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## **Smart City Sebagai Salah Satu Alat Untuk Mencapai Kota Berkelanjutan (Studi Kasus: Penerapan Konsep Kabupaten cerdas di kabupaten Sleman Indonesia)**

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### **Abstrak**

Kota berkelanjutan adalah kota yang dirancang dengan mempertimbangkan dampak terhadap lingkungan, dihuni oleh populasi dengan jumlah dan perilaku yang membutuhkan minimal energi, air dan makanan, dan menghasilkan lebih sedikit CO<sub>2</sub>, gas, polusi udara dan air. Terlebih lagi pemerintah pusat telah mencanangkan Indonesia pada tahun 2030 yang akan mengimplementasikan kota cerdas/pintar menuju pembangunan berkelanjutan. Khususnya di Kabupaten Sleman, pemerintah berkomitmen untuk menjadikan Kabupaten Sleman sebagai Kabupaten Cerdas pada tahun 2021. Hal ini dapat ditunjukkan dalam visi Kabupaten Sleman yaitu Terwujudnya masyarakat Sleman yang lebih sejahtera, mandiri, berbudaya dan terintegrasi dengan sistem e-government menuju smart regency tahun 2021". Paper ini menganalisis bagaimana Kabupaten Sleman menerapkan konsep kota pintar, dan apakah konsep kota pintar dapat mewujudkan kota berkelanjutan di Kabupaten Sleman. Penelitian ini menggunakan pendekatan kualitatif dengan wawancara mendalam dalam memeriksa data, juga tinjauan pustaka. Hasil dalam penelitian ini adalah sebagai berikut: pertama, dari tahun 2016-2019 Kabupaten Sleman memiliki beberapa aplikasi untuk mendukung implementasi kota pintar seperti Satu Data UMKM, Home Creative Sleman, aplikasi Lapor Sleman, aplikasi Smart Sleman, aplikasi pajak online, e-pasien, layanan darurat sleman, dan ruang pintar Sleman. Kedua, ada banyak elemen di kota pintar yang sangat penting khususnya pemerintahan cerdas, kehidupan cerdas, ekonomi cerdas, masyarakat cerdas, dan lingkungan cerdas. Namun, dalam kenyataannya untuk mendukung terwujudnya kota cerdas, tidak semua aspek telah diimplementasikan dengan baik untuk mencapai kota berkelanjutan, komponen terpenting terkait dengan lingkungan yang cerdas belum dapat diimplementasikan dengan baik di Kabupaten Sleman. Masih banyak problematika tentang masalah lingkungan di antaranya adalah pembangunan hotel dan apartemen yang tidak mengindahkan lingkungan, populasi di Kabupaten Sleman semakin banyak, serta makin sempitnya ruang terbuka hijau.

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## Smart City as A Tool to Achieve Sustainability City Case Study: Sleman Smart Regency Implementation, Indonesia

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**Keyword:**  
Smart City,  
Smart  
Environment,  
Sustainability,  
Development,  
Implementation.

### **Abstract**

*Sustainable city is a city that designed by considering the impact on the environment, inhabited by population with a number and behavior that requires minimal support for energy, water and food from the outside, and produces less CO<sub>2</sub>, gas, air and water pollution. Moreover the national government envisions Indonesia 2030 which shall implement the smart city towards sustainable development. Especially in Sleman Regency, the government is committed to make Sleman Regency as a Smart Regency in 2021. It could be shown in the vision of Sleman Regency which is "The realization of a more prosperous Sleman community, Independent, Cultured and Integratede-government system to the Smart Regency in 2021". This paper would like to analyze how the Sleman Regency implement the Smart city concept, and does the smart city concept can achive the sustainability city. The research uses the qualitative approach with in-depth interview in examining the data, also the literature review. The result in this study reveals the following: firstly, from 2016-2019 Sleman regency has several applications to support the smart city implementation such as One Data of UMKM, Home Creative Sleman, Lapor Sleman app, Sleman Smart app, online tax app, e-patient, sleman emergency service, and Sleman smart room. Second, there are many elements in smart cities that are very important for smart government, smart life, smart economy, smart society, and smart environment. However, in supporting to support the realization of smart cities, not all aspects must be implemented properly to achieve a managed city, components related to smart environment cannot be implemented properly in Sleman Regency. There are still many problems regarding environmental problems such as the development of the construction of hotels and apartments that do not heed the environment, incrasing the populations, the limitations of green open space.*

