Economic Improvement, Environmental Sustainability, and Community Empowerment in Indonesia: Bibliometric Analysis (Smart City and Smart Tourism) Year 2013-2022

Abstract. This study aims to provide visualization of smart city and smart tourism trends using a database taken from Scopus from 2013 to 2022 using an approach with bibliometric and scientometric techniques. The data collection process goes through several steps, namely searching for literature through the Scopus database by entering keywords in the form of "smart city" and "smart tourism," which are limited from 2013-2023 so that 189 articles of data are produced. Then, the data was analyzed using Scopus analysis and the CiteSpace application. This study, it was findings that namely 1) The number of publications on smart cities and smart tourism has shown an overall increase in the eight years from the last 2013-2021 period and decreased to 31 articles in 2022; 2) China is the country that studies "smart city" and "smart tourism" the most; and, 3) Through this research, the trend of smart city and smart tourism has been widely studied and obtained the top three subtopics including information and technology, augmented reality, and sustainability. The conclusion of this study shows that smart cities and smart tourism are topics of interest from 2013 to 2022. In addition, this study resulted in fourteen (14) clusters that have been analyzed using CiteSpace and show that China is the country that researches smart cities and smart tourism the most. This finding proves that smart cities and smart tourism do not only focus on technology development but involve social aspects such as economic, environmental, and social.

Keywords: bibliometrics, smart city, smart tourism

1 Introduction

Humans create technology intending to improve the quality of life. The motivation for creating this technology was to assist in accomplishing tasks. Technology has been known for a long time by the public. Starting with handwriting and then developing with the help of machines to write. History records that the invention of the typewriter became the starting point...
point for technological developments in making documents and sending messages to others. The design of electricity also contributed to facilitating human work. With a touch of technology, typewriters were replaced by computers that used electrical energy and had more complex functions. Computers function as document creation tools, data processing tools, and interactive communication media, especially with the internet. The impact of the internet is enormous in human life in all aspects. Information technology civilization has entered the era of digitalization. Various new products emerged, and "modern society" changed into a "digital society." Services that previously used paper and physical documents are now trying to become paperless and digital file-based so that bureaucratic and administrative services become more effective and efficient with digitalization.

The government manifests information technology through the concept of a smart city. The image of a smart city is an idea of a smart city that can help citizens manage resources efficiently, provide the right information for their activities or predict unexpected events. This concept develops along with the advancement of information technology that is increasingly widespread and can be accessed by anyone from various backgrounds, including young and old, rich or poor, as well as from villages or cities. With the advancement of information technology, people can more easily and quickly communicate, get the information needed, and do work more efficiently, quickly, and simply. A smart city aims to create an efficient, integrated, sustainable city based on smart data and technology. The smart city concept is divided into six categories: smart living, smart environment, smart governance, smart people, and smart economy (Kurniawan, 2020). IMD World Competitiveness Center, through The Smart City Observatory, presents Smart City Index (SCI) data which describes 141 cities studied, including Indonesia, especially Jakarta, and Medan, which deserve to be considered as (Purnomowati & Ismini, 2014).

Through this smart city concept, the Government of the Republic of Indonesia, through the Ministry of Communication and Information Technology of the Republic of Indonesia, fully supports the implementation of smart cities by developing a tourism-based digital ecosystem or smart tourism. Smart tourism is a tourism concept initiated in the form of collection through data analysis combined with the use of information technology to make the travel experience more valuable, efficient, and sustainable. In the application of a smart city, it is formed through four elements, namely technology, applications, and the Internet of Things (IoT). This smart tourism application has an impact on improving the experience and satisfaction of tourists to visit again to enjoy tourist destinations in Indonesia. However, the implementation of smart tourism in Indonesia is a big challenge because several things require attention, such as inadequate infrastructure, bureaucratic governance processes that tend to be complicated, human resources that are less technologically literate, and poor management of tourist destinations in Indonesia.

This smart tourism concept will be a breakthrough for tourism in Indonesia which has an impact on increasing people's income so that it has a positive impact on people's welfare. Of course, the implementation of the smart city concept in Indonesia requires Penta helix collaboration involving five stakeholders, such as the government, academia, the Industrial or Business World, the community, and the media (10–12). This Penta helix concept will accelerate the process of achieving smart tourism technology-based tourism that is sustainable, inclusive, and oriented to Indonesian citizens. In addition to the Penta helix concept, the application of the smart tourism concept is also influenced by the millennial generation as a generation that is able to change the behavior of the tourism market. This is evidenced by previous research that explains the relationship between millennials and smart tourism. Explained that smart tourism through technology is a real step to expand the wings of target tourists, especially millennial tourists. Then, according to (14), the concept of technology-based smart tourism is a real problem-solving to bring a more optimal and sustainable approach.
2 Literature Study

