Smart City Policy: Strategy and Implementation to Realize Smart Urban Governance in Indonesia

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Abstract: This paper elaborates on policies, strategies, and implementation of Smart Cities in Indonesia. Due to regulatory, strategy, and implementation problems for Smart City, there are still differences in understanding and strategy in its implementation. Smart urban governance is part of a smart city, so one strategy to implement smart urban governance is a smart city policy in Indonesia. There is a fragmentation of inconsistent approaches, policies, implementations, and strategies in practice. This research will develop arguments, analyze published articles and regulations, and map them out. The research method used was a qualitative approach. The data sources used were articles from Scopus which found 213 articles using the keywords smart city policies and smart urban governance and regulations, which were then processed using VOSviewer and Nvivo 12 Plus software. This study indicated that to implement smart urban governance in Indonesia, strategies such as the first need to be supported by the central government to make a policy regarding smart cities, including smart urban governance, followed by smart city policies in the towns in Indonesia. Second, there are technological developments that support the implementation of smart cities. Third, there are institutional and human resource factors, but these are still obstacles to implementing smart cities in Indonesia. Meanwhile, the urban issues developed in Indonesia are mega-urban in the big island, urban management and financing, housing for lower-income, sustainable urban infrastructure, and resilient disaster mitigation and management.

Keywords: *Public Policy; Smart City; Smart Urban Governance*

INTRODUCTION

A smart city concept was originally aimed at improving the quality of an area/city by making the area/city become "smart," balanced with improvements in Information Communication and Information Technology Technology (ICT) (Arafah & Winarso, 2020). The development of the Smart City increased when the European Union created the Smart City in 2010, aimed at creating smart solutions to be able to face the challenges of urbanization, globalization, and climate change (Cocchia, 2014; Jucevičius, R., Patašienė, I., & Patašius, 2014) because urbanization, globalization, and climate change are complex problems. Moreover, the issue of urbanization that urban areas must face is due to the movement of people from villages to cities. So that urban areas are increasingly dense with a population that is not matched by the expansion of urban land and other

problems arise. World urbanization data estimated that in 2050 there will be approximately 66% of the world's population living in urban areas.

The percentage of urban in Indonesia will continue to increase every year. Even in 2025, it is estimated that 67.66% of the population will live in urban areas. In 2045, it is estimated that around 82.37% of the population will live in urban areas due to urbanization. While Woldometers noted urbanization in Indonesia, in 2019, approximately 55.8%, equivalent to 150.9 million people of Indonesia's population, lived in urban areas. This figure increased by 0.7% in 2018, 55.1% or equivalent to 147.6 million people (Khairunnisa, Purnomo, & Salsabila, 2020).

Some cities in Indonesia have implemented the Smart City, including Jakarta, Bandung, Makassar, Surabaya, Semarang, Yogjakarta, and Denpasar, followed by other cities in Indonesia. Thus, cities must provide necessities such as healthy food, clean water, sufficient energy, and certainty about economic, social, and environmental stability. With Smart City, the city government will hopefully solve various problems quickly and precisely in serving public needs. The government can also use this information to create comfort, security, order, and a better life. The government has the duty and function to serve the people. Therefore, the key to the success of good governance is to look at or look in the mirror at public services that are no longer adequate to overcome problems. An integrated approach is needed to overcome all difficulties in the city so that a Smart City concept is born (Insani, 2017).

Smart urban is one part or dimension of a smart city. A smart city strategy and implementation are needed to realize smart urban governance, including smart environment, mobility, government, economy, people, living, and disaster management. Smart city strategies are needed for city services that refer to smart urban governance. The government makes regulations to control to ensure that the community gets a healthy environment and guarantees business actors to invest as part of a smart city (Susena, B., & Widowaty, 2018). Cities that successfully implement the smart city concept have breakthroughs in solving problems and improving city performance. One of the most critical dimensions of a smart city is to provide services using the latest technology and build smart infrastructure to deliver effective services to everyone living in the town (Insani, 2017; Sudaryono, 2014).
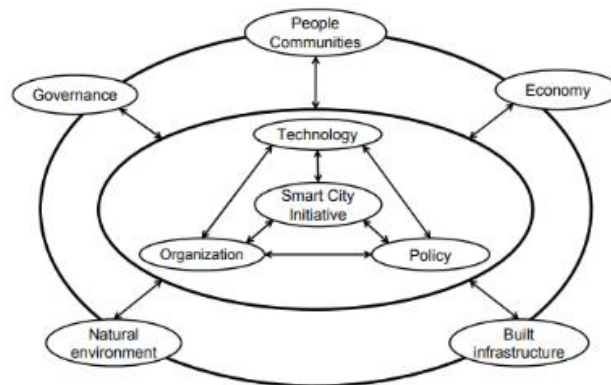

