www.bircu-journal.com/index.php/birci
Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Humanities and Social Sciences
ISSN 2615-3076 Online)
ISSN 2615-1715 (Print)
Budapest Institute

Sustainable Planning and Development of Smart City: A Structured Literature Review

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Abstract

This study aims to provide a more detailed understanding of smart city sustainable development planning using a systematic literature review method, by re-reading previous research studies that are deemed relevant to the discussion of the theme of Planning and Sustainable Development. Articles are taken from publications of various publishers using the SCOPUS database and are given a limitation of the year of publication within 2020. The results of this study display 270 articles that are relevant to the topic of this research. The figure is obtained from the number of (.ris)-formed files which is exported to Mendeley software. Then a paper review is done to see the shortcomings of previous research so that improvements can be made to make the discussion more structured, starting from planning to implementation. The limitation of this research is that the examples of articles presented are different from the conditions that exist in each country, so there needs to be a critical understanding of the government system in the examples that are used as references. Other than that, special considerations are needed in determining equations and new discoveries from articles that are used as reference to develop the main idea according to the chosen topic and title.

Keywords
Planning; development; smart city

I. Introduction

Globalization has implications for the very rapid development of Science and Technology (IPTEK). The projection of smart city development is an innovative effort made by urban ecosystems in overcoming various problems and improving the quality of human and community life. It is undeniable that the latest products are starting to emerge, causing the stigma of modern society to shift and the meaning of being a digital society being expanded. Over time, many countries have begun to look at the use of information technology to provide maximum and even optimal public services. The implementation of information systems and communication technology is growing rapidly in bureaucracy and companies (Kumar, Singh, Gupta & Madaan, 2020). The problem of the flow of urbanization gives birth to new problems for urban areas starting from waste, education, transportation, socio-economic, disaster, and health. On the other hand, an increasingly modern and well-established society has many expectations, such as a comfortable living and work environment, adequate public areas, and the ease of managing all forms of public services. The concept referred as a smart city is a concept that presents a smart city arrangement that can play a role in making it easier for people to get information quickly and precisely. The smart city concept is presented as the answer for efficient resource management. It can be said that the concept of a smart city is the integration of information directly with urban communities. According to Kominfo in Susanto (2009) there are 6 dimensions to a smart city,

DOI: *https://doi.org/10.33258/birci.v4i4.3045*

including smart governance, smart branding, smart economy, smart living, smart society, and smart environment. The big cities in the world make this dimension as the foundation for a smart city. To support various urban infrastructure development activities and provide good services to the community, local governments need adequate technology to carry out all of their activities. In order to create a global, competitive society, as well as a smart and livable city, the government as a stakeholder must determine the right policy by preparing a quality future city development concept, which is called Smart City. The concept of a smart city is predicted to be a solution to the problem of urban development in the region. Smart Cities are designed to be able to increase the productivity of people who live there, resulting in the arrangement and management of the city that is carried out by utilizing information and digital technology optimally in all aspects. Starting from the building management system, environmental quality management, and public services. In short, the city is developed into an engine of economy and productivity, making the people healthy, productive, and prosperous. The difference between this study and other previous studies is related to the focus of the study. The previous studies focused more on smart city development strategies, while this study focused on examining how the transformation of planning and smart city development.

The concept of realizing a smart city affects various things. Along with the increasing demand for energy for various purposes, intelligent multi-energy systems have become a trend in urban development. It is possible and important to consider traffic flow guidance for electric and non-electric vehicles in urban transport networks in such a smart environment.(Xie, Hu, Wang, & Chen, 2020). This illustrates challenges in the planning process to realize a smart city, especially regarding the arrangement of the multi-energy system planning concept. This study focused on future transportation management factors, natural gas energy reserves, and distribution networks. The first is about integrated energy station infrastructure, meaning the need for media or connecting components whose purpose is to convert energy sources to what is needed, distribute energy and store energy reserves. This study is more about how to optimize investment and operational strategies for renewable energy generators, energy converters, storage devices, and charging facilities in a coordinated manner. If the concept of the study is implemented in a structured and massive manner, it enables the flow of non-electric vehicles and its navigation to charging facilities can be incorporated into the concept of future transportation with renewable energy.

Related articles discussed (Choi, Choi, Kim, & Lee, 2020). With today's global urban concerns such as climate change, urbanization, and energy, smart cities have been recommended as a solution in urban planning. This study provides an overview of South Korea's smart city ambitions by studying the recent history of smart city legislation and their limitations. This case study illustrates one of the world's fastest developing economies' experience with smart cities as their primary national sector for economic growth. Additionally, it examines smart city trends through the use of big data analytic methodologies. Despite obstacles such as economic recession, inability to differentiate cities, and low service levels for expected smart city functions, we can recognize the current state of South Korea's smart city policies as follows: 1) Korea's smart city development project is actively implemented; 2) Public consensus indicates that the application of advanced technology and the active role of government are required; and 3) A comprehensive and strategic approach with integration and the application of advanced technology is required. This study proposes recommendations for the future path of South Korea's smart city administration, serving as a model for global smart city planning and development.

