BIS HUMANITIES AND SOCIAL SCIENCE

Volume 1 2024 | DOI: 10.31603/bishss.108
5th Borobudur International Symposium on Humanities and Social Science (BIS-HSS) 2023

UNIMMA PRESS
Universitas Muhammadiyah Magelang

Smart cities and smart village in Indonesia: Bibliometric analysis

G M Munandar[1*], E A Wibowo[1] and M N W Hidayah[1]

[1] Muhammadiyah Gombong University, Kebumen, Indonesia
[*]Corresponding author email: galihmahardika@unimugo.ac.id

Abstract

In Indonesia, only big cities like Jakarta, Medan, Bandung, Yogyakarta, Makassar, and many others have adopted the concept of Smart City. The main concept of this study is that Indonesia has the potential to develop its smart system, for example in rural areas that have not implemented the internet of things and other technology. Bibliometrics was used to validate the concept of the smart village that can be applied in Indonesia based on the references found in Scopus, the parameters are the number of research, the most cited, the most productive author and country, and the last mind map Vos viewer. The purpose of this study is to analyze the smart village system that can be applied in Indonesia based on bibliometric references. This is qualitative and quantitative research, which means that this research uses qualitatively using technique descriptive statistics and quantitative using bibliometric and Vos viewer as a tool. The smart village is a hot topic for the next Indonesian researchers, which serve as references for the upcoming research.

Keywords

Smart cities, Smart village, Bibliometric analysis

Introduction

Smart city becomes a hot topic since globalization issues are frequently discussed by researchers. According to [1] state research domain about the smart city was first discussed in 1992. The main focus of the smart city system is information, technologies of communication, and urban area. The concept of the smart city has various definition, [2] define the smart city as a system that develops human and social capital and then interact with resources of nature and economics based on technological innovation and solutions regarding a public issue, efficient development, and increasing quality of life that implicate to the stakeholders.

[3] State that population of Indonesia in 2035 will reach 305.6 million and there are 514 cities in Indonesia. Indonesia has a large area and a crowded population. Two variables, such as area and population, may have positive and negative effects. On the positive side, it will give areas in Indonesia access to high-quality human resources that will

Published:
October 20, 2024

Selection and Peer-review under the responsibility of the 5th BIS-HSS 2023 Committee

develop in line with the technological advancements, on the negative side, however, technological advancements present a brand-new difficulty. The requirement of a smart city is digitalization to support the system [4]. The government of Indonesia wants to implement the smart city system in 100 cities [5]. In Indonesia, the concept of a "smart city" focuses on major cities that may expand their public services, such as features and facilities that are used by the public [6]. There is some research concerning smart cities applied in Bandung, Jakarta, Yogyakarta, Bekasi, Tangerang, Surabaya, Padang, Depok, Tangerang Selatan, Medan, and Manado.

As aforementioned, the smart city program is only targeting major cities in Indonesia. Unlike the previous research, this research focuses on the villages in Indonesia. The researchers want to figure out the possibility to apply for the smart city program in the village based on the research that has already been done. In reality, the researchers want to take the first step toward creating an ecosystem based on technological innovation. The primary objective of this research is to ascertain the feasibility of implementing technological innovations within the village context, followed by identifying the crucial steps necessary for the development of the comprehensive system.

Methods

The method for this research was bibliometric and the data was analyzed using excel and VOS viewer. The data were collected from 2013 until 2022, according to [1] has the same method and technique of data collection. To solve the purpose of the study, the researchers follow [1] but in a different section which means the object on previous research different with this study. This study focusses on the village and the keyword that the researchers used is a smart city and village city. The previous study uses the smart city as the keyword and limited the scope of the study only to Indonesia. Although there have been numerous studies on smart cities, the researchers found there are many research talk about smart city, so previous research is appropriate to limit their study only to Indonesia.

Results and Discussion

The result of the research based on bibliometric analysis is presented in result section and the discussion in discussion section.

Number of research

There are 328 papers that were discovered as a result of using the keywords "Smart village and Smart Cities" within the publication years of 2013 until 2022. It is shown in Figure 1. There are less than 10 research in 2013 discussing villages and smart cities. The number was increasing in 2018, but it was going down after 2019, it was caused by the pandemic which became the main reason make the research went down.