Figure 1. Smart City Framework
Source: (Chourabi et al., 2012)

Based on Figure 1, the smart city framework created by (Chourabi et al., 2012) explains that external and internal factors can affect the success of a smart city. External factors that can influence the success of a smart city are people, communities, governance, natural environment, built infrastructure, and economy. At the same time, the internal factors that can affect the success of a smart city are technology, organization, and policy. The internal factor of the success of this smart city greatly affects whether or not the policy runs to build a smart city. It must be supported by digital and integrated city development with support for physical infrastructure, smart technology, high mobility devices, and computer networks with adequate (technology dimensions). In addition, creativity, knowledge, education, and learning are needed as the main drivers of the formation of a smart city, where manual problems are transformed with knowledge into digital system models through creativity and presented in learning that fully needs to be consistent to be implemented (human resource dimension) and also needed support from the

government and policies for governance as the basis for smart city design and implementation. Policies support and play a role where relationships are formed between government institutions and non-government parties, and other sectors in building an integrated administrative environment (institutional dimension) (Hasibuan & Sulaiman, 2019).

The smart city concept will succeed if the government understands and contributes to the community's needs and is supported by the highest level of government (Insani, 2017). According to Cohen, "Smart cities use information and communication technologies (ICT) to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint–all supporting innovation and the low-carbon economy." A smart city can measure or see how far the implementation is in a town or area.

Table 1. Smart City Implementation Level

Implementation	Status
0	The initial level of implementing the *Smart City* At this level, the situation is still an ordinary city, but there is potential to become a *Smart City*
1	The starting level of a city or area becomes a Smart City This level is characterized by the availability of the internet throughout the city area
2	Continuation stage of the first level This level is marked by a city that has started to connect with networks in other cities or has implemented a *Metropolitan Area Network* (MAN)
3	Already at the level of *open information* This level is marked when the city has openness with other cities to share data and information online
4	A level that already has the process of processing data and information using good security Every data accessed is maintained the value of importance contained in the data and information
5	This level is characterized by being well integrated within the city and between cities as a combination of levels 2,3 and 4

Source: (Hasibuan & Sulaiman, 2019)

Smart cities are needed because many people live in urban areas/areas. This high level of urbanization will bring up various problems that can damage strategic development plans and suck up urban facilities (Khairunnisa et al., 2020). To be able to realize a smart city concept in these cities, several steps are needed, such as encouraging and developing new patterns with leadership and governance structures, collaborating with all parties involved by building and using "smart" infrastructure and preparing models financing capable of responding to future challenges and opportunities (Khairunnisa et al., 2020). However, it is not easy to realize a smart city because it requires strategic and creative thinking. Strategic, in the sense that it must be done in a planned manner for the future (futuristic), starting from problem identification, grouping problems, abstraction processes, determining ways and solutions to problems, as well as planning for implementation (Nugraha, 2014)(Insani, 2017). At the same time, creative thinking is an ability that can produce valuable and new works, both at the individual and organizational levels (Insani, 2017; Lazuardi, 2015).

