

## Conference

# Readiness of Smart City Implementation in Klaten, Indonesia

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**Abstract.** This study described the readiness of the Office of Communication and Information Technology to realize the Klaten smart city program. Qualitative methods were used. The data were obtained through interviews with several employees at the Communication and Information Office of Klaten Regency and with the local population of Klaten Regency. The study results indicated that, based on Mutula and Brakel's e-readiness theory, the Department of Communication and Information of Klaten Regency is ready to realize the Klaten smart city program. This theory consists of 5 indicators: enterprise readiness, human resource readiness, information readiness, ICT readiness, and external environment readiness.

**Keywords:** readiness, Office of Communication and Information Technology, smart city

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## 1. Introduction

The development of technology and information is something that can't deny. This condition has hit various parts of the world, including Indonesia. At this time, Indonesia is entering the era of the industrial revolution 4.0, which is marked by the Roadmap and Making Indonesia 4.0 strategy launched by President Joko Widodo in 2018 at the Indonesia Industrial Summit.

Over time, the industrial revolution disrupted the government sector. Technological innovations that are growing are forcing the government to make changes. There are demands from the community to obtain effective, efficient, and uncomplicated public services. In Law No. 25 of 2009 concerning public services, the state is obliged to serve every citizen and resident to fulfil their fundamental rights and needs within public services. Therefore, the government must carry out changes to provide fast services immediately, and the role of technology does not spare this. One of the government's innovations in the digitalization era is the application of the innovative city concept.

The Ministry of Communication and Information, in collaboration with the Ministry of Public Works and Public Housing (PUPR), the Ministry of Home Affairs, the National

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Development Planning Agency (Bappenas), and the Presidential Staff Office, formed the Movement Program towards 100 Smart Cities. The program aims to guide and assist regencies/cities in compiling a smart city master plan to maximize the use of technology to improve public services and increase an area's potential. The Movement Towards 100 Smart Cities has been rolling from 2017 to 2019.

This movement towards 100 smart cities encourages various regions to compete in realizing the innovative city concept. One of the areas chosen to complement the move towards 100 intelligent cities is Klaten Regency. Furthermore, the Regent of Klaten, Sri Mulyani, emphasized that the Klaten smart city master plan as a development guide in Klaten, which is in line with the vision of the Klaten Regency Government, which is to create an advanced, independent, and competitive Klaten. Therefore, of course, in realizing the Klaten smart city, several aspects need to be prepared.

The Klaten Regency Communication and Information Office, as one of the OPDs, has the task of supporting the Klaten smart city in terms of technology and information. Therefore, an organization's readiness is needed to avoid or minimize failures in implementing the innovative city concept. Thus, the researcher wants to know the Department of Communication and Information's preparedness to realize Klaten smart city using the Mutula and Brakel e-readiness theory. These consist of 5 indicators: enterprise risk readiness, human resource readiness, information readiness, ICT readiness, and external environment readiness.

## 1.1. Smart City

According to Giffinger et al., a smart city is a concept of a city with good performance and foresight from the economic, governance, mobility, environmental, and life aspects built through good cooperation between citizens who have independence high awareness. (1). A smart city is a concept for creating, implementing, and employing technology as a complex interaction between various current systems in a given area (Primary, 2014). Meanwhile, Cohen stated that a smart city is a city that continuously utilizes information and communication technology intending to make people's lives more innovative, more efficient. (Human, 2017). It can conclude that a smart city is an innovative concept that utilizes information technology to integrate the entire community, such as administration, health, education, transportation, economy, agriculture, energy resources, security, and public safety. Where the International Business Machines Corporation (IBM) divides smart cities into six indicators, including:

1. *Intelligent people*, several people who live in the area and have relatively the same culture who can understand the benefits and uses of the infrastructure facilities that have been provided by the government properly and correctly.
2. *Innovative governance*, the Implementation of government governance smartly can change traditional patterns in the bureaucracy to be faster, more effective, efficient.
3. *Smart mobility*, developments in public transport, and mobility. Such as traffic jams, traffic violations, pollution. So we need innovations that are following the times.
4. *An intelligent economy* creates an ecosystem that supports the community's economic activities in line with the leading regional economic sectors that are adaptive to changes in the current information age.
5. *Innovative environment*, innovative environmental management. There is a concern for the environment in urban development that is as great as the attention given to developing physical infrastructure and facilities and infrastructure for residents.
6. *Smart living* emphasizes the process of managing the quality of life and culture that is better and smarter.