The path toward smart city development is greatly reliant on the city's specific circumstances. To manage smart city projects successfully, it is necessary to understand the

conditions of urban development, which include multiple parties (community, government, and private) with the ability to control digital, physical, and human infrastructure, as well as the context of the city's circumstances, which include geographic, demographic, and structural factors. Although several studies have examined the management dynamics essential to smart city development, they have not taken into account the effect of urban contextual variables (Nicolas, Kim, & Chi, 2021). As a result, it presents a problem as to how contextual elements especially impact the dynamics of smart city growth. To address this issue, previous researchers developed a structural equation model (SEM) to analyze the maturity of enablers and the level of achievement of performance goals in 50 smart cities. The study further examined the evolutionary tendency of these assessment ratings in the context of urban characteristics. The findings demonstrate the unique impacts of economic growth, geographic region, density, and size on the maturation of smart cities.

It is undeniable that as the world's population increases, the waste will increase too. Especially if we look at the situation in Indonesia, especially the DKI Jakarta, which most people already have a pragmatic tradition, so that waste is everywhere and ignored. With the advancement of urbanization, urban solid waste management has had a significant impact on human production/life and social ecological health, and trash management has become one of the world's key concerns (Zhang, Li, Wan, Skitmore, & Sun, 2020). This study focuses on smart technology, related to renewable innovations regarding the waste development process by prioritizing the principles of smart city development and discussing what are the needs of sustainable development strategies. Researchers propose an intelligent urban waste disposal process using robotic operating system ROS (Route Operation System) and RRT (Rapid Exploration of Random Trees) path planning algorithm. The process of running the system is done by managing data management per family. Automatic waste disposal will directly carry out automatic communication from homes where the waste is deemed full enough to be directly connected to the garbage collection vehicle (WCV) and then an automatic carry out will be done by the WCV. The system is added with IoT (Internet of Things). This system gives scientific data support for smart environmental layout with a better ecosystem development.

China as the largest population in the world, of course, has many challenges if we talk about urban environmental management. Of course, when we consider it in the context of development, the government must satisfy the requirements of its citizens and establish the concept of smart city energy (SEC), because it cannot be denied that over time the need will increase and cities are forced to adapt by emphasizing smart cities for the future. With major urbanization and energy concerns, China can serve as a model for furthering knowledge of this notion in the context of a quickly rising country (Liang, Ma, Chong, Li, & Ni, 2020). The context of the recommendation of a new smart city concept (SET) against the backdrop of China's deployment is highlighted in this study. SEC is discovered in this study. To address the issues of urbanization and exhibit business model innovations to assist economic growth, SET highlights the need of conducting energy development and planning. Of course, there are obstacles in this development process, namely in the planning process and policy support. This is due to a lack of funding for projects and the capacity of local companies to carry out the development process. Hopefully the government and the private sector will collaborate hand in hand by strengthening planning and investment in every region in China to promote the SET project.

The Southern World's future cities will quickly urbanize and become warmer as a result of climate change and urbanization (Bardhan, Debnath, Gama, & Vijay, 2020). It is undeniable that the southern states have high temperatures, of course with these climatic conditions it has positive and negative impacts. The negative impact is that the demand for coolers will increase manifold due to hot temperatures, and of course the demand for energy sources will increase. But on the other hand this also has a good impact, by utilizing the potential of sunlight as an energy source, by placing the tool on the roof of the house. This enables photo-voltaic (PV)-based decentralized energy and optimized application for various peer-to-peer environmental areas. This study found that cooling energy can be reduced by up to 80% if it is balanced with the utilization of the sun's potential as energy.

COVID-19 is a global health problem including Indonesia. This was initiated from the information of the World Health Organization (WHO) on 31 December 2019 there was a case of a cluster of pneumonia with a new etiology in Wuhan City, Hubei Province, China and later expanded beyond China. On 30 January 2020, COVID-19 was set to become the public health Emergency of International Concern (PHEIC). (Susilawati, et al. 2020)

The ongoing Covid-19 outbreak has caused various activities to be hampered. Of course we are obliged to keep our distance from each other. The government certainly has to work extra in monitoring, especially in public places. Therefore, there is a need for tools that can monitor the community in a state of the Covid-19 outbreak. More precisely, data-driven smart applications that efficiently manage scarce resources offer a futuristic vision of smart, efficient and secure city operations (Shorfuzzaman, Hossain, & Alhamid, 2021). Researchers recommend reducing COVID-19 through mass video surveillance by using a monocular camera, which is then identified and validated by anyone who commits a violation. It becomes important to categorize complete urban planning scenarios for architecturally, socially, and economically viable cities due to the unbearable population growth (Misra & Kumar, 2020). The researcher suggests that the smart city concept opens up opportunities for integrated sustainability hybrid developers who broadly implement three main parameters regarding social, economic, and environmental components for sustainability.

