

Mapping Research on the Implementation of Smart Village Policies in Indonesia: A Bibliometric Study for the Years 2017-2025

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ABSTRACT

Article Info :

Article history :

Received : 08-02-2026

Revised : 03-06-2026

Accepted : 28-10-2026

Keywords :

Smart Village,
Public Sector Policy,
Human Resource Capacity,
Bibliometric Approach.

The objective of this study is to analyze the role of public sector policies in the development of Smart Villages (SV) in Indonesia, particularly the use of information and communication technology (ICT) for improving the quality of life of rural communities. Although the Indonesian government has launched various programs such as the Digital Village Program and Smart City, the implementation of these policies still faces various challenges such as limited infrastructure, low digital literacy levels, and lack of inter-agency coordination. The present study uses a bibliometric approach to map the relevant research and policy trends and to identify challenges and opportunities for Smart Village development. The research findings indicate that, despite some progress, the current public sector policies are not yet fully effective in bridging the digital divide between villages and cities. This research promotes the need for more inclusive and integrated policy improvements and for strengthening human resource capacities in the villages to support the creation of sustainable and competitive Smart Villages.



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How to cite this article:

Mahulauw, S., Tuanaya, W., & Wance, M. (2026). Mapping Research on the Implementation of Smart Village Policies in Indonesia: A Bibliometric Study for the Years 2017-2025. *Journal of Government Science Studies*, 5(2), 333-347. <https://doi.org/10.66254/jgssvol5issue2page333-347>

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Journal homepage: <https://ojs3.unpatti.ac.id/index.php/jgss/>

Journal e-mail: jurnaljgssunpatti@gmail.com

Systematic Literature Review · **Open Access**

INTRODUCTION

One of the major focuses of accelerating the development of inclusive and sustainable rural areas is the development of Smart Villages in Indonesia. The Smart Village concept is based on the use of information and communication technologies (ICT) aiming to help improve the quality of life in rural communities, optimizing local resources and enabling an efficient and competitive development process. The development of Smart Village in Indonesia is driven not only by technology but also by the public sector policy that creates an ecosystem of support. Good public policies can help provide clear guidance on the development of digital infrastructure, improve human resource capacity and generate new jobs in rural areas. Research results indicate that there are 1,424 villages in 32 provinces in Indonesia that have been developed into smart villages (Susilowati et al., 2025). Saleh et al. (2025)'s research results prove that the external environment has a strong positive effect on the ICT behavior of smart villages. However, perceptions and attitudes toward ICT usage do not have a significant direct impact on behavior (Saleh et al., 2025).

However, the implementation of Smart Village in Indonesia has various challenges related to the existing public policies. The hindering factors are fragmented policies, non-coordination among government agencies and limited budget allocation for technology development in rural areas. Conversely, policies to support the development of digital infrastructure and village-based technology are often not matched with sufficient education for rural communities on how to use that technology effectively. This results in a gap in the adoption of the technologies between rural and urban areas, which constitutes a hindrance to the attainment of the basic goal of Smart Village, i.e., equitable development and improved quality of life for rural communities. The research results of Susilowati (2024) stated that the dimensions of smart villages that support smart cities in Indonesia are the community, technology, institution, and village resource potential (Susilowati et al., 2024a). The communication pattern is an all-channel pattern with five actors, star, bridge, opinion leader, liaison, cosmopolitan and isolated. This model supports the potential of a smart economy to develop smart villages (Jayawinangun et al., 2024).

For that reason, a bibliometric study related to public sector policies in the development of Smart Villages in Indonesia is very important to conduct. Through a comprehensive literature analysis, this research aims to map the research and policy trends that have been applied in the development of Smart Villages, as well as to identify the strengths, weaknesses, opportunities, and challenges faced in its implementation. This bibliometric study will also help in providing new insights on the best policies that can be applied to support the establishment of more effective and inclusive Smart Villages, considering the local context of Indonesia. The research results aim to guide and can serve as a reference for policymakers in formulating more targeted technology-based rural development strategies. Susilowati (2024) claims that the research results reveal that the smart village concept provides more benefits to regions outside Java through its role as a connector between areas with spatial inefficiencies and low population agglomeration (Susilowati et al., 2024b). The researchers have identified the existing conditions for developing smart village dimensions; specifically, the development of Ara Village aligns with the Village Medium-Term Development Plan (RPJMDes) and reflects the actual conditions in Ara Village, allowing for the identification of gaps in smart village development (Permanasari, 2024).

