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# Transforming Smart City Governance for Quality of Life and Sustainable Development in Semarang City, Indonesia

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**ABSTRACT**

This study seeks to thoroughly understand the catalysts driving Semarang, one of Indonesia's cities, to become a smart city, with the ultimate goal of improving the long-term well-being of its citizens. Driven by the various barriers that exist in urban development, we begin with a thorough examination of the causes influencing this shift, focusing on the critical role played by Semarang's local government. Semarang, with its rich history and environmental challenges, provides a distinct case study of urban life in Indonesia. Our research used a diverse approach to unravel the rich narrative of Semarang's evolution, including interviews and observational analysis. Our findings highlight the function of the local government in crafting concepts of sustainable development, innovation and community engagement into Semarang's urban planning framework to aid its transition to a smart city. Key drivers of this transition include the development of local regulations, government readiness, and stakeholder collaboration. While seemingly small, these efforts have had a tremendous impact on human progress, providing important insights for the community. This study needs to continue with comparisons with other cities, we want to learn about lessons that can be used to optimize urban ecosystems around the world, ensuring that the quality of life for all citizens improves.

## 1. INTRODUCTION

The primary objective of this research is to look at the local government's efforts to improve the quality of life in the community through smart governance design. This is because city expansion and development do not always correspond to the degree of security, comfort, and welfare of urban residents [1-3]. People have always identified cities or urban areas with a comfortable life, with all its conveniences. A good city can provide services to its residents to achieve a good Quality of Life (QL). Šanda and Křupka [4] identified QL to include aspects of living standards, unemployment rate, number and condition of roads, education, environment, and urban and rural areas.

The smart city (SC) development concept is a development concept that prioritizes sustainable urban development using the latest science and technology, with the aim of environmental sustainability and human life [5, 6]. Not everyone has the same understanding of the definition of SC. Some people tend to define SC as the transformation from an ordinary city to a sustainable city. A smart city involves the integration of various technological innovations to meet the needs and convenience of people's lives. In general, the goal of SC development is to support the improvement of the best quality environment for people and their communities. Generally, the development of SC is through research, construction design of buildings and city infrastructure, connection of land, air, and water movement, business, regulation of green energy products and distribution, ICT development, mass housing, comfortable environment, waste management, use of available natural resources, etc. [7]. The European SC Framework describes the elements covered by the SC concept, including smart governance, economy, mobility, environment, people, and living. Figure 1 illustrates the interrelationship between elements in the SC's concept.

Figure 1 provides a detailed illustration of the intricate amortization process within urban environments, shedding light on its functioning. Within this urban context lies the complex concept of Smart Cities (SC), encompassing six fundamental aspects. The realization of these facets relies heavily on prudent governance, as discussed by Schiavone et al. [8], define smart governance as a government that actively

promotes existing communities and civil society, with municipal officials prioritizing citizen well-being and happiness. This governance model is consistent with good government ideals, stressing traits such as openness, transparency, collaboration, accountability, and participation, all of which are helped by information technology, as Lopes [9] points out. As a result, smart governance emerges as a key driver in the creation of Smart Cities, emphasizing its critical role in this revolutionary process.

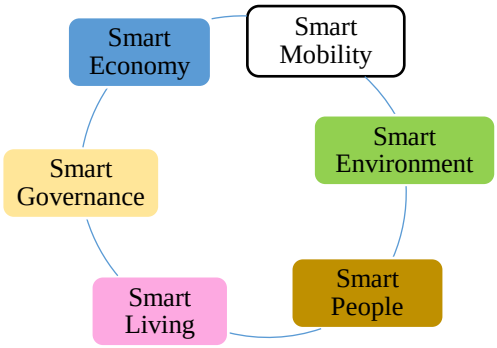


**Figure 1.** The interrelationship elements in the SC concept

The study of smart city development makes an important contribution to maintaining the sustainable development of cities around the world, including at research sites. Through the mapping of 1000 papers on sustainable urban development from 2013 to 2023, it becomes clear that research on smart city development is still classified as a new study. Despite its potential growth, the field remains in its early phases, indicating ongoing exploration and discovery. Using the keyword "city concept", previous studies focused more on aspects of city administration, community, urban development, and woman, but did not focus on the development of smart cities. Figure 2 depicted this mapping, with the sustainable of cities as the main point. The color gradation in Figure 2 illustrates the tendency of studies about smart city development and sustainable city. Lighter colors (green and yellow) indicate the focus of the current developing study, and older colors (blue and dark green) indicate focus in previous studies. This mapping confirmed that the study of the development of smart city shows a trend that is always evolving, so this study is important to continue to develop, especially study of sustainable development cities through smart city concepts.

