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Evaluation of Smart City Policy Implementation in Realizing Digital-Based Public Services

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A B S T R A C T

This study evaluates the implementation of Smart City policies in Riau Province, Indonesia, focusing on digital-based public services through the CIPP (Context, Input, Process, Product) model. Using a qualitative approach with fifteen informants, data were gathered via interviews, observations, and document reviews, and analyzed thematically. The findings indicate that while the policy aligns with modernization needs and has improved accessibility and satisfaction, challenges remain in human resources, infrastructure, and cross-sector coordination. The study concludes that Smart City policies contribute positively to service innovation, but strengthening institutional capacity, technology, and digital literacy is essential.

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INTRODUCTION

In a global era marked by the acceleration of digital transformation, the implementation of Smart City policies is a strategic demand in public administration to increase efficiency, transparency, and accountability of services to the community (Al Nuaimi et al., 2021). In Indonesia, the national "100 Smart City" movement is a concrete step by the government in encouraging city modernization through digital services (Sulistyaningsih et al., 2023). However, the implementation of this policy has not been evenly distributed, especially in areas such as Riau Province which face infrastructure gaps and human resource readiness (Loso & Santosa, 2022; Huda et al., 2024). Recent data shows that digital inequality between regions is still high, which can slow down the adoption of digital-based public services (Fadillah & Mursyidah, 2024; Mora et al., 2021). This condition marks the contextual urgency of research in the realm of public administration.

On a global scale, challenges in the implementation of Smart Cities in developing countries emphasize that success does not depend only on technology alone, but also on socio-economic reforms, regulations, and citizen engagement (Tan & Taeihagh, 2020). Furthermore, (Jennifer Clark, 2020) in Uneven Innovation states that while Smart Cities promise to bring inclusivity and efficiency, their practices often reinforce inequality and concentrate power on big tech players without regard for marginalized communities. Other international research shows how the lack of accountability mechanisms and citizen participation can exacerbate the risk of inequality in Smart City implementation (Esashika et al., 2022). All of these findings reinforce the need for a more in-depth analysis in understanding the gap in the implementation of this policy in the context of Riau Province.

Although the literature on Smart City evaluation in Indonesia has developed, there is a large gap related to in-depth analysis of policy implementation with an evaluative approach. For example, (Loso & Santosa, 2022) highlights trends and challenges, but has not examined the implementation aspects of policies at the provincial level systematically. (Lisdawati et al., 2024) described the issue of communication and resources in the Samarinda case study, but the study did not integrate evaluation frameworks such as Context-Input-Process-Product to get a complete picture. (Sulistyaningsih et al., 2023) emphasized the need for national policy alignment, but has not explored empirical analysis in regional areas such as Riau. International research, including (Ismagilova et al., 2023) and (Ruhlandt, 2020), also shows that the lack of knowledge transfer from central governments hinders the quality of Smart City implementation in many regions. This highlights an important research gap in comprehensively evaluating the implementation of Smart City policies based on policy evaluation models, especially in Riau Province.

This research explicitly aims to evaluate the implementation of Smart City policies in realizing digital-based public services in Riau Province, Indonesia. The focus of the analysis includes the suitability of the policy context, the availability of technology inputs and resources, the effectiveness of the implementation process between sectors, and product achievements in improving access to

digital services. The approach used is a qualitative method with a policy evaluation model of Context, Input, Process, and Product. Thus, this study offers a more comprehensive evaluative structure compared to previous studies.

Theoretically, this research contributes to expanding the study of public policy evaluation, especially in the context of public administration and Smart Cities in Indonesia. By applying the Context-Input-Process-Product policy evaluation model in the Smart City realm, this study offers a systematic and integrated analytical framework to assess various dimensions of policy implementation, which has been rarely used in Indonesian studies (Lisdawati et al., 2024; Mora et al., 2021).

Practically, the results of this study are expected to provide strategic recommendations for local governments in Riau and related stakeholders to improve institutions, strengthen digital infrastructure, increase human resource capacity, and expand people's digital literacy. These recommendations will support the acceleration of the adoption of digital public services in an inclusive and sustainable manner.

Furthermore, this study also enriches understanding of the importance of knowledge transfer and policy support from the central government to the issue areas that are the main obstacles as stated by (Ismagilova et al., 2023). With an empirical focus on Riau, this research can be a regional reference that shows the implementation of policies in a concrete and contextual manner.