The urge to study public sector policies in the development of Smart Villages in Indonesia occurs with the rapid development of information and communication technology (ICT) that can be used to improve the quality of life for communities, particularly in the rural areas. The research on the implementation of Smart Villages in Indonesia has been growing in recent years, following the emergence of various government policies to accelerate digital transformation in villages. These studies often refer to the possible use of ICT in the education sector, health, and more efficient management of natural resources. However, while many studies have shown the

significant potential of Smart Villages, many have also criticized the implementation of policies that have not yet been fully effective in bringing positive impacts to rural communities. Therefore, this research tries to further investigate the role of the public sector policies in accelerating or inhibiting the Smart Villages development in Indonesia. The research results show that there is a model of smart community that can be connected with the village infrastructure to develop smart village economies and sustainable smart villages (Tosida et al., 2024). The process of developing a smart village is also stated to be successful in line with the vision and mission of the Regency (Arista & Purabaya, 2024). Based on the research of Yuskar (2024), village management and policy makers in West Sumatra Province, IT practitioners and researchers are expected to help Nagari in implementing smart village (Yuskar et al., 2024).

In terms of benefits, the study of public sector policies in Smart Village development gives the chance to understand how technology can be better integrated into the lives of rural communities. Another benefit is that rural communities could experience an improvement in the quality of life, thanks to the easier access to information, public services and new economic opportunities. Relaxing rules for building digital infrastructure in villages can boost competitiveness and create new jobs. However, implementation of these policies has been hampered by limited budgets and low levels of online literacy in rural areas. The government has initiated the Smart Village program, but the key challenge is to ensure that the policy touches upon all strata of the village community and is not confined to some more developed villages. Dimensions of smart village governance and the use of digital applications (Susilowati & Rachmawati, 2024) Research on smart villages Stakeholders may plan targeted programs to improve community welfare (Utama, 2024) Climate village programs can be applied to other sectors to strengthen participation in smart village concept (Ariyaningsih & Shaw, 2023)

On the contrary, some parties argue that the development of Smart Villages can worsen the gap between urban and rural areas, as the technology implemented is often not tailored to the needs and capacities of rural communities. Moreover, many policies tend to concentrate on the development of technological infrastructure while neglecting the social-economic and cultural aspects of rural communities. Another shortcoming is its high reliance on technology, which can create access gaps for those who are unskilled or unable to access. This research will try to analyze in a more deep way how the public sector policies can tackle these issues and promote the development of Smart Villages in a more inclusive and equitable way. According to Muhtar (2023), innovation, knowledge, growth, and management seem to influence smart village planning in Indonesia, while the smart village model that only applies information and technology systems shows its shortcomings; hence, it is also necessary to pay attention to aspects of smart governance, smart environment, and smart society (Muhtar et al., 2023). Darmawan (2023) in his study recommends that policymakers in the development of smart villages pay more attention to the hierarchy of smart villages (Darmawan et al., 2023). Meanwhile, research findings from e-government can address user satisfaction issues in realizing SIS and Smart Villages (Ariyanto et al., 2022).

The research focuses more on public sector policies that affect the development of Smart Villages in Indonesia. Many previous studies have discussed the application of technology in Smart Villages, but most of them tend to focus on the technical aspects or digital implementation without deep identification of the role of government policies to support or hinder such development. This research is original in terms of the bibliometric methodology for mapping research trends as well as the analysis of public sector policies adapted to the Indonesian context. This research aims to fill the existing gap, namely to examine the extent to which current public policies are effective in promoting the development of inclusive and sustainable Smart Villages. Thus, this research expects this study to provide broader contributions for both policymakers and technology developers to provide a broader contribution for both policymakers and

