

# How to realize a river-based smart city? (lesson learned from Banjarmasin)

*by Ika Sartika*

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**Submission date:** 30-Jun-2023 09:52PM (UTC+0700)

**Submission ID:** 2124786231

**File name:** How\_to\_realize\_a\_river-based\_smart\_city\_lesson\_lea.pdf (267.71K)

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## How to realize a river-based smart city? (lesson learned from Banjarmasin)

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To cite this article: I Sartika 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **673** 012033

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## How to realize a river-based smart city? (lesson learned from Banjarmasin)

I Sartika<sup>1</sup>

<sup>1</sup>Institut Pemerintahan Dalam Negeri

**Abstract.** The city of Banjarmasin, which is above the flow of hundreds of rivers, has the biggest challenge in implementing a smart city. Banjarmasin City Government must focus and choose whether to focus on the river or land-based smart cities. To realize river-based smart cities, there are consequences that all facilities must be provided as well as water quality and water transportation, while current conditions are still inadequate. This study aims to analyze the factors that can accelerate the realization of river-based smart cities. The research method used is qualitative with data sources derived from the results of in-depth interviews with informants. Informants in the study were determined using the Penta helix principle, which consisted of: academics, businessmen, community, local government, and media. The total informants were 25 people. Data processing using the program, NVIVO 12 PLUS. The results showed that to realize a river-based smart city in Banjarmasin, it is necessary to identify supporting factors that are appropriate to the characteristics of the area and the culture of the surrounding community. The results showed that five aspects must be considered, namely: community, environment, transportation, business, and government. A river-based smart city is a concept that has not been widely discussed scientifically, even though it is very useful to be applied in cities that have enormous river potential, such as Banjarmasin.

### 14 Introduction

The Smart City concept based on the United Nations aims to form a sustainable city (economic, social, environment), establish a city that is safe, comfortable for its citizens, and strengthens the city's competitiveness in terms of the economy. Smart City uses information technology to run a more efficient city life [1]. Smart City can be defined into 6 (six) dimensions [2], namely: Smart Government, Smart Economy, Smart Live, Smart Living, Smart People, and Smart Mobility. Smart cities are a vision of urban development to integrate information and communication technology (ICT) and the Internet of Things (IoT) technology in a safe way to manage municipal assets. Cities in developed countries of the world have implemented Smart City with very sophisticated technology. The top five best cities in the world that implement Smart City are Vienna, Toronto, Paris, New York, and London. How about Indonesia? On May 22-23, 2017, the Movement into 100 Smart City was kicked off in Makassar. The inauguration was marked by the signing of the MoU (Memorandum of Understanding) between representatives of the Central Government and 25 regional heads elected as participants in the first stage.

Movement Towards 100 Smart City continues to roll and is now entering the second stage. There are 50



cities/regencies that will transform into Smart Cities throughout Indonesia. Minister of Communication and Information Rudiantara said Smart City is an ongoing process. Improvement of services to the community that continues to be improved into a city/regency is categorized as a smart city [3]. Banjarmasin City is one of the cities chosen in the second stage of the Movement to 100 Smart City.

The city of Banjarmasin, which is above the flow of hundreds of rivers, has the biggest challenge in implementing smart cities, especially preparing people's mentality [4]. Banjarmasin City Government must focus and choose whether to focus on the river or land-based smart cities. River-based cities are now capitalizing on the potential of their bodies of water to serve as critical transportation networks to complement land-based transport [5]. Given the magnitude of transport-problems in many large cities, the potential of rivers to serve as transportation arteries is being recognized once again [6]. Cities such as Brisbane, New York, London, Gothenburg and Bangkok have operating urban ferry systems which play an important role in the transport functions of each city [7]. River-based smart cities require good water quality and transportation facilities. Meanwhile, the river water quality in Banjarmasin City is yellow and not clear. Banjarmasin City is unique in terms of its geographical conditions in the form of river flow. The smart city concept that will be implemented in the future will certainly be different from other cities in Indonesia.

Research on smart cities has been widely carried out in other cities, including outside Indonesia. The focus of previous research discusses more aspects of smart cities including stakeholder involvement in smart city planning [8], smart city governance [9], government readiness in realizing smart cities [10], citizen engagement [11], smart city services [12], smart city strategies [13], smart city models [14], as well as examples of smart cities in Europe [15]. Other research related to smart cities but more focused on management [16], local government innovation [17], and technical city development [13]. River-based smart city models are still relatively rare. That is, previous research more focused on smart city design in general without considering the number of rivers as potential as happened in Banjarmasin City. Therefore, this paper will try to identify factors that need to be considered to realize a river-based smart city in Banjarmasin.