In the 1999 United National Habitat campaign, urban governance needed to achieve the development of human settlements that adhere to the principles of sustainability, subsidiarity, equality, justice, efficiency, transparency, responsibility, civil order, citizenship, and security which are interdependent and mutually reinforcing (Muslim, Ardila, 2020; UN Habita, 2002). Urban governance focuses on the stakeholders' capacity because achieving the expected results comes
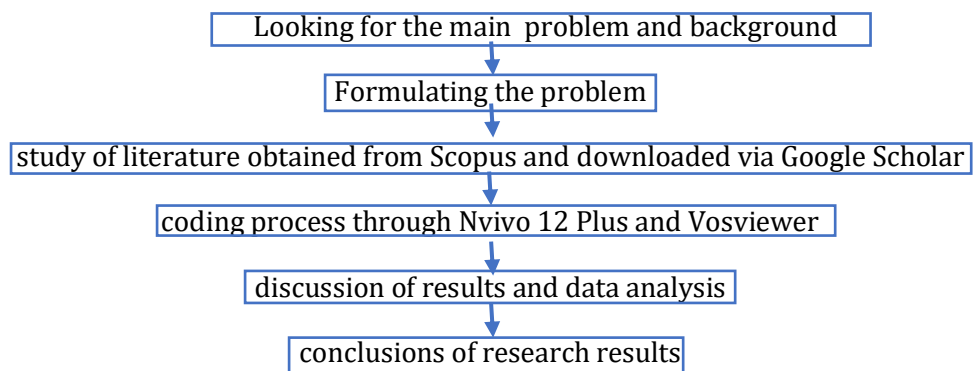
from dialogue and negotiations of actors and strong strategic direction and leadership in an institution (Muslim, Ardila, 2020). Urban governance aims to respond to various problems related to urban development effectively and efficiently, held accountable by the government and the community (Latifa, 2013). Urban governance examines how local, regional, and central governments and stakeholders determine and decide on an urban area's planning, financing, and management (Safaruddin, 2018). According to (Slack, E., & Côté 2014), there are four points in urban governance, namely to play an essential role in shaping the physical and social character of urban areas; affect the quantity and quality of local services and delivery efficiency; determine cost-sharing and distribution of resources between different groups; affect the ability of citizens to access local government Denney and be involved in decision making, affect local government accountability and be responsive to citizen demands (Safaruddin, 2018).

There is fragmentation in implementing smart cities in several cities in Indonesia because big cities in Indonesia have many similarities and differences. Applying Smart City in each of these big cities has a different background. Implementing a smart city in Jakarta and Surabaya is different. Likewise, the smart city developed in Bandung and the smart city in Makassar also have differences at the smart city level. The difference in the potential of natural and human resources impacts how a smart city will be built.

RESEARCH METHOD

This study employed qualitative research techniques in conjunction with a literature review strategy. It is a complete summary of the research on a certain topic to show the reader what is already known about the issue and identify gaps in knowledge and also used to justify decisions based on past research (Denney, Andrew S., 2013). The research design using this literature study focused on the results of the paper that followed this research, elaborating on smart city policies, strategies, and implementation in realizing smart urban governance in Indonesia. The research design will be described in Chart 1.

Chart 1. Research Design

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│        Looking for the main  problem and background         │
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        │         Formulating the problem         │
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│ study of literature obtained from Scopus and downloaded via Google Scholar │
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        │   coding process through Nvivo 12 Plus and Vosviewer   │
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          │    discussion of results and data analysis    │
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            │    conclusions of research results    │
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This data collection technique was obtained through various stages, (1) Journals obtained from Scopus were the result of using the keywords "smart city policies" and "smart urban governance" and obtained 314 journals. (2) After that, the authors filtered again by year, articles published starting from 2015-2021 with the subject area of social science and environmental scientist. So from the filtering, 213 articles appeared. (3) In the next step, the authors obtained various articles/journals based on those that appear on Scopus and downloads via google scholar. (4) After downloading the articles/journals, the authors enter the articles into Mendeley for later processing using Nvivo 12 plus and Vosviewer software.

The data analysis method used the Nvivo 12 plus and Vosviewer software. Using Nvivo software, 314 articles were grouped into 213 journals by creating a themes mapping. In the next step, the authors analyzed the 213 articles from Scopus and related them to the study topic of smart city policies and urban governance. Finally, the authors tried to make the results of the concept map of the study from the results of the literature review. The data analysis technique

steps are as follows (1) entering the literature review that has been obtained from Scopus as many as 213 articles and downloaded via Google Scholar to Nvivo 12 Plus and Vosviewer, (2) conducting the coding process based on the theme, (3) reviewing results and discussion based on linkages and dominant themes in smart city and smart urban governance studies and clusters and theme relationships in smart city and smart urban governance studies, (4) collecting all data obtained from Nvivo 12 Plus and Vosviewer and analyzes data explanations, and (5) making report the conclusion of the data analysis results.

