

Research Article

Governance Analysis in Driving Smart City Policy in Aceh

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Abstract.

This study wants to analyze the implementation of smart city which is a concept of city development based on technology. The smart city concept consists of several aspects including smart governance, smart society, smart living, smart economy, smart environment, and smart branding. Aceh is one of the Indonesian provinces that initiated the smart city concept for the development of each regency/city. The research aims to analyze governance in encouraging smart city policies in Aceh. This research method uses a mixed method approach, which is a combination of quantitative approaches used to see facts that occur based on government system data that has been carried out; and qualitative method in building a narrative on the Aceh governance system based on smart city indicators which is on target or not. The results of this study show that there are several regencies/cities in Aceh that have implemented smart city-based governance. One of which is Banda Aceh City. This study recommends that the Government of Aceh should further socialize smart city-based governance so that the government of each regency/city in Aceh implements smart city governance to actualize a prosperous, harmonious, and simpler bureaucratic society.

Keywords: smart city, governance, government

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1. Introduction

Smart city is a new governance model based on information and communication technology. The city becomes smarter and more efficient in utilizing various existing resources, as well as improving services and quality of life of the community by prioritizing environmental sustainability.

Governance using the smart city concept is one of the requirements that can encourage the progress of the country [1] So, earnest and continuous efforts are urgently needed to accelerate changes (reforms) to ideal governance. Therefore, in the Grand Design of the Indonesian government's bureaucratic reform, the second terms in 2010-2025, requires a public service to run innovatively and efficiently using a digital technology approach [2] In today's digital era, it is very important for the government to adapt to the era, including in public service activities with the use of internet. As explained by

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Thomas L Friedman, countries that have the potential to advance today are countries that are able to adapt through the use of advances in information technology, in order to obtain benefits for the government and its citizens. [3]. It is because almost all human activities today are related to the internet, whether educational, business, political, religious, social, and others. In addition to speeding up the process and facilitating the fulfillment of human needs, through online activities, users also benefit from cost and time efficiency especially for urban communities that are full of daily activities.

Urban existence continues to experience significant developments and changes, and has a major influence on human civilization [4]. In addition, natural population growth in cities is high, and increasing urbanization rates are common problems faced by cities in Indonesia [5]. So it has an impact on the high need for public services that must be accommodated by the government. Because the government must provide public services that are in accordance with the needs and expectations of the community [1] On the basis of these problems and urgent needs, an alternative smart city concept emerged.

A smart city is a dream of all major cities around the world. While smart cities have several different points of view on their definition. [6] define that smart city is an acceleration of cyber services that have speed, reliability and accuracy. According to the Regional Development Planning Study Center Team [7], the smart city concept has become a global issue throughout the world to encourage community activity and participation for city management through a citizen-centric approach. So that it has an impact on dynamic interactions between service users (the community) and government service providers. The six smart city indicators classified by [8] consist of; Smart economy, smart people, smart governance, smart mobility, smart environment, and smart living.

In Indonesia in particular, the concept of smart city was first popularized by the City of Surabaya in 2011 with three focuses, namely smart governance, smart living and smart environment [9] In addition, Indonesia has made 3 (three) pilot cities in the implementation of smart cities including Bandung, Bogor and Makassar. The results of the implementation and development are more focused on spatial planning aspects [4].

Then in its development, until the end of 2021 the Ministry of Communication and Information has assisted the implementation of smart cities in 141 cities/regencies throughout Indonesia, and targets to expand the reach of the program in 2022, as well as conduct evaluations in all cities/regencies that have implemented the smart city concept before [10].

Aceh is the westernmost province of Indonesia consisting of 23 regencies/cities. One of the cities that have regulated the implementation of smart cities is Banda Aceh City, which is contained in Banda Aceh Mayor Regulation Number 18 of 2020 concerning Smart City of Banda Aceh City. The vision of Banda Aceh's smart city development is to become an innovative and competitive Islamic smart city [11]. The smart city dimensions of Banda Aceh City include smart governance, smart branding, smart living, smart society, and smart environment.

Meanwhile, in Subulussalam City, which is the border area of Aceh-North Sumatra, the smart city program is contained in the Regional Medium-Term Development Plan (RPJMD) for 2020-2024 [12]. However, for other districts/cities in Aceh, researchers have not found regulations and policy penetration directions related to the implementation of smart cities in governance. Therefore, this study aims to analyze Aceh's smart city-based governance

2. Methods

This research uses a mixed method approach, which is a combination of quantitative and qualitative approaches. The quantitative approach is used to see the facts that occur based on data from the government system that has been carried out so far, while the qualitative approach is used to get a narrative picture of Aceh's governance system based on smart city indicators or has not reached the target.

