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The Implementation of Smart Cities in Indonesia: A Literature Study on Technology Based Governance and Public Services

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ABSTRACT
The rapid development of Information and Communication Technology (ICT) has driven the implementation of Smart City initiatives in Indonesia as a solution to urban challenges such as congestion, pollution, inefficient governance, and inadequate public services. However, disparities in technological infrastructure and digital literacy remain significant obstacles to equitable Smart City development across regions. This study employs a qualitative research method with a literature review approach to analyze the implementation of Smart Cities in Indonesia. Data were collected from scientific journals, government reports, and case studies from both domestic and international Smart City initiatives. Thematic analysis was used to identify key patterns and trends in governance and technology-based public services. This research aims to explore the challenges, opportunities, and impacts of Smart City implementation in Indonesia, with a focus on governance efficiency and technology-driven public services. It also seeks to provide recommendations for optimizing Smart City strategies. The results indicate that major cities like Jakarta, Bandung, and Surabaya have successfully implemented Smart City frameworks, improving public service efficiency and government transparency. However, rural and small urban areas face challenges such as digital infrastructure gaps, low public engagement, and regulatory weaknesses in data protection and cybersecurity. Despite these challenges, the integration of Smart City technologies has the potential to enhance public participation, optimize resource management, and drive sustainable urban development. The study concludes that successful Smart City implementation in Indonesia requires (1) equitable access to digital infrastructure, (2) enhanced digital literacy programs, (3) strong data protection and cybersecurity regulations, and (4) effective collaboration between the government, private sector, and society. Addressing these aspects will enable Indonesia to develop Smart Cities that are inclusive, efficient, and sustainable for long-term urban transformation.

Introduction

The application of the Smart City concept in Indonesia has become an increasingly important issue in an effort to improve the quality of life of the community in line with the development of information and communication technology (ICT). As a country with a large population and rapid urbanization, Indonesia faces major challenges in providing adequate infrastructure and efficient public services. In this context, the implementation of Smart City is expected to be a solution to overcome various urban problems such as congestion, pollution, and inefficient management of natural resources. Smart City is not just about the application of technology in daily life, but also includes efforts to create a city that is more sustainable, inclusive, and responsive to the needs of society (Ningsih & Arianto, 2024). Therefore, the

study of the implementation of Smart City in Indonesia is very relevant to identify the existing challenges and opportunities, as well as provide recommendations to improve the implementation of this concept.

As an effort to improve the efficiency of governance, Smart City relies on the use of technology to create a more integrated and responsive system. In governance, technology serves as a tool to improve transparency, accountability, and public participation. Governments can use technology to better manage data, monitor city activities in real-time, and provide public services that are faster and more accessible to the public. Thus, Smart City not only provides benefits to the community in terms of convenience, but can also improve the quality of services provided by the government, reduce convoluted bureaucracy, and provide convenience for the public in accessing information and public services (Deni et al., 2023).

However, the implementation of Smart City in Indonesia is not as easy as turning the palm of your hand. The problem of uneven infrastructure, both physical and digital, is one of the main challenges in implementing Smart Cities in Indonesia. Most regions in Indonesia, especially in rural and disadvantaged areas, still have limited access to the information technology needed to support the implementation of Smart Cities. This causes a gap between big cities that have adopted advanced technology and areas that have not been reached by the development of digital technology. In addition, this problem of digital inequality also exacerbates inequality in access to technology-based public services (Pambudi et al., 2023). Therefore, the government needs to pay attention to the aspect of equitable access to technology throughout Indonesia so that the implementation of Smart City can be felt by all levels of society, not just certain groups.

Governance in the context of Smart City focuses on the principles of transparency, efficiency, and participation. A good government is one that is able to listen to the voice of the people and respond quickly to their needs. In this case, technology plays a big role in increasing public involvement in the decision-making process. Digital applications and platforms allow the public to provide input, file complaints, or even participate directly in public policy planning. With this technology-based government system, it is hoped that a more inclusive and responsive government can be created to the dynamics in society. In addition, the use of technology can also increase government accountability, because every action taken by the government can be monitored in real-time through an integrated system (Pitrianti et al., 2023).

