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Transforming Public Services Towards Smart City in the Perspective of E-Government in Indonesia

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Abstract

The development of digital technology has brought significant changes in various aspects of life, including public services. In the digital era, people demand faster, transparent, and more efficient services. This encourages the government to transform public services by utilizing information and communication technology (ICT). This Transformation of manual systems into digital ones also improves business processes, increases accountability, and ensures community involvement in policymaking. This study uses a qualitative method with a case study approach. The researcher collects data through observation, data analysis, literacy studies, and/or literature review studies. Implementing public policies using smart cities with an e-government system in Indonesia still faces various multidimensional obstacles. The main problems identified include digital access disparity, limited network infrastructure, large implementation budgets, lack of public understanding, linguistic and technical competence barriers, cybersecurity issues, and rejection of digital Transformation.

Keywords: Public Service Transformation, Smart City, E-Government

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Introduction

The development of digital technology has brought significant changes in various aspects of life, including public services. People demand faster, more transparent, and more efficient services in the digital era. This encourages the government to transform public services by utilizing information and communication technology (ICT). This Transformation not only transforms manual systems into digital ones but also improves business processes, increases accountability, and ensures community involvement in policymaking.

The government, as a public service provider, is required to adapt to technology to create innovations in public services. Currently, innovation is not unfamiliar to the government, both at the central and regional levels, although the innovations developed are not limited to the use of information and communication technology. The issuance of Government Regulation Number 38 of 2017 concerning Regional Innovation further emphasizes the importance of the role of innovation in improving the quality of services to the community. The PP states that regional innovations are carried out to boost government performance so that public services can run optimally for the realization of community welfare.

As a form of commitment, the Ministry of PAN-RB implements *the* One Agency, One Innovation policy, which requires each Ministry/Institution and Regional Government to produce at least one public service innovation every year. Not only that, the Ministry of PAN-RB also routinely holds Public Service Innovation Competitions as a demonstration of skills in developing innovations for government agencies and SOEs/D. On the other hand, the Ministry of Home Affairs appreciates local governments that have succeeded in innovating through *the Innovative Government Award* (IGA). Meanwhile, the State Administration Institution also gave the *Innovation Nusantara Award* (Inagara Award) to local governments that consistently innovate through *the Innovation Laboratory*. These efforts prove that innovation has become an integral part of government practices in Indonesia.

Along with the development of public service innovation and the need for the use of information and communication technology (ICT), the government sees opportunities to optimize bureaucratic services. This is because the application of ICT in accelerating bureaucratic services is a form of innovation breakthrough. In the end, the idea emerged to create public service governance in urban areas supported by ICT, which was later known as the *smart city* concept. Various major cities in Indonesia have begun to implement this concept with all the advantages and limitations faced.

The implementation ***of e-Government*** is a solution to reduce queues and minimize the time needed for the application process. For example, the **Digital Dukcapil service** by the Ministry of Home Affairs makes it easier to take care of population documents such as ID cards and birth certificates online. OSS can also be used to manage business licensing services that facilitate online licensing management. However, challenges such as the digital divide and data security still hinder their implementation. The Transformation of public services is also related to the principles ***of good governance***, namely transparency, participation, and accountability. With digitalization, the community can monitor bureaucratic processes that were previously closed *in real-time*. Allowing citizens to submit complaints and monitor their follow-up. This

encourages improvement in service quality while reducing corrupt practices and abuse of authority.

On the other hand, the success of digital Transformation of public services requires the readiness of infrastructure and human resources. There are still many regions in Indonesia that experience internet network constraints and a lack of digital literacy. The government needs to expand internet access and provide training for state civil servants (ASN) and the community. A good example of implementation is the ***Smart City program*** in cities such as Jakarta and Bandung, which incorporates IoT (Internet of Things) technology to improve the efficiency of transportation services and citizen complaints.

The concept *of a smart city* intended for the welfare of the community has not been implemented by the regions. Therefore, this paper aims to identify various prerequisites for smart *city development* in Indonesia and to analyze the extent to which digital Transformation has improved the quality of public services. This study will provide evidence-based policy recommendations to accelerate the digitalization of public services in Indonesia.

Transformation of public services

Change etymologically means a change in appearance, both form, nature, work, and so on. Change can be interpreted as a process of change that can occur continuously, either in whole or in part, and adjust to the circumstances. According to Anthony Antoniades (1990), Transformation is a gradual process of change so that until the ultimate stage, change is carried out by responding to the influence of external and internal elements that will direct changes from previously known forms through the process of repeating.