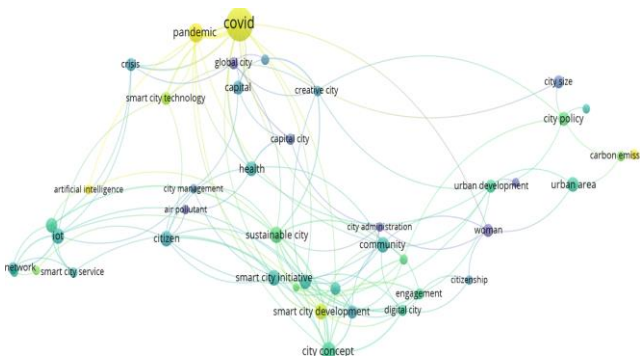


**Figure 2.** Mapping of study of smart city development

This research was conducted at Semarang, a city in Indonesia's Central Province of Java that has been renowned for its pioneering efforts in Smart City Development. With its rich historical legacy and Dutch colonial architecture, Semarang is a thriving metropolitan hub with different ethnic communities, including Javanese, Chinese, and Arab inhabitants, as recorded by Amaruli et al. [10] and Azizah et al. [11]. The municipal government actively supports these communities, creating an atmosphere that promotes growth and improves their quality of life. Semarang has successfully implemented smart governance practices through collaborative efforts involving government agencies, local communities, the private sector, and the media, resulting in significant improvements in several development indicators, such as economic growth, Gross Domestic Regional Product (GDRP), Human Development Index (HDI), and bureaucratic reform index. This collaborative approach emphasizes Semarang's commitment to long-term urban development.

This study seeks to fill the gap in research on developments in the implementation of smart cities in developing countries, and its impact on improving the quality of life of the community. This study uses a set of crucial questions to investigate the impact of smart governance in Semarang City. Initially, it will investigate how smart governance efforts improve the quality of life for Semarang citizens to discover the practical benefits and transformational potential of these techniques on daily living standards.

The study explored how Semarang's smart city development aligns with the six fundamental elements of Smart Cities: government, economics, mobility, environment, people, and living. This study will shed light on Semarang's skilful integration of these essential features, providing a comprehensive knowledge of its alignment with worldwide smart city standards.

The study also delves into the efficacy of collaborative efforts among government entities, local communities, the private sector, and the media in advancing smart governance objectives in Semarang. This investigation will elucidate the role of multi-stakeholder synergy in the success of these initiatives.

Furthermore, the study aims to explore specific smart governance practices in Semarang that have catalyzed improvements in crucial development indicators, such as economic growth, Gross Domestic Regional Product (GDRP), Human Development Index (HDI), and the bureaucratic reform index. The result of this study contributes to Indonesia's sustainable development objectives achievement overall and highlights the wider effect of smart governance on regional and national progress.

## 2. LITERATURE REVIEW

The interrelation of smart governance, sustainable development, and quality of life is the foundation of modern urban planning and administration. The following are several theoretical studies and literature reviews that support the transformation of cities into smart cities.

### 2.1 The smart city governance concept

In the modern era, effective governance requires a partnership between the government, companies, and society. Government actions have a huge impact on the nation's future, mandating flexible, cooperative, and inclusive policies that

seek feedback from both businesses and the general public [12]. To effectively meet varied socioeconomic demands, governance necessitates close collaboration among local governments, companies, and communities. To build smart cities, diverse stakeholders, including community groups, corporations, and ordinary individuals, must align their interests for mutual gain [13]. This collaborative strategy not only promotes sustainable growth but also creates lively and inclusive urban environments.