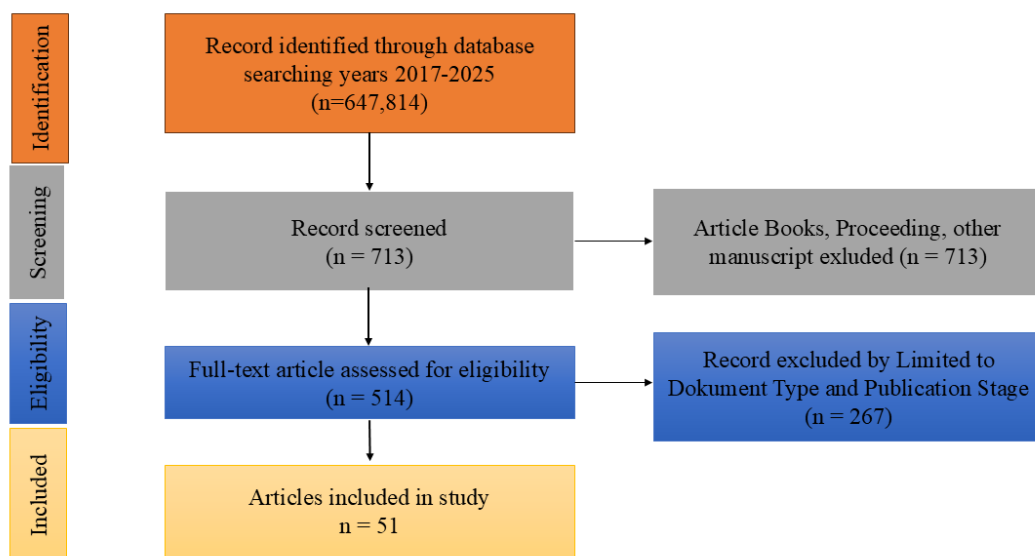
technology developers in formulating more targeted development strategies. The study result indicates that the Nusantara smart village project in Indonesia has become the basis of digital transformation (Susanti et al., 2023). The results of the study indicate that there are three aspects of development that have been carried out by Banyuwangi Regency, namely government services, economy and tourism (Jayanthi et al., 2022). The research on smart village has similarities with the results of thematic analysis which has gained global attention from researchers especially in the fields of application development, technology management and implications for society (Agustiono, 2022).

This research has significant novelty compared to previous studies, as it focuses more on the analysis of public sector policies in the development of Smart Villages in Indonesia. Several previous studies have discussed the application of technology in Smart Villages, but most of them focus on technical and digital implementation rather than on the role of government policies that support or hinder such development. The originality of this research is founded on the bibliometric methodology for mapping research trends and analyzing public sector policies adapted to the Indonesian context. The aim of this work is to fill the gap by evaluating the impact of current public policies on the development of inclusive and sustainable Smart Villages. Thus, this study we expect this study to provide broader contributions for both policymakers and technology developers to provide broader contributions, both for policymakers and technology developers, in formulating more targeted development strategies.

METHOD

The PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is used to ensure quality and transparency in systematic literature reviews. The description of Figure 1. The PRISMA Method is as follows:

Figure 1. PRISMA Method



The implementation of this research is the stages to search through the scopus database with 3 keywords, namely "Smart", "Smart Village", and "Indonesia", to find articles related to the topic. We extracted 647814 articles from the period 2017-2025. The identification process aims

to retrieve articles that discuss the development and implementation of the Smart Village concept in Indonesia.

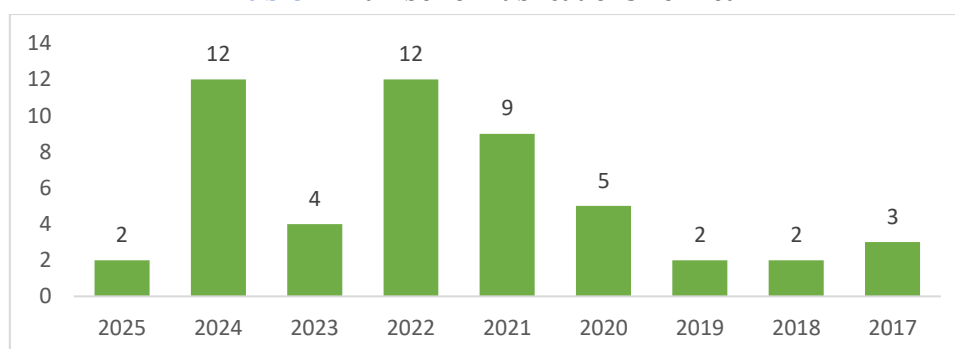
After identification, the next step is screening. In this step, 713 articles are selected to be screened. The articles were reviewed based on relevant criteria, such as whether they actually discuss the concept of Smart Village in Indonesia. The screening process also includes the exclusion of irrelevant articles such as books, proceedings, or other manuscripts not meeting the criteria. 514 articles were obtained from the screening stage, which were then subjected to the eligibility assessment stage. The 514 selected articles were reviewed in more detail during the eligibility assessment to assess whether they met more specific inclusion criteria, such as the type of publication and the topics covered. Articles that did not meet the inclusion criteria, such as document type or publication stage, were excluded in this study, and 51 eligible articles were retrieved. Subsequently, these articles were collected in a systematic study for further analysis to provide an in-depth understanding of the implementation and challenges of Smart Village in Indonesia.