RESULT AND DISCUSSION
Smart Urban Governance in Indonesia

Figure 4 shows several themes related to and still connected with the concept of urban governance in Indonesia. Smart urban governance is part of a smart city, so one strategy to implement smart urban governance is through a smart city in Indonesia. Smart urban governance is a step that must be taken by the government, especially in big cities that have a high population density and complex problems. Given the problematic issues, especially in big cities in Indonesia, smart urban governance is needed to manage and develop settlements prioritizing sustainability and using technology as part of a smart city.

It can be seen in Figure 4 that smart urban governance has a close relationship with urban, policy, city, public, change, climate cities, and sustainability, proved by the appearance of words printed in bold on the results of the Nvivo 12 Plus (Figure 4). Smart urban governance certainly has a close relationship with "urban" "city" because the problems and policies of smart urban governance are suitable to be applied in cities with dense populations with various problems brought about by an imbalance between the population and the available land. The smart urban governance step is closely related to climate change and sustainability. Since climate change can occur because of the habitual pattern of the population that does not reflect urban sustainability, smart urban governance will show an urban area that prioritizes sustainability.

Figure 4. Urban governance analysis
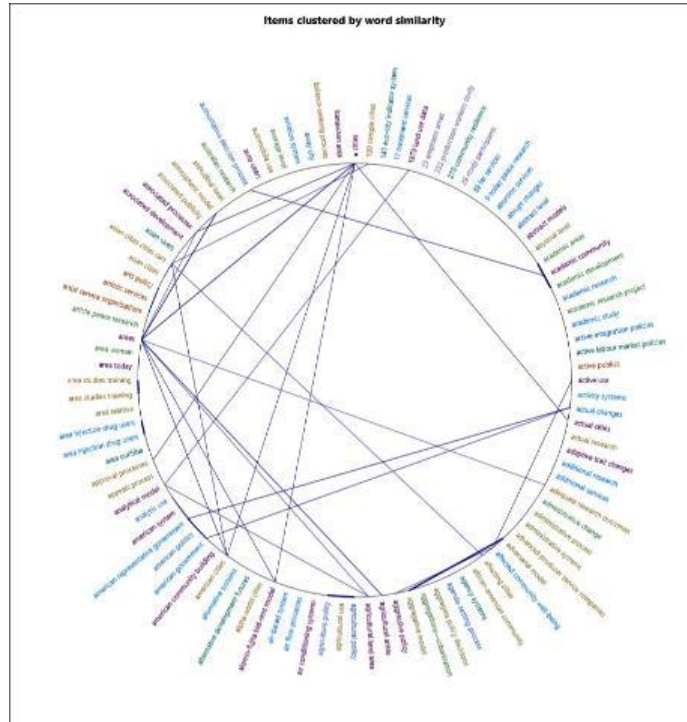*Source: processed using Nvivo 12 Plus*

Figure 5. clustered items of urban governance
Source: processed using Nvivo 12 Plus

Table 3 explains that the strategy and implementation of smart urban governance in Indonesia start with urban, public, city, social, and policies. These five things are interrelated and strengthened. To realize smart urban governance in an urban area is a facility provided for the public and the public's interests, welfare, and convenience. So, to make it happen, a policy made by the government is needed because the government has the authority to make these policies and implement them together with other stakeholders and the community.

Table 3. The percentage content of urban governance

Word	Length	Count	Weighted percentage (%)
urban	5	11606	001
public	6	5784	001
city	4	5312	001
cities	6	4650	001
social	6	4462	001
policy	6	4272	001

Source: processed using Nvivo 12 Plus

In Figure 5 are the concepts related to realizing smart urban governance in Indonesia. The related concept is the compact city, which is closely associated with implementing urban governance. In addition, it is closely associated with the urban form because a structured and sustainable urban arrangement is needed to realize smart urban governance. So structured urban planning is required to implement smart urban governance's initial objectives and manage cities with complex problems. Technological urbanism is also necessary for smart urban governance because the system depends on technology. It will create an urban area where all public services are interconnected/integrated using technology.