The quantitative data used in this study is data sourced from the Central Statistics Agency [13], while qualitative data is obtained by conducting a literature study. There are six indicators of smart cities analyzed in this study smart governance, smart society, smart living, smart economy, smart environment, and smart branding. The following is an explanation of the smart city indicator table

The explanation of each quantitative indicator derived from the welfare indicators of the Acehnese people in the period 2016 to 2021, so that the assessment of the success of *smart cities* depends heavily on the level of welfare of the community. The data analysis method used in this study to explain the success of *smart cities* uses *cluster analysis* so that districts/cities that have or have not met the *smart city* criteria are obtained.

TABLE 1: Smart City Indicator Data.

Indicators of people's well-being	Abbreviation
Population growth rate (Year)	X ₁
Population density (km ²)	X ₂
Residents 10 years and above with the highest education of junior high school or above (%)	X ₃
Average expenditure per capita per month (Rp)	X ₄
Households with tap water source (%)	X ₅
Young population 0 – 14 years (%)	X ₆
Senior population ≥ 65 years (%)	X ₇
Residents who have health complaints (%)	X ₈
Life expectancy (%)	X ₉
Households with a floor area of < 10 m ² (%)	X ₁₀

Source: (Data Processed, 2022)

3. Results and Discussion

The results of this study show that the average results of high cluster accuracy to identify the success of smart cities in each district/city in Aceh Province are based on data on people's welfare indicators from 2016 to 2021. The initial stage is the standardization of modifiers. Object clustering is by clustering objects based on the minimum distance of an object to a predetermined cluster center.

Districts/cities in Aceh Province are grouped into four clusters based on the characteristics of the districts/cities. The initial cluster center is determined from the average value of adjacent districts/cities in terms of the geographical location of the districts/cities. The results of district/city clusters in Aceh Province based on smart city indicator data using the cluster method are presented in the following table.

The results of district/city clusters in Aceh Province show that the geographical location and government structure of the districts/cities greatly affect the results of the clusters produced. The characteristics produced by each *cluster* are in accordance with the reality in the field. Information obtained from members of the first cluster is a district/city that is experiencing expansion and is just developing. The second *cluster* member is a district/city whose area is located around the coast. The third cluster member is a district/city located in the highlands area. Members of the fourth *cluster* are the center of the economy, government, and tourism of Aceh Province. The following are the results of *smart city* mapping in Aceh Province based on the following picture.

The *cluster* picture obtained is said that districts/cities that are in clusters with very low welfare levels are members of the first *cluster*. The medium welfare level is the members

TABLE 2: Results of Cluster Districts / cities in Aceh Province with Cluster method and Cluster characteristic.

Cluster	Characteristics of district/city modifiers		Member Cluster
	Tall	Low	
	Maximized in implementing <i>smart city</i>		Banda Aceh
1	Average expenditure per capita per month (X_6) Residents aged 0 – 14 years (X_9)	Population density per km 2 (X_2)	Sabang, Aceh Jaya, Simeulue, Bener Meriah, Aceh Tengah, Aceh Tamiang, Langsa.
2	Dependency load number (X_3) Percentage of the elderly population \geq 65 years (X_{10})	Percentage of population 10 years and over with the highest education of junior high school or more (X_5)	Aceh Besar, Pidie Jaya, West Aceh, Nagan Raya, Aceh Barat Daya, Aceh Selatan.
3	Percentage of population 10 years and over with the highest education of junior high school or more (X_5)	Percentage of population growth rate (X_1) Average length of illness (X_4)	East Aceh, Lues, Southeast Aceh, Subulussalam, Aceh Singkil.
4	Average expenditure per capita per month (X_6) Percentage of households with tap water source (X_8)	Dependency load number (X_3) Percentage of young population 0 – 14 years (X_9).	North Aceh, Lhokseumawe

Source: (Data Processed, 2022)



Figure 1: Smart City Mapping Results (Data Processed, 2022).

of the second and third *clusters* and the districts/cities with high welfare levels are the Banda Aceh City *cluster*. The causes of the high and low levels of people's welfare of cluster members include the geographical location of the district/city, socio-cultural conditions, human resources, natural resources, and progress of regional development which includes government structures based on the concept of *smart city*.

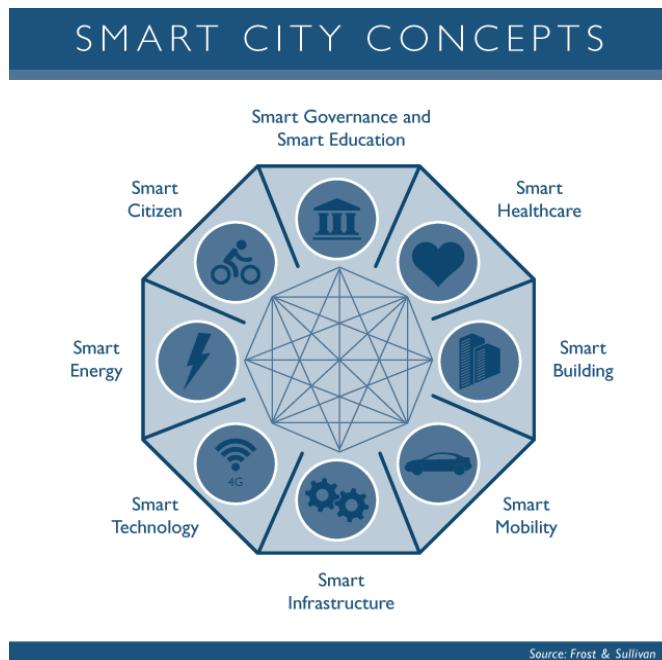


Figure 2: Smart City Concept (Data Processed, 2022).