## 1.2. Smart City Development in Indonesia

Technological developments have resulted in various cities worldwide competing to create a smart city, intending to realize a sustainable town and support residents' quality of life. IESE Business School in 2019 measures the implementation of smart cities in various cities based on ten dimensions, namely human capital, social cohesion, the economy, public management, governance, the environment, mobility transportation, urban planning, international outreach. And technology. As a result, Jakarta as the representative of Indonesia is far below, ranked 142 out of 174 cities worldwide with low performance.

The IMD World Competitiveness Center Smart City Observatory, in collaboration with the Singapore University of Technology and Design (SUTD), conducted research on 102 cities in the world and ranked them in the "Smart City Index 2019" ranking. With indicators of community acceptance, economy, technology, and human resources. As a result, three representative cities in Indonesia, namely Makassar, Jakarta, and Medan, were ranked 80, 81, and 82 (2). Many things still need to be improved in

implementing and developing smart cities in Indonesia with these conditions. However, the government consistently and gradually continues to realize smart cities in various cities in Indonesia.

### 1.3. Readiness Level

The level of readiness is a systematic measurement of the maturity or readiness of an organization. Readiness itself indicates the possibility that an individual, organization, or system is declared ready, not ready, or not ready (3). (4) interprets electronic readiness or e-readiness as the level of readiness of a society, organization, peror economy in adopting information and communication technology (ICT). According to The Economic Intelligence Unit Limited and IBM Corporation, e-readiness is a measurement of the quality of a country's ICT infrastructure and the capacity of society, economic actors, and the government to take advantage of ICT as a positive value. Assessing the e-readiness from the Mutula and Brakel Theory, it consists of 5 indicators, including:

1. *Enterprise readiness* is an indicator used to determine the readiness of the Klaten Regency Communication and Information Office in implementing technology both in terms of organization and its relation to strategy, management, and information system processing.
2. *Human resource readiness* is the readiness of human resources of the Department of Communication and Information in realizing Klaten smart city.
3. *Information readiness* is the readiness of the Department of Communication and Informatics of Klaten Regency about providing information and communication services for the public.
4. *ICT readiness* is an indicator used to determine the readiness of information technology infrastructure of the Department of Communication and Information, Klaten Regency.
5. *External environment readiness* is the readiness of the Klaten Regency Communication and Information Office's external environment to realize the Klaten smart city.

## 2. Methods

This qualitative descriptive research describes the Office of Communication and Information Technology's readiness to realize the Klaten smart city. The research location is in the Department of Communication and Information Technology of Klaten Regency. The researcher obtained sources of data in this study from direct interviews with informants. The informants accepted used purposive sampling and snowball sampling, consisting of the Head of Informatics, Head of Network Infrastructure Section, Informatics Engineering Extension, Computer Institutions, and several Klaten people. Then the researcher used the triangulation technique to test the validity of the data. Data analysis used techniques from Miles and Huberman, which consisted of data reduction, data presentation, and concluding.

## 3. Results and Discussion

### 3.1. Enterprise Readiness

Organizational readiness is an essential factor in the realization of the Klaten smart city. The article is that without the readiness from within the Klaten Regency Communication and Information Office, other factors support Klaten Regency's readiness as a smart city. In preparing for the realization of a Klaten smart city, the first thing that the Klaten Regency Communication and Information Office must do is prepare a strategy. Later, the steps to realize a smart city to achieve the predetermined goals. In this case, the readiness strategy has stated in the Klaten Regency smart city master plan. It contains the objectives, the vision and mission of the Klaten smart city, the Klaten smart city strategy, the Klaten smart city action plan, and the Klaten smart city development roadmap.

Klaten Regency is one of the regencies that passed the movement program towards 100 smart cities. Therefore, making a plan is the primary step that government must take. Planning is a process of defining the goals of an organization, creating strategies to achieve the organization's goals, and developing plans for organizational work activities. In terms of realizing a smart city, the Klaten Regency Communication and Informatics Service has compiled a Klaten smart city master plan that focuses on an organization's policy descriptions. In this case, the master plan has long-term goals and comprehensive scope.

Klaten Regent said the preparation for the Klaten smart city master plan to guide the development and implementation would run effectively and efficiently and serve the community to the maximum (5). In this case, the Department of Communication and Information, which acts as a facilitator in realizing Klaten smart city, is expected to prepare information technology infrastructure. However, about the provision of information technology infrastructure, it focuses not only on the Klaten smart city. The availability of adequate technological infrastructure at the Klaten Regency Communication and Information Office is an additional value in realizing the innovative city concept.

The concept of a smart city is not always about technology, but sometimes technology is one of the supporters of realizing a smart city. The expectation of the uses of ICT in the construction of government applications to make performance more effective and efficient. In this case, every OPD of Klaten Regency hopes that coordinate with the Communication and Information Office concerning making applications to support its performance. In addition to providing programmers, later these applications will be monitored by the Department of Communication and Information if there are obstacles.