In 2006 studies on urban governance began to be studied frequently, especially on urban form, urban sprawl, compact cities, urban containment, neo-traditional development, design, and sustainability theory. Furthermore, in 2008 the focus of studies often carried out was urban planning and eco-city. Studies on commuting were constantly reviewed in 2010, which are still related to smart urban governance. In 2012, the study focused more on planning related to urban governance. Moreover, the direction of the survey in 2014 was more on technological urbanism,

which is closely related to implementing smart urban governance that relies on technological advances. In 2016, the study focused more on regenerative cities and ecological wisdom, which also support the implementation of urban governance in an urban area.
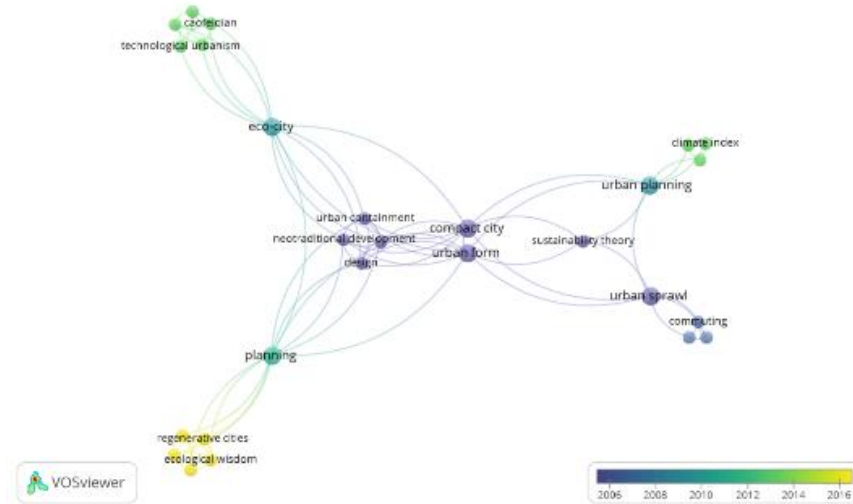

Figure 6. Overlay visualization of urban governance
Source: processed using VOSviewer

Table 4 explains that urban governance has 5 cluster concepts. The first cluster consists of eco-city, planning, urban containment, neotraditional, development, design, compact city, urban form, technological, urbanism, and techno-city. At the same time, the second cluster consists of the concepts of planning, urban form, compact city, eco-city, urban containment, neo-traditional, development, design, regenerative cities, ecological wisdom, resilience, transportation, and history. The third cluster comprises urban form, compact city, sustainability theory, urban sprawl, urban planning, eco-city, urban containment, neotraditional, development, design, and planning. The fourth cluster comprises urban planning, human biometeorology, climate, index, sustainability theory, urban sprawl, urban form, and compact city. Finally, the fifth cluster comprises urban sprawl, urban planning, sustainability theory, compact city, urban form, commuting, traffic, and congestion tools.

Table 4. Cluster Concepts of Urban Governance

Cluster of Concepts	Concepts/Themes	Total
Cluster 1	eco-city; planning; urban containment; neotraditional; development; designs; compact city; urban forms; technology; urbanism; techno-city.	13 items
Cluster 2	planning; urban forms; compact city; ecocity; urban containment; neotraditional; development; designs; regenaritive cities; ecological wisdom; resilience; transportation; history.	13 items
Cluster 3	urban form; compact city; sustainability theory; urban sprawl; urban planning; eco-city; urban containment; neotraditional; development; designs; planning.	11 items
Cluster 4	urban planning; human biometeorology; climate; index; sustainability theory; urban sprawl; urban forms; compact city.	8 items
Cluster 5	urban sprawl; urban planning; sustainability theory; compact city; urban forms; commuting; traffic; congestion tools.	8 items