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expected to create innovative experiences for consumers, foster sustainable competitive advantages for tourist destinations, and create smart travel competencies. This technology can be manifested through the concept of the Internet of Things which is explained by (26), stating that IoT is one of the factors that influence the development of smart cities and smart tourism that has an impact on sustainable economic potential. (27) found that virtual reality has a positive impact on tourists, such as increased satisfaction and tourist visits, and there are experiences spread by word of mouth. According to (28) who researched the metaverse relationship, the satisfaction provided through content creates a much more interesting travel experience. This is reinforced by, (29), who stated the importance of adopting digital technology with various applications in providing sustainable management in tourist cities and transforming into digital tourism destinations to impact the development of the high-end tourism industry.

However, there is a gap in technological facilities in the application of smart cities and smart tourism. As explained by (30) states that there is a gap between the implementation of smart tourism and smart implementation related to sustainable technology. However, the application of this technology affects generation z travelers, as explained by (31), showing the influence of technological advances that have an impact on meeting the needs of generation z, who have instant characteristics in seeking technology-based travel experiences. This is also in line with (32), who researched cultural tourism solutions revealing that the use of virtual reality and applications brings new experiences for visitors to increase tourist participation in tourist visits. The application of this technology is also confirmed by (33), stating that algorithms related to Information Communication Technology (ICT) are closely related to satisfactory tourism service results with optimal performance. In line with (34), who researched smart cities and smart tourism in Dubai, the smart city concept aims to provide solutions for tourists to meet their travel needs through a platform involving various stakeholders.

The implementation of smart cities and smart tourism also differs from other cities, so it has a positive and negative impact. According to (35), examining the differences in the concept of smart cities through the perspective of waterfront cities with cities located elsewhere, it is known that mobility, environment, and life are three differentiating factors. On the other hand, (36) stated that the smart city paradigm is related to the consideration of sustainability aspects, such as reducing environmental impact, optimizing energy resource management, and designing innovative services and solutions for citizens. This is emphasized by (37), who saw the case in Tel Aviv-Yafo and stated that the smart city development model has an impact on several aspects, namely personal safety, transportation access, and accessibility of people with disabilities. Some of these previous studies prove that implementing smart cities and smart tourism has side effects in the environment, human resources, security, and technological accessibility.

Nevertheless, the application of smart cities and smart tourism are two blades of the sword, with both positive and negative impacts. According to (38), discussing the potential value of applications in line with tourism development and contributing to tourism globally will positively impact the sustainable development of society, economy, environment, and people. In line with that, (39), who researched the development of tourist sites and mobile applications, stated that there was a development to a positive Sarah as evidenced by the quantitative scale of users who operated it more. On the other hand, this implementation also has a negative impact. According to (40), who researched the use of modern technology in Polish museums, there is a low selection of smart tourism and an emerging technology gap. According to (41), the development of smart cities and smart tourism has an impact on economic development which affects environmental growth that reaches limits.
3 Research Methods

This research uses a type of qualitative research as a humanistic method through the point of view, way of life, or expression of feelings studied in line with the research problem (Fathani et al., 2022). This method uses bibliometric and scientometric approaches. A bibliometric approach is an approach that involves mathematical and statistical functions in analyzing bibliographic data in the form of keywords, authors, and journals adopted as data sources. Meanwhile, the scientometrics approach is an approach to understanding the development of science through reliable quantitative testing and systematic qualitative views. The data source from this study was taken from the Scopus database with the keywords "smart city" and "smart tourism." The number of documents successfully analyzed is 189 articles from 2013 to 2022. The process of data collection in this study can be seen as follows.

Figure 1: Data Collection Process

From Figure 1, it can be seen that the data collection process goes through several steps, namely 1) Search for literature through the Scopus database; 2) Enter keywords in the form of "smart city" and "smart tourism," which are limited from 2013 to 2023, document types in the form of articles and conference papers, subject areas of social sciences and environmental sciences, and languages of English, French, and Portuguese; 3) Data generated totaling 189 articles from Scopus; 4) The data obtained is exported in Research Information Systems (RIS) format; 5) Data is analyzed using Scopus analysis and CiteSpace applications. The CiteSpace application is important to analyze the relationship between scientific publications, identify patterns and trends, and visualize publication networks through the keyword "smart city" and "smart tourism" and; 6) Data was generated in the form of 189 articles that were successfully processed.