II. Research Method

This study aims to examine various scientific articles that discuss plans related to smart city development that have been published in reputable international journals. Furthermore, the review article in this study is directed at the conceptual study of the relationship between planning and smart city development which will be explained through the following questions, namely: (1) what is the relationship and clustering between planning and sustainable development of smart cities? (2) What are the dominant themes in the study of the relationship between planning and sustainable development of smart cities? (3) What are the topics related to the study of the relationship between planning and sustainable development of smart cities? (4) What type of mapping is used in the study of the relationship between smart city planning and development? (5) What concepts are used in the study of the relationship between smart city planning and development? Some of the questions above will be explained based on the topic of the study, framework, and some previous research findings that have been indexed in the Scopus database. Articles that will be reviewed in this study will go through several stages (1) Article search and (2) Topic Mapping.

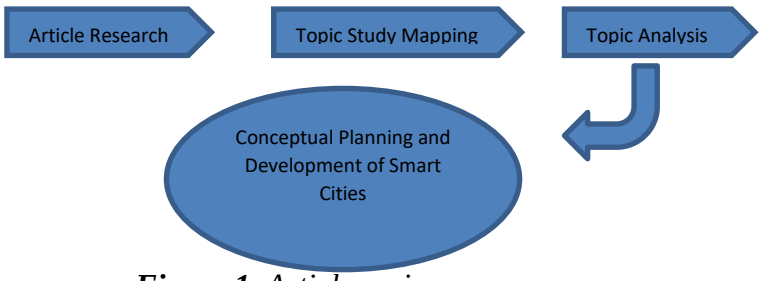

Figure 1. *Article review process.*

III. Result and Discussion

In this section, the researcher performs bibliometric analysis with network, overlay, and density visualization using VOSviewer to obtain information on the bibliometric network that exists among previous downloaded articles. It should be noted that this bibliometric network consists of nodes and edges. Nodes are depicted through visualizations whose contents are journals, researchers and keywords. While the edge denotes the connection between two nodes. Not only does the edge serve to indicate the presence of a relationship, but it also helps to express the relationship's strength, which is represented by distance. The closer a node is to other nodes, the higher the relationship. The following are the results of network visualization, overlay, and density based on the relationship and grouping of keywords.

TOPIC 1: Keyword Linkage and Grouping.

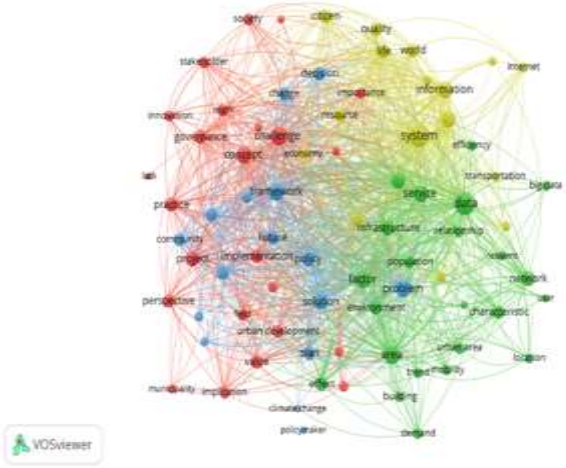

Figure 2. *Network visualization on mapping and clusters of 75 articles that have been identified.*

In the network visualization (figure 1), each circle represents a keyword taken from the title and abstract of the article. By visualizing the size of the circle, it means that the number of journal publications that have a relationship with the keyword, both in journals and journal abstracts. The larger the circle size, the greater the number of articles that have relevance to these keywords. From the analysis results, it was found that there were 75 articles out of a total of 146, which were further identified into 4 clusters. Each cluster is represented by a different color which is used to see a list of dominant concepts from each cluster. With this classification, the aim is to identify how many themes are often discussed in previous research. According to Figure 1, it can be seen that cluster 1 represented by a red circle, which includes the challenge keyword; concepts; economic development; fields; governance;

implementation; importance; investment; lacks; municipality; perspective; practice; projects; regions; smart city concept; smart city development; society; stakeholders; urban development; urban environment; values; work. Cluster 2 in green includes area keywords; big data; characteristics; comparison; data; demands; effect efficiency; environment; factors; infrastructure; location; mobility; networks; population; relationships; residents; services; trends; urban areas; urban planning; users. Cluster 3 is blue which includes the keyword change; climate change; community; decisions; frameworks; futures; goals; opportunities; plans; policies; policymaker; problem; solutions; sustainability; sustainable development. The 4th cluster in yellow includes the keyword application; citizens; economy; effectiveness; information; integration; Internet; life; performance; quality; resources; sustainable development; systems; transportation; urbanization; world.

Table 1. Grouping of themes in the relationship between planning and sustainable development of smart cities.

Cluster	Concept Name	Total
Cluster 1	Challenge, Concept, Economic, Developemnt, Field, Governance, Implementation, Importance, Investment, Lack, Municipality, Perspective, Practice, Project, Region, Smart City Concept, Smart City Development, Society, Stakeholder, Urban Development, Urban Environment, Value, Work.	22
Cluster 2	Area, Big Data, Characteristic, Comparison, Data, Demand, Effect, Efficiency, Environment, Factor, Infrastructure, Location, Mobility, Network, Population, Relationship, Resident, Service, Trend, Urban Area, Urban Planning.	20
Cluster 3	Change, Climate Change, Community, Decision, Framework, Future, Goal, Opportunity, Plan, Policy, Policymaker, Problem, Solution, Sustainability, Sustainable Development.	15
Cluster 4	Application, Citizen, Economy, Effectiveness, Information, Integration, Internet, Life, Performance, Quality, Resource, Sustainable Development, System, Transportation, Urbanization, World.	16

In this section, the first cluster will explain the challenges and implementation in smart city planning and development. The article that is considered related to the first cluster is "Challenges and Solutions for Organizational Design in Urban Digitalization", written by (Csukás, Bukovszki, & Reith, 2020). This article discusses the challenges and solutions for smart city development. The research conducted by (Csukás et al., 2020) shows that investment and policy-making are very central in the transition to smart city development. Therefore, early planning must be conceptualized with integrity, especially for stakeholders.