Source: processed using VOSviewer

Based on Figure 7, to implement smart urban governance in Indonesia, one must start with several things, such as national government, urban processes, cultural processes, one-way process, democratic process, criminal justice pro, easy process, design process, research process, passing process, transformative process, ecological processes, evolutionary process, similar processes, transformation process, local policy process, dynamic process, hydrologic processes, genetic processes, and biological processes.
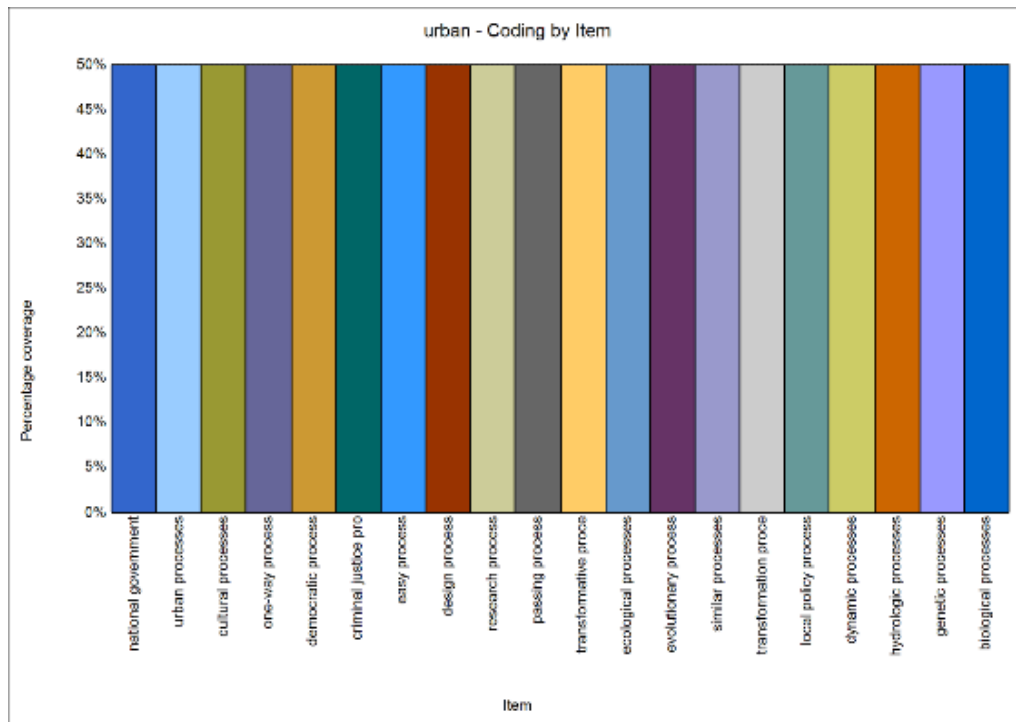

Figure 7. A Priority of Urban Governance
Source: processed using Nvivo 12 Plus

Discussion

This study's findings indicate that to implement smart urban governance in Indonesia, an effort or strategy is needed, such as. The central government must first support making a policy regarding smart cities, including smart urban governance, followed by smart city policies in the towns in Indonesia because a policy is an initial foundation for implementing a smart city. The policies contained in the smart city must be clear about the mechanism for the implementation process, how the budget must be issued, and the approaches must be integrated and consistent with each other. Because if a policy content or mechanism is contradictory and inconsistent, it will hinder the implementation of a smart city.

As with the implementation of smart cities in Indonesia, there is still no consistency in its policies, and it is still not integrated between them. All procedures must be integrated to implement a smart city that covers all aspects, including urban matters, because a smart city is a system that will make all public services systemized and integrated.

Second, the strategy that must be carried out to implement smart urban governance in Indonesia is the development of technology that supports the implementation of smart cities so that all urban services are online-based using an integrated internet site and cover all urban services (Allwinkle, Sam & Cruickshank, 2011). There are still no fully online-based urban services in Indonesia because procedures must go to government agencies to manage or upload files.

Furthermore, in addition to technological developments, institutional and human resource factors must support smart cities (Nam, T., & Pardo, 2011). Whereas what happened in Indonesia, smart cities were constrained by two factors or one of these factors. This human resource factor includes employees in all government agencies/agencies related to urban and community services. Because these factors must be balanced, when the local government implements a smart

city in its area, then the human resources in government institutions/agencies must be technology literate, and the community as the target user must also be technology literate so that when a smart city is implemented, it does not become a wasted system.