## 2. Method

This research was conducted with a qualitative descriptive approach following the objectives of the study. The operational scope of this research is focused on six aspects in smart cities, then broken down into dimensions according to each aspect [10], [18], namely:

- 1) Smart Government:
  - a. Enabling supply & demand side policy
  - b. Transparency & open data
  - c. ICT & e-government
- 2) Smart Economy:
  - a. Entrepreneurship & innovation
  - b. Productivity
  - c. Local & global interconnectedness
- 3) Smart Living:
  - a. Culturally vibrant & happily
  - b. Safe
  - c. Healthy
- 4) Smart Environment:
  - a. Green buildings
  - b. Green energy
  - c. Green urban planning

- 5) **Smart People:**
  - a. 21<sup>st</sup> Century education
  - b. Inclusive society
  - c. Embrace activity
- 6) **Smart Mobility**
  - a. Mixed-modal access
  - b. Prioritized clean and non-motorized options
  - c. Integrated ICT

In this study, the informants were determined based on the Penta-Helix Model [19], which included five types of stakeholders: the business world, city government, the community, universities, and the media. Determination of informants using accidental sampling techniques. While the data collection techniques used were interviews conducted with informants, documentation; conducted on documents relevant to research such as results of previous studies on smart cities, historical data, images, maps, regulations, and writings in media that are relevant and related to the research topic, as well as observation, that is, researchers involve themselves with activities that are being observed, such as trying out the applications that have been prepared by the Banjarmasin City Government. With observations like this, the data obtained will be more complete, sharp, and by reality. Also, to see the driving factors for the realization of a smart city in Banjarmasin, careful observation is needed.

Data analysis was performed using NVIVO software. NVIVO is a software package produced by QSR International, has many advantages, and can significantly improve the quality of research. Qualitative data analysis is made easier and produces more professional results. This software can reduce a large number of manual assignments and give researchers more time to find trends, recognize themes, and draw conclusions [20]. The procedure of data analysis using NVIVO software is as follows.

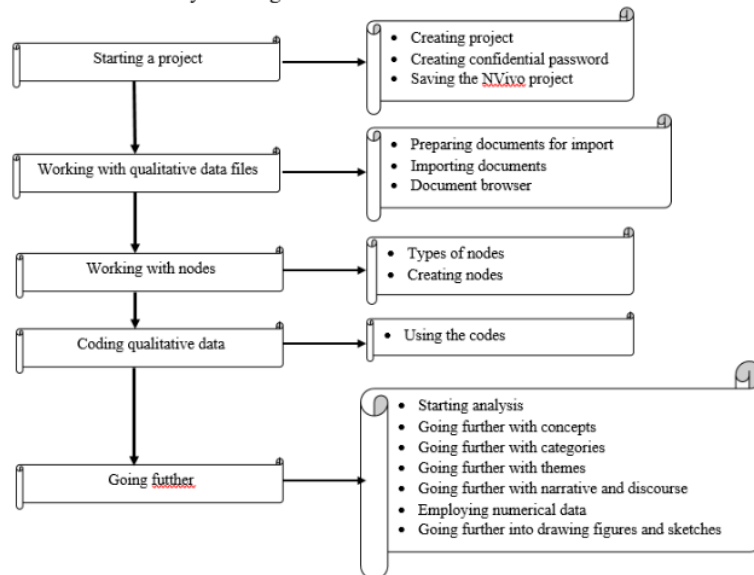


Figure 1. Procedure for Using NVIVO Software [20]

### 3. Result and Discussion

The realization of a city into a smart city depends very much on the readiness of all parties, not only the government. Therefore, the determinants that can accelerate the formation of smart cities in Banjarmasin will be identified based on stakeholder perceptions. As mentioned in the previous section, stakeholders in this study are determined based on the principles of Penta helix, Academician, Businessmen, Community, Government, and Media. Stakeholders' perceptions are captured through in-depth interviews with informants. Further data processing uses the NVIVO 12 PLUS software to map the results of interviews so that they are more meaningful and can be categorized according to research needs. The first step is importing interview transcripts in word format into the NVIVO program.