The efforts of the Communications and Information Technology Office in implementing the application are carried out optimally, such as providing infrastructure including servers, storage, resources, as well as assisted publications through the [klatenkab.go.id](http://klatenkab.go.id) website, billboards, and Videotron in Klaten. In addition, in responding to community demands and global challenges triggered by technological advances, one of the foundations of intelligent cities is connectivity embodied with the Internet of Things (IoT) concept. The explanation above shows that the Department of Communication and Information Technology infrastructure is ready to participate in the global internet era.

### 3.2. Human Resource Readiness

Human resources are the central supporting pillar and the driving wheel of the organization in achieving the vision, mission, and goals. HR, in this case, is a group of people who work at the Klaten Regency Communication and Information Office. The level of competence and expertise of HR will significantly influence the application of the innovative city concept. To assess the capacity and quality of HR in carrying out a function show that the HR's level of responsibility and competence (6).

The availability of human resources at the Communication and Information Technology Office is still lacking. The fact is evidence that there are still several vacant

positions or employee needs. However, the Department of Communication and Informatics overcomes this deficiency by recruiting non-PNS programmer technical personnel and taking into account the competencies required. The Ministry of Communication and Informatics uses a sociological approach in recruiting employees, considering it competes with companies that provide better guarantees.

Concerning the application of smart cities and the use of technology, the Human Resources of the Ministry of Communication and Informatics are expected to have the ability to utilize various kinds of technology. It is undeniable that the times are increasingly demanding that the government continue improving services to be more effective, efficient, and cut time. Therefore, awareness of the Ministry of Communications and Informatics Human Resources on the importance of ICT in public service activities is a must because to enter the Ministry of Communication and Information, of course, through selection. Although not 100% of employees are aware of the importance of the benefits of technology, their awareness and willingness to learn is high. And also supported by the existence of training and technical guidance concerning improving the competence of human resources. Despite being hindered by the COVID-19 pandemic,

Furthermore, in carrying out their duties concerning providing information services to the entire community of Klaten, the Human Resources of the Ministry of Communication and Informatics are always required to provide up-to-date, informative, and accurate information. Evidence always provides up-to-date information from managing several social media such as Instagram, Twitter, YouTube, and the PPID platform. One of them is the Kominfo Service program that reviews essential information from events in Klaten Regency, namely Kuping Panas or a collection of important information that is currently hot, which is broadcast on the Youtube channel the Kominfo Service.

Overall, the readiness of the Ministry of Communications and Informatics Human Resources is not yet fully ready. Still, the Ministry of Communication and Information Technology always seeks several ways to continue to improve the quality and competence of its human resources.

### 3.3. Information Readiness

According to the Klaten Regency Regulation Number 19 of 2016 concerning the Implementation of Public Information Disclosure in the Klaten Regency, providing information and communication services for the public is one of the tasks that the Communication and Informatics Office must fulfil. Public information is increasingly easy to get through social media owned by the Regional Government. The use of information technology

by the government to provide information and services for its citizens, business affairs, and other matters relating to the government. In addition, the development of using social media, such as Instagram, Twitter, YouTube, and other platforms, government applications to improve government services to the community. However, to be able to work optimally.

The application is a form of change written document into something that can be accessed with the help of technology so that the information in the application must match what is in the paper. Moreover, in making applications, the Ministry of Communication and Informatics must be guided by technical standards and procedures for developing and developing applications. In addition, the Klaten Regency Government also has a PPID website, which contains complete and accurate information that the people of Klaten Regency can access. Following PPID, the mission of realizing accurate and valuable public information services encouraged the acceleration of general information services in every SKPD in the Klaten Regency environment. It recognized reliable and professional human resources for information services. In addition, the design of the appearance of the public service application is a way to be easily understood by the diversity of the Klaten community.

The recommendations for application development in the Klaten smart city master plan are to make the government's interaction with the community better and more active. Government applications built are a form of coordination between the Ministry of Communications and Informatics with various OPDs. Although the target application development is planned for completion in 2021, several applications are running according to their functions. Some of these applications are applications with a background in serving the community, such as Sipon Keduten and Matur Dokter, while others are still in the development and trial stages.

But it is considering that something created by humans is inseparable from imperfections. Therefore, there are still some obstacles to the application and website of the Klaten Regency Government, both from the user and service provider side. The condition of the application is down so that the government can not access it, which is influenced by network conditions. However, the Ministry of Communication and Informatics monitoring always taken immediate action to control all the conditions.

