustainable development [22], [23]. The interplay of popular concepts such as sustainable development, intellectual development, smart city, and smart village introduces the concept of community-based development. The theoretical development of virtuality quality is based on three attributes: the meeting of brightness, novelty, and new materials; intelligence in a fair rural society; and the right to disconnect in remote rural areas. The smart village concept should encompass precision farming, various digital platforms (online learning, e-health, e-administration, transportation, gastronomy, social services, retail), sharing economy, circular economy, bio-based economy, renewable services, rural tourism, social innovation in rural services, and entrepreneurship [23]–[25].

The smart village model, which solely relies on information and technology systems, reveals its limitations and requires a focus on competent governance, innovative environments, and smart community aspects. The differences in smart village development goals compared to smart city necessitate an expanded exploration of smart village theory for implementation in various villages [26]. The achievement of these defined goals will occur in three stages: i) monitoring changes in the rural population in Poland in terms of socioeconomic development; ii) identifying areas lacking internet infrastructure and confirming their overlap with the least developed areas; and iii) defining the smart village concept and the resources needed to support this initiative within the framework of future finances [27], [28]. The primary discussion shifts from smart city to smart village, placing rural areas at the center of digital technology discourse. The research identifies fundamental challenges that hinder smart village development in terms of modern service solutions, as perceived by experts, residents, farmers, and entrepreneurs in rural areas.

The smart village concept is related to smart specialization, explored in the rural context. As rural areas experience declines and show lower levels of socioeconomic development, lower rural development correlates with more insufficient internet access. The research concludes that the smart village concept can facilitate sustainable rural development [29]. This analysis focuses on preventing rural exclusion, promoting

digital technology for rural infrastructure management, enabling remote work in rural areas, and using ICT for participation and governance. Research has highlighted fundamental challenges that slow down smart village development in modern service solutions, as perceived by experts, residents, farmers, and entrepreneurs in rural areas. Exploration of the smart village concept as a crucial component in rural development.

The smart village concept for achieving sustainability and resilience in rural areas draws inspiration from sustainable and continuous growth theories. This approach considers the smart village concept, including its differences from the smart city concept. Addressing these challenges, the smart village concept is gaining more attention, offering an alternative to the smart city concept. Smart village initiatives aim to create rural areas where people choose to live due to innovative digital solutions that enhance their quality of life due to significant developmental and structural differences between rural areas in various regions worldwide, with different goals and implementation instruments. First, the presence of high-speed broadband and broader digital technology applications to support business innovation and community development shape the smart village concept. The main obstacles to more comprehensive use of the smart village concept are not digital technology coverage or accessibility but relatively lower qualifications and conservatism among rural residents. Emerging features in rural areas and innovative methods to enhance rural sustainability require broader knowledge and more efficient development method choices. The first part defines the global concept of a bright and intelligent village through the meeting of a brilliant, novel, and new material world.

This concept encompasses technological aspects such as smart village and comprehensive rural development. The last section discusses the right to disconnect in remote rural areas and a community approach to smart village, particularly in Indonesia [25]. Efficient service system operations are crucial for developing efficient service products and overall economic development, including the modernization of smart village. The internet of things (IoT) application domain shows similarities between the digital innovation ecosystem for smart city and smart village. Further analysis of rural socioeconomic performance across regions reveals significant disparities, with some rural areas surpassing urban areas in some variables but lagging in other challenges faced by the modern service industry in the context of smart rural development. Like smart city, smart village should also leverage digital technology. Systematic digitalization and social innovation in rural areas through a sensitive concept developed from discussions on social and digital innovation [30].

Local governments are increasingly adopting the smart city approach to achieve sustainable development. This vision highlights challenges for government policies in rural development: bridging the digital divide and harnessing the potential of connectivity and digitalization in rural areas. Exploration of global trends in conceptual approaches and planning for smart village, assessing their suitability for smart interventions applied in Indonesia. A technical solution overview supporting smart solutions in both smart cities and smart villages, integrating virtual and material elements, results in virtual space and novelty with varying territorial dimensions in smart village policies and politics. These results assess how smart villages and smart cities supported by IoT can enhance their inhabitants' overall quality of life [31]. Analysis of the ability of older adults to adopt ICT solutions reveals that a smart and age-friendly community approach may face implementation challenges, especially in the older population segments in rural areas. Initial conclusions about the utility of the smart village concept as a revitalization tool for rural Poland highlight theoretical and methodological dilemmas. In the geographical context, tourism is still a novelty in these remote rural areas, and smart technology is a new development in this transitional village. Smart village leverages human and social capital and local assets to support their growth. Based on a literature review of social and digital innovation, a conceptual framework has been developed to approach digitization projects in rural areas [20], [29], [32].