In addition to the governance aspect, technology-based public services are also one of the main pillars in the implementation of Smart City. One example that has been implemented in several major cities in Indonesia is a digital application-based public service system. Through the application, the public can access various public services such as tax payments, permit registration, or complaints about public problems more easily and quickly. This is certainly very beneficial for people who are busy and do not have much time to come directly to the service office. In addition, the use of the app also allows the public to monitor the status of their applications directly, which increases transparency and public trust in the services provided by the government (Suprianto, 2023).

However, to realize an effective and sustainable Smart City, the government must pay attention to sustainability in every policy and project implemented. The sustainability in question is not only related to environmental sustainability, but also social and economic sustainability. In the context of Smart City, this means that the technology applied must be

able to bring equitable benefits to all levels of society, without neglecting more vulnerable or less affordable groups. Therefore, every planning and implementation of technology must consider social and economic factors so that the goals of a Smart City can be achieved properly (Aisyah & Pratama, 2023). Social and economic sustainability must also include strengthening people's capacity to utilize technology, which will open up opportunities for them to be more actively involved in the development of smart cities.

On the other hand, the implementation of Smart City also presents challenges in terms of data management. Smart cities rely on the use of big data to monitor various aspects of life in cities, such as traffic, air pollution, energy consumption, and more. However, efficient data management requires clear policies regarding data privacy and security. The government must ensure that the data collected and used for Smart City purposes is not misused and still maintain the right to privacy of the public. Therefore, strong regulations regarding the protection of personal data are very important to ensure that the application of technology in Smart Cities does not violate human rights and still prioritizes the welfare of the community (Mardinata et al., 2023).

As the Smart City concept develops, it is also important to understand the role of the private sector in supporting the implementation of smart cities. The private sector has a big role to play in providing the technology, infrastructure, and investment needed in the development of Smart Cities. Collaboration between the government and the private sector is urgently needed to ensure that the technology applied is truly in accordance with the needs of the community and accessible to all groups. In addition, the private sector can also play a role in developing cheaper and more efficient technological innovations, which can be applied in various regions in Indonesia, including remote areas that may not have access to advanced technology (Damayanti et al., 2024).

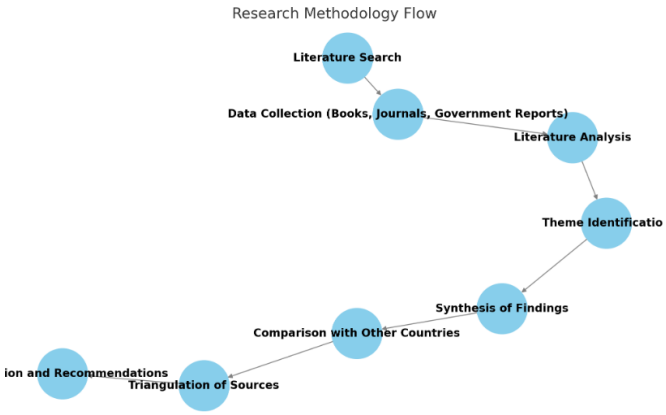
Human resources are also a determining factor in the successful implementation of Smart City in Indonesia. Effective application of technology requires a skilled workforce and has the ability to operate the technology. Therefore, increasing the capacity of human resources, both among government officials and the community, must be a priority in the development of Smart City. The government must provide adequate training and education to improve the digital literacy of the public and government apparatus so that they can make maximum use of technology in improving the quality of public services (Hariro et al., 2024). Without the support of skilled human resources, the implementation of Smart City will be constrained and unable to provide optimal benefits.

In the end, the implementation of Smart City in Indonesia is not an easy thing, but it is very important to improve the quality of life of the community and improve the governance system. By paying attention to various existing challenges, such as equitable access to technology, effective data management, and strengthening human resource capacity, Smart Cities in Indonesia can be an effective solution to create smarter, more efficient, and sustainable cities. The government, the community, and the private sector must work together to realize the vision of a Smart City that is inclusive and beneficial to all levels of society. Therefore, this study aims to provide an overview of the implementation of Smart City in Indonesia with a focus on technology-based governance and public services, as well as analyze the challenges and opportunities that exist in its implementation.