In addition to the policies of the central and local governments, the development of internet technology, institutional factors, and human resource factors, several things support the implementation of smart urban governance in Indonesia, as shown in Figure 8.
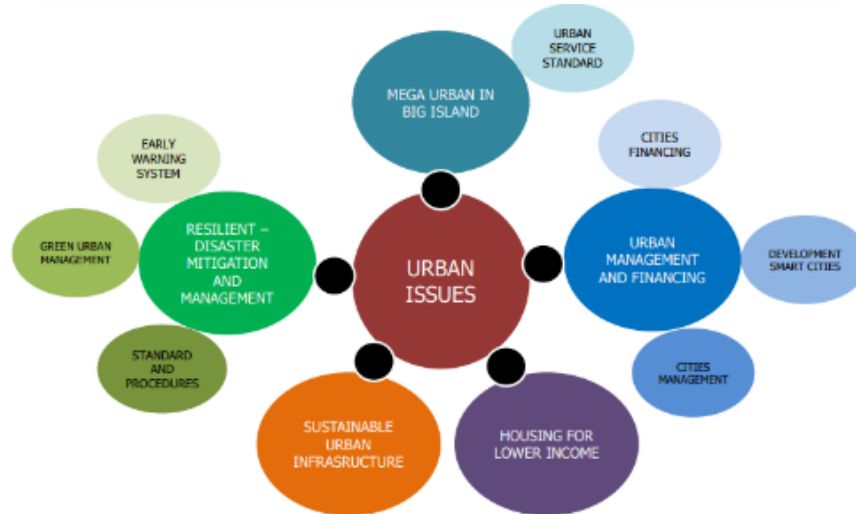
Figure 8. Urban Development in Indonesia
Source: (BAPPENAS, 2015)

Five urban issues must be developed in urban governance in Indonesia. The first concerns mega-urban in big islands, carried out by standard urban services for large areas. The second is urban management and finance by paying attention to three aspects: city financing, the development of smart cities, and city management. The third is housing for lower-income—the fourth is related to sustainable urban infrastructure. And the fifth is about resilient disaster mitigation and management, which consists of three aspects: early warning system, green urban governance, and standards and procedures.

An urban that will transform into a new urban plan must focus on policies and strategies to achieve effective results. There are vital elements to achieve this: national urban policies, regulation in urban governance, and urban economy.

Table 5 shows the central government's roadmap regarding national urban development from 2015 to 2045. In 2015 it was the basis or the beginning of urban development. Then in 2025, it is scheduled to fulfill the Urban Service Standards (SPP) and livable cities. The year 2035 is planned so that all cities in Indonesia have reached 100% of the fulfillment of green cities. And by 2045, it is scheduled that all cities in Indonesia will have reached smart and competitive cities and have reached 100%.

Table 5. National Urban Development Road Map 2015-2045

Year plans	Goals
2015	Baseline urban governance
2025	Fulfillment of Urban Services Standards (SPP) as well as livable cities
2035	All cities achieved 100 percent compliance with indicators for green cities
2045	100 percent of smart and competitive city indicators were attained for all cities.

Source: (BAPPENAS, 2015)

Figure 9 explains the central elements of achieving a sustainable urban in Indonesia. The first element is a national policy regarding sustainable urban development and planning. The second element is sustainable urban governance, a local fiscal system; the third element can implement sustainable urban service standards. The fourth element provides indicators of sustainable urban performance to see every action or plan towards a sustainable urban.
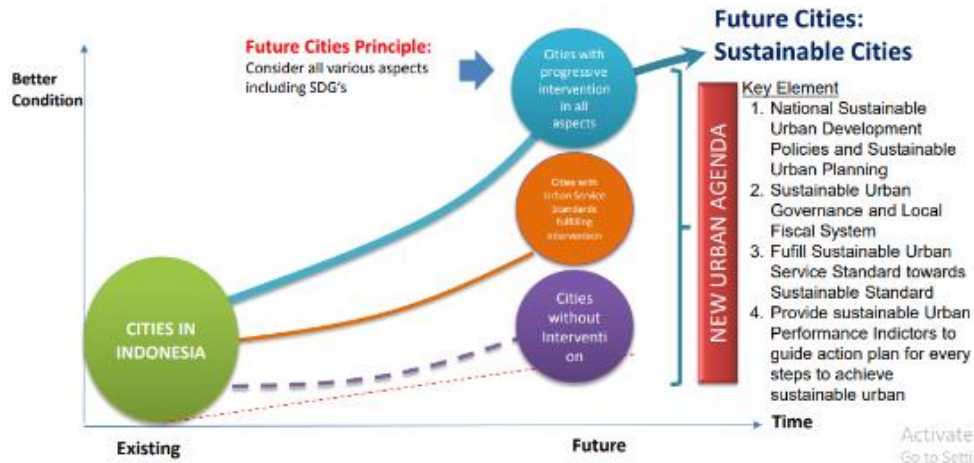

Figure 9. Achieve Sustainable Urban in Indonesia
Source: (BAPPENAS, 2015)

Figure 10. National Urban Development Framework
Source: (BAPPENAS, 2015)

Table 6 shows several national programs for urban development in Indonesia. The first program concerns technical assistance conducted by local government and urban development partners. This program is carried out in several areas in Indonesia, such as Banda Aceh, Balikpapan, Denpasar, Palembang, Tangerang, Surakarta, Yogyakarta, Semarang, Palu, Probolinggo, Kupang, and Surabaya. This program has main activities such as technical assistance to prepare technical documents for the city infrastructure program and to link to alternative finance.