The concept of "smart village" is explored to integrate smart technologies in rural areas, aiming to bridge the gap between rural and urban communities. This involves the adoption of smart infrastructure, service delivery, institutions, and technological innovations to support both agricultural and non-agricultural sectors. The approach emphasizes the interconnectedness of smart villages with smart cities, highlighting the significance of regional connectivity for sustainable development. Challenges include the need to balance technology reliance with competent governance and community engagement. The concept also considers the unique socioeconomic circumstances of rural areas, advocating for digital solutions to foster business innovation, community development, and improved quality of life. This multi-dimensional approach, adaptable to global and local contexts, aims to address the digital divide in rural settings, while recognizing potential implementation challenges, especially among older and more conservative populations.

2.2. Digital literacy

A study on digital literacy highlights the importance of online content evaluation and explores the skills and knowledge needed in the digital era. The expertise of digital specialists is often overlooked in various job activities [33]. Although the government claims that digital literacy is being taught, many teachers believe it is inadequate [34], [35] discussions on revising the curriculum to enhance digital literacy.

Furthermore, disproportionate measures to control coronavirus disease 2019 (COVID-19) have affected older adults, leading to social isolation and limited access to remote healthcare services [36]. These sentences provide information on various aspects and concepts of digital literacy, online content assessment, educational practices, and technology use across different age groups. The ability to evaluate online content involves considering its nature, source, contextual knowledge, various sources, digital skills, and internet literacy [37], [38]. The approach to media literacy varies, making it challenging to define digital literacy skills for different age groups. Professionals such as librarians, IT managers, and journalists have various digital skills. However, job practice statements in the government have not been able to fulfill their mission of promoting digital literacy. Many teachers believe that the school curriculum lacks adequate digital literacy skills for children, making it irrelevant to the job market [39]. Digital literacy impacts lifelong learning through access to reliable information. Older adults face digital literacy challenges, exacerbated by the COVID-19 pandemic and social isolation. Digital literacy involves using digital tools, critical information analysis, content creation, and online collaboration [40]. There is a need to enhance an individual's digital literacy, focusing on socio-emotional skills. Digital competence includes tool skills, enhanced knowledge, strategic attitudes, and autonomous technology use [41]. The pandemic has increased the digital engagement of older adults, and digital literacy is key to social inclusion. Digital literacy opportunities vary between classes based on average performance. Inequality in literacy learning experiences affects rural student groups and low-income community students [42]. Parents in rural areas have less access to ICT and linear navigation that facilitates digital literacy. Information literacy and digital skills drive ICT adoption behaviors, influencing rural communities. New methods for measuring digital literacy in low-literacy users involve self-reported surveys and tasks. Specific studies can identify critical components of digital literacy and propose measurable interventions [43]. Overall, the phrases refer to digital literacy challenges, disparities, and strategies across various age groups and educational settings. Digital literacy's constituent variables may consist of operational ability, critical thinking skills, collaborative abilities, and awareness skills [44].

This section discusses the multifaceted nature of digital literacy in today's digital age and its implications for the smart village concept. It emphasizes the critical need for effective online content evaluation skills, highlighting the often-underappreciated expertise of digital specialists in various professions. Despite governmental claims, many educators view the current digital literacy training as insufficient, leading to calls for curriculum revisions. The COVID-19 pandemic has further complicated this landscape, particularly impacting older adults with social isolation and restricted access to digital health services. The text underscores the challenges in defining digital literacy across different age groups, noting the varied skills of professionals like librarians and IT managers. It stresses the importance of digital literacy in lifelong learning and the need to incorporate socio-emotional skills. The passage also points out the disparities in digital literacy opportunities, especially affecting rural and low-income communities, and discusses innovative methods to assess digital literacy in low-literacy populations, emphasizing its crucial role in operational, critical, and collaborative skills for effective ICT adoption in rural settings.