The characteristics of a *cluster* of districts/cities in Aceh Province in terms of similarity show the effectiveness of *smart city* implementation in each region. The similarity of the characteristics of each cluster can be seen from the high and low welfare indicators of each district/city. The results of this *cluster* can be a reference for the Aceh Provincial government in taking development policies that aim to improve the welfare level of the people of Aceh Province based on just and civilized humanity in order to produce humans who are ready to compete with the development of modern technology that continues to develop.

So that later the government can allocate funds according to the needs of each district/city in Aceh Province. The results of this development are expected to reduce the poverty rate of Acehnese residents so that the implementation of *smart cities* can be carried out optimally and evenly. Education on smart city understanding must also be given good socialization, in order to form a joint commitment in realizing *smart cities* in each district/city in Aceh Province.

From several other literatures, it was found that the concept of smart city is still not optimally carried out by various other provinces in Indonesia. As conducted by [14] in “Smart Government in Realizing *Smart City* in Bandung City”. This study examines the implementation of *smart city* in Bandung City in terms of *online services*, infrastructure, and *open government*. Of these three aspects, which still do not support the implementation of smart *cities* related to infrastructure mapping according to the needs of the Bandung City Government in implementing *smart government*.

[15] in a study wrote that the smart *city* concept can give birth to innovative and efficient development planning directions. The smart *city* concept can also make it easier for the government and the public to access public participation spaces. Then [16] also explained in his study on the concept of smart cities in the contemporary era that it is required for local governments to take advantage of technological developments as a potential for the realization of progressive development using the smart *city* concept.

Based on some of the review literature above, it shows that the *smart city* concept approach developed is more likely to use digital technology in providing space for public participation. In addition, Widiyastuti, ST., MT et al. [17] The concept of smart city using a sustainable and integrative approach, where this study emphasizes more on how the government’s strategy to realize a smart city does not ignore sustainability aspects. Hidayat (2020) in his thesis entitled “The Role of Sustainable Development on Poverty Alleviation”. This study examines poverty alleviation through social, economic, and environmental pillars in Indonesia.

Study of the National Development Planning Agency [18], in the study of smart city development in Indonesia, 2015, *smart city* is a further development of urban areas that are able to meet the needs of its population and lead to sustainable urban development. Previous *smart city* studies have also been examined by Sucitawathi et al. [3] result from the research saw how the concept of implementing smart city in Denpasar City which is implemented by several agencies including: a). Communication, Informatics, Coding and Statistik Agency under the name Denpasar *cyber monitoring*, b). Regional Disaster Management Agency through the Damapanpana program, c). Licensing Office with online licensing program, d). Immigration Office, through *e-passport* service.

Then the study of smart city, the concept of smart city as an alternative to solving district/city problems, in major cities of North Sumatra Province by Hasibuan and Sulaiman (2019). The results of this study show that the inability to balance the concept of smart cities, the pillars of smart city development, the paradigm of government, and the vision and mission of local governments is one of the causes of undirected and unmeasured *smart city* development.

Furthermore, a study conducted by [14] on *smart cities* in Bandung City: a review of technological, human, and institutional aspects. The results of this study concluded that the implementation of *smart city* in Bandung City can be seen from three aspects, namely technology, humans, and institutions, but in the human and institutional aspects it is still not optimal, so it still requires effective socialization, especially related to the use of *online applications*.

From several types of review literature above, none of them explain how the support of the provincial government in implementing the *smart city* concept in governance in districts/cities, so both regulations and policy directions are still unclearly carried out by each region. Then from the results of previous studies, all explanations related to the implementation of *smart cities*, which have only succeeded in urban areas, or areas close to the provincial capital, infrastructure, and public accessibility are more supportive

4. Conclusion

Based on studies that have been conducted on governance in encouraging smart city policies in Aceh using *smart city* indicators through a 4 (four) *cluster* approach. So it was found that Aceh Province is still experiencing obstacles in implementing *smart cities* in 3 (three) *clusters* caused by regional geographical factors, including regional expansion factors and newly developing areas, districts/cities located in coastal areas, and districts/cities located in highland areas. While *cluster 4* (four) is the central district/city of the economy, government, and tourism of Aceh Province. At this stage it has been considered good the implementation of smart city, due to regulations on smart cities, the high desire and commitment of the City government, and the existence of several *smart city* components that have been implemented quite well.

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