The second cluster related to services and infrastructure. The article relevant to the second cluster is "Optimal Design of Energy Storage System to Buffer Charging Infrastructure in Smart Cities". Research conducted by (Zhao, Thakur, & Chen, 2020) talks about the dramatic growth of electric vehicles (EVs). However, in reality EVs have challenges such as (1) Energy gap in fuel stations due to high demand (2) Lack of infrastructure due to high construction costs. Researchers found innovations in a solution by bringing up electrical energy storage technology (large batteries), which are predicted to save 20% -36% for energy storage. In this case, it proves that planning is the most important in the development process. When the production of goods has been successful, likely the supporting infrastructure can become a problem. Since we find many development projections that are neglected due to the absence of sustainability, lack of funds or no benefits (profits for investors) when the projection is successful. In addition, there is related research

conducted by (Kim, Oh, & Kim, 2020) entitled "The Transition From Traditional Infrastructure to Living Soc and Its Effectiveness for Community Sustainability: The Case of South Korea" Precisely in 2018, the South Korean government implemented a social overhead capital policy whose further impact of the policy can improve livelihoods by referring to the concept of an inclusive city, smart city, balanced development of metropolitan and provincial cities. Based on a review of the existing literature and relevant policies from South Korea, researchers (Kim et al., 2020) explore the application of this policy and provide some suggestions for its sustainability by comparing the state of existing South Korean urban facilities and looking at the balance of facilities between metropolitan cities and provinces.

The third cluster deals with the objectives and factors that influence smart city planning and development. The article relevant to the third cluster study is "Exploring the Smart Future of Participation: Community, Inclusivity, and People with Disabilities", written by (Bricout, Baker, Moon, & Sharma, 2021), which explains that the use of technology affects the potential involvement of civil society, especially persons with disabilities since with technology anyone in anywhere can communicate. Regarding persons with disabilities, the researcher wants accessibility, usability and equality by accommodating a smart future framework that connects people with disabilities to services. Then related to policy, one article that is considered relevant is "Policy Framework and Mechanism of Life Cycle Management of Industrial Land (LCMIL) in China" (Dai, Gu, & Xie, 2020) which discusses the improvement and optimization of industrial land use, this is a never ending problem if we mention urbanization and rapid population growth in urban areas. (Dai et al., 2020) focuses on the design of industrial land use policies against the backdrop of limited land in urban areas.

In cluster four, the dominant keywords are systems and information. The article that is deemed relevant is “Digital Information Tools for Urban Regeneration: Capital's Approach in Theory and Practice” (Bratuškins, Zaleckis, Treija, Koroļova, & Kamičaitytė, 2020). This research describes the state of the city slumped, and the need for repair or renovation in all factors, particularly related to the governance structure and capital of the city environment. In addition, there is also the need for community participation, so that the quality of the environment and the quality of life of the community increases. With the presence of technology it is possible to promote the availability of public services, because on the other hand it affects the regeneration of urban conditions and systematizes existing digital information devices that can empower the regeneration process. The thing that is not forgotten in people's lives is about health in the smart city concept, that the world of health in today's era must optimize health care information strategies. This is considered to be able to reduce treatment costs without reducing service quality. The minimum cost of care is due to the proper evaluation of the use of health data information systems. The model is carried out by developing management accounting innovations to help make decisions regarding the allocation of resources and activities to each information system. In addition, one of the articles entitled "City Information Modeling: A Conceptual Framework for Research and Practice in Digital Urban Planning" (GIL, 2020) stated that digitalization is an urban development process driven by the need for informed, evidence-based, collaborative and participatory urban planning and decision-making, exemplified in the Smart City concept. This digital transformation is made possible by the development of information technology in various fields such as 3D city models, Digital Twins, Urban Analysis and Informatics, Geographic Information Systems (GIS), and Planning Support Systems (PSS). In this context, City Information Modeling (CIM) has recently emerged as a concept related to the various driving forces of these technologies. This article reviews the state of the art CIM (definition

and application) in the academic literature and proposes a general definition and conceptual framework. (GIL, 2020) offers a context for transdisciplinary work, and a focus on integration challenges, for research and development, in both academia and industry. This will contribute to advance the debate on digitizing the development process of the built environment in the Smart City area.