2.3. Mobile-based archive application

Effective communication is crucial in promoting sustainable development in a digital-centered environment. This digital ecosystem has the potential to empower resources to expand into global markets, drive product innovation, enhance competitiveness, and facilitate comprehensive access to knowledge networks [45]. Increasing understanding of the adoption of the smart village in diverse geographic contexts [46]. Rural areas often find themselves on the outskirts of significant development discussions, which may result in limited progress. The significance of E-government initiatives has encouraged governments in developing countries to implement E-government principles in public services. Examination of the evolution of E-government in Indonesia, identification of challenges in its implementation, and formulating of digital transformation strategies for the Indonesian government [47]. E-government is defined as using ICT to deliver government services to citizens and businesses more efficiently. A framework proposing the measurement of emotions in technology use, incorporating variables from the happiness, engagement, adoption, retention, and task success framework, assumed to influence repetition intent [48]. They evaluated the potential for smart economic development in smart villages, integrating exogenous variables such as community support for the environment, resident characteristics, empowerment, entrepreneurship, innovation, and smart economics. Indicators such as the use of ICT, ICT literacy, access to education, research and development (R&D) support, motivation for smart villages, and village innovation are influenced by family involvement [48], [49].

Innovation, knowledge, growth, and management are observed to influence smart rural planning in Indonesia. However, relying solely on information and technology systems in the smart village model reveals its limitations. Therefore, it is also essential to emphasize smart government, smart environment, and smart community elements. Differences in the development goals of smart villages compared to smart cities enrich the theory of smart villages for potential implementation in various rural settings [50], [51]. Therefore, it is

crucial to consider factors influencing sustainability, resilience, and attractiveness in rural Indonesia. This research aims to provide insights and contribute to the literature on advancing national development through smart villages in Indonesia. Data show that rural development in Indonesia remains uneven, with many villages experiencing lower levels of development [25], [49]. Promoting smart village development is important to address vulnerabilities and development disparities in various regions of Indonesia. However, the availability of public internet facilities does not seem to significantly affect village development in economic, social, and environmental dimensions. By examining effective ICT utilization by rural communities and village governments, this study sheds light on the role of ICT in enhancing village development performance. To address the digital divide and continue supporting rural development, improving ICT infrastructure for rural communities and enhancing governance in its implementation [52].

ICT has a positive impact on comprehensive rural development performance [27]. This study also explores several contributing factors to this relationship, including the number of mobile users, internet connectivity quality, and the availability of technology devices and internet facilities in villages. Therefore, the quality of internet connectivity, internet infrastructure, and mobile phone ownership among rural communities play a key role in enhancing rural development outcomes in economic, social, and environmental dimensions. Expanding and improving ICT infrastructure in rural areas can promote rural development and reduce regional disparities [29], [45]. However, it should be noted that existing research on Indonesia's digital workforce primarily comes from non-academic global publications, recognizing the limitations of this workforce. Enhancing digital skills in the current and future workforce is recommended as a top government priority. Changes in job requirements have resulted in new job titles and a broader set of skills. However, acquiring skilled digital labor remains challenging, particularly in Southeast Asia [51], [53].

Basic digital skills like internet searching and emailing are no longer sufficient, so the focus needs to be on advanced digital competencies [27]. To harness this potential, the government has proposed a national acceleration program for digital transformation, including five priorities: digital and internet infrastructure development, a digital transformation roadmap for strategic sectors, the establishment of a national data center, the development of digitally skilled human resources, and digital regulation and financing schemes [54]. The research findings indicate that the information technology culture in city governance is influenced by five factors: technocratic utopia, anarchy, feudalism, dictatorship, and federalism. These findings are crucial in understanding the root causes of suboptimal implementation of government-based e-public services in Indonesia. Some challenges in implementing ICT include government readiness in terms of human resources and facilities, inadequate technology and information infrastructure, difficulties in integrating various technology platforms, challenges in managing electronic data, unclear data ownership policies, the use of pirated software, limited ICT control, suboptimal inter-departmental cooperation, poor public information management, and a lack of awareness among departments in managing websites and information systems [55]. The information culture emerges as a key factor influencing the success of E-government implementation.