In recent years, the Transformation of public services has become the focus of many countries, including Indonesia, to improve the quality, efficiency, and accountability of services to the community. This Transformation not only involves the use of digital technology, but also a paradigm shift from a rigid bureaucracy to a more responsive to the needs of society.

Regarding the transformation of public services, the government has accommodated it with Law Number 25 of 2009 concerning public services. The birth of this law itself has several considerations, namely:

1. The state has an obligation to serve every citizen and population, fulfilling their basic rights and needs within the framework of public services, which is the mandate of the 1945 Constitution of the Republic of Indonesia.
2. The importance of building public trust in public services carried out by public service providers is in line with expectations and demands.
3. It is an effort to emphasize the rights and obligations of every citizen and resident as well as the realization of the responsibility of the state and corporations in the implementation of public services.
4. It is an effort to improve the quality and ensure the provision of public services in accordance with the general principles of good government and corporations and to provide protection for every citizen and population from abuse of authority in the implementation of public services.

One of the main drivers of public service transformation is the adoption of information and communication technology (ICT). The Government of Indonesia, through ***its e-government*** initiative, has developed various digital platforms, such as **the Government Administration Service System (SAP)** and **Online Single Submission (OSS),** to facilitate business licensing. According to Dwiyanto (2015), digital-based public service reform can reduce corrupt practices, shorten service times, and increase transparency. In addition to digitalization, the principle **of *citizen-centric* service** is also the key to Transformation. This concept emphasizes the importance of listening to public aspirations in designing services. A study from the OECD (2017) shows that countries that implement a participatory approach tend to have higher levels of community satisfaction.

Smart City

The concept *of a smart city,* according to Cohen (2010), explains that smart cities are identified in 6 (six) main dimensions, namely *smart government*, *smart economy*, *smart society*, *smart mobility*, *smart environment*, and *quality of life* (quality life). Of the six (6) dimensions, in its application, each city can focus on one dimension depending on the characteristics and urgency of the city's problems. Meanwhile, Supangkat et al. (2015) explained that a *Smart City* is the development and management of a city with the use of information and communication technology to know, understand, and control various existing resources more effectively and efficiently to maximize services to the community and support sustainable development.

The above concept explains that *a smart city* is a form of using information and communication technology to optimize services to the community. So, it can also be interpreted that a *smart city* is one of the implementations of public service innovations in the field of technology, where there is the development of *e-government* with the use of information and communication technology in the management of governance and services to the community.

E-government

E-Governance, according to Mustopadijaya (2003), states that *electronic administration* is a substitution of the expression for *electronic government* (e-gov) given to a government that adopts internet-based technology; this Internet can also complement and increase its methods and services. The main goal is to give the best satisfaction to the service user or to give maximum satisfaction. *The World Bank* (WB, 2000) views *e-government* as an adoption according to developments that also use global banking technology. The development *of e-government* is intended to increase government management's efficiency, effectiveness, transparency, and accountability using the Internet and other digital technologies.

Furthermore, Indrajit (2005) stated that *e-government* is a business that creates a synchronous atmosphere of government administration using shared *objectives* according to a number of interested communities. *E-government* is the implementation of new technology-based government as an effort to improve government performance in relation to using citizens, business communities, and other related groups towards good government (World Bank, 2001). *E-government* is allocated to:

1. the government that uses technology, especially the implementation of web-based Internet to increase access is also government delivery/services to citizens, business partners, employees, and other governments;
2. a process of reform in the way the government works, there are much news that also puts services on internal and external clients for the benefit of the government, citizens, and business actors;
3. The use of new technology such as wide area network (WAN), Internet, world wide web, and personal computers of government agencies to reach citizens, businesses that are also made by other government branches: improving services to citizens, improving services in global businesses that are also industries, empowering citizens through access to knowledge that is also news, which also creates a more efficient and effective government work.

According to Mustopadidjaja (2003), *e-governance* can also be understood as the use of technology from WEB (network), internet communication, which is also the implementation of interconnection to facilitate communication and also expand access and service rewards that are also government news to the population, global business, job seekers, and other governments, both institutional and interstate. From the formulation of the above definition, it is clear that *e-governance* is the use of communication technology that is also the news in order to achieve goals, including:

a. increase the efficiency of government;
b. put a lot of services to the citizens better;
c. to put access to news to the public at large;
d. This results in a more responsible administration of government that is transparent to citizens.