Overall, this research contributes to the development of policy evaluation theory in public administration and strengthens the empirical database of Smart City implementation at the provincial level. The results are expected to be a reference for policy improvement and optimization of digital services that are more effective, efficient, and equitable.

THEORETICAL REVIEW

Smart City Evaluation Framework

The evaluation of the implementation of the Smart City policy cannot be separated from the assessment framework used. (Gracias et al., 2023) emphasized that most evaluation frameworks still tend to be rigid and pay less attention to aspects of flexibility and interpretability. In fact, the success of Smart City requires a comprehensive, transparent, and adaptive evaluation system to local needs. This is reinforced by (Lacson et al., 2023) which highlights that in developing countries, including Indonesia, Smart City evaluations have not been able to capture local social, economic, and political complexities. Therefore, the use of the Context, Input, Process, Product (CIPP) based evaluation model is relevant to fill this gap, because it assesses Smart City as a whole, starting from environmental conditions to policy results felt by the community.

Public Participation in Digital Governance

Community participation is an important dimension of Smart City, but research shows that there is an empirical gap in practice. (Collins et al., 2022) found that citizen participation in the formulation and evaluation of Smart City policies is still limited, especially outside the European region. The lack of a clear

methodology for measuring public engagement was even more pronounced during the pandemic, as public services shifted to the digital realm. (Esposito et al., 2024) show that Smart City not only functions as a technical instrument for service efficiency, but also has a symbolic dimension as a form of social development. This means that citizen participation not only strengthens the legitimacy of policies, but also determines the meaning of Smart City in the local context.

Digital Transformation and Technology Efficiency

The success of Smart Cities is also measured by the extent to which technology investments are able to produce real benefits. (Bafail, 2025) uses the Data Envelopment Analysis (DEA) approach to assess the efficiency of Smart Cities at the global level. The results of the study show that the effectiveness of Smart City is determined by the ability to convert inputs in the form of investment and technology research into outputs that are directly felt by the community, such as satisfaction and quality of life. This is important in the context of public administration in Indonesia, where the allocation of technology budgets is often large, but the benefits are not optimal.

Digital Public Service Good Practices

Case studies in several countries can be a reference in understanding how Smart City policies improve public services. The E-Mongolia platform, for example, has managed to provide more than 1,200 digital services in just a few years since its launch in 2020, with the number of active users reaching 1.8 million by 2024 (E-Mongolia, 2025). In Thailand, the Traffy Fondue application leverages artificial intelligence to report and follow up on urban infrastructure problems, with a complaint resolution rate of 77 percent by 2025 (Hansen, 2025). These two examples show that the success of digital services is not only a matter of technology, but also the effectiveness of coordination mechanisms and the government's response to citizens' needs.

Implementation Challenges in Developing Countries

Smart cities in developing countries face more complex challenges than developed countries. (Kabuya et al., 2024) shows the existence of fundamental problems such as infrastructure inequality, limited institutional capacity, and the lack of a uniform definition of Smart City. Therefore, they offer an integrative approach that combines the concepts of smart cities and smart villages to address regional gaps. (Tan & Taeihagh, 2020) added that without regulatory reform, institutional capacity building, and inclusive policies, Smart City implementation risks becoming a technology project with no real impact on society. Thus, the main challenges are not only technical, but also political and institutional.

METHODOLOGY

Types and Approaches to Research

This study uses a qualitative approach with a descriptive evaluative design oriented to the Context, Input, Process, and Product (CIPP) policy evaluation model. The qualitative approach was chosen because it allows

researchers to understand in depth the social, political, and administrative context of the implementation of Smart City policies, which are difficult to measure with quantitative indicators alone. According to (Creswell & Creswell, 2023), qualitative research is particularly relevant for exploring complex social experiences, perceptions, and processes in public policy. The descriptive evaluative design is considered appropriate to analyze the extent to which the implementation of the Smart City policy in Riau Province has achieved its goals, as well as identify obstacles in its implementation (Zawacki-Richter et al., 2020).