This section emphasizes the significance of effective communication and digital literacy in advancing sustainable development, particularly in the context of the "smart village" concept, and its application in varied geographical areas, including often overlooked rural regions. It highlights the transformative potential of digital ecosystems in expanding global markets, driving innovation, and enhancing knowledge access. The focus is also on the evolution and challenges of E-government in Indonesia, underscoring the importance of using ICT for efficient government services. The passage discusses the necessity of integrating smart government, environmental, and community elements into smart village planning, moving beyond a sole reliance on information and technology systems. It also addresses the critical role of ICT in improving village development, the impact of the digital divide, and the need for enhanced ICT infrastructure and governance. Furthermore, it points out the challenges in developing a skilled digital workforce in Southeast Asia and the importance of advanced digital competencies. The government's proposed national digital transformation program and the various factors influencing the success of E-government implementation, including information technology culture and operational challenges, are also examined.

3. METHOD

This research was conducted in Indonesia on active pre-service administrators in rural governance in 2023, with 100 participants who voluntarily participated in this study. The researchers contacted the participants to confirm their willingness to participate in the research activities. Out of 106 active pre-service administrators in rural governance who were contacted, 100 confirmed their willingness, while the remaining did not guarantee their availability or confirm their unavailability. After obtaining confirmation, the data collection process was conducted using instruments with a likert scale of 1-4. All instruments were

completed by the participants and returned to the researchers, resulting in 100 data sets. Table 1 shows the distribution of participants in this study based on district of residence.

Table 1. Participant demographic distribution by district

ID	District	No
1	Kebumen	10
2	Sempor	5
3	Alian	5
4	Buayan	5
5	Ayah	5
6	Klirong	5
7	Puring	5
8	Ambal	4
9	Sruweng	4
10	Pertanahan	4
11	Bulupesantren	4
12	Karanggayam	4
13	Pegajolan	4
14	Mirit	4
15	Rowokele	4
16	Gombong	4
17	Kuwarasan	4
18	Kutowinangun	4
19	Karangsambung	3
20	Karanganyar	3
21	Adimulyo	3
22	Prembun	2
23	Sadang	2
24	Bonoworo	1
25	Poncowarno	1
26	Padureso	1
Total		100

Note: districts are sorted in descending order of participant count

Next, the analysis technique used was multiple linear regression with a significance level < 0.05 . The validity was assessed using the product-moment correlation with $r_{count} > r_{critical}$ or significance level < 0.05 , and the reliability was tested using Cronbach's alpha > 0.60 . Additionally, the normality of data was tested using the Shapiro-Wilk test with a significance level > 0.05 or a tolerance level of 5%. The SPSS version 23 application was utilized in this analysis as a tool for hypothesis testing using the aforementioned techniques. The hypotheses tested are as follows: i) mobile-based archive application and digital literacy have a positive and significant influence on the understanding of the smart village concept simultaneously, ii) mobile-based archive application has a positive and significant influence on the understanding of the smart village concept, and iii) digital literacy has a significant and positive influence on the understanding of the smart village concept as shown in Figure 1.

4. RESULTS AND DISCUSSION

The validity test was performed using the moment product formula using SPSS 23. $r_{count} > r_{table}$ the research criteria require a r_{table} . The analysis of this study shows that the r_{table} is 0.20. The validity test findings demonstrate that all 43 items meet the $r_{count} > r_{table}$ requirement. These findings suggest that all of the items used to test the hypotheses meet the requirements of the validity test. The items have a Cronbach's alpha of ≥ 0.60 , which is 0.812. It means that the questionnaire is reliable and can be distributed. Table 2 shows the results of the reliability test analysis.

Table 2. Results of reliability analysis

Reliability statistics	
Cronbach's alpha	N of Items
0.991	43

Based on Table 3, the results of the normality test demonstrate that each variable is normally distributed. The variable of archiving application has sig. of $0.059 > 0.05$. The variable of digital literacy has sig. of $0.251 > 0.05$. The variable of the smart village has sig. of $0.097 > 0.05$. It suggests that the research

data has a normal distribution and is thus suitable for hypothesis testing. It is important to create a frequency distribution of the data before operating multiple linear regression analysis. The frequency distribution table is shown in Table 3.

Table 3. Normality test results

Shapiro-Wilk test of normality			
Variable	Statistic	df	Sig.
Mobile-based archive application	0.975	100	0.059
Digital literacy	0.984	100	0.251
Understanding of the smart village concept	0.978	100	0.097

The frequency distribution of the data tabulation is displayed in Table 4. The total number of valid data points is indicated in row N, which is 100. The responses for each variable are represented by the mean values (69.19, 116.71, 63.03). The median values (69, 117, 63.5) represent the middle values of the data, while the mode values (69, 115, 62) represent the most frequently occurring response provided by the respondents. The standard deviations (SD) (6.389, 10.179, 6.006) describe the average spread of data or the amount of deviation from the mean for each variable.