The usefulness and role of e-government, in its essence, is the implementation of new technology, which is also communication (*information and communication technology = ICT)* in public administration. *E-governance* is an effort to revitalize the organization and government management. This is intended to be able to carry out tasks that are also useful in the best possible way in the management of public services. *E-governance* is useful for facilitating interaction between the government using the government (G to G), the government using citizens (G to S), and also the government using global business (G to B), both national and international. In addition, *e-governance* plays a role in providing answers to environmental changes that require efficient, effective, transparent, and accountable state administration.

Methodology

This study uses a qualitative method with a case study approach. The researcher collects data through observation, data analysis, literacy studies, and/or literature review studies, which are based on primary and secondary materials, namely the Constitution of the Republic of Indonesia basic materials, secondary materials consist of books, newspapers, journals, documents, and the internet/website that contain relevant/related topics and focus on improving the efficiency of public services with technology in the digital era. The data obtained was analyzed descriptively to understand the Transformation of public services in the digital era.

Result and Discussion

Transformation of public *innovative city policies* in Indonesia towards *smart governance.* The concept of a Smart City cannot be separated from the rapid development of digital technology in the last two decades (Nam, T., & Pardo, T. A., 2011). Digital Transformation has fundamentally changed the picture of urban management (Harrison, C., & Donnelly, I. A., 2011). Change, driven by many related factors, creates a major need for cities around the world to adopt smarter ways of managing increasingly complex urban challenges (Giffinger, R., Fortner, C., Kramar, H., & Meijers, E., 2007). Population displacement is one of the main factors in the Smart *City concept* (United Nations, 2018). According to UN data, by 2050, it is predicted that around 68% of the world's population will live in urban areas (United Nations, 2019). Population growth causes this dense population movement to have serious consequences on various aspects of urban life (Batty, M., 2013), ranging from the need for infrastructure or infrastructure and public services to the environment. This challenge is even more complicated in developing countries such as Indonesia because they have to deal with limited resources and inadequate infrastructure (Firman, T., 2009).

The development of *the Internet of Things* (IoT), *Big Data*, and *Artificial Intelligence* (AI) technology has opened up new opportunities for overcoming urban problems (Alavi, A. H., Jiao, P., Buttlar, W. G., & Lajnef, N., 2018). Sensors connected to the internet network can collect *real-time* data on various aspects of city life, from air quality and traffic density to energy consumption (Rathore, M. M., Ahmad, A., Paul, A., & Rho, S., 2016). Furthermore, the economic aspect is also an important consideration in the development *of Smart City* (Angelidou, M., 2017). In a universal scope, major cities in Indonesia compete with each other to attract investors and people with related abilities. The development of *smart cities* can increase cities' competitiveness by creating an environment that supports the idea and growth of digitalization. The effectiveness resulting from this implementation can also save the government budget in the long run, although it requires considerable investment at the beginning.

According to research developed by City, S (2018), there are six cities in Indonesia with different *smart city* implementations. First, the city of Bandung, in the city of Bandung the application *of the smart city concept* which includes Hay U for online licensing, SIP for sub-district report cards by residents, *citizen complaints online*, Silakip to monitor the work of the City Government and the use of Twitter social media as a place for citizen communication (City, 2018), Both Makassar City, in the implementation of *smart cities* in Makassar City have been able to monitor congestion and online parking payment systems that are already *on the track*. In addition, Makassar already has a Makassar *Smart Card* that can be used for government system affairs and payments (City, 2018).

Third, Surabaya City, one of the applications *of smart cities* in Surabaya is the concept of *traffic lights* are regulated with *Closed Circuit Television* (CCTV) and *Integrated Traffic System Management*, where when the queue is long in front of the traffic light, the red light will automatically run shorter (City, 2018). Fourth, Semarang City's regional planning information systems, evaluation monitoring information, integrated

online citizen reporting, public CCTV applications, and building licensing systems can be managed without the need to come to government offices (City, 2018).

Fifth, DIY Yogyakarta, implementing an electricity system through a smart grid will regulate the use of power plants with New and Renewable Energy (NRE) and fossil energy. The plant needs to be regulated because it is not always possible for NRE to continue operating; it needs to be supported by fossil plants. In addition, on the customer side, the smart grid can also regulate the use of electricity automatically according to needs so that savings can be created (City, 2018); the Sixth City of Denpasar, in the application of the *Denpasar Cyber Monitor* with various *smart city* applications are synergized in one room. Covering disasters with emergency phone number 112, flood monitoring, ATCS, Denpasar Online People's Complaints (Pro), Geographic Information System, and E-Sewaka Dharma (City, 2018).