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## INTRODUCTION

In Indonesia, many regions have already implemented the concept of smart city such as Balikpapan, Makassar, Yogyakarta, Bandung, Surabaya Banyuwangi, Tomohon, East Lombok, Sukabumi, Bandung, Samarinda, Bandung, Semarang, Tangerang, Sleman, Bekasi, Bogor, Cirebon, Pelalawan, Banyuasin, Bojonegoro, Gresik, Sidoarjo, South Tangerang, Mimika, Kutai Kartanegara, Siak, and Jambi (Sutanta, *et al* 2016). Each of these regions or cities showed innovation being smart cities. This include the presence of smart hospitals, where health services are much more accessible to the public . Smart hospitals

that can facilitate the community, adding a sensor device on the patient and board status placed waiting room to track the existence of patients (Indera, n.d.). Then another example is the smart parking censor platform, which is a feature of filling up gasoline and adding features vehicle wash and service.

In Yogyakarta, some districts have implemented smart city/smart regency. For example, Sleman Regency which is one of the pilot project of Ministry Of Communication And Informatics of Republic Indonesia in terms of application smart city (Anindra, Supangkat, & Kosala, 2018). As it is known that in 2017 Sleman was awarded as a District committed to continue to support the implementation of smart city and 24 other cities/districts in Indonesia (slemankab.go.id, 2019). Moreover, in 2017 Sleman has completed 5 quick win in one data of SMEs, smart room, *Lapor Sleman*, Sleman Creative House, and Sleman Creative Space (slemankab.go.id, 2019). Regent Sri Purnomo as Regent is fully committed to make Sleman as a smart regency in 2021, based on the application of integrated information and communication technology. Strategy and road map of smart city implementation is founded on a regional medium term development plan (RPJMD) of Sleman 2016-2021. The implementation of good information technology will ultimately support the process of determining the direction and policy of an organization, as well as the Sleman regency. In accordance with the vision of Sleman Regency that is "The realization of a more prosperous Sleman community, Independent, Cultured and Integrated system to the Smart Regency in 2021 (RPJMD Sleman 2016-2021).

The components of Smart Regency development in Sleman Regency Government is focused on several aspects (RPJMD Sleman, 2016-2021), namely:

1. Service, emphasis on technology utilization and improvement of human resource commitment to realize excellent service toward Sleman Smart Regency.
2. Internal efficiency, simplifying procedures, standardization, emphasis on time efficiency and cost of unnecessary pruning/bureaucratic procedures, as well as standard setting.
3. Networks/inter-governmental institutions, emphasis on establishing connections between government institutions for resource sharing, particularly related to data resources.

Based on (Nam, Taewoo, 2011), a comprehensive view of smart city emphasized the commitment to innovation in technology, management and policy. There are three (3) components that influence smart city namely: (1) smart government, (2) smart technology, and; (3) smart citizen. Smart government which continues to be developed by Sleman Regency government to support smart regency. Sleman regency is very committed to continue realize the smart regency. Many applications that have been made by Sleman local government to facilitate the community in obtaining services more easily, effectively, and

efficiently. In addition, which is not less important to realize the Smart Regency in Sleman is smart citizen. It is already mention above that smart city is about how synergy between technology and its citizens; without smart people, smart city development will not run well. Intelligent societies are urgently needed as the main driving force of the digital economy which is expected to produce a change in the future of the economy (Holler, n.d.). A citizen or community who often use the internet will most likely be more productive. The more connectivity a person has, the more information they can get (Chang, Chang, Hung, & Tsai, 2010). This is what causes wireless technology is very important in building intelligent people. Here are the smart city applications that have already been done by government of Sleman. However, the environment side also take a part for realizing the sustainability city (Borja Zapata, Rosa M. Arce, 2018). In view of the reports abridged in later sections of this report, analysts concur that maintainability relies upon social, economic, environmental and governmental factors.