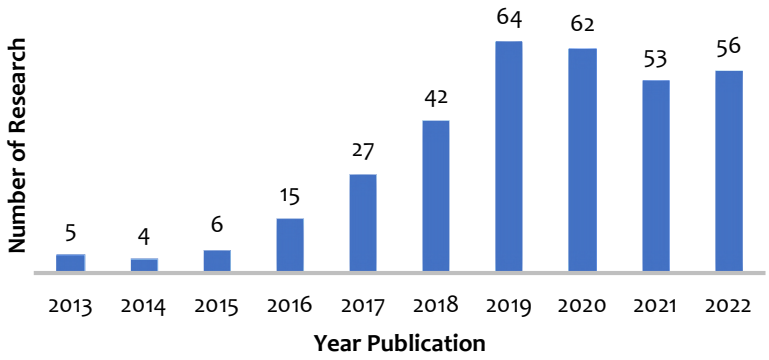

Figure 1. The number of research found in scopus.com

The most cited research

Table 1 show that the most cited research is written by Lytras, M.D. and Visvizi, A. with the title "Who Uses Smart City Services and What to Make of it: Toward Interdisciplinary Smart Cities Research" and followed by the same author with different title relate with the smart city as a primary theory. In the third, fourth, and fifth the researchers talk about the most technology that smart cities applied.

Table 1. The most cited research

Author	Title	Citations
Lytras, M.D., Visvizi, A.	Who Uses Smart City Services and What to Make of it: Toward Interdisciplinary Smart Cities Research	215
Visvizi, A., Lytras, M.D.	Rescaling and Refocusing Smart Cities Research: from Mega Cities to Smart Villages	162
Nabeeh, N.A., Abdel-Basset, M., El-Ghareeb, H.A., Aboelfetouh, A.	Neutrosophic Multi-Criteria Decision-Making Approach for IoT-Based Enterprises	118
Chui, K.T., Lytras, M.D., Visvizi, A.	Energy Sustainability in Smart Cities: Artificial Intelligence, Smart Monitoring, and Optimization of Energy Consumption	98
Pasika, S., Gandla, S.T.	Smart Water Quality Monitoring System with Cost-Effective Using IoT Open Access	81

The most productive authors and country

There are the top 5 of the most productive authors and countries discussing the villages and smart cities as shown in Table 2 and Table 3. Table 2 discuss authors that often did research concerning smart cities. The most affiliation from Cambridge then King Abdulaziz and Szkola Glowna. There are 15 papers from Cambridge that demonstrate to researchers that there are few papers published with the Scopus Index which means that certain areas of research can still be developed by other researchers.

Table 2. The most productive authors

Author	Affiliation	Number of Papers
Fang, Y.	Universal Village Society, Cambridge, United States	7
Lytras, M.D.	King Abdulaziz University, Jeddah, Saudi Arabia	6
Visvizi, A.	Szkola Glówna Handlowa w Warszawie, Warsaw, Poland	6
Yang, Z.	Universal Village Society, Cambridge, United States	4
Yuan, H.	Universal Village Society, Cambridge, United States	4

There are 74 papers from India, followed by Indonesia with 29 papers. The number of papers in the Scopus Index indicates to other researchers whether a topic is still less and can be developed. The country that appears as the most productive one tends to have a lot of developing villages or rural areas.

Table 3. Most productive countries

Country	Number of Papers
India	74
China	29
Indonesia	29
United States	29
Italy	17

Vosviewer

Figure 2 illustrates research points in chronological order from the earliest to the most recent studies. Figure 2 shows the topics that are frequently discussed including networks, data, building, planning, rural area, and the world. is the most frequently discussed topic in Indonesia can be seen through small dots and it turned out that there is no connection to the rural area.