Population and Sampling Techniques

The research population includes all stakeholders who are directly or indirectly involved in the implementation of the Smart City policy in Riau Province. The sampling technique was carried out using the purposive sampling method because the selection of participants was based on their knowledge, experience, and involvement in Smart City policies. The number of participants in this study consisted of fifteen people, consisting of local government officials, information technology managers, and representatives of the digital service user community. This number is considered adequate in qualitative research because the focus is on the depth of information, not statistical representation (Saunders et al., 2021).

Data Collection Techniques

Data collection was carried out by three main techniques: in-depth interviews, participatory observations, and review of official documents. The interviews were conducted in a semi-structured manner so that researchers could explore the views of the participants while maintaining consistency between informants. The interview guide was developed with reference to CIPP model-based policy evaluation indicators. Observations were made on digital public service activities in local government agencies to obtain a direct picture of the implementation mechanism. In addition, documents such as local regulations, official reports, and statistical data are used to complete the primary data. To ensure validity, source triangulation is used by comparing the results of interviews, observations, and documents (Noble & Heale, 2019).

Research Procedure

The research process is carried out in stages starting from preparation, data collection, to analysis. The preparation stage includes determining the location of the research in Riau Province, preparing interview guidelines, and applying for permits to related agencies. The data collection stage was carried out through in-depth interviews that took place between June and August 2025, field observations of digital public services, and the collection of official documents related to the Smart City policy. All data is recorded systematically and recorded with the consent of the participants. After that, the raw data is transcribed, categorized, and analyzed thematically.

Data Analysis Techniques

Data analysis was carried out with a thematic analysis approach to identify key patterns, themes, and categories that emerged from field data. The analysis model used refers to the stages (Miles et al., 2018), namely data reduction, data presentation, and conclusion drawing and verification. Data reduction is carried out by classifying information according to CIPP components. The presentation of data is in the form of a thematic matrix that illustrates the inter-thematic linkage. Conclusions are drawn by linking empirical findings with policy evaluation theories and Smart City literature. To support the traceability of analysis, NVivo 14 software is used, so that the data coding process is more systematic and transparent (Jackson & Bazeley, 2019).

RESULTS AND DISCUSSION

Policy Conformity with Needs (Context Aspect)

The results of the study show that the Smart City policy in Riau Province is quite in line with the direction of modernization of public services which emphasizes efficiency, transparency, and ease of access. This is in line with the vision of the local government to make digitalization an important instrument in bureaucratic reform and increasing regional competitiveness.

From interviews with local government officials, it was revealed that the Smart City policy is seen as one of the strategic programs that must be encouraged because it is able to respond to people's demands for faster and more accountable services. An official of the Communication and Information Service said that: "*Smart City for us is the gateway to provide more modern services and reduce slow bureaucratic practices. We want people to be able to take care of enough services from home, no longer having to come to the office many times.*" (P1, interview, June 2025).

From the public's side, the majority of informants stated that the existence of digital services is very helpful, especially for population administration and business licensing. A user of the service from among the community stated: "*If it is easier to make an ID card or business document extension, you don't have to queue for a long time. But I don't know if all services can be done through the application or still mixed.*" (M3, Interview, July 2025).

Nevertheless, a gap was found between the policy vision and the public's understanding. Some respondents admitted that they did not fully understand what Smart City is and the direct benefits they feel in their daily lives. This raises the perception that the Smart City policy is still limited to government jargon. A community respondent said: "*I often hear the term Smart City, but honestly I don't know the difference from ordinary services. Sometimes you still have to come to the office too.*" (M7, Interview, August 2025).

These findings show that even though policy is on target, public communication and digital literacy efforts are still needed so that the public can better understand and utilize Smart City services optimally.

Availability of Resources and Infrastructure (Input Aspect)

In the input aspect, this study found a number of significant obstacles, including limited human resources, technological infrastructure, and budget

support. These obstacles are the main factors affecting the effectiveness of Smart City implementation in Riau Province.

First, in terms of human resources, many local government apparatus, especially at the sub-district and village levels, do not have adequate competence to operate the digital system optimally. An information technology staff member in the local government stated: "*There are still many employees who stutter with technology. There are new apps, but not everyone can use them right away. Finally, I still asked for help from the IT staff*" (P5, Interview, July 2025). This has an impact on the slow adoption of technology in the bureaucratic environment.