4. Finding dan Discussion

4.1 Finding
We present the number of articles per year showing that the number of publications related to smart cities and smart tourism increased from 2013 to 2021 at 42 but decreased to 31 articles in 2022, as shown in the figures.

Next, the author will visualize the data based on keywords through Figure 2 visualized through cite space.

The network of clusters on smart city and smart tourism based on the image above, you can see the network between keywords with the theme of smart city and smart tourism. First, the network with keywords with the kernel cluster is information and technology; the first cluster is augmented reality, the second cluster is sustainability, the third cluster is China, the fourth cluster is open innovation, the fifth cluster is cloud computing, the sixth cluster is smart tourism, the seventh cluster is long term goals, the eighth cluster is Dianoue Systems, the ninth cluster is Big Data, the tenth cluster is the Internet of Things, the eleventh cluster is Citizen Science, the twelfth cluster in South Korea, the thirteenth cluster is Integrated Development, the fourteenth cluster is Trajectory. This cluster overview can be seen through models with cluster timeline bases, such as in Figure 5 below.
Figure 5. The Timeline of Clusters on Smart City and Smart Tourism

The 0th cluster, or information and technology, is one of the important factors related to the keywords “smart city” and “smart tourism,” where this technology and information brings tourists to have a better experience, the welfare of the population increases business effectiveness and leads to holistic, comprehensive values (Hanum, 2020).

Then, we continued with the 1st cluster in the form of augmented reality. Augmented reality is a technology that combines elements of the real world with elements of the digital world through computer devices. Augmented reality plays an important role in the smart tourism and smart city sectors that can provide an additional impression that is active through innovation from this technology.

The 2nd cluster, namely sustainability, refers to efforts to maintain or improve the current quality of life without sacrificing the ability of future generations to meet needs that include environmental, social, and economic aspects. In the context of tourism, sustainability means maintaining the natural, cultural, and economic resources of a tourism destination while minimizing its negative impact on the environment and local communities.

Then the 3rd cluster is China. China is a leader in research development with the keywords smart city and smart tourism as analysts from the Scopus database. Figure 6 below.

Figure 6. Documents by Country or Region

Compare the document counts for up to 15 countries/territories.
From Figure 6, it can be seen in the period 2013-2022 that, China led the research with the keywords smart city and smart tourism with a total of 38 documents. Kemduan, followed by Spain with a total of 19 documents; Italy with 15 documents; Portugal with 14 documents; the United States with 13 documents; India with 11 documents; Brazil with 10 documents; the United Kingdom with 9 documents; South Korea with 9 documents; and, Greece with 8 documents. This is a sign of proof that the Chinese state has invested in the development and implementation of projects of smart cities and smart tourism.

Then, continued with the 4th cluster, namely open innovation, is an approach that adopts cooperation and collaboration with external parties, including individuals, companies, and institutions, to obtain new ideas, knowledge, and resources that can be used in the innovation process (48). Open innovation has a relationship with smart cities and smart tourism through diverse perspectives, new ideas, and collaboration with external parties to help improve the efficiency, quality, and sustainability of smart solutions to create smart tourism cities (49).

Then the 5th cluster is cloud computing. Cloud computing is a computing model in which computing resources such as data storage, servers, applications, and related services are provided over the internet as on-demand services so that users can access and use those resources flexibly as per their needs, without the need to have their physical infrastructure (50). By utilizing cloud computing, smart cities and smart tourism can optimize computing resources, improve data accessibility, gain valuable insights from data analytics, and improve the security and reliability of the technology infrastructure used (Tsaih & Hsu, 2018).

Next, the sixth cluster is about smart tourism. Smart tourism and smart cities are interrelated and can support each other in creating smart and sustainable tourism experiences (52). By integrating smart tourism in smart cities, tourist destinations can improve the quality of the tourist experience, improve operational efficiency, strengthen environmental sustainability, and provide broader economic benefits to local communities (53).

Then, the seventh cluster is long-term goals. Long-term goals are to be achieved over a longer period, usually in the next few years or decades (49). By building integrated and mutually supportive long-term goals, smart cities and smart tourism can lead to holistic, sustainable, and innovative development, which creates long-term benefits for city dwellers, tourists, and the environment (54).

The eighth cluster is dialogue systems. A dialogue system is a computer system designed to interact with humans through conversation. The system uses voice recognition and synthesis technology, natural language processing, and artificial intelligence to understand user queries and commands and respond appropriately (55). Through the application of dialogue systems, smart cities and smart tourism can improve user interaction, provide a more personalized and efficient travel experience, provide real-time information, and obtain valuable data for better development and decision-making (51).