Method

The research method used in this study is a qualitative research method with a literature study approach. This research aims to explore various literature related to the implementation of Smart City in Indonesia, with a focus on aspects of governance and technology-based public services. The qualitative method was chosen because this research prioritizes a deep understanding of the Smart City concept and the challenges and opportunities that exist in its implementation. Literature studies are carried out by browsing various relevant sources, such as books, journal articles, government reports, and other publications that discuss the implementation of Smart City both in Indonesia and in other countries that have similar experiences (Firmansyah Setio Aji et al., 2023).

The data collection process begins with a search for literature related to the Smart City concept, technology-based governance, and public services that are integrated with technology (Sarjito, 2024). These sources are drawn from various scientific databases, including Google Scholar, JSTOR, and national publication portals related to information technology and governance. In addition, research reports published by government agencies and international organizations involved in the development of Smart Cities are also used as important references in this study (M. H. M. Zein, 2023).



In analyzing the data, a thematic analysis approach is used to identify the main themes that emerge from the existing literature. Researchers will categorize the information obtained based on certain topics, such as the challenges of implementing Smart City, successful implementation, and policies that support technology-based governance. Each theme found will be analyzed in depth to understand how the implementation of Smart City in Indonesia can be used as a solution in improving public services and governance that is more efficient and transparent. In addition, an analysis will also be carried out on the factors that affect the success and failure of Smart City implementation in Indonesia (Satibi, 2023).

The analysis method used also involves the synthesis of various findings from the existing literature. This synthesis aims to combine information that has been found in different literatures and draw more comprehensive conclusions. In this way, researchers can formulate recommendations based on the evidence found from previous research. In addition, synthesis analysis also helps in exploring comparisons between the implementation of Smart Cities in Indonesia and in other countries that have been more advanced in this regard, such as Singapore and South Korea (Sagena et al., 2023).

This literature study approach provides an advantage because it allows researchers to obtain a broad picture of the implementation of Smart Cities in Indonesia without being limited to a specific location. By exploring various existing sources, researchers can gain

deeper insights into the dynamics and challenges faced in efforts to create smart cities in Indonesia. In addition, this method also makes it easier for researchers to find various Smart City implementation models that have been proven successful in other countries and can be adapted to be applied in Indonesia (Muharman et al., 2023).

Another advantage of this research method is its ability to produce an in-depth and comprehensive analysis of Smart City theory and practice. This research not only discusses the underlying concepts of Smart City, but also delves deeper into the social, economic, and political implications that arise from the application of technology in governance and public services. Therefore, this research is expected to make a significant contribution to the development of technology-based public policies in Indonesia. This study also prioritizes the validity of data by choosing reliable and relevant sources to the topic discussed. In addition, researchers will triangulate sources, namely by comparing various literatures from various disciplines and different sources. This is done to ensure that the information obtained is objective and unbiased. Thus, the results of this study are expected to provide an accurate and reliable picture of the implementation of Smart City in Indonesia as well as appropriate policy recommendations to improve the quality of technology-based public services in Indonesia (Aisyah & Pratama, 2023).

In addition, this study will also examine external factors that affect the implementation of Smart City in Indonesia, such as government regulations, private sector support, and community participation. These factors will be analyzed to understand how these various elements interact with each other in supporting or hindering the successful implementation of Smart City in Indonesia. In this analysis, the researcher will relate the theories of technology-based governance to the socio-political context of Indonesia, so that this research is not only based on theory, but also considers local factors that affect the implementation of Smart City (Kalogis, 2024).

Results And Discussion

Result

Based on the literature analysis that has been carried out, there are several important findings regarding the implementation of Smart City in Indonesia, especially in the aspects of governance and technology-based public services. This research identifies a number of factors that affect the success and challenges faced in the implementation of Smart City, as well as various policies that can strengthen technology-based governance in Indonesia.

1. Smart City Implementation in Indonesia: Challenges and Opportunities

The implementation of Smart Cities in Indonesia faces complex challenges, which are mostly caused by the disparity in technological infrastructure between big cities and small towns. Although major cities such as Jakarta, Surabaya, and Bandung have begun to develop various technology-based systems to manage infrastructure and public services, small towns and rural areas often have difficulty accessing such infrastructure (Rahmawati & Sugiyanto, 2024). This causes unevenness in technology-based public services that should be accessible to all levels of society. The existence of a limited internet network in many areas is a major obstacle, considering that Smart Cities depend on strong and stable connectivity to run various necessary applications (Suryawijaya, 2023).