**Table 1.1. A List of Smart City Apps Issued By The Sleman Regency Government**

The Name of Application	Description
Sleman TV	Manage by Department of Communication and Information that provides visual video under the theme smart city, tourism, medium micro enterprises, etc.
One Data of UMKM (Medium micro enterprises)	The integration information system about UMKM.
Home Creative Sleman (State-Owned Enterprises)/BUMN	In collaboration between government, academic professional, business and community in making economic creative.
<i>Lapor Sleman App</i>	The application provide the citizen to report what happening in their life, like lost people, the street that damaged, etc.
Sleman Smart App	The application is based on the android/smart phone created to give the access of information related with Sleman website, amazing sleman, permissions, Sleman map, etc.
E-patient	e-patient gives the information about medical prsonnels, i.e. doctors and through the website the community also can directly register to get priority number for medical checkups.
Online Tax	facilitate the community to pay taxes online, so the community that want to pay the tax do not need to come to tax office.
CCTV Monitoring	Accessed through website (24jam.sleman.go.id), the application created for increase the number of security
Sleman Emergency Service	This application is for ambulance emergency services, where everyone can access by call center (0274-8609000).

Sleman Smart Room	Created to facilitate the government especially to deal with policy making, meeting, coordination, etc. The smart room is equipped with the technology and information and communication (ICT).
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Source: *Kedaulatan Rakyat*, February, 28th, 2019.

The efforts of the Sleman Regency government have actually been carried out to realize the Sleman Smart Regency in 2021. The development of technology to improve the field of public services, health, and the environment has also been manifested. In addition, Sleman ranked second in the Best Smart Governance category in the 2018 Indonesia Smart Nation Award (ISNA) from City Asia, becoming one of the top 6 districts that have succeeded in realizing Community-Based Total Sanitation in 2018, and had won the *adipura* award in 2017. a form of appreciation from the government for selected cities that have succeeded in maintaining cleanliness and sustainable management of the urban environment. Sleman's success in achieving this *adipura* is due to sanitation management efforts, namely waste management from waste sources from offices, businesses, terminal markets, etc. well managed, starting from sweeping, collection and management (slemankab.go.id).

For the management of Green Open Space (RTH), it is carried out with the Hajj planting program, bride planting, school children graduating planting, so that the shade can be evenly distributed from villages and cities. Whereas sanitation management in Sleman has been carried out by making 127 pieces of Ipal which can be utilized by the community to maintain clean water sources so that they are not polluted by waste. In the future the strategy that will be implemented to be able to maintain *adipura* by improving clean living patterns for the community by managing waste independently from collection, sorting to the use of waste. In the future, pioneering has also been carried out to have its own landfill in Sleman Regency. Sleman will also build a sewage treatment plant by making regulations on suction of sewage, sanitation, and city shade.

In addition, Sleman also has the best innovation in maintaining the condition of open defecation while simultaneously improving the quality of access to community-based services. The pillars of total community-based sanitation are: open defecation, washing hands with soap (ctps), securing drinking water and household food, securing household waste, securing household liquid waste. Therefore, with the concept of smart city that has been applied in the sleman paper district, trying to explain the relation of smart city is one of the efforts to achieve sustainability city.

## **RESEARCH METHOD**

This research uses qualitative approach. Qualitative research is a study that intends to understand the phenomenon of what the subject of research is experiencing holistically and by way of description in the form of words and language, in a natural special context by utilizing various natural methods (Sugiyono, 2017). Qualitative research has the following characteristics: (1) research data obtained directly from the field, and not from laboratory or controlled research; (2) extracting data is done naturally, making visits to the subject's natural situations; and (3) to gain new meaning in the form of answer categories, researchers must develop a dialogical situation as a scientific situation (Sugiyono, 2017). This research conducted at Sleman regency government. The Data collection techniques in this study is using non- participatory observation, interviews, and documentation. While the data analyst using Miles and Huberman (2014) said there are 3 kinds of interactive data model analyst that can be used, namely; (a) data reduction; (b) the presentation of data; (c) draw conclusions/verifications.

