ABSTRACT

Yogyakarta is a city in Indonesia which is one of the tourist destinations in Indonesia. In 2021, the total population in Yogyakarta City reach 415,509 people of 32.5 km^2. However, Yogyakarta City is not free from problems, such as garbage, inadequate public facilities, PDAM services, electricity services, etc. as recorded on the complaint menu of the Jogja Smart Services application. During the January-December 2021, 802 complaints were recorded in the application. However, in this study, we will take some of the cases from the 802 complaints. There are five problems that, according to the author, can be solved with a smart system, namely PJU, PLN Services, PDAM Services, AQMS, and Garbage. And to solve them, we can use four kinds of smart devices, smart metering, smart lighting system, smart waste management, and then smart air quality monitoring. Another factor is that the Yogyakarta City Government has an e-government master plan document stipulated in the Yogyakarta Mayor Regulation Number 15 of 2015 concerning e-Government, namely "The realization of e-Government as a means of reliable Yogyakarta City management information system in supporting effective public services, efficient, transparent, accountable and participatory so that it becomes Yogyakarta Smart City". From these factors, it encourages the Yogyakarta City Government to develop Yogyakarta City towards a smart city.

The smart city concept is divided into 6 aspects, namely (1) Smart economy; (2) Smart mobility; (3) Smart environment; (4) Smart people; (5) Smart living; and (6) Smart governance.. To achieve Smart Indonesia, it will not be enough if it is only done by the Central Government (Top to Down). All levels of government must participate in realizing Smart Indonesia. Starting from the Central Government, the Provincial Government, to the Regional Government must work together in building it. In this case, Smart Province is the initial step to support the formation of smart cities in the relevant provinces through e-governance. The purpose of establishing digital governance or e-governance is to build an information system that will assist managerial and data integration that can support decision-making in the form of policies .

In realizing the smart city concept, it requires Internet of Things technoloy. One of technology of Internet of Things is LPWAN. That technology is the strongest

candidate in the smart city concept which includes one of the technologies in IoT connectivity. Therefore, the author in this case will analyze using a non-cellular LPWAN. In this study, the non-cellular LPWANs used were LoRAWAN and Sigfox. The analysis used for this research is technical and economic analysis. The results of the technical analysis are coverage by signal and coverage by SNR. For LoRaWAN, coverage by signal is -70.07 dBm and Sigfox is -59.29 dBm. Meanwhile, the coverage by SNR LoRaWAN is -101.12 dBm, and for Sigfox it is -83.31 dBm. For the results of the economic analysis in the form of LoRaWAN IRR of 39.51% and Sigfox of 53,63%,The payback period that will be obtained by each LPWAN is, LoRaWAN takes 3 Years 11 Months and Sigfox 2 Years 10 Months.