RESULTS AND DISCUSSION

Number of publications per year

Based on Table 1, the trend of annual publications can be described as follows:

Table 1. Number of Publications Per Year



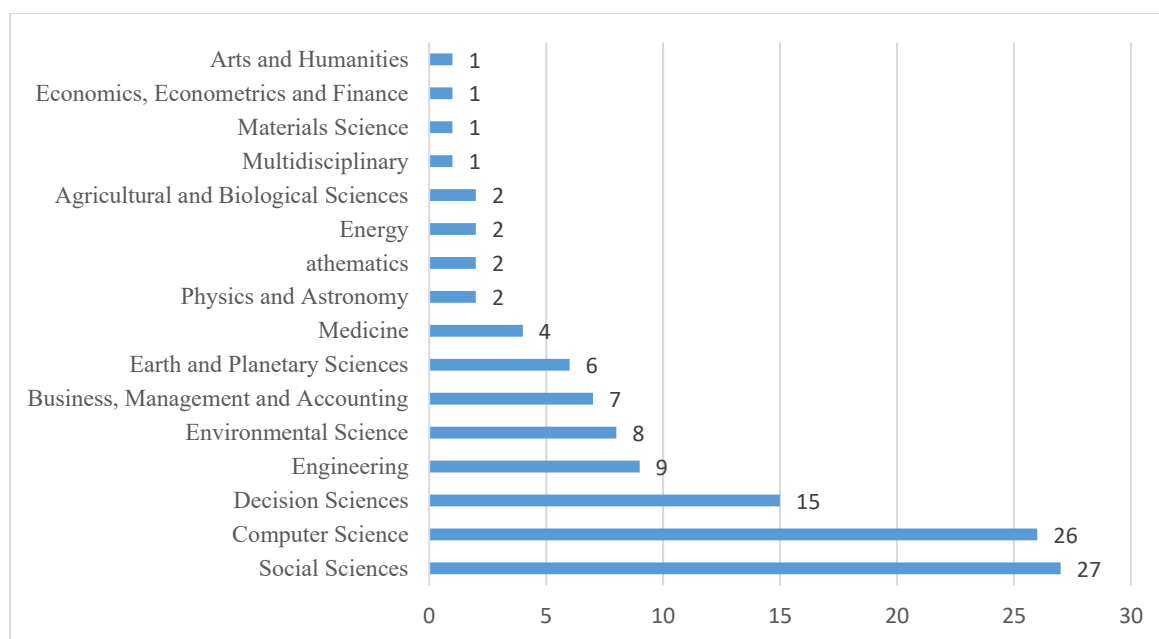
Source: Scopus, 2026

Increasing interest in this subject in scientific literature. The year 2023 is a key year with a total of 12 publications, which means that the subject is gaining more attention. In contrast, the number of publications for 2024 and 2025 are fewer with 12 and 2 publications respectively. That could mean the topic is still focused on the trends that did emerge in 2023. However, the number of publications has been relatively stable in 2021 and 2022 (9 and 12 articles, respectively) which indicates continuous development. The years 2017-2019 had less visitors and less publications indicating that this topic has only recently received more intensive attention. Overall this data shows an increase in interest in this topic in 2023.