In addition to infrastructure constraints, the implementation of Smart City is also hit by regulatory problems that have not fully supported the development of smart cities. The

current policies are not adequate to regulate the use of big data, privacy, and cybersecurity, which are the main components in the Smart City ecosystem. Many regions do not have clear regulations regarding the management of their citizens' personal data, which is a sensitive issue related to public trust in the government in managing their data. Therefore, it is necessary to update policies that pay attention to aspects of digital regulation, including personal data protection and cybersecurity to ensure the successful implementation of Smart City in Indonesia (Erwin et al., 2023).

However, behind these challenges, the implementation of Smart City also brings great opportunities, especially in improving the efficiency of public services. With an integrated and technology-based system, various services that previously required more time and effort can be carried out automatically and quickly. For example, in the transportation sector, big cities such as Jakarta have leveraged technology to manage traffic more efficiently using data-driven management systems and sensors. This not only reduces congestion but also optimizes the use of city resources. On the other hand, in health services, many cities have begun to implement telemedicine that allows citizens to get health services without having to come directly to the hospital, which is very useful during the COVID-19 pandemic (Khoirunisah et al., 2024).

Another opportunity is in the aspect of transparency and accountability of the government. With the implementation of Smart City, data used by the government can be accessed openly by the public, which facilitates supervision and encourages accountability in the management of budgets and resources. In addition, with the existence of a technology-based public complaint application, people can more easily submit their complaints about public services or other problems in their city. The government can also respond more quickly to these problems, which will ultimately increase public satisfaction with the services provided by the local government (Aprilla et al., 2024).

2. Technology-Based Governance Model

Technology-based governance models have been adopted by several major cities in Indonesia with the aim of improving the quality of public services and accelerating the decision-making process. One successful example of the implementation of this model is the City of Bandung, which has launched the "Bandung Command Center" application that integrates data from various public services in one platform. The app allows real-time monitoring of the city's situation, from traffic conditions, air quality, to public infrastructure maintenance. With integrated data, the government can make faster and more accurate decisions in dealing with emerging problems, as well as optimize the use of the budget for more efficient public services (H. M. H. M. Zein & Septiani, 2024).

Bandung's success in developing a technology-based governance model is inseparable from proactive policy support from the local government. Policies that support the development of information technology infrastructure in the city allow the implementation of these applications to run well. For example, Bandung has successfully facilitated the implementation of a sensor-based waste management system that can automatically send data to cleaners if there are full garbage cans. A system like this reduces the waste of human resources and improves the quality of cleaning services in the city. This governance model can also be applied in other cities in Indonesia that have similar characteristics (Sarjito, 2023).

However, the implementation of technology-based governance models also faces major challenges, one of which is the digital divide between various regions. Large cities with

greater resources find it easier to implement advanced technology, while small towns and rural areas often struggle to keep up with these developments. Inadequate infrastructure and limited internet access are the main obstacles in ensuring the equitable distribution of Smart City services throughout Indonesia. Therefore, it takes maximum efforts from the central and regional governments to expand the reach of technology and provide training to government officials in the regions to be able to utilize information technology to the fullest (Maimuna et al., 2024).

In addition, the technology-based governance model also requires collaboration between the government, the private sector, and the community. The government as a policymaker must have a clear vision regarding the purpose of applying technology in governance, while the private sector can play a role in providing the needed technology infrastructure. The community must also be involved in this process so that they can take advantage of technology-based public services optimally. Therefore, good collaboration between various parties is the key to success in the implementation of effective technology-based governance (Erlinnawati & Purwanto, 2024).

3. Technology-Based Public Services

Technology-based public services in Indonesia have begun to grow rapidly, especially after many local governments realized the importance of efficiency in providing services to the community. One example of the application of technology in public services is the e-Government system which is used to simplify the administrative process and management of government data. This system allows the public to access various government services online, such as electronic ID card registration, business license management, and filing complaints related to public service issues. The advantages of this system are ease of access for the public, time efficiency, and transparency in government data management (Bao et al., 2023).