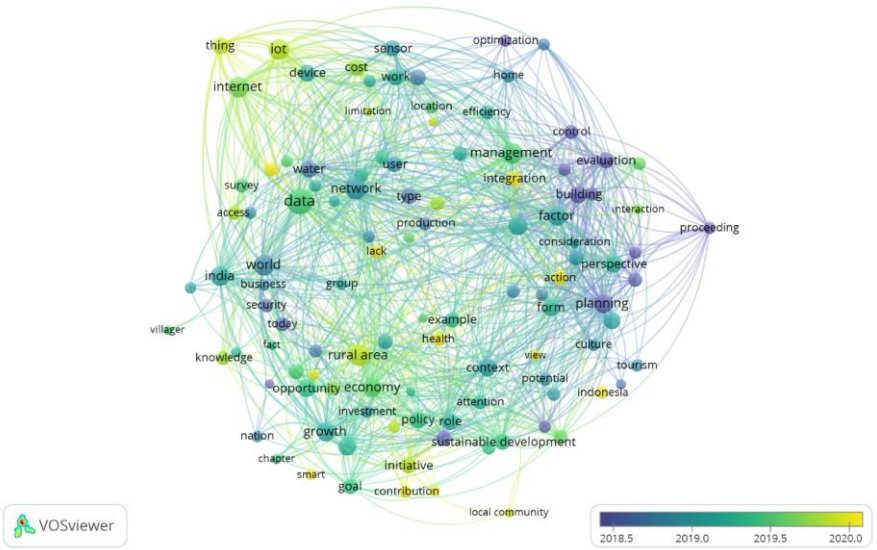

Figure 2. Area possibility and the newest idea research

According to the figure, it can be concluded that the new area is the thing and IoT then the most discussed research indicated with the bigger dots. In 2020 and present the thing area, internet area, IoT area, etc. Based on that, it appears to advise new researchers on the technology's applicability to the new topic.

Discussion

According to the results, it can be said that there are no researchers from Indonesia with a productive affiliation who research village smart cities. On vosviewer, there is a possibility Indonesia had a potential talk about the rural area. According to Alec and Gerd (2020), a smart village in a rural area may be a solution to obtain detailed information about an individual. In Indonesia, where there are sizeable villages that

need to be exposed but they are located in difficult-to-reach territory. The researchers in Indonesia can use this idea in their research or study to help Indonesia prosper and have a bright future. The results of the study can help the government to be concerned on develop villages and easy access.

Conclusion

According to the results and discussion it can be concluded that Indonesia has the potential to apply the ecosystem innovation technology. There were only a few papers on village smart cities, out of 328 papers, Indonesia only published 29 papers. It presents a huge opportunity for researchers, making it possible to reach the purpose of the study to build the ecosystem for innovation.

Acknowledgments

Proin The study was fully funded by LPPM Universitas Muhammadiyah Gombong.

References

[1] A. Parlina, H. Murfi, and K. Ramli, "Smart city research in Indonesia: A bibliometric analysis," *2019 16th Int. Conf. Qual. Res. QIR 2019 - Int. Symp. Electr. Comput. Eng.*, pp. 1–5, 2019, doi: 10.1109/QIR.2019.8898264.

[2] Z. Allam and P. Newman, "Redefining the smart city: Culture, metabolism and governance," *Smart Cities*, vol. 1, no. 1, pp. 4–25, 2018, doi: 10.3390/smartcities1010002.

[3] B. P. Statistik, "Proyeksi Penduduk Indonesia," 2013.

[4] H. Herdiansyah, "Smart city based on community empowerment, social capital, and public trust in urban areas," *Glob. J. Environ. Sci. Manag.*, vol. 9, no. 1, pp. 113–128, 2023, doi: 10.22034/gjesm.2023.01.09.

[5] F. Anindra, S. H. Supangkat, and R. R. Kosala, "Smart Governance as Smart City Critical Success Factor (Case in 15 Cities in Indonesia)," *Proceeding - 2018 Int. Conf. ICT Smart Soc. Innov. Towar. Smart Soc. Soc. 5.0, ICISS 2018*, no. October, 2018, doi: 10.1109/ICTSS.2018.8549923.

[6] S. Alec and K. Gerd, "The Smart Village," *IEEE Pervasive Comput.*, vol. 19, no. 1, pp. 84–86, 2020.