Subject Area Journal

Section of Table 2. Regarding the field of study, the researcher can elaborate according to the description below:

Table 2. Field of Study of the Article



Source: Scopus, 2026

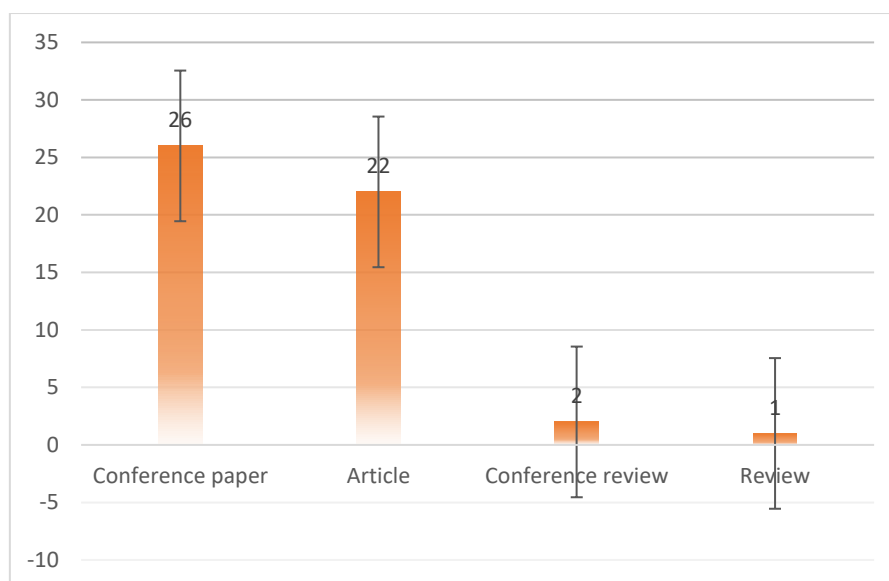
There are several areas that dominate the publications followed by Computer Science, areas displayed. The journal subject, with 27 publications, based on the description in Table 2. The most number of publications was standard Social Sciences with 27 publications followed by Computer Science with 26 publications. This shows the researchers are highly interested in social studies and information technology-related subjects. Also important are topics related to Decision Sciences that revolve around decision-making and data analysis with 15 publications. This points out the necessity of data-driven decision-making in many research areas including public policy and technology. Engineering and Environmental Science have 9 and 8 publications, respectively, showing the great interest and relevance of the technology and environmental science sectors for the development of Smart Villages that use technology and consider environmental sustainability.

Some subject areas have lower numbers of publications compared to others. Business, Management and Accounting was published 7 times, which means that the research topics are relevant to management and accounting, but not as popular as other fields. Within the discipline of Earth and Planetary Sciences (6 publications), topics regarding the earth and planets receive little attention, although they could be relevant for research on sustainable development and smart villages in more isolated rural areas. Other subjects such as Medicine, Physics and Astronomy, and Mathematics have 2 publications each. Therefore, there is relevance to these topics, but they have not yet become a primary focus in the framework of public policy and Smart Village. Currently, there is only one publication for Agricultural and Biological Sciences, one for Multidisciplinary, and one for Materials Science. This may indicate that these topics are not very relevant for research themes in Smart Village.

Document Type: Journal

Section of Table 3. Related to document types can be detailed as follows:

Table 3. Journal Document Types



Source: Scopus, 2026

From the analysis results of Table 3, there is a difference in the types of documents published on this topic. Most of the publications are conference papers (n=26), suggesting that many studies are presented at scientific conferences, probably to introduce ideas or preliminary results regarding the development of Smart Villages and public sector policies. Second place goes to articles with 22 publications. This total is a large number of articles published in scientific journals. Usually these are more in-depth articles and undergo a rigorous peer review process. Besides, 2 publications are in Conference reviews, which indicates that there is also quite some attention to in-depth reviews or discussions on topics presented in conferences. The type of Review document with only one publication indicates that although it is important, a comprehensive analysis of this theme in the form of a systematic review has not been widely conducted. The dominance of conference papers and articles indicates a focus on updating research findings and exploring an ever-evolving topic.