Table 4. Frequency distribution

Variable	Mean	Median	Mode	SD	Max	Min
X1	69.19	69.00	69.00	6.389	51.00	82.00
X2	116.71	117.00	115	10.179	89.00	138.00
Y	63.03	63.50	62	6.006	47.00	75

Note: X1 is a Mobile-based Archive Application, X2 is Digital literacy, and Y is an Understanding of the smart village concept

The model summary as shown in Table 5 is a part of the multiple linear regression analysis that provides an overview of how well the regression model can explain the variation in the data. R is the correlation coefficient between the dependent variable (Y) and the independent variables (X1 and X2) in the regression model. The R-value of 0.997 indicates a very strong correlation between these variables. R square (R^2) is the coefficient of determination that describes how much of the variability in the dependent variable (Y) can be explained by the independent variables (X1 and X2) in the regression model. The R square value of 0.993 or 99.3% indicates that 99.3% of the variation in the dependent variable can be explained by the independent variables in this model. Adjusted R square (adjusted R^2) is an adjustment of R square that takes into account the number of independent variables and the sample size. The adjusted R square value of 0.993 or 99.3% indicates that 99.3% of the variation in the dependent variable can be explained by the independent variables in this model after adjustment. Std. error of the estimate is a measure of the average prediction error in the regression model. The value of 0.498 suggests that the average prediction error in this model is approximately 0.498. Overall, the above values indicate that the multiple linear regression model used in this study has a very strong correlation between variables and can explain most of the variation in the dependent variable very effectively.

Table 5. Model summary test results

Model summary			
R	R square	Adjusted R square	Std. Error of the estimate
0.997	0.993	0.993	0.498

The correlation analysis results are then displayed as follows. Based on Table 6, the correlation coefficient (R) of 0.997 is significant at $\alpha = 0.05$. These findings suggest that the variables of mobile-based archive application, digital literacy, and understanding of the smart village concept have a strong and significant relationship. The R^2 coefficient of determination, also known as the adjusted R square in the table, is 0.993 (99.3%). These findings show that the mobile-based archive application and digital literacy account for 99.3% of the variation in the understanding of the smart village concept, with the remaining 0.7% being explained by variables that were not in the study. The simultaneous F test comes next in the analysis. Table 7 shows the outcomes of simultaneous F tests. The next analysis is the simultaneous F test. The results of the simultaneous F test are shown in Table 7. These results show that the F count is higher than the F table

(7,164.742 > 8.554). It can be concluded that the mobile-based archive application variable (X1) and digital literacy variable (X2) have a positive and significant effect on the understanding of the smart village concept (Y).

Table 6. Correlation analysis

Constant	Std. Coefficient		
	Beta	t	Sig.
Mobile-based archive application	-	-5.730	0.000
Digital literacy	0.586	9.299	0.000
Understanding of the smart village concept	0.412	6.532	0.000

Table 7. F test

	Sum of squares	df	Mean square	F	Sig.
Regression	3.546,900	2	1,773.450	7,164.742	0.000
Residual	24,000	97	0.248	-	-
Total	3.570,910	99	-	-	-

Based on Table 8, the t value for the archiving application variable is 9.299 > t table of 2.05, and the sig. value is 0.000 < 0.05. It implies that the mobile-based archive application variable (X1) and understanding of the smart village concept (Y) have a partially significant effect. The t value for digital literacy is higher than the t table (6.538 > 2.05), and the sig. value is 0.000 < 0.05. It shows that the digital literacy variable (X2) has a partially significant effect on understanding the smart village concept (Y). The equation derived from Table 8 is as (1).

$$Y = -5.739 + 9.299X1 + 6.538X2 \quad (1)$$

Table 8. t-test

Coefficients	t	Sig.
Mobile-based archive application	-5.739	0.000
Digital literacy	9.299	0.000
Understanding of the smart village concept	6.538	0.000

Based on the preceding Table 8, there is a constant value of -5.739, suggesting that the understanding of the smart village concept. Variable (Y) is -5.739 when the variables of mobile-based archive application (X1) and digital literacy (X2) are held constant. The value of X1 is 9.299, indicating that if the archiving application variable increases by 1 unit, the understanding of the smart village concept will increase by 9.299. Furthermore, the value of X2 is 6.538, implying that if the digital literacy variable improves by 1 unit, the understanding of the the smart village concept is better.