After being classified based on clusters with Smart City Planning Development research, the articles are classified based on the year of publication. The data obtained from the overlay using VOSviewer can be used to identify trends regarding the relationship between planning and sustainable development. In this overlay visualization, node colors are used to represent a keyword and indicate the year the article was published containing that keyword. The result of research conducted by (Wathne & Haarstad, 2020) talks about smart city discourse about urbanism. Increasingly sophisticated technology makes information and transparency of a policy more mobile. Improved policy mobility allows the government to manage cities effectively and efficiently, also can cope the challenges of urban problems.

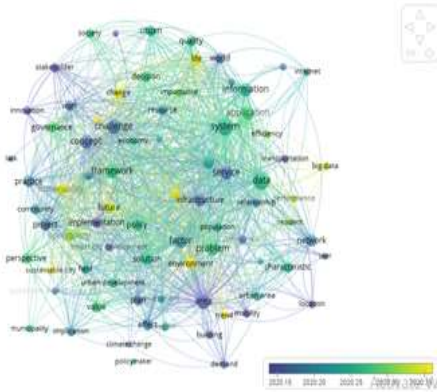

Figure 3. *Classification of articles according to year*

In addition to the relevant article for 2020 mid-term “Moving Towards Smart Cities: Solutions that lead to the Smart City Transformation Framework”. The authors (Kumar et al., 2020) explain that urban development planning is driven by transparent, collaborative and participatory decision-making which is in line with the smart city concept. The transformations made possible by the development of science and technology such as 3D city models, Urban Analysis and Informatics Geographic Information Systems (GIS), and planning support systems (PSS). With this media, it is hoped that the sustainable urban development planning process will be better. Furthermore, one of the keys that is widely discussed in the final 2020 period is the environment. One of the relevant discussions is "Developing WSN/BIM-Based Environmental Monitoring Management System for Parking Garages in Smart City". (Lin Prof. & Cheung, 2020) states that building Information Modeling (BIM) in collaboration with a wireless sensor network (WSN) will make the technology have sensing and control capabilities located in parking garages with the aim of collecting carbon monoxide (CO), knowing and checking the temperature, and humidity in real time.

Furthermore, after visualizing the overlay, the density visualization is done. This visualization shows that there are keywords that have stigma. This is seen from the thickness of the color. If the color of the circle is getting thicker, it indicates that the keyword is dominantly discussed by previous research related to the research topic.

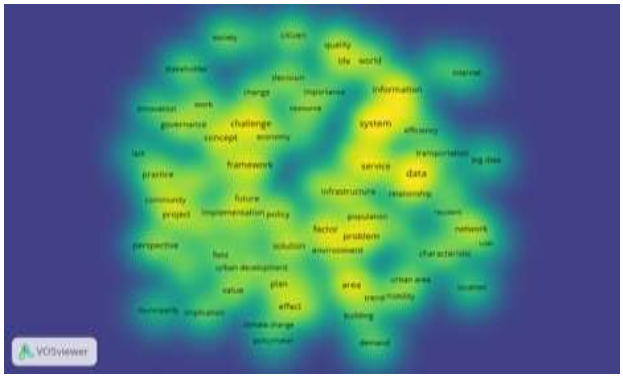

Figure 4. *Density Visualization, Mapping and Clustering based on dominant keywords.*

In accordance with the third picture, it can be seen that the dominant keywords include (1) System; (2) Data; (3) Information; (4) Problems; (5) Challenges; (6) Concepts. In the third picture, these keywords are often discussed by previous studies related to the topic of discussion of the relationship between planning and sustainable development of smart cities. Keywords about system and data are very important aspects in planning because it is impossible for planning to be integrated and comprehensive without data and systems. Other than that, the keywords factor and problem describe empirically where many cities in the world previously made the transition to smart cities. It is hoped that other cities can use this empirical study as a consideration for smart city planning and development. The last keyword is concept, which is useful to emphasize when a smart city project has been planned, such as the sustainability of supporting policies and supporting infrastructure. Whereas, the other keywords only support the same discussion objectives, so they support the dominant keywords, and vice versa.

TOPIC 2: Correlation and Grouping of Authors in the Relationship Between Planning and Smart City Development.

After visualizing the network, overlay, density related to the key, the next step conducted is visualizing network, overlay, and density regarding the author in research on planning and development of smart cities. The 4th image visualization depicts several authors who contributed and conducted previous research according to the relevant discussion topics according to the researchers' research on smart city planning development. It can be seen in the network visualization. There are 3 clusters consisting of 7 author items. Cluster 1 is red, cluster 2 is green, and cluster 3 is blue.