The second program is the resilient city program by the local government and urban development partners. This program is carried out by several cities in Indonesia, such as Palembang, Palu, Balikpapan, Denpasar, and Pontianak. This resilient city program includes risk zoning, urban upgrading investment, and urban ecosystem rehabilitation. The third program is the green city program carried out by the local government and urban development partners in several cities in Indonesia, such as Medan, Batam, Malang, and Kendari. This green city program has main activities such as green city action plans, innovative financing mechanisms, urban management partnerships, and small-scale pilot projects in cities. Finally, the fourth program is the urban nexus program carried out by local governments in several areas in Indonesia, such as Pekanbaru and Tanjung Pinang, providing technical advice to municipal governments and planning officers, project implementation of nexus initiatives, and feeding the experiences gained at the local level into a regional dialogue and learning platform to achieve a pooling of knowledge and the potential for synergies in action are the main activities of this urban nexus program.

Table 6. National Urban Development Program In Indonesia

Program	Key partner	Key activities	Estimated location pilot project
Technical assistance	Local government. Urban development partners.	1. Technical assistance to prepare technical documents for the city infrastructure program 2. Linking to alternative financing	1. Banda Aceh 2. Balikpapan 3. Denpasar 4. Palembang 5. Tangerang 6. Surakarta 7. Yogyakarta 8. Semarang 9. Palu 10. Probolingg 11. Kupang 12. Surabaya
Resilient city	Local government program. Urban development partners.	1. Risk zoning 2. Urban upgrading investment 3. Urban ecosystem rehabilitation management.	1. Palembang 2. Palu 3. Balikpapan 4. Denpasar 5. Pontianak
Green city	Local government program. Urban development partners.	1. Green city action plan 2. Innovative financing mechanisms 3. Urban management partnerships 4. Small-scale pilot project in cities	1. Medan 2. Batam 3. Malang 4. Kendari
Urban nexus	Local government program.	1. Providing technical advice to municipal government/ planning officers 2. Projecting implementation of nexus initiatives 3. Feeding the experiences gained at the local level into a regional dialogue and learning platform to pool knowledge and the potential for synergies in action.	1. Pekanbaru 2. Tanjung Pinang

Source: (BAPPENAS, 2015)

CONCLUSION

In Indonesia, smart cities have no consistency in their policies, and policies are still not integrated because there are no fully online-based urban services. There are still procedures that must go to government agencies to manage or upload files. To succeed in smart cities and smart urban governance, human resources in government institutions/agencies must be technology literate, and the community as the target user must also be technology literate so that when a smart city is implemented, it does not become a problem useless system.

The seriousness of the government in implementing smart urban governance is shown by the roadmap that has been made by the central government regarding national urban development starting from 2015 to 2045. Five urban issues developed in urban governance in Indonesia are regarding (1) mega urban in big island, (2) urban management and finance, (3) housing for lower-income, (4) sustainable urban infrastructure, and (5) early warning system, green urban management, and standards and procedures.

Implementation of smart urban governance in Indonesia must start with several things, such as national government, urban processes, cultural processes, one-way process, democratic process, criminal justice pro, easy process, design process, research process, passing process, transformative process, ecological processes, evolutionary processes, similar processes, transformation processes, local policy processes, dynamic processes, hydrologic processes, genetic processes, and biological processes. The strategy to achieve smart urban governance in Indonesia requires an effort, the first of which must be supported by the central government to make a policy regarding smart cities, including smart urban governance, followed by smart city policies in the towns in Indonesia. Second, the strategy that must be carried out to implement smart urban governance in Indonesia is the development of technology that supports the implementation of smart cities so that all urban services are based online using an integrated internet site and includes all urban services.

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