In addition, technology-based applications are also widely used to optimize health services. For example, several hospitals in Indonesia have begun to implement digital-based health service systems, such as telemedicine that allows patients to consult with doctors virtually without having to come to the hospital. This is especially beneficial for people who live in remote areas and have difficulty accessing health facilities. Another innovation is a hospital management information system that can monitor drug stock, doctor schedules, and patient data in an integrated manner. This technology not only improves hospital efficiency, but also improves the quality of health care faster and on target (Budiyatno, 2023).

However, despite the many advantages of applying technology in public services, problems related to people's digital literacy are still a significant obstacle. Many people, especially in remote areas, are not used to using technology to access public services. Therefore, there is a need for education and training programs to improve people's digital literacy, so that they can optimally utilize various applications and systems provided by the government. Without increasing digital literacy, technology applied in public services may not be effective and not fully utilized by the community (Khoirunisah et al., 2024).

On the other hand, the implementation of technology-based public services also requires attention to data privacy and security issues. The use of technology in public services allows governments to collect personal data of their citizens, which if not managed properly can pose a risk of misuse. Therefore, policies that regulate personal data protection and privacy must be strengthened so that people feel safe in using digital-based public services. The government must ensure that the data collected through public service applications is

only used for legitimate purposes and is not misused by irresponsible parties (Firman & Rahmawati, 2023).

4. Regulatory and Policy Constraints

Regulatory and policy constraints are one of the main challenges in the implementation of Smart City in Indonesia. Most local governments do not have adequate regulations to regulate the use of information technology in government. In fact, clear regulations are very important to create a supportive environment for the development of Smart City. For example, policies regarding the use of personal data in Indonesia still need to be strengthened, considering that Smart Cities rely heavily on the collection and processing of personal data of their citizens to improve the quality of public services. Current regulations have not been able to provide adequate protection for such personal data, which can cause concern among the public (Pangestu, 2024).

In addition, some existing policies at the regional level are also not in line with the goals of Smart City development. Some regulations that hinder innovation, such as rules that are too strict regarding data management or the use of certain technologies, still need to be revised to better support the development of technology in public services. For this reason, more flexible and adaptive policies are needed to technological developments so that the implementation of Smart Cities in Indonesia can run smoothly. The central government also needs to provide support to local governments to formulate policies that are in accordance with the needs and characteristics of each region (Pangestu, 2024).

Another regulatory obstacle that is often faced is uncertainty in regulations related to collaboration between the public and private sectors in the development of Smart Cities. Many tech companies are interested in working with governments to develop systems and applications for smart cities, but they often face unclear policies regarding the rights and obligations of each party in the project. Therefore, a clear policy is needed regarding collaborative governance between the government and the private sector in order to create an ecosystem that is conducive to the sustainable development of Smart City.

As a solution step, the government needs to immediately strengthen the regulatory and policy framework related to information and communication technology. This step will open up opportunities for further development of Smart Cities in Indonesia and accelerate the resolution of existing problems. Good regulation will create a positive investment climate and provide legal certainty for stakeholders, be it the government, the private sector, or the community. With good regulatory support, Smart City will be able to develop more optimally and provide greater benefits to the community (Wardhana Samsudin, 2024).

5. The Role of the Community in Smart City Development

The community plays an important role in the development of Smart Cities in Indonesia, because the success of technology implementation in public services does not only depend on infrastructure and government policies, but also on the level of active community involvement and participation. One example of community participation in Smart Cities is through the use of applications provided by the government for various public services, such as community complaints, environmental problem reporting, or air quality monitoring. With this kind of application, people can immediately report the conditions around them, such as damaged roads or environmental cleanliness, so that the government can immediately take the necessary actions (Arafah & Winarso, 2020).

However, community involvement in the development of Smart Cities is often hampered by the low level of digital literacy, especially in areas that are not used to the use of technology. People who are not familiar with digital devices or technology-based applications may find it difficult to take advantage of the various services provided. Therefore, it is important to involve the public in training or education programs regarding information technology so that they can understand the benefits and how to use the application effectively. Intensive digital literacy programs can increase public awareness of the importance of technology in making various aspects of daily life easier, while supporting the implementation of a more inclusive Smart City (H. M. H. M. Zein & Septiani, 2024).