## **FINDING AND DISCUSSION**

The area of development in the Sleman Regency Government is focused on: Services, emphasis on the use of technology and increasing the commitment of human resource to realize excellent service. Internal Efficiency, Simplifying Procedures, Standardization, emphasis on time and cost efficiency, unnecessary procedure/bureaucratic trimming, and standard setting. Network between government institutions, the emphasis is on establishing connections between government institutions for sharing resources, especially related to data resources (Prihantoro, 2019). The development of Sleman Smart City is proven by the following products/services:

### **Smart Governance**

<b>Service</b>	<b>Information</b>
e-ppdb	The new student admission information system for junior high schools in Sleman is integrated online and in real time
Mobile pbb	Android mobile application used by the public to check the amount of land and building tax to be paid annually and payment history information of the previous 5 years
Lapor sleman	It is a forum/media for Sleman residents to express their aspirations and complaints in the form of complaints, criticisms and suggestions to the sleman district government related to the development problems in sleman district
Sleman tv	The official youtube channel of the Sleman regency government presents video coverage of various government and community activities and activities in the sleman district
Online tax	Integrated licensing system which is an online licensing service in Sleman Regency, where the public can manage various types of licensing systematically starting from registration, counseling,

	checking the status of the permit process as well as information on completed permit documents and payment bills to be broadcasted via SMS by the system
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Source: [mediacenter.slemankab.go.id](http://mediacenter.slemankab.go.id)

### Smart Branding

Service	Information
Sleman creative space	It is the center of Sleman's creative industry economic ecosystem in the fields of film, animation and video. Facilitating the community or creative industries in Sleman to be creative and networked
Branding 'Sleman The Living Culture'	Tourism branding that has global values and icons, and can attract tourists, investors and business people to visit, invest and do business in Sleman Regency
Branding 'Beras Sleman'	Sleman rice is rice branding that originates, is managed and consumed by the Sleman community. The quality of Sleman rice has been recognized and a regent's circular has been issued regarding the use of sleman rice in the sleman district government
<i>Kopi Merapi</i>	Volcanic activists at Mount Merapi bring fertility to plants that grow on the slopes of Merapi, including coffee plants

Source: [mediacenter.slemankab.go.id](http://mediacenter.slemankab.go.id)

### Smart Economy

Service	Information
Home Creative Sleman	Is an integrated service center for micro, small and medium enterprises (MSMEs) in accommodating and developing the creative industries of the community
Traditional market revitalization	Traditional market revitalization is carried out by the sleman district government through development, empowerment, and improvement of the quality of community market management in order to increase competitiveness; implementation of professional management; facilitate access to supply of goods of good quality and competitive prices; and facilitation of access to finance to market traders in public markets
<i>e-pangan</i>	It is an application of information services on managing data of basic needs at the farmer and basic levels that are arranged accurately. Monitoring the price of staple goods is very much needed as one of the factors determining the policy relating to agricultural and food commodities in Sleman

Source: [mediacenter.slemankab.go.id](http://mediacenter.slemankab.go.id)

### Smart Living

Service	Information
SES (Sleman Emergency Service)	SES is an ambulance car service for people in an emergency situation that is provided free of charge to the community. SES services in the "call center" cluster located in the Sleman District Health Office with numbers 0274-8609000 or 08112668900
E-patient	It is a system of polyclinic patient registration at RSUD and Sleman District Health Centers online. The public can take advantage of this system facility by registering online on D-1 day for morning registration, and on the afternoon of the day before 12 noon for afternoon registration
Lasamba	LASAMBA can be used for various needs such as education,

	health, and food. The assistance provided is in the form of disability aids, social assistance funds, to the neglected elderly funds
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Source: [mediacenter.slemankab.go.id](http://mediacenter.slemankab.go.id)

**Smart Society**

Service	Information
e-library	Android mobile online library application that contains a collection of sleman library books that can be accessed by people anywhere, anytime
OPAC	A catalog system that makes it easy for people to get information and reference books in the sleman library collection
<i>Ngantar Paimah</i> (Delivery service to home)	This program is a form of social service for people who come to the social service and need transportation services for further referral services or to go home for free
Work Training Center	Improving the quality and productivity of the workforce through the management of Three in One Kiosks (3 in 1), namely training, certification, and placement, as well as competency facilitation
e-ppid	Facilities provided by the sleman district government to serve the public in submitting requests and obtaining public information online

Source: [mediacenter.slemankab.go.id](http://mediacenter.slemankab.go.id)

**Smart Environment**

Service	Information
Management of Available Green Space	Planning, compiling, implementing, and maintaining green open space for the community, especially in the sleman area. The purpose of green open space is to maintain the availability of land as a water catchment area, creating urban planological aspects through a balance between the built environment that is useful for the benefit of the community. The results of green open space include security, comfort, welfare, and beauty of the region
Smart energy (PJU)	Smart energy technology for public street lighting, through the use of energy saving lamps / LEDs, the utilization of solar energy panels, as well as the implementation of the lighting system