Article According to Researcher Affiliation

According to the description in Table 4. Regarding publications by affiliation, it can be detailed as follows:

Table 4. Publications by Affiliation

No	Lembaga	Jumlah	No	Lembaga	Jumlah
1	IPB University	6	20	State Secretariat of the Republic of Indonesia	1
2	Pakuan University	6	21	IPDN	1
3	Bina Nusantara University	5	22	Kalpataru Business School	1

4	Universitas Gadjah Mada	4	23	Universiti Kebangsaan Malaysia	1
5	National Institute of Public Administration	3	24	University of Dundee	1
6	Universitas Andalas	3	25	Agency for Science, Technology and Research, Singapore	1
7	Telkom University	3	26	Keio University	1
8	Universitas Trunojoyo Madura		27	Universiti Malaya	1
9	Badan Riset dan Inovasi Nasional	3	28	Institut Teknologi Bandung	1
10	Hasanuddin University	2	29	Universitas Padjadjaran	1
11	Universitas Sebelas Maret	2	30	Universitas Udayana	1
12	Universitas Negeri Malang	2	31	Universitas Tanjungpura	1
13	Universitas Pembangunan Nasional Veteran Jakarta	2	32	Universiti Malaysia Terengganu	1
14	Telkom Indonesia	1	33	Universiti Sultan Zainal Abidin	1
15	Universitas Islam Madura		34	Institut Teknologi Nasional Bandung	1
16	School of Architecture, Planning and Policy Development	1	35	Universitas Muhammadiyah Tasikmalaya	1
17	State Secretariat of the Republic of Indonesia	1	36	Universitas Ibn Khaldun Bogor	1

18	Universitas Musamus Merauke	1	37	Universitas Djuanda	1
19	Universitas Pendidikan Nasiona	1	38	Universitas Bosowa	1

Source: Scopus, 2026

According to the results of the analysis presented in Table 4, IPB University is the institution with the highest contribution of research on this theme, with a total of 6 publications. The second rank is held by Pakuwon University with 5 publications and Bina Nusantara University with 4 publications. The three publications of Gadjah Mada University and the National Institute of Public Administration show the important role of major universities and government institutions in research related to public sector policies and Smart Village development. The high academic interest on this topic domestically is reflected in the large number of publications from a number of leading universities in Indonesia.

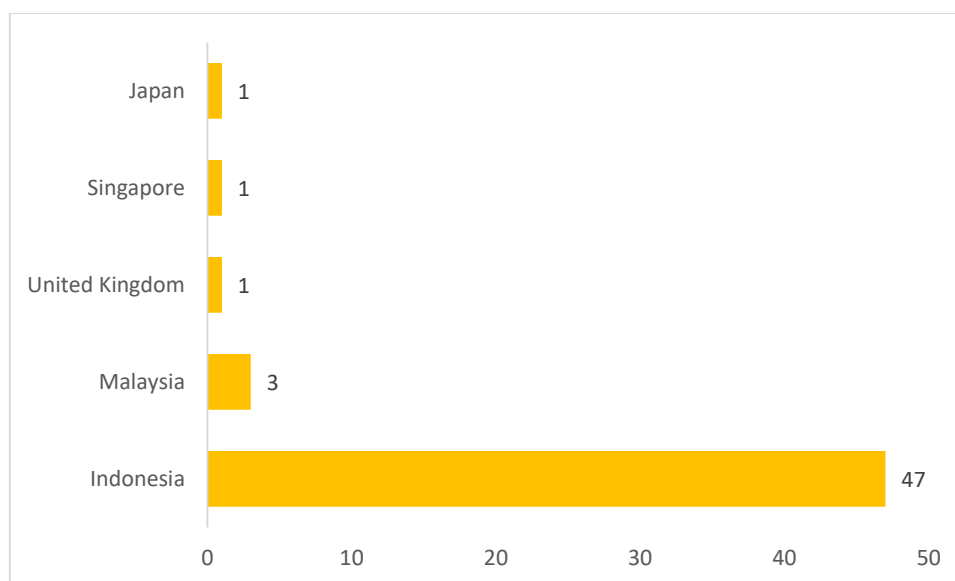
On the other hand, several other universities, such as Telkom University, Universitas Trunojoyo Madura, and Hasanuddin University, each have 2 publications. That means, although these institutions contribute a lot, they are still below the bigger institutions such as IPB University. Meanwhile, international institutions such as Keio University and Universiti Malaya had only one publication in the field. This shows that there is still interest from abroad but their contribution is limited compared to domestic institutions.