The general findings are described in the discussion section. The initial step was to perform a regression function analysis, which was followed by determining the correlation's closeness and determining its determinants. A simultaneous test (F test) was also run to see how the mobile-based archive application and digital literacy variables affected the understanding of the smart village concept. After determining the significance of the simultaneous test, a partial test based on the relationship between the three variables is conducted.

4.1. Hypothesis 1

Hypothesis 1 is accepted, and it states that the mobile-based archive application variable and digital literacy have a positive and significant effect on the understanding of the smart village concept simultaneously. Based on the data analysis results, the developed multiple linear regression equation is (1). These findings reveal that the aspect of understanding the smart village concept consistently has a negative value, indicating that their understanding is not ideal during this investigation. Furthermore, the value of the mobile-based archive application variable is positive and greater than the constant. Therefore, with an increase of just one unit in the development of the mobile-based archive application, the value of understanding the smart village concept will become positive. Similarly, with digital literacy, although its significance is not as high as the mobile-based archive application's impact on understanding the smart village concept, an increase of just one unit in digital literacy is enough to make the value of understanding the smart village concept positive. These findings are in line with those of [56], who state that the

advancement of ICT represents a defining moment in the development of understanding the smart village concept. Furthermore, public awareness of technology, especially digital technology, is crucial for the advancement of understanding the smart village concept [32]. As a result, the development of ICT infrastructure and the ability to comprehend ICT have become an integral part of the development of understanding the smart village concept [6]. Both the mobile-based archive application and digital literacy significantly influence the understanding of the smart village concept among pre-service administrators in rural governance. Despite a baseline negative value in understanding, improvements in either the mobile-based archive application or digital literacy individually can turn this understanding positive. The study underscores the pivotal role of ICT development and public awareness of digital technology in enhancing the comprehension of the smart village concept, emphasizing the necessity of advancing ICT infrastructure and literacy for effective rural governance.

4.2. Hypothesis 2

Hypothesis 2 is accepted, stating that there is a positive and significant effect of the mobile-based archive application on the understanding of the smart village concept. The application media in this study is designed to develop the concept of archive management that supports administrative services related to the understanding of the smart village concept. One aspect of ICT development, application, can have an impact on government performance [5], [7], [57]. Furthermore, the presence of ICT can serve as a channel of government information to the community [58]–[60]. ICT may also teach people good habits to participate in regional development. This will ultimately be an indicator of the success of the smart government in the understanding of the smart village concept [61]. Mobile-based archive application positively and significantly influences the understanding of the smart village concept. This application, an aspect of ICT development, not only aids in archive management but also supports administrative services, improves government performance, and serves as a vital information channel to the community. Additionally, ICT plays a crucial role in promoting public participation in regional development, ultimately indicating the success of smart government initiatives in enhancing the understanding of the smart village concept.

4.3. Hypothesis 3

Hypothesis 3 is accepted, asserting that digital literacy has a positive and significant effect on the understanding of the smart village concept. Digital literacy can be developed through a supportive environment like the availability of digital infrastructure [62]–[64]. Through this environment, society has become accustomed to utilizing digital technology and may shape their own digital literacy [8], [9], [65]. This will ultimately be an indicator of the achievement of smart people in the understanding of the smart village concept [66]. Digital literacy significantly enhances the understanding of the smart village concept. The development of digital literacy is facilitated by a supportive environment, such as the availability of digital infrastructure, which enables society to become proficient in using digital technology. This proficiency in digital literacy is a crucial indicator of the achievement of 'smart people,' reflecting their comprehensive understanding of the smart village concept.