Second, the limitations of technological infrastructure are still a real obstacle, especially related to uneven internet access. Rural areas in Riau still often experience network disruptions that cause digital services to not run consistently. A resident from a coastal area expressed his complaint: "*We often have difficulty accessing the internet. If you want to register online or check the status of the service, sometimes fail, so you are forced to stay in the office directly.*" (M10, Interview, July 2025).

Third, although local governments have allocated budgets to support the implementation of Smart Cities, the available funds are more focused on the procurement of new applications, while infrastructure maintenance and employee training are not yet a priority. A government official said: "*We have a budget for the system, but to be honest, more is spent on initial procurement. Maintenance or HR training is still limited*" (P8, Interview, August 2025). To clarify, here is a table of the main obstacles to the input aspect:

Table 1. Obstacles to Smart City Input Aspects in Riau Province

Component	Key Findings
Human Resources	The capacity of apparatus to operate digital systems is still low at the local level
Technology Infrastructure	Internet network is unstable in rural areas, hardware is limited
Budget and Funding	Implementation budget available, but minimal for long-term maintenance

Overall, the results of the research on the input aspect show that although the Smart City policy framework has been well prepared, the supporting capacity in the form of human resources, infrastructure, and budget is still inadequate. This condition has the potential to slow down the achievement of Smart City goals in Riau Province if targeted and sustainable improvement steps are not taken immediately.

Implementation and Coordination Mechanism (Process Aspects)

The results of the study show that the Smart City policy implementation mechanism in Riau Province still faces obstacles in terms of cross-sector coordination. Several local government agencies already have initiatives to develop digital systems, but they are still partially running and have not been integrated. This condition causes duplication of applications and confusion among the public regarding which platform to use.

From the observation results, population administration services are relatively more integrated, with an integration rate of around 70 percent. This can be seen from the population document printing service that can be accessed online. However, other services such as business licensing, health, and education are still running sectorally with limited integration. Business licensing, for example, has only reached 45 percent integration, while health and education services are only 30 percent and 25 percent, respectively.

A local government official explained: "*There are indeed integration efforts, but each agency tends to have its own application. So people are confused, they have to download application A for health, application B for education. We hope that there is one door to integration to make it easier*" (P4, Interview, July 2025). This condition is reinforced by a statement from an information technology manager: "*Our big challenge is coordination. Sometimes there are agencies that make applications without coordination with us in the IT team, and in the end the systems do not connect to each other*" (P6, Interview, August 2025).

From the perspective of society, the fragmentation of digital services also causes confusion. A community respondent said: "*If it is good for KTP matters now, it can be done through the application. But if it is a matter of children's school or health, they still have to come directly because the application is different and sometimes it doesn't work*" (M9, Interview, July 2025). Thus, these findings indicate that the process aspect in the implementation of the Smart City policy in Riau Province requires strengthening cross-sector coordination. Comprehensive system integration is the key so that people are not burdened by the many sectoral applications that run independently.

The Impact of Digital Services on Society (Product Aspects)

In terms of products, the results of the study show that the Smart City policy in Riau Province has begun to have a positive impact on the community, although it is not evenly distributed at all levels. The majority of respondents stated that digital services are faster, more transparent, and more efficient than manual services, especially in population administration matters such as the creation of Identity Cards, Family Cards, and birth certificates.

A resident shared his experience: "*In the past, it took months to make an ID card, now it is only a few days through the online system. This is definitely very helpful, especially for those of us who are busy working*" (M2, Interview, June 2025). However, the level of public satisfaction is not completely even. Elderly groups and people in areas with limited internet access still experience difficulties. This is reinforced by the statement of one of the elderly respondents: "*I don't understand how to use the application, so I ended up asking for help from my child or to the officer. Otherwise, I can't access that service*" (M11, Interview, July 2025).

In addition, several complaints related to technical glitches in the application were also expressed. Some respondents said that the system often encountered errors when accessed during peak hours, thus reducing the convenience of use. One of the digital service users said: "*The application is good, but sometimes it is an error or takes a long load. So if you are in a hurry, it is a bit difficult*" (M8, Interview, August 2025).

These findings confirm that although the Smart City policy in Riau Province has had a positive impact, improvement efforts are still needed to improve the quality of applications, expand internet access, and provide assistance for vulnerable groups such as the elderly. With these steps, the benefits of digital services can be felt more evenly by all levels of society.