The next step is to make nodes which are the keywords in the realization of the smart city in Banjarmasin. Nodes were determined based on the results of interviews with informants. By using the run query menu on the NVIVO 12 PLUS program, words that often appear from the interview results are obtained. In this case, five words often appear, with the results shown in Figure 2 below. The word government and community are two words that often appear or are often referred to by informants, followed by the words environment, transportation, and business. The words that often appear describe the expectations of stakeholders, namely river-based smart cities in the city of Banjarmasin are expected to be realized at the initiative of the government and the community by utilizing the river as a means of transportation and business, by paying attention to environmental sustainability.



**Figure 2.** Words Frequency Query of Interview Result

Nodes can also be increased according to the results of the interview and will be found during the coding process. From the coding process, it can be seen that the five nodes produce different subnodes depending on the results of interviews with informants. The description of each node with its forming factors can be seen in the following section.

The community has attributes or sub-nodes of culture, education, health, participation, and welfare. Culture and health attributes are the elements that make up the largest portion of the community. That is, in realizing a river-based smart city in Banjarmasin City, it cannot be separated from the culture of the people who have a Malay background. Basically, the Malay community has a friendly and respectful character. The second attribute is health. The results showed that health was the most widely discussed by informants, both in terms of facilities, or supporting regulations. The public wants health aspects to be an important consideration in realizing smart cities. Other attributes that must still be considered are education, participation, and welfare. Education with health is a basic community needs that must be a development priority. The embodiment of the smart city must be accompanied by high community participation. All things prepared by the government will be in vain if the community does not get the maximum benefit. The ultimate goal of all is to improve community welfare.

The characteristic of the city of Banjarmasin that is unique to the flow of the river in each location, so it is called a city of a thousand rivers, causes the environmental aspects to be an important priority in realizing a smart city. The results showed that environment friendly is a concept that should be promoted by the Banjarmasin City Government. Environment friendly is a very dominant factor in the aspect of investment.

Other aspects are regulation and a thousand rivers. That is, everything related to the environment must be outlined in regulations passed by the Banjarmasin City Government. One thing that needs to be mutually agreed that the smart city that will be realized is different from other regions, given that Banjarmasin is a city of a thousand rivers.

Transportation plays an important role when talking about the city of a thousand rivers because it will not be separated from the use of rivers as a means of transportation. Likewise for the city of Banjarmasin, although at present the river conditions are still less than optimal, both as a means of transportation and also in terms of water quality. But in the future, river conditions must be improved so that they are suitable for transportation and can be an alternative mode besides land transportation. Or at least the river can be a means of transportation in the context of tourism. Currently, it has been implemented, but it is still not optimal. Integration with other modes online needs to be well designed, so that the factors forming the river-based smart city from the transportation aspect consist of the internet network, infrastructure, mixed modes, and river utilization.

The business aspect that involves entrepreneurs is another important thing to realize a smart city. The business climate is an important factor because it can be an indicator of the investment attractiveness of a location. A conducive business climate is the main capital in the development of the local economy. The business climate in Banjarmasin is promising for investors, although access to the international world is still not optimal. The business that is expected to develop in the city of Banjarmasin is the utilization of local potential that can be marketed together with the use of rivers as a means of transportation and tourism.

From the aspect of government, transparency is an attribute that has the largest portion based on the perception of informants. That is, the public hopes that the government process can be accessed transparently by all parties. The concept of a smart city that is offered must be able to answer the people's curiosity about everything that happens in government. Another aspect that is no less important is public services. The community hopes that the government will continue to focus on more quality, efficient, and effective public services. River-based Cedas City must be a Banjarmasin City Government policy that must be written and supported by various other regulations.

The overall research results can be seen in Figure 10 below. Factors forming the river-based smart city in the city of Banjarmasin are shown visually with different portions. All factors must still be considered because each has a contribution to the realization of a river-based smart city in the city of Banjarmasin.



**Figure 3.** Factors Forming River-Based Smart Cities in Banjarmasin

## 2 Conclusion

To realize a river-based smart city in Banjarmasin, it is necessary to identify supporting factors that are appropriate to the characteristics of the area and the culture of the surrounding community. The results showed that five aspects must be considered, namely: community, environment, transportation, business, and government. The five aspects are formed from other important factors that are more detailed. All factors must still be considered because each has a contribution to the realization of a river-based smart city in the city of Banjarmasin.

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