Source: [mediacenter.slemankab.go.id](http://mediacenter.slemankab.go.id)

Broadly, there are three main things that must be prepared by a city planning in developing smart cities, which are environmentally friendly, efficient in the use of energy, and applying appropriate technology. Seeing the development of the concept of urban planning in Indonesia can be said to be very fast (at the level of the concept), but the implementation process is not as fast as a continuous discourse. Cities in Indonesia accept the concept of adaptation results from countries that have successfully implemented the concept of smart cities (Caragliu, 2017). The concept of smart city is now a dream of many big cities, including in this sleman district. In terms of technology development for service needs, the sleman district is quite capable. Sleman Smart Regency is designed to maximize public services and support sustainable development. In conclusion, smart city must be able to make its people active in activities, do it calmly, safely, comfortably, happily, and happily.



Sleman Regency continues to show its commitment in realizing Sleman Smart Regency 2021 by continuing to improve the system, human resources, including technology. From various interviews that have been compiled by the author, the Sleman community welcomes the ideas or ideas from the government. The hope of the people of Sleman will be that the Regency is comfortable, in front, and prosperous for the people. In addition, the government is more responsive in responding to the problems that exist in the Sleman Regency Headquarters (Interview, 09/06/2019).

However, an important point to realize sustainability city through smart city is in the context of smart environment. Although other elements are also very important to support the sustainability of sustainability city, the main point of sustainability city is seen from its smart environment. Review the definition of sustainability city that is a city that is designed by considering the impact on the environment, inhabited by population with a number and behavior that requires minimal support for energy, water and food from the outside, and produces less CO<sub>2</sub>, gas, water and water pollution (Kavitha, 2016). In other hand, A sustainable city or commonly called a sustainable city is a city that is designed by considering the impact on the surrounding environment. In other words, a sustainable city is a city that pays attention to the harmonious balance between the development of the city, and the development of its environment. If this balance is broken, then there arises the unsustainability of the system in a city (Nations, 2015). At the beginning of the issue of urban sustainability, this was only seen from its impact on environmental health and energy. But now, the notion of a sustainable city or sustainable city has expanded widely. And the impact on the environment of concern also becomes diverse, viewed from various aspects. The following are the aspects that are considered for a sustainable city: air, water and climate quality, biodiversity, energy, food and agriculture, economy, and economic development, environment and public open space, health and hygiene, public transportation, use of material, hazardous, solid and liquid waste treatment, education (Assessment, 2015).

The thing that needs to be appreciated from Sleman Regency is that one of them is to achieve the Adipura award. The achievement of the 2017 Adipura award is an achievement of the Sleman Regency in realizing a clean, healthy and comfortable urban environment. Sleman was chosen because it succeeded in maintaining cleanliness and sustainable management of the urban environment. Sleman's success in achieving this adipura is due to sanitation management efforts, namely waste management from waste sources from offices, businesses, terminal markets, etc. well managed, starting from sweeping, collecting, and managing. Meanwhile, 275 garbage banks have been formed in the community which are part of the community's activities to reduce landfill waste, so that the accumulated waste is left over from the residue transported to the landfill site. Sleman has also built a 3 R processing site with 31 groups supported by depo transfer, there are

around 28 and plans for each village to have a depo transfer (Prihantoro, 2019). In addition, the management of Green Open Space (RTH) in Sleman Regency is carried out with the hajj planting program, bride planting, school children graduating planting, so that the shade can be evenly distributed from villages and cities. Whereas sanitation management in Sleman has been carried out by making 127 pieces of Ipal which can be utilized by the community to maintain clean water sources so that they are not polluted by waste. In the future the strategy that will be implemented to be able to maintain adipura by improving clean living patterns for the community by managing waste independently from collection, sorting to the use of waste. In the future, pioneering has also been carried out to have its own landfill in Sleman Regency. Sleman will also build a sewage treatment plant by making regulations on suction of sewage, sanitation, and city lull (Prihantoro, 2019).