In addition to application conditions, data and information security are no less critical for monitoring 24 hours non-stop. The internet is a very open medium of information and data. Still, the sophistication of technological advances impacts internet security which is very vulnerable to information system attacks. The information security factor is significant to consider in implementing ICT governance to realize Klaten smart city. The



regulation found in Regent Regulation Number 18 of 2018 concerning the Implementation of e-Government. Regional governments must manage data in the information system for internal and external interests by paying attention to information security.

### 3.4. ICT Readiness

The readiness of information and communication technology shows as a production sector and a national e-readiness strategy. The role of ICT in the smart city concept is to accelerate the community service process by developing information system applications to realize and improve the dissemination of information and empowerment to the community. It can show how the Department of Communication and Informatics utilizes ICT in supporting public service activities in the information service unit. Spread of 57 pieces of computer equipment throughout the Klaten Regency OPD. The availability of computer equipment in each OPD is certainly very supportive of performance both in daily activities and concerning providing electronic-based public services.

In providing online information services, the Ministry of Communication and Informatics has to fulfil the internet network for each OPD. The availability of a LAN network and bandwidth evidence spread across various OPDs. With the LAN and bandwidth, of course, it can provide better network quality. Especially for OPDs that prioritize fulfilling services to the community, convenience and good network quality are needed. So far, the quality of the distributed network is quite good. As for providing services to the public regarding the ease of accessing the internet, the Department of Communication and Informatics provides free hotspot services at various points of public space. So far, there have been 20 free hotspots, with speeds ranging from 20 Mbps. It is an effort to support the movement program towards 100 smart cities.

Furthermore, in the Coding and Telecommunications Section of the Klaten Regency Communication and Information Office, one of the tasks is to carry out data or system recovery in the event of an operational disruption to encryption and information security. Information security is a priority because of the sensitivity of the information handled by the Ministry of Communication and Informatics. The use of public service applications guarantees the safety of the data that has been uploaded so that they do not worry about data leakage. Talking about online systems, of course, nothing in this world is truly secure. Therefore the Department of Communication and Informatics strives for data and information security in accessing public service applications, one of which is a firewall system 24 hours. A firewall is a protection system to monitor data packet traffic that goes to or leaves a computer network. Data packets that have been checked

can be accepted, rejected, or even modified before entering and leaving the network. In addition to using a firewall system, the Ministry of Communication and Informatics also strives for applications using the HTTPS domain. Although not all applications that go through the website at the Klaten Regency Government use the HTTPS domain, the Ministry of Communication and Informatics continues to strive so that government applications and websites can be more secure.

Concerning applications oriented towards providing public services and realizing the smart city concept in the e-government dimension, the use of information technology indeed aims to maximize public services more responsive, effective, efficient, and accountable. The people of Klaten have already felt this benefit. Fulfilling services using applications and saving costs and time, in this COVID-19 pandemic, people are not worried about interacting with other people.

### 3.5. External Environment Readiness

The Ministry of Communication and Informatics' external environment readiness as assistance in implementing the Klaten smart city of them is the existence of local policies governing smart cities in the Klaten Regency. The government must consider using an essential approach to clarify because some areas have doubts about realizing a smart city due to a clear path. However, the same thing happened to Klaten Regency. We know that Klaten passed the movement program towards 100 smart cities in 2019. So at this time, Klaten Regency is still referring to the smart city roadmap in innovative city development. However, the draft regional regulation regarding the smart city master plan already exists.

In addition, government support is also at the forefront of realizing a smart city. One form of support is the establishment of a competent city council tasked with directing, monitoring, and controlling the development of intelligent cities and regularly reporting to the Regent. Also formed a technical implementation team in charge of compiling a master plan for innovative city development, collecting an evaluation draft, analyzing and recommending performance achievements, encouraging and directing regional apparatus, and making innovative and creative steps for smart city development. Another support is also provided in training to the government concerning providing education about smart cities.

The COVID-19 pandemic made many agendas that have been prepared by the Ministry of Communication and Informatics hampered. Although some changes to the plans for online meetings, the government felt that this was not running optimally.

This situation also impacts society, where knowledge is still not evenly distributed in technology and more clearly about the innovative city concept.

## 4. Conclusion

From the research results in realizing the Klaten smart city, there are five indicators: enterprise readiness, human resource readiness, information readiness, ICT readiness, and external environment readiness. The researcher can say that the Klaten District Communication and Information Office is quite ready. It's just that there are still some obstacles, including the absence of regulations governing intelligent cities, lack of human resources, limited budget, lack of coordination with other OPDs. It is not evenly distributing people who are technology literate, and the existence of the covid 19 pandemic has set several agendas.

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