In addition, community participation can also be realized in the form of collaboration between the government, the private sector, and the community itself in designing and developing technological solutions that can solve problems in the city. For example, in the development of smart transportation systems, the public can be invited to provide input on the desired transportation policy or use a transportation monitoring application that helps the government in planning better transportation policies. This kind of collaboration not only accelerates the implementation of Smart City, but also ensures that the solutions implemented are in accordance with the needs of the local community.

In addition, with the Smart City system based on data and technology, the community can also play an active role in supervising the use of the government budget. Through the transparency platform provided by the government, the public can monitor how the public budget is used for the construction and maintenance of the city's infrastructure. This not only encourages government accountability, but also gives the community the opportunity to participate in decision-making related to the management of city resources. The higher the public participation in Smart City, the greater the opportunity to create a smarter, more efficient, and transparent city (Heriyanto, 2022).

6. Government Involvement in the Success of Smart City

The government has a key role in the success of the implementation of Smart City in Indonesia, because the right policies and regulatory support will be the main foundation for effective smart city development. One of the important steps taken by the government to support the implementation of Smart City is to create policies that support the development of information and communication technology infrastructure that is evenly distributed throughout the region. In addition, the government must also facilitate research and development (R&D) in the field of technology to create innovative solutions that suit the specific needs of each region.

The government must also play an active role in ensuring that people can access Smart City services easily and efficiently. One of the steps that can be taken is to introduce a digital-based public service system that is easily accessible and utilized by all levels of society, regardless of their educational background or digital literacy level. Training and education programs related to technology also need to be held to ensure that the community can make optimal use of these services. In addition, the government also needs to pay attention to the inclusivity aspect in every policy taken, so that no community group is marginalized or left behind in the implementation of Smart City (Subkhan, 2023).

To support the success of Smart Cities, governments must involve various parties in decision-making, including the private sector and the public. Collaboration between the government, the private sector, and the community will ensure that the technology solutions

implemented are in accordance with the real needs of the community, and are able to answer the challenges faced by the city. The government needs to open up space for the private sector to invest in the development of technologies that will be used in public services, such as applications, hardware, and data management systems. This collaboration can also improve the efficiency of city management, as well as minimize waste in the use of the budget (Almahdali et al., 2024).

In addition, the government must pay attention to sustainability aspects in the development of Smart City. The development of technologies used in Smart Cities must not only be efficient and innovative, but must also pay attention to environmental and social impacts. For example, the application of technology in the transportation sector, such as electric vehicles or application-based transportation, must pay attention to the environmental impact and the availability of supporting infrastructure. The government must design policies that facilitate the use of environmentally friendly technology, as well as encourage the public to participate in preserving the environment. This will ensure that the development of Smart Cities in Indonesia does not only focus on technological advancements, but also on social and environmental sustainability (Pratama, 2024).

7. Data Security and Privacy in Smart Cities

Data security and privacy are very important aspects in the implementation of Smart City, because the Smart City system relies heavily on the collection, processing, and storage of citizens' personal data. This data is used to improve the efficiency of public services, but if not managed properly, it can cause potential misuse or leakage of information that is very detrimental to the community. Therefore, the government must have a clear and firm policy regarding the protection of the personal data of its citizens. One of the policies that can be implemented is to ensure that every application used in the Smart City meets high security standards, including data encryption and strict supervision of anyone who has access to the data (Nanda & Farida, 2018).

In addition, data management in Smart Cities must also pay attention to the principles of transparency and accountability. The public has the right to know how their data is used by the government and third parties involved in the management of the Smart City system. Governments should publicly communicate their data management policies, as well as provide clear information about individuals' rights regarding their personal data. This is important to build public trust in the Smart City system that is being implemented. Without sufficient transparency, the public may feel worried and reluctant to participate in technology-based public services.

On the other hand, although technology can improve efficiency in data management, the risk of data leakage and misuse must still be watched out. For this reason, the government needs to involve independent institutions that can audit data management policies, as well as ensure that the technology used is safe from potential cyber threats. In addition, education and socialization to the public regarding their rights in personal data protection must also be carried out regularly so that people are more aware of the importance of maintaining their privacy in the digital world.