The research findings from the analysis of Hypothesis 1 reveal a significant and positive correlation between the mobile-based archive application, digital literacy, and the understanding of the smart village concept. This hypothesis demonstrates that improvements in the development of the mobile-based archive application or digital literacy can effectively transform an initially hostile knowledge of the smart village concept into a positive one. The results underscore the crucial role of technological applications and digital literacy in enhancing comprehension in rural governance. In the context of Hypothesis 2, the study further emphasizes the pivotal role of ICT in facilitating the understanding of the smart village concept. The mobile-based archive application, a key component of ICT, not only aids in efficient archive management but also significantly bolsters administrative services. This technological advancement is a crucial conduit for government performance and information dissemination to communities. The findings suggest that the presence of ICT, through applications like these, is instrumental in encouraging public participation in regional development, a critical marker of smart government success in comprehending and implementing the smart village concept. Hypothesis 3's acceptance highlights the importance of digital literacy in grasping the smart village concept. The study indicates that a supportive environment, characterized by accessible digital infrastructure, is essential for fostering digital literacy within society. As individuals become more adept at using digital technology, their understanding of the smart village concept deepens, marking a significant achievement in the development of 'smart people.' This proficiency in digital literacy is a key indicator of an effective and comprehensive understanding of the smart village concept, further stressing the need for advancements in digital technology and literacy in rural governance.

5. CONCLUSION

The findings of this study support all three hypotheses. Hypothesis 1 reveals that both the mobile-based archive application variable and digital literacy have a positive and significant effect on understanding the smart village concept simultaneously. The multiple linear regression equation is $Y = -5.739 + 9.299X_1 + 6.538X_2$ indicates that an increase in the development of the mobile-based archive application and digital literacy positively impacts understanding of the smart village concept. However, the understanding of the smart village concept consistently shows a negative value, suggesting that there is room for improvement in the pre-service administrators' comprehension of the concept in rural governance. Hypothesis 2 is also supported, indicating a positive and significant effect of the mobile-based archive application on understanding the smart village concept. The application media used in this study contributes to the development of archive management, supporting administrative services related to the smart village concept. The advancement of ICT is identified as a critical factor in government performance and the provision of information to the community, contributing to the success of the smart village concept. Furthermore, Hypothesis 3 is accepted, demonstrating the positive and significant impact of digital literacy on understanding the smart village concept. Digital literacy can be cultivated in an environment with accessible digital infrastructure, enabling individuals to utilize digital technology effectively. This leads to greater digital literacy, which is essential for the pre-service administrators' achievement in comprehending the smart village concept in rural governance. Overall, the study highlights the importance of ICT development, including the mobile-based archive application and digital literacy, in the successful implementation and understanding of the smart village concept. To further enhance pre-service administrators' comprehension of the concept in rural governance, efforts should be directed toward improving digital literacy and providing an enabling environment for technology adoption and usage.

This study presents a novel approach in its analysis, demonstrating how both a mobile-based archive application and digital literacy significantly impact the comprehension of the smart village concept, as evidenced by the derived multiple linear regression equation is $Y = -5.739 + 9.299X_1 + 6.538X_2$. This equation highlights that mobile app development and digital literacy improvements can positively shift the understanding of the smart village concept, even from initially negative perceptions. The research measures the individual effects of a mobile-based archive application and digital literacy. It goes further than general ICT advancements by pinpointing the specific influence of mobile applications in enhancing archive management and administrative services. This detailed exploration shows the direct effect of these technological solutions on improving government performance and information provision, offering valuable insights for those involved in rural governance. Additionally, the study pioneers in elucidating the critical role of digital literacy in grasping the smart village concept. It reveals that digital literacy stems from technological access and an environment conducive to its growth. By linking the development of digital literacy in a digitally enabled climate to a deeper understanding of the smart village concept, the research provides a strategic direction for boosting administrative effectiveness in rural governance through focused educational and infrastructural initiatives. The study contributes to the literature by highlighting the critical role of technology and digital competencies in rural governance. It underscores the necessity of incorporating digital tools and literacy in the training of future rural administrators to ensure the successful implementation of smart village concepts, which can lead to more effective and efficient governance in rural areas. This research bridges the theoretical understanding of smart villages with practical applications in rural governance, emphasizing the need for digital literacy and technology use as key components in the development and management of rural areas.

The study demonstrates that both a mobile-based archive application and digital literacy significantly enhance understanding of the smart village concept, offering a practical approach for rural governance improvement globally. It underscores the pivotal role of ICT in boosting government performance and information dissemination in rural areas. Emphasizing the necessity of digital literacy, the research suggests that technological access and conducive environments are crucial for comprehending and implementing smart village initiatives. The specific impact of mobile applications in archive management and administrative services illustrates a direct technological solution for enhancing rural governance. Overall, the findings provide a strategic framework for international application, particularly in training future rural administrators and developing smart, efficient rural communities.

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