In addition, the efforts of the Sleman Regency Government to change people's behavior to become more hygienic through the Community-Based Total Sanitation (STBM) approach have won appreciation from the Ministry of Health. Sleman Regency received the STMB award as the six best city districts in Indonesia in its ongoing STBM efforts. Based on STBM e-Monev Data up to July 2018 the Ministry of Health noted that there were 1 province and 21 regencies and cities that had reached 100% in pillar 1, which is Free from Open Defecation. Sleman Regency is included in 21 Regencies and Cities that have committed to Stop Open Defecation. This commitment is demonstrated by the issuance of the Sleman Regent Decree No.124/Kep.KDH/A/2017 which was declared on November 9, 2017. Sanitation access in Sleman Regency up to 2018 amounted to 294,081 households or 90.51% using Permanent Healthy Latrines , 12,767 households or 3.93% use semi-permanent healthy latrines and 18,068 households or 5.56% share using permanent healthy latrines and semi-permanent healthy latrines. The sustainable STBM program in Sleman Regency does not only stop and is limited to the success of the Open Defecation Pillar, this is proven by the success of the Sleman Regency up to October 2018 which has declared 12 Villages from 86 Villages in Sleman Regency As STBM Villages that implement 5 STBM Pillars (Musimatun, 2019).

From the achievements in the Sleman Regency, there are 2 main issues related to the environment that should also get the attention of the government especially the Sleman Regency. Based on observations and interviews, there are a number of things that have become a public problem, including the increasing population density of sleman because there are many migrants, especially students studying in Sleman such as UGM, UNY, Amikom, UII, etc. Then the limitations of land are increasingly narrow which will also narrow the green open space in Sleman Regency because of the construction of many hotels and even apartments in Sleman Regency (Interview, 10/6/2019).

**Picture 1. Problems Encountered in Sleman Regency**



Source: Modified by author (2019).

With the increasing population and the development of hotels and apartments is increasingly widespread in Sleman, of course, bring bad impacts on the environment. In Sleman, hotel construction was built between agricultural land, while in Yogyakarta City the hotel was built between community houses. The development impact was felt by the community around the hotel, starting from the construction process to the operation of the hotel. In the data collected by BPS (Sleman in 2018), Hotel Tax is indeed very high in contributing to the Yogyakarta Local Revenue, which reaches 30%. However, this high number cannot be compared with the suffering experienced by the community around the hotel construction. Citizens' pumps often sound continuously, which indicates that the number of reservoirs is not yet full but the water in the well has run out. Another consequence is the lack of green open space which will have an impact on the amount of pollution and make it uncomfortable.

The decisions taken by the government in terms of development in essence must refer to 3 aspects, namely economic, social, and environmental. When these 3 things are not carried out, the development results will create new problems. In the case described above, the existence of a hotel might be able to drastically increase regional income, but the benefits for the community can be said to be very minimal. With environmental conditions (ground water) which are increasingly declining, this will directly impact on communities experiencing clean water crises.

In general, good development is all about changing people from limited conditions to better in the future, and poor conditions to become richer and more prosperous. Development should not only focus on economic growth, because the most important thing is to facilitate the community to get their basic needs. The construction of hotels and apartments in Sleman Regency is considered to be far from the SDGs concept because it has damaged the basic needs of the community in the form of clean water even though smart city has been implemented. Firmness is needed from the relevant government to stop the construction of hotels, malls and apartments so that these conditions do not spread.

## CONCLUSION

In terms of the implementation of the concept of smart city, Sleman Regency has shown its seriousness in realizing Sleman Smart Regency in 2021. It is proven by the many achievements that have been achieved nationally in terms of smart city. Then many applications have been developed by the government to facilitate the public in obtaining public services. However, Sleman can be said to be not ready to achieve sustainability city because there are still many environmental problems faced. To be able to achieve the sustainability of the city a lot of government tasks, especially Sleman regency to improve especially in the environmental sector should be done. Policies must be pro-environment and have a positive impact on the environment not only economically. The basis of sustainability city is a city that can make its people comfortable to live, also free from pollution. Aside from the policy, there needs to be integration between institutions to realize this, and also must make development priorities to improve the quality of the environment in Sleman Regency.

## RECOMMENDATION

The government and the community must have a role in creating a smart city that aims at sustainability city. In addition, the government must also make a priority scale to improve the quality of the environment in Sleman Regency, as well as make policies that are pro to the environment so that later it can achieve sustainability city through smart cities that have been implemented.

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