Cybersecurity in the context of Smart City also requires the active role of various parties, including the private sector, who have expertise and technology in dealing with cyber threats. Collaboration between the government and the private sector is urgently needed to develop solutions that can mitigate the risk of data leaks and cyberattacks that may occur. In

this case, strict regulations regarding personal data protection and cybersecurity must be implemented consistently so that the implementation of Smart City can run safely and profitably for all parties involved (Nuzir & Saifuddin, 2015).

Discussion

The implementation of the smart city concept in Indonesia brings major challenges related to the management and use of technology to improve the quality of life of the community. According to (Rachmawati, Sari, et al., 2021), smart city is a concept that focuses on the use of information and communication technology (ICT) in the management of various sectors of life to create efficiency and sustainability. However, the main challenge in the implementation of smart cities in Indonesia is the low public awareness of the benefits of this technology. Therefore, a more holistic approach is needed in introducing and educating the public so that they can adapt to existing technology. This process requires the active role of the government, the private sector, and the community itself to create an environment that supports the development of smart cities (Rachmawati, Sari, et al., 2021).

In addition, the digital divide between urban and rural areas is also one of the main challenges in the implementation of smart cities in Indonesia. This digital divide, according to (Shin et al., 2021), is closely related to limited access to technological infrastructure in rural areas. Inadequate infrastructure makes it difficult for people in rural areas to access digital services that can improve their quality of life. For this reason, government programs that focus on equitable digital access are very important in creating an inclusive smart city. Research by (Shin et al., 2021) suggests that to address this problem, large investments in technology infrastructure and internet access throughout Indonesia are needed.

On the other hand, the importance of collaboration between the government, the private sector, and the community is the key to the success of smart city development. As explained by (SULISTIA & NAM, 2022), the private sector can play a big role in providing the needed technology and innovation, while the government is tasked with providing supportive policies. (SULISTIA & NAM, 2022) also emphasized that the community must be directly involved in the planning and implementation process of smart cities, so that they have a sense of ownership of the project. Good collaboration between these three parties can accelerate implementation and ensure that the technology applied is in accordance with the needs of the community.

However, although there are many advantages that can be obtained, the implementation of smart cities is also faced with cost problems. According to (Rachmawati, Haryono, et al., 2021), the development of smart cities requires large funds, especially in terms of digital infrastructure development and human resource training. However, they argue that this investment will provide long-term results in the form of operational efficiency, improved quality of public services, and better use of data for decision-making. Therefore, policy makers must prepare an adequate budget and plan alternative funding sources to reduce the cost burden in smart city development.

Finally, it is important for the government to ensure transparency and accountability in every stage of smart city implementation. According to (Rachmawati, Haryono, et al., 2021), technology can be used to increase public information disclosure, which in turn will strengthen community participation in the development process. With technology that supports transparency, the public can access information related to ongoing projects and

policies, as well as provide constructive input. This will strengthen democracy and create a better relationship between the government and citizens.

Conclusion

The implementation of Smart City in Indonesia faces various challenges and opportunities in the management of technology-based government and public services. The main challenges faced include inequality in digital infrastructure, low digital literacy in the community, and regulations that have not fully supported data management and cybersecurity. In addition, there is still a gap between big cities that have implemented advanced technology and remote areas that have limited access to technology.

However, the opportunities offered by Smart Cities are considerable in improving the efficiency of public services, government transparency, and community participation. With the implementation of technology-based systems, public services can become faster, more transparent, and efficient, while big data technology can help governments make more accurate decisions. The success of Smart City implementation also relies heavily on close collaboration between the government, the private sector, and the community in creating innovations that suit local needs.

To ensure the sustainability of Smart City implementation, efforts are needed to increase people's digital literacy, strengthen personal data protection regulations, and invest in technology infrastructure that is evenly distributed throughout Indonesia. The government must also ensure that every policy implemented is inclusive and accessible to all levels of society, including vulnerable groups. With the right strategy, Smart City can be an effective solution in creating smarter, more efficient, and sustainable city governance.

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