Several institutions such as Padjadjaran University, Udayana University, National Institute of Technology Bandung, and Muhammadiyah University Tasikmalaya also recorded a contribution of one publication. This shows that although their contributions are smaller, research related to this theme has begun to spread to various universities in Indonesia. In this context, it can be concluded that the topic of public sector policies in the development of Smart Villages is increasingly gaining widespread attention from various institutions in Indonesia, although several major universities still dominate the publications related to this theme.

Contribution of Articles by Country

The results of the analysis regarding the contribution of the articles can be detailed in Table 5 below:

Table 5. Contribution by Country



Source: Scopus, 2026

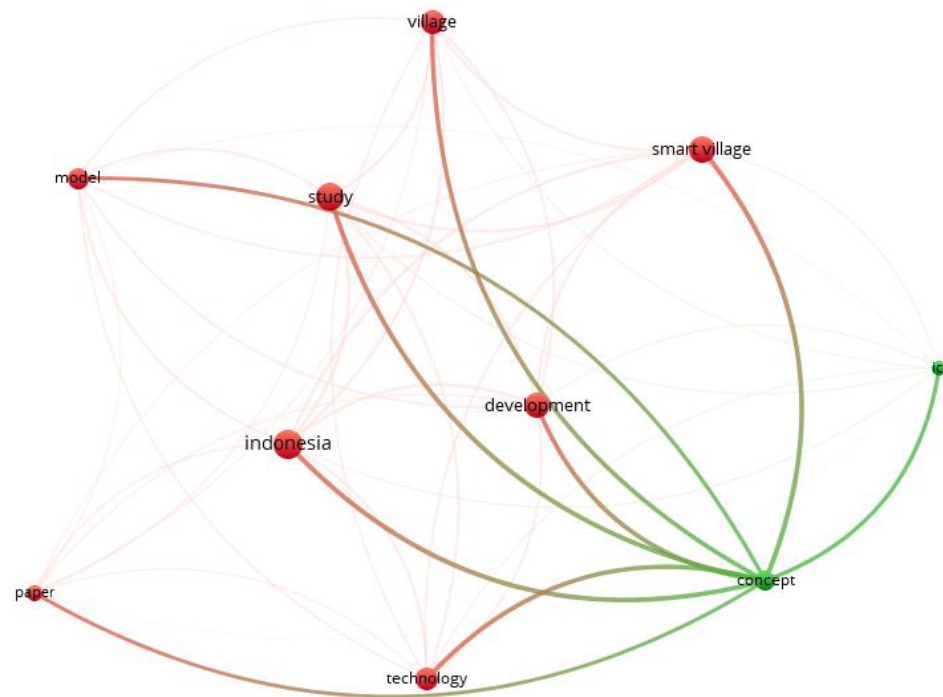
Based on the description in table 5, it can be outlined that Indonesia dominates research publications related to this theme with a total of 47 publications, indicating that this topic is a major focus in Indonesia. This indicates the strong involvement of Indonesian researchers and institutions in the development of public sector policies to support Smart Village. The large contribution from Indonesia also reflects the significance of this research for the social context and village development in Indonesia. For the relevant research for Malaysia, three publications with a neighboring country were identified but these contributions were much less than Indonesia.

There are two publications with an undefined country or region of origin, which indicates a gap or ambiguity in the recording of the origins of the research. Japan and Singapore had only one publication each, which indicates a very low contribution of these countries to the research topic. Overall, this data shows that Indonesia is the main center in research related to Smart Village development, with smaller contributions from other countries.

The Relationship Between Research Themes

As for the analysis results in Figure 2, regarding the relationship between the research themes, it can be described as follows:

Figure 2. Relationship of Research Themes



Source: Scopus, 2026

The description of Figure 2 shows the results of the bibliometric analysis of the relationships between keywords in the research on Smart Village in Indonesia. Smart Village and Development are two very interconnected concepts, so most of the research is on the development of Smart Villages. Indonesia also appears as a key keyword; this shows the high attention given to the implementation of Smart Villages in Indonesia, both in terms of policy and technology. Additionally, Models and Studies are also strongly associated with Smart Villages, showing that a large body of research works are dedicated to the development of models or case studies about the implementation of Smart Villages. Technology and Smart Villages The Technology and Smart Villages link highlights the role of technology in the development of smart villages. Concept, which is more general, refers to the framework or basic theory used to understand Smart Village, while Paper reflects the contributions of research published in scientific journals. To summarize, this visualization illustrates the interrelations of different concepts related to the development of Smart Villages and offers insight into the main focus of this research.