The 9th cluster is big data. Big data refers to large and complex data sets that cannot be processed using traditional methods. Data in big data usually has a large volume, high speed, and complex diversity (56). By applying big data, smart cities and smart tourism can optimize big and complex data to gain valuable insights, improve operational efficiency, provide better services to users, and improve safety and security (57).

The tenth cluster is the Internet of Things which refers to a network of physical objects digitally connected and interacting with each other through the Internet equipped with sensors, software, and connectivity so that it is possible to collect and exchange data (19). IoT is important to use in the application of smart cities and smart tourism because it is the main key to smart tourist city accessibility (26).

The eleventh cluster is citizen science.

Citizen science refers to the practice of involving the community in the process of collecting data, observation, experimentation, or contribution to scientific activities involving non-scientific communities, or ordinary citizens, actively participating in the research process and...
4.2 Discussion

The concept of smart city and smart tourism itself aims to provide convenience for the community in terms of utilizing Information and Communication Technology (ICT). These two concepts are smart concepts for alternatives in solving problems involving the role of society. The development of Smart Tourism correlates with the progress of Smart Cities where ICT solutions are increasingly being implemented with the aim of improving tourist comfort and utilizing data as a valuable source of information. However, the adoption of this concept in various tourism sectors can take place at different speeds so that gaps may arise in development. Contrary to this,  research the concept of a smart city in DKI Jakarta, stated that this smart city concept would facilitate residents on all fronts through the palm or technology. The Indonesian government has tested virtual reality technology on Habibie tourist destinations, impacting the ease of service for tourists and the tourism provider community. Information assists this convenience and Communication Technology (ICT) manifested through the Internet of Things, virtual reality, augmented reality, and digital platforms to facilitate the service of this tour. The use of this technology is needed to ensure the preservation of nature and culture so that it will have a positive impact on society in Indonesia. The application of the technology-based smart tourism concept is the best solution for all parties that brings a much more applicable tourism experience. The use of tourism applications is in line with the role of tourism in facing digital challenges, where this technology makes it easier for people to access tourist destination information.

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will have an impact on improving the experience of tourism services in Indonesia. According to (17), who researched the Pangandaran area, destinations have transformed using the internet, such as websites, social media, and applications that positively impact increasing tourist visits. However, the implementation of smart cities and smart tourism in Indonesia has encountered challenges and obstacles that are in line with previous research. According (6) revealed that the implementation of the smart city in Bandung has experienced several obstacles, including 1) the government has not carried out massive socialization to the community; 2) inadequate infrastructure; 3) lack of apparatus in understanding smart city; and, 4) System Operating Procedures only refer to the roadmap of the Mayor of Bandung. In line with that, according (2) states that the application of smart cities in an area, including 1) the availability of data and information; 2) security and privacy; 3) large investment; 4) adequate IT infrastructure; 5) social adaptation; and 6) application development. This is emphasized by (9) stated that the application of smart cities requires different approaches between one region and another related to the characteristics of an area. (70) also stated that the implementation of smart tourism in Simalungun Regency experienced major obstacles in the form of inadequate Information and Communication Technology, thus hampering the design of smart tourism. Thus, implementing the concept of smart city and smart tourism is not only through the use of technology. However, it requires other aspects that support implementation in Indonesia. This has been proven by (71) who researched in Tanjung Lesung, West Java Province, and found that the application of smart tourism and smart cities is carried out gradually through increasing community capacity in the form of empowerment, digital marketing, and institutional development. Then (5) who researched in Malang City, said that strategies are needed in the form of environmental sustainability, fast service, and community readiness. In line with that, the long-term development of smart cities in Malang requires the readiness of superior Human Resources through community empowerment, including MSMEs and cooperatives (8). The tourism strategy in Indonesia involves millennials contributing to developing tourism branding to improve Indonesia’s economy (15). Finally, the implementation of smart cities and smart tourism must also pay attention to environmental sustainability (72).

5 Conclusion

The conclusion of this study shows that smart cities and smart tourism as topics of interest in the period 2013 to 2022; although there was a decrease in the number of publications in 2022, overall, there was a significant increase in the last eight years. In addition, this study resulted in fourteen (14) clusters that have been analyzed using CiteSpace and show that China is the country that researches smart cities and smart tourism the most. This finding proves that smart cities and smart tourism do not only focus on technology development but involve social aspects of Economic Improvement, Environmental Sustainability, and Community Empowerment in Indonesia. Smart cities and smart tourism not only strive to improve efficiency and convenience by using advanced technology but also aim to have a positive impact socially, economically, and environmentally. These findings can be used as a reference for academics and government in developing the concept of smart city and smart tourism.
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