The development *of smart cities* in each city has different characteristics. This is a form of public service transformation that is applied in the use of applications intended to support the performance of public services. According to Van Lendegen (2011), in the explanation of the Bappenas road map, some of the *smart city* criteria that are referenced for development in Indonesia include the following.

Key drivers of smart city *development,* according to Van Lendegen 2011

No	**Parameter**	***Key Driver***
1	*Smart Governance*	1. Clean, inclusive democratic process Sec. 2. A well-connected and integrated administration of government 3. Improvement of services
2	*Smart people*	1. Improvement of education Sec. 2. Control of learning through Remote e-education Solution Sec. 3. A more informed society
3	*Smart environment*	1. The environment is designed in a sustainable way Sec. 2. Reduce energy use through technological, energy conservation, and material recycling
4	*Smart Mobility*	1. A clean and efficient transportation system 2. Utilize and Megefesienkan network to K movement Stuttgart, person Clan Goods for mango-Saxon Congestion Sec. 3. *Applying "new social attitude"* such as sharing vehicles and bike-car options.

5	*Smart Economy*	1. Regional/global competition Sec. 2. Access to broadband for the entire community in order to increase sales Sec. 3. Independent location, helping to manage populations within an area Sec. 4. Electronic transactions of the process in all fields *(e-banking, e-shopping, e-actuation, etc.)*
6	*Smart Living*	1. High-quality access to healthcare *(e-health, remote health monitoring)* 2. Electronic health record *management* Sec. 3. Home automation, smart home, and smart building. 4. Access to various types of social services.

Bappenas, 2015

The concept of smart city parameters in public services remains a relevant and interesting topic for further research. Various policies in the field of urban planning are an important foundation in realizing the optimal implementation of smart cities. In the context of government, technological developments have brought significant changes in the administrative system. One proof is the issuance of Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems (SPBE), which aims to improve government efficiency and transparency through the use of digital technology. This policy is a tangible form of e-government that facilitates the provision of public services and information through digital platforms.

In Indonesia, the use of e-government in government processes has increased significantly and created a major transformation in the pattern of interaction between the public and government agencies. The implementation of e-government provides various benefits, such as increasing administrative efficiency, process transparency, and speed in the delivery of public services. In addition, this system has played an important role in simplifying bureaucratic procedures and minimizing the potential for corruption through the implementation of more structured and systematic governance.

Obstacles *to Smart City* towards *E-Governance* in Indonesia

In this study, researchers found a number of problems faced by regions in Indonesia in the implementation of *e-governance*. Under the pretext of innovation, cities in Indonesia are competing to create a superior and quality smart city order. Facing this, there are challenges that are the basis for the implementation *of an ideal smart city*, including in districts and cities in Indonesia as follows.

1. Infrastructure Gap

The application of e-governance in forming a smart city certainly requires adequate infrastructure readiness. The use of the Internet as the main basis for the use of e-governance applications is very fundamental. The uneven internet connectivity runs in parallel with the findings of a survey by the Indonesian Internet Service Providers Association (APJII), which states that internet penetration in Indonesia in

disadvantaged areas only contributes 3.2%. (APJII, 2024) The government has collaborated with the private sector to provide internet connections to remote parts of Indonesia, one of which is cooperation with the satellite giant Starlink from the United States. The trial of the device will be implemented in the capital city of the archipelago in 2024 based on the Press Release of the Ministry of Information and Information Technology Number 255/HM/KOMINFO/04/2024. Even so, the price to get *a receiver* unit (*router*) and high subscription fees are considered impossible for most people because 96.9 internet users in Indonesia have an income of less than 5 million Rupiah, and the average monthly cost allocated for internet use by 81.53% of the public is Rp. 50,000 to Rp. 100,000 (APJII, 2024).

According to the 2023 Network Readiness Index Report, which measures a country's capacity to provide *e-services*, Indonesia's readiness ranking ranks 59th out of 134 countries. It gets a lower score when compared to the average country in Asia and the Pacific, which has implications for the use of Information and Communication Technology (ICT) to be very low in Indonesia (Institute, 2023). The central and regional governments need to carry out hardware subsidy programs and maintenance costs to expand internet infrastructure in collaboration with the private sector as one of the solutions to increase internet access and the use of *e-government services* in Indonesia. Cooperation between the government and the private sector, such as with the Starlink satellite, needs to be strengthened to expand internet coverage to remote areas (Barlian & Ismelani, 2022). This step must be accompanied by a policy that reduces the cost of *receiver* units and internet subscription fees to make it more affordable for low-income people. Intensive education and training on online portals must be provided to the community, especially in rural areas. That will help overcome doubts about using *e-government* services and increase trust and effectiveness in using digital technology.