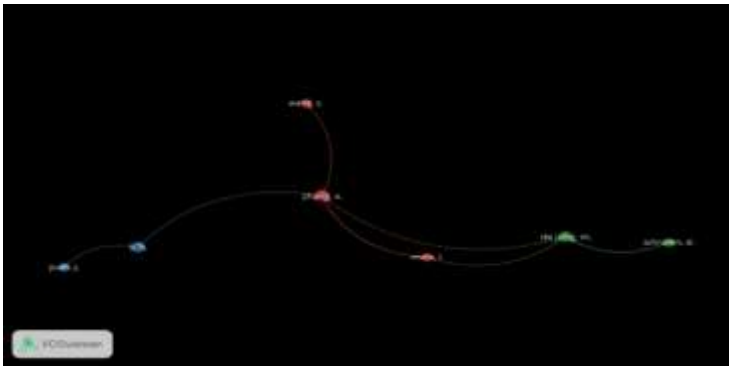

Figure 5. *Network author visualization related to previous research.*

In the first cluster, it is seen that Zhang X is the dominant author. Zhang X is an author who has written an article entitled "Understanding Intra-Urban Human Mobility Through an Exploratory Spatiotemporal Analysis of Bike-Sharing Trajectories". Result of the research conducted by (Li, Wang, Zhang, Jia, & Tian, 2020) describes a smart city but with an ecological approach where urban communities are mobile using bicycles, besides that the city government can carry out its role as urban development planning to promote green transportation and to reduce traffic congestion. In addition, in a relevant article entitled "Smart City Oriented Ecological Sensitivity Assessment and Service Value Computing based on Intelligent Sensing Data Processing". (Duan, Zhang, Fan, Hou, & Hou, 2020) reveal that sustainable development and environmental protection using the sanshui river research area in Xunyi, which integrates the network system in the control center of the ecological space in the countryside.

Table 2. Author clustering.

Cluster	Author Name	Total
Cluster 1	Zhang,x; Moral; Wang, s;	3
Cluster 2	De Jong M; Schavren;	2
Cluster 3	Yuan, j; Li, h;	2

In the second cluster, de Jong, m is the dominant actor. De Jong,m once wrote an article entitled "Input-Output Modeling for Smart City Development". (Noori, de Jong, Janssen, Schraven, & Hoppe, 2020) express about the concept of a smart city by describing various aspects and developing it with an Input-Output model in policy making and analysis of appropriate development choices during planning to implementation, so that readers know the impact of a choice that has been made. It should be noted that the development of smart cities in this journal focuses more on dealing with challenges, such as climate change, air pollution, and congestion.

In the third cluster, the dominant actor is Li,h. (Wang et al., 2021) once wrote an article entitled “Impacts of Electric Vehicle deployment on the electricity sector in a strictly urbanized environment” which discussed the development of electric vehicles in order to create a clean environment. However, there is a problem where there are still obstacles regarding refueling electricity. Researchers think a small area like Singapore with dense population conditions has a very limited space if used as an option for electricity development. In addition, another article entitled "An Intelligent Waste Removal System for Smarter Communities" reveals the conditions of continued urbanization until environmental problems related to waste. In the conceptual direction towards smart city development, the use of appropriate technology can be used as a solution to the problem of waste. This system model uses ROS (Route Operation System) robot operation and algorithms in accordance with RRT (Rapid Exploration of Random Trees) path planning.

Then after the mapping and clustering of author with smart city research planning development is done, the mapping of author based on publishing year will be carried out.

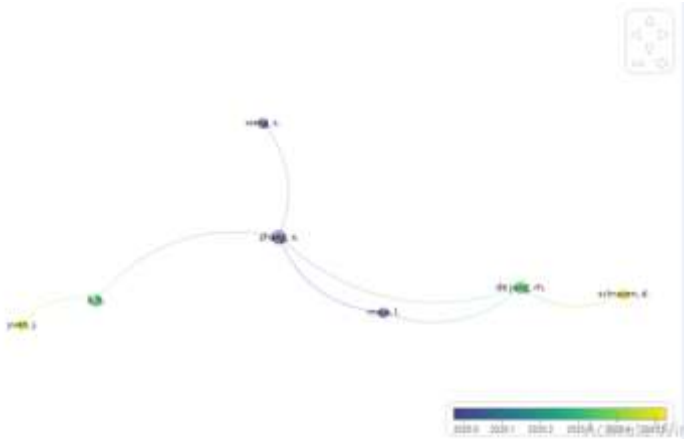

***Figure 6**. Visualization of the author's Overlay related to previous research by year classification.*

According to the overlay visualization in Figure 5, it can be seen that there are 3 clusters that all of them were published in 2020. The difference is the categorization of the early, middle, and final period. In early 2020, one of the articles published was “The Optimal Planning of Smart multi-energy System Incorporating Transportation, Natural Gas and Active Distribution Network”, written by Wang, s. Then the article published in 2020 for the medium period is "Mapping the Knowledge Doman of Smart City Development to Urban Sustainability: A Scientometric Study", written by Li, p. Finally, for the late 2020 period, one of the published articles entitled “Past, Present, Future: Engagement with Sustainable Urban Development Through 35 City Lables in the Scientific Literature 1990-2019” which is written by Schraven, D.

After visualizing the overlay is done, the density visualization is carried out. Figure 6 shows the author's name which has a distinction from the thickness of the color. The thicker and lighter the author's color indicates that the author is dominant in previous research related to the topic of discussion.