Discussion

The research findings with the study issue on “Public Sector Policies in the Development of Smart Village in Indonesia” were analysed. This research aims to examine the role of government policies in the promotion of the establishment of smart villages through the use of information and communication technology (ICT). Smart Village is a new concept, which uses technology to better the quality of life in rural areas, including education, health, economy and infrastructure. The development of Smart Villages is crucially dependent on public sector policies that promote the development of digital infrastructure and enhance online literacy in rural areas. But the implementation of existing policies is often hampered by limited budgets, lack of coordination between agencies and low technological readiness in some areas. The results of

Tosita's (2022) study classified smart villages as still dominated by developing villages (Tosida et al., 2022). In addition, Ilham (2022) states that villages in Indonesia are generally agricultural villages that still require digitization in the agricultural sector (Ilham et al., 2022).

Although the Indonesian government has launched various programs to support the development of digital villages and Smart Cities, this research focuses on identifying the extent to which these public sector policies can be effectively implemented at the village level. This research will analyze the challenges in implementation of existing policies, and explore the opportunities for policy improvements that can promote equal access to technology across villages in Indonesia. Therefore, this theme is very relevant when considering sustainable development in Indonesia which aims to reduce the digital divide and improve the welfare of rural communities thru more inclusive and technology based policies. Alhari (2022) said that the design of digitalization development in the e-government dimension in the aspect of application platforms in the fields of administrative services, public aspirations, development management, and documentation management of village government is needed (Alhari & Fajrillah, 2022). Moreover, Putri (2022) explained that the implementation of smart village through websites can be classified into four types of users, namely village officials, village SMEs, general public, and service users (Putri et al., 2022). Technology utilization in Indonesia is a community-based tourism approach to make tourist villages become smart villages (Firdaus et al., 2022) (Firdaus, 2022).

The relationship of the research theme on public sector policies in the development of Smart Villages in Indonesia with the government programs that have been implemented can be seen in various aspects. The Indonesian government has shown its commitment to improve the quality of life in rural communities through the utilization of information and communication technology (ICT) in some policies and programs such as the Digital Village Program and Smart City. The programs aim at connecting more villages to the digital world, enhancing access to public services, and creating new economic opportunities through the enhancement of digital infrastructure and the empowerment of communities. His research results proved that the digital transformation of the village cannot be separated from the infrastructure of ICT, online literacy and digital services (Irmayani, 2022) (Irmayani et al., 2022). Suharjito (2021) states that the population of more than 250 million people is dispersed over 17,504 islands, and 53.3% of the population lives in urban areas and the rest in rural areas. This research shows that the indicators of a smart village include the use of information technology in villages (Suharjito, 2021).

However, the findings of this research indicate that the government's policies in support of the Smart Village concept have not been fully effective in addressing the existing challenges, despite the existing public sector policies. The research found that although Indonesia has many publications related to this topic, still there is a gap between the existing policies and the implementation on the ground, especially in terms of inter-agency coordination, budget allocation and the improvement of electronic literacy in villages. The government's programs are in line with the research theme in terms of providing a policy foundation, but the implementation of these policies still faces various obstacles that require further improvement, such as uneven technology distribution and a lack of training for rural communities.

CONCLUSION

The result of the study showed that the existence of policies of the public sector had a very significant effect on the development of Smart Village in Indonesia. ICTs are critical in improving the quality of life in rural communities. To support the establishment of digital villages, the Indonesian government has undertaken several programs such as the Digital Village Program, and the Smart City, but the implementation of these policies

still faces various challenges, among others, limited infrastructure, low levels of digital proficiency, and lack of coordination among various related agencies. The study revealed that there has been some progress in some areas but the existing public sector policies are not fully effective to bring significant change at the village level.

The study indicates the need for more integrated policies to emphasize improving human resource capacity, providing more equitable infrastructure and providing online literacy training for rural communities. "Technology-based and more inclusive policies can help close the urban-rural divide and create more sustainable and competitive villages. Thus, this research is expected to contribute to formulating more effective and relevant policies in supporting the development of Smart Villages in Indonesia.

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