The Quadruple Helix model adds a fourth helix that emphasizes public participation and acknowledges the crucial roles of media, industry, culture, values, lifestyles, art, and the creative class [14]. In addition, the Quintuple Helix idea recommends adding a fifth helix, the environment, to support knowledge-based sustainable growth [14, 15]. Governance encompasses the management of public affairs by a range of individuals and organizations, spanning both public and private sectors. It entails navigating intricate challenges through continual processes aimed at reconciling divergent interests and promoting cooperation [16]. Fundamental to governance is its reliance on formal structures and regulations to uphold compliance and rally individuals and institutions toward advancing the common welfare of society.

Ultimately, the primary goal of government is to enhance societal welfare through development, with a particular emphasis on improving the quality of life (QL). Quality of life indicators encompass various aspects of human well-being, making it a crucial consideration in contemporary governance [17].

Governance is the administration of public affairs in various ways by persons and institutions, both public and private. Governance administers issues in a continuous process that accommodates competing or different interests and acts cooperatively. Governance empowers formal institutions and regimes, intending to enforce compliance, and organize people and institutions in the common interest [16]. For this reason, the most important function of governance is to improve the welfare of society through development, through improving Quality of Life (QL). QL indicators are all things that concern the whole of life, especially people's well-being [17]. QL is a major concern in modern government.

Smart governance relates to governance that gives place and support to the existence of indigenous people in the form of basic urban leadership, the co-creation of new administration (e-administration) for citizen satisfaction, and the use of various instruments for coordinating efforts, reconciling benefits and trading information. Smart governance, defined as the strategic use of information and communication technology (ICT) in public administration, is important in supporting sustainable development and improving citizens' quality of life [8, 13].

A comprehensive framework for effective smart governance, encompassing visionary leadership, robust legal infrastructure, civic engagement, transparency, exemplary public services, and integrated management. This model transcends technological aspects, emphasizing a citizen-centric approach. It envisions a city where citizens actively participate in policy-making through digital platforms, government operations are transparent, and public services are customized to meet individual needs [18-22].

By implementing these concepts, cities may create governing systems that are both technologically modern and responsive to residents' needs. This method establishes a virtuous circle of better quality of life and sustainable urban development, in which innovations and policies benefit the community while generating more intelligent and livable urban settings for all stakeholders. these principles, cities can develop governance systems that are both technologically advanced and aligned with citizens' aspirations. This approach creates a virtuous cycle of improved quality of life and sustainable urban development, where innovations and policies positively impact the community, fostering more intelligent and livable urban environments for all stakeholders.

### 2.2 The smart governance concept and sustainable development

To provide a clear, overarching conceptual framework for our study, we present a visual model that depicts the deep links between smart governance, sustainable development, and quality of life in urban environments. This model acts as a guide for readers in future conversations.

Effective governance stands as the cornerstone of sustainable urban development, shaping the future of our cities. The integration of IT in smart governance design reflects the creativity of the government, which drives growth in society. This smart governance strategy, distinguished by bureaucratic agility and strategic use of technology, promotes openness, justice, and accountability in urban operations [23].

Our model highlights how smart governance delivers excellent public services and establishes frameworks for smart business processes via bureaucratic preparedness and constant innovation [24]. These governance innovations, when backed by appropriate policy frameworks, have a direct impact on sustainable development, as defined by the United Nations Commission on Sustainable Development.

Mooij [25] and Ryu et al. [24] underline the importance of robust governance structures. This emphasis on governance is consistent with the larger goal of improving communal quality of life. Demonstrating a shared commitment to improve social well-being. Furthermore, the emphasis on quality of life is consistent with the United Nations' commitment to sustainable development, which promotes striking a healthy balance between human needs and environmental protection.

Our conceptual framework, which visualizes these linkages, gives a thorough understanding of how smart governance practices contribute to sustainable urban growth and, ultimately, improve city people's quality of life. Retry adding the citation and reference.

To give a clear, overarching conceptual framework for our research, we suggest a visual model (Figure 3) that depicts the complex linkages between smart governance, sustainable development, and urban quality of life. This model, which appears at the start of our theoretical part, acts as a guide for readers through adhering to discussions.

Concerning the UNCSD definition, the Wuppertal Institute proposes indicators for the four dimensions of sustainable development, as well as their interrelationships with and between these dimensions (Figure 4). The United Nations Commission on Sustainable Development (UNCSD) identified 134 sustainable development indicators and 58 universal indicators for all countries.