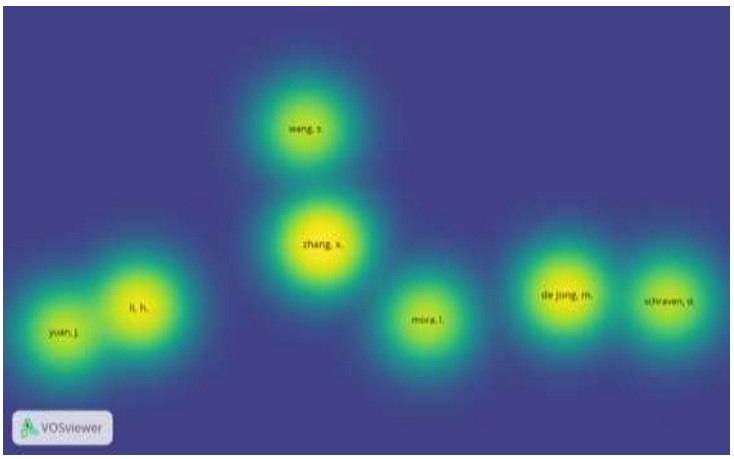

***Figure 7**. Visualization of Density Mapping and Clusters by dominant author.*

Based on the density visualization data in Figure 6, it can be seen that the most dominant authors are Zhang, De Jong, m, and Li, h. The three authors are related to each other. Zhang often collaborates with L in writing for example in one of his articles entitled "Panoramic Visual Perception and Identification of Architectural Cityscape Elements in a Virtual-Reality Environment". In addition, De Jong, M often collaborates with N. Noori, and

Janssen, which has been proven by the emergence of the journal "Input-Output Modeling for Smart City Development". Then the article entitled "Mapping the Knowledge Domain of Smart City Development to Urban Sustainability: A Scientometric Study" written by li, h is done in collaboration with Z. wu, M. Jiang.

V. Conclusion

A smart city is a system concept located in a city where the entire existing system makes it easier for all parties involved in a city. Creating a smart city, requires a common paradigm regarding a real smart city. In addition to the need for clear regulations, the need for direct regulation of smart cities requires good cooperation from several parties who want to focus on the vision for smart city development as a public service to the community. From the results of research that has been taken from various library sources, it appears that China dominates in the advancement of smart cities. Viewed from the development of smart cities, the factors that cannot be separated are the use of information and technology facilities. Overall, the smart city concept has six characteristics, namely smart city, smart economy, smart mobility, smart environment, smart people and smart living. However, in reality the strategy in smart city development must adapt to the potential and conditions of each region. This is reflected in what happened in Korea, precisely in Soul, indeed smart cities have been implemented and run well, but there are problems related to community culture. There are many people who are not ready with the smart city concept. There are still many people who still live with the traditional approach. The limitations of this study are the lack of journal sources that match the title, so it is necessary to find new things to reveal problems in the smart city development planning process.

References

Aigbavboa, CO, Oke, AE, Aghimien, DO, & Akinradewo, OI (2020). Improving resilience of cities through smart city drivers. Construction Economics and Building, 20(2), 45–64. https://doi.org/10.5130/AJCEB.v20i2.6647

Bardhan, R., Debnath, R., Gama, J., & Vijay, U. (2020). REST framework: A modeling approach towards cooling energy stress mitigation plans for future cities in warming the Global South. Sustainable Cities and Society, 61. https://doi.org/10.1016/j.scs.2020.102315

Bratuškins, U., Zaleckis, K., Treija, S., Koroļova, A., & Kamičaitytė, J. (2020). Digital information tools for urban regeneration: Capital's approach in theory and practice. Sustainability (Switzerland), 12(19), 1–16. https://doi.org/10.3390/su12198082

Bricout, J., Baker, PMA, Moon, N.W., & Sharma, B. (2021). Exploring the smart future of participation: Community, inclusivity, and people with disabilities. International Journal of E-Planning Research, 10(2), 94–108. https://doi.org/10.4018/IJEPR.20210401.oa8

Choi, C., Choi, J., Kim, C., & Lee, D. (2020). The smart city evolution in South Korea: Findings from big data analytics. Journal of Asian Finance, Economics and Business, 7(1), 301–311. https://doi.org/10.13106/jafeb.2020.vol7.no1.301

Csukás, MS, Bukovszki, V., & Reith, A. (2020). Challenges and solutions for organizational design in urban digitalization. European Journal of Sustainable Development, 9(2), 615–629. https://doi.org/10.14207/ejsd.2020.v9n2p615

Dai, B., Gu, X., & Xie, B. (2020). Policy Framework and Mechanism of Life Cycle Management of Industrial Land (LCMIL) in China. Land Use Policy, 99. https://doi.org/10.1016/j.landusepol.2020.104997

Duan, Y., Zhang, L., Fan, X., Hou, Q., & Hou, X. (2020). Smart city oriented Ecological Sensitivity Assessment and Service Value Computing based on Intelligent sensing data processing. Computer Communications, 160, 263–273. https://doi.org/10.1016/j.com.2020.06.009

Ghasemi, A., & Saberi, M. (2020). The key factors in transforming Birjand City to a smart city: Smart mobility, smart government. Indonesian Journal of Electrical Engineering and Computer Science, 19(1), 317–324. https://doi.org/10.11591/ijeecs.v19.i1.pp317-324

GIL, J. (2020). City Information Modeling: A Conceptual Framework for Research and Practice in Digital Urban Planning. Built Environments, 46(4), 501–527. https://doi.org/10.2148/BENV.46.4.501