DISCUSSION

The results of the study show that the implementation of the Smart City policy in Riau Province through the evaluation of Context, Input, Process, and Product (CIPP) produces a fairly comprehensive picture of the dynamics of digital-based public policy. In general, this policy is in line with the needs of modernizing public services, but still faces serious challenges in terms of resources, coordination, and equitable distribution of impacts to the community. The findings on the context aspect show that the Smart City policy in Riau is in line with the goal of modernizing public administration which emphasizes efficiency, transparency, and regional competitiveness. This is in line with the idea of digital governance that emphasizes bureaucratic transformation to be more adaptive to technological developments (Myeong et al., 2022). In this study, local government officials emphasized that Smart City policies are considered an important strategy, although public understanding is still limited. This condition indicates a gap between policy formulation and public acceptance, as explained by (Cardullo & Kitchin, 2021) that community participation is an important element in Smart Cities, but is often underpaid at the implementation stage.

Limited human resources, technological infrastructure, and long-term budgets are real obstacles in implementation. The uneven digital literacy of the apparatus, especially at the sub-district and village levels, hinders system optimization. This condition is in accordance with the findings (Pereira et al., 2021) which affirm that Smart City development requires support for sustainable institutional capacity and resources in order to run effectively. On the other hand, infrastructure limitations such as unstable internet networks widen the digital divide between regions. This is reinforced by (Crutzen et al., 2023) which shows that digital infrastructure inequality is still a major obstacle to the equitable distribution of public services in many developing regions.

In the process aspect, the results of the study show that coordination between agencies is still not optimal. Overlapping sectoral applications lead to service fragmentation that confuses the public. These findings are in line with research (Barczik et al., 2023) which emphasizes that system integration in Smart Cities is not only a technological issue, but also coordination between institutions and consistency in policy implementation. In line with that, (Pereira & Parycek, 2020) emphasized that an adaptive and transparent policy evaluation mechanism

is important to address integration problems that often arise in Smart City programs.

Meanwhile, in terms of products, the Smart City policy in Riau has had a positive impact in the form of increasing accessibility and efficiency of public services, especially in the field of population administration. However, community satisfaction is not evenly distributed, especially for the elderly and people in areas with limited internet access. This condition shows the existence of a digital divide which was also found by (Haque et al., 2022) in their research on the digital divide in developing countries. Other factors such as application technical glitches also strengthen implementation challenges. Research conducted by (Lim et al., 2024) emphasizes that the success of Smart Cities is highly determined by the quality of digital systems that are able to provide a satisfactory user experience, so improving the quality of applications is an urgent need.

Theoretically, this study confirms the relevance of the use of the CIPP evaluation model in public policy, which provides a comprehensive picture ranging from the context, inputs, processes, to products. This enriches the literature on Smart City evaluation in Indonesia, which was previously limited to conceptual or sectoral studies. Practically, the findings of this study provide recommendations for local governments in Riau to strengthen institutional capacity, expand digital literacy, and integrate service systems so that people are not burdened by application fragmentation. The limitation of this study is that the number of participants and the scope of the observation area are still limited, so the results are not fully representative of the entire Riau Province. Further research can combine quantitative approaches to measure the level of public adoption in a more representative way and explore the long-term impact on the effectiveness of digital public services.

CONCLUSION AND RECOMMENDATION

This study shows that the implementation of the Smart City policy in Riau Province through the Context, Input, Process, and Product (CIPP) evaluation approach provides a comprehensive overview of the dynamics of digital-based public policy. In general, policies have been aligned with the need to modernize public services, but are still faced with serious challenges in the form of limited human resources, inequality in digital infrastructure, and suboptimal coordination across sectors. Nevertheless, this policy has begun to have a positive impact, especially in improving the accessibility and efficiency of population administration services, although the level of community satisfaction still varies.

Theoretically, this study confirms the relevance of the CIPP evaluation model in assessing the effectiveness of Smart City, as well as contributing to the development of digital policy evaluation literature in Indonesia, which was previously limited. Practically, the results of the study recommend the need to strengthen institutional capacity, increase digital literacy, expand technological infrastructure evenly, and integrate services across sectors so that Smart City policies are more inclusive and sustainable.

FURTHER STUDY

Thus, these findings can be a reference for local governments and future researchers to improve Smart City implementation strategies that are more adaptive to the needs of local communities.

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