The model also shows how these factors work together to improve the quality of life in cities, which aligns with the United Nations' commitment to sustainable development. This comprehensive approach highlights the interconnection of social, environmental, economic, and institutional aspects in creating a sustainable future, as outlined by the Wuppertal

Institute's four dimensions of sustainable development [26].

By illustrating these linkages, our conceptual framework gives a thorough understanding of how wise governance practices contribute to long-term urban growth and, ultimately, improve city people's quality of life.

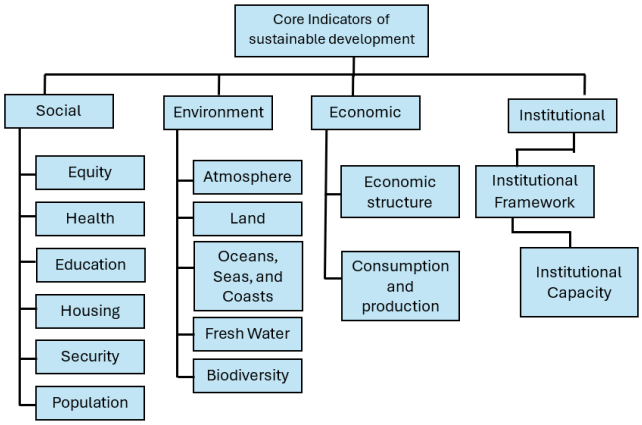


**Figure 3.** The indicators of sustainable development by UN

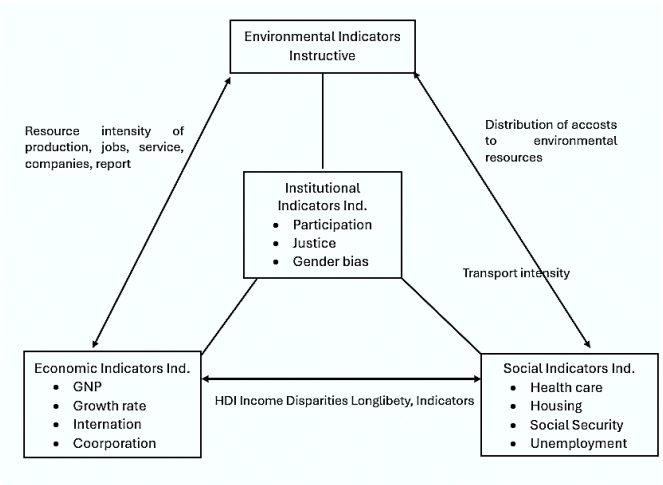


**Figure 4.** The four dimensions of sustainable development

## 2.3 Quality of life

The concept of quality of life emerges along with the concept of sustainability. The quality-of-life approach focuses on social welfare, whereas sustainable development includes nonmaterial components [27]. The goal of sustainable development is to improve everyone's quality of life by providing facilities and infrastructure services that are in the public interest [28]. The United Nations established the Human Development Index (HDI) in 1990, which includes three key indicators: health, education, and income. This indicator is still used in many nations, with varied variations to meet their needs [27]. Figure 5 illustrates the study's relationship between quality of life, sustainability, and smart city growth. The image depicts the critical significance of smart cities in guaranteeing development sustainability and increasing people's quality of life.

Figure 5 illustrates the relationship between smart cities, sustainability, and quality of life. All three factors emphasize basic human needs, comfort, health, and shared well-being. The government functions to realize these goals through ICT [27].