Kim, Y., Oh, J., & Kim, S. (2020). The transition from traditional infrastructure to living soc and its effectiveness for community sustainability: The case of south korea. Sustainability (Switzerland), 12(24), 1–16. https://doi.org/10.3390/su122410227

Klusáček, P., Konečný, O., Zgodová, A., & Navrátil, J. (2020). Application of the smart city concept in process of urban recycling-Case study of Spitalka in Brno, Czech Republic. DETUROPE, 12(1), 22–40. Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-85091859536&partnerID=40&md5=f89c9e41d01c7d2f730632b09bd61347

Kumar, H., Singh, MK, Gupta, MP, & Madaan, J. (2020). Moving towards smart cities: Solutions that lead to the Smart City Transformation Framework. Technological Forecasting and Social Change, 153. https://doi.org/10.1016/j.techfore.2018.04.024

Li, W., Wang, S., Zhang, X., Jia, Q., & Tian, Y. (2020). Understanding intra-urban human mobility through an exploratory spatiotemporal analysis of bike-sharing trajectories. International Journal of Geographical Information Science, 34(12), 2451–2474 . https://doi.org/10.1080/13658816.2020.1712401

Liang, X., Ma, L., Chong, C., Li, Z., & Ni, W. (2020). Development of smart energy towns in China: Concepts and practices. Renewable and Sustainable Energy Reviews, 119. https://doi.org/10.1016/j.rser.2019.109507

Lin Prof., Y.-C., & Cheung, W.-F. (2020). Developing WSN/BIM-Based Environmental Monitoring Management System for Parking Garages in Smart Cities. Journal of Management in Engineering, 36(3). https://doi.org/10.1061/(ASCE)ME.1943-54790000760

Linde, L., Sjödin, D., Parida, V., & Wincent, J. (2021). Dynamic capabilities for ecosystem orchestration A capability-based framework for smart city innovation initiatives. Technological Forecasting and Social Change, 166. https://doi.org/10.1016/j.techfore.2021.120614

Malik, A., & Singh, S. (2020). A case study on reliability analysis of travel time using public transport by recording the in-vehicle travel time for green and sustainable transport development. Journal of Green Engineering, 10(11), 11893–11913 . Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-85098447974&partnerID=40&md5=4b9938f013a33696da33cf8eab7c9317

Misra, M., & Kumar, D. (2020). A Hybrid Indexing Approach for Sustainable Smart Cities Development. Journal of the Indian Society of Remote Sensing, 48(11), 1639–1643. https://doi.org/10.1007/s12524-020-01171-y

Murty, VK, & Shankar, SS (2020). Towards a scalable architecture for smart villages: The discovery phase. Sustainability (Switzerland), 12(18). https://doi.org/10.3390/su12187580

Nicolas, C., Kim, J., & Chi, S. (2021). Understanding the Influences of Urban-Specific Contexts for Smart City Development Using Structural Equation Modeling. Journal of Urban Planning and Development, 147(2). https://doi.org/10.1061/(ASCE)UP.1943-5444,0000670

Noori, N., de Jong, M., Janssen, M., Schraven, D., & Hoppe, T. (2020). Input-Output Modeling for Smart City Development. Journal of Urban Technology. https://doi.org/10.1080/10630732.2020.1794728

Oliveira, TA, Oliver, M., & Ramalhinho, H. (2020). Challenges for connecting citizens and smart cities: ICT, e-governance and blockchain. Sustainability (Switzerland), 12(7). https://doi.org/10.3390/su12072926

Shorfuzzaman, M., Hossain, MS, & Alhamid, MF (2021). Towards the sustainable development of smart cities through mass video surveillance: A response to the COVID-19 pandemic. Sustainable Cities and Society, 64. https://doi.org/10.1016/j.scs.2020.102582

Susilawati, et al. (2020). Impact of COVID-19's Pandemic on the Economy of Indonesia. Budapest International Research and Critics Institute-Journal (BIRCI-Journal).P.1147-1156.

Wang, L., Nian, V., Li, H., & Yuan, J. (2021). Impacts of electric vehicle deployment on the electricity sector in a highly urbanized environment. Journal of Cleaner Production, 295. https://doi.org/10.1016/j.jclepro.2021.126386

Wathne, MW, & Haarstad, H. (2020). The smart city as mobile policy: Insights on contemporary urbanism. Geoforum, 108, 130–138. https://doi.org/10.1016/j.geoforum.2019.12.003

Xie, S., Hu, Z., Wang, J., & Chen, Y. (2020). The optimal planning of smart multi-energy systems incorporating transportation, natural gas and active distribution networks. Applied Energy, 269. https://doi.org/10.1016/j.apenergy.2020.115006

Zhang, Q., Li, H., Wan, X., Skitmore, M., & Sun, H. (2020). An intelligent waste removal system for smarter communities. Sustainability (Switzerland), 12(17). https://doi.org/10.3390/SU12176829

Zhao, D., Thakur, N., & Chen, J. (2020). Optimal Design of Energy Storage System to Buffer Charging Infrastructure in Smart Cities. Journal of Management in Engineering, 36(2). https://doi.org/10.1061/(ASCE)ME.1943-54790000742