2. Cost Factor

A classic problem that is often discussed in Indonesia is the cost factor, which has not been reached. Seeing the inequality between regional original income in each city district in Indonesia is certainly an inhibiting factor in realizing *successful e-government*. Referring to (Permenkominfo) No. 5 of 2021 concerning the implementation of telecommunication networks, which involves various forms of cooperation, including between the government and the private sector. This can be done through public-private partnerships to build and manage internet networks and provide hardware access at a more affordable cost. In addition, the government can incentivize technology and telecommunications companies to invest in underserved areas.

3. Public Awareness

Public awareness of *e-government* services is the key to the transformation of public services towards a more effective and inclusive one in the digital era. In Indonesia, as in many other developing countries, the lack of awareness of the various initiatives offered by the government through electronic platforms has become a significant obstacle to adopting such services. The government has made efforts to improve access and reach of services by offering online options, but this effort has not fully succeeded

in reaching the wider community. Many are unaware or even confused about using the app. Most people do not understand that the problems faced can solve these various administrative procedures online, which in turn leads to the continued practice of long queues and the use of expensive brokerage services.

4. Data Privacy and Security

Hacking incidents that often occur will automatically suppress the level of public trust, especially in data management carried out by the government through SPBE. The lack of clear security standards and protocols can limit the development of *e-government* projects that contain sensitive information such as names, dates of birth, identity numbers, phone numbers, fingerprint data, parents' names, and so on. For citizens' successful use of *e-government*, the elements of trust, convenience, and trust in data management in SPBE are very important.

As an effort to strengthen data security and privacy in the implementation of e-government in Indonesia, we can learn from the best practices implemented in Colorado, United States. These states have established specific regulations regarding data protection to support their e-government systems (Iswandari, 2021). Colorado's regulations ensure proper data use and impose severe sanctions against data breaches so that it can be a model for Indonesia in building a stronger data protection system. Implementing the Colorado model-based data security system is expected to increase public trust in the government in managing personal data. In addition, it is also important to increase public digital literacy about cybersecurity through comprehensive education programs. This education will help people understand how to protect their personal data when accessing e-government services while reducing concerns about potential fraud and misuse of data.

5. Many Applications

The Government of Indonesia has encouraged digital innovation through the development of various public service applications, such as the implementation of smart cities and e-government. However, this policy poses a new problem in the form of fragmentation of digital services, where people have to download and operate many different applications for the purpose of managing state documents (Kominfo RI, 2021). A study by Firman (2022) shows that in Jakarta alone, more than 15 public service applications are developed separately by different agencies, creating complexity for users. This phenomenon is known as "application overload" in the imaginative city literature (Anthopoulos, 2017), which is contrary to the principle of ease of access that is to be achieved.

UNDP research (2022) revealed that 63% of government digital service users feel overwhelmed by the number of applications that must be learned and managed. This problem is exacerbated by the low digital literacy of Indonesian people (APJII, 2023), where only 28% of users understand how to manage their personal data on various different platforms. A case study in Bandung by Kurniawan et al. (2021) found that the average citizen has to download 3-5 different applications just to take care of basic licensing, which reduces the effectiveness of digital Transformation. In this case, of course, making smart cities in the implementation of e-government is very confusing for people in Indonesia.

Conclusion

The implementation of public policies using *smart cities* with *an e-government* system in Indonesia still faces various multidimensional obstacles. The main problems identified include digital access disparities, limited network infrastructure, large implementation budgets, lack of public understanding, linguistic and technical competence barriers, cybersecurity issues, and rejection of digital Transformation (Kominfo, 2022). The digital inequality between urban and rural areas is evident, with many underdeveloped areas still experiencing difficulties in terms of internet connectivity.

The three crucial issues that are interrelated in the implementation of e-government are:

1. **Infrastructure aspect**: Uneven internet coverage, especially in remote areas, has an impact on the low utilization of government digital services (BPS, 2023).
2. **Economic aspect**: The high cost of digital devices and internet data packages creates barriers for low-income people (World Bank, 2022).
3. **Socio-cultural aspects**: Low digital literacy and still strong conventional bureaucratic practices through brokers slow down the adoption of digital systems (APJII, 2023).

The problem of language complexity and the inability to operate technological devices are additional barriers, especially for certain groups of people. Anxiety about the vulnerability of personal data amid rampant data leak cases has further reduced public interest in government digital services. The transition from manual to digital systems also faces resistance from various parties who are used to conventional procedures.

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