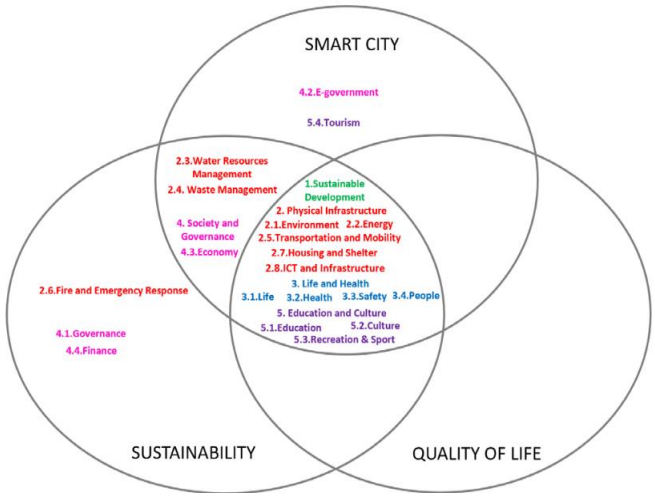


**Figure 5.** Linkage of smart city with sustainability and quality of life

## 3. METHODOLOGY

This research begins with numerous stages, including data gathering, analysis, and conclusion. The data-gathering step included a Focus Discussion Group (FGD) with the local government, field observations, and document reviews. Participants in the FGD included local government authorities interested in smart city development, such as the Office of Communication and Information Technology (*Kominfo* Agency) and the Regional Development Planning Agency (*Bappeda*), as well as community leaders from Semarang. The number of FGD participants was six people, consisting of four resource persons from elements of the city government (one head and two staff of the *Kominfo* Agency, a person from *Bappeda*), as well as two participants. Field observations included looking at websites, accessing information rapidly, and visiting public facilities.

The discussion in the FGD questioned how the concept of SC development, the direction of city government policies, the smart city action plan, bureaucratic readiness including budget, progress over the last five years, stakeholder and community involvement, obstacles and support in implementing smart city-based city development,

Creswell and Poth [29] stated that qualitative data analysis includes display and data reduction to group data according to themes. The data processing stage involves entering the data into the analysis table and then assessing all parts of smart governance that contribute to improving the community's quality of life. The analysis stage includes identifying aspects that affect the success of good governance. Data analysis uses the principle of triangulation, which verifies data with other data sources and compares it with the results of previous research [30].

After grouping the data according to themes, the analysis stage is carried out through conceptualization into three themes. This study explores more thoroughly into smart governance, concentrating on three major themes: policy, bureaucratic preparation, and services. Consider policy to be the guiding force that shapes governance through its rules and judgments. Bureaucratic readiness ensures that everything runs well and is fair and transparent. Consider services as necessary support, making it simple to access government processes and public assets. Consider this interaction in Figure

6, which illustrates how policy, bureaucracy, and services collaborate to better people's lives. This model is more than simply a road map for understanding governance in the digital era; it also piques interest, encouraging both researchers and practitioners to learn more about smart governance for the benefit of society.

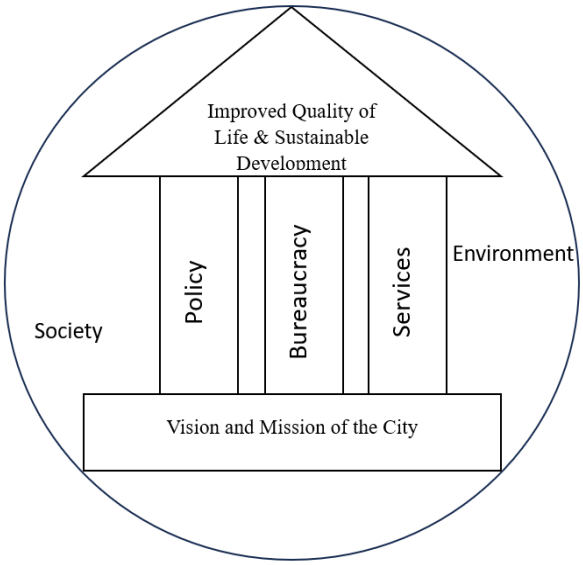


**Figure 6.** The smart governance aspects

The last stage is to conclude the research findings, followed by the study objectives.

## 4. RESULT

### 4.1 The transformation of the city of Semarang from the oldest to the smart city

Semarang, located on Java Island's northern coast, exemplifies Indonesia's diverse cultures and history. Its old alleys tell a story of interlaced influences, blending Dutch colonial architecture with the brilliant colours of Chinese history [31]. Semarang's journey, from its humble beginnings in Hindu culture to its bustling present altered by Islamization, reflects Indonesia's dynamic progress. The bustling port, which served as a portal to affluence during the Dutch colonial era, is crucial to its development.

Today, Semarang pulsates with the rhythms of diversity, bringing together a diverse range of races and traditions. Javanese, Chinese, Arab, and a variety of other immigrant cultures converge each lending its flavour to the city's bustling streets [32]. From colourful cultural festivals to bustling markets, Semarang flourishes as a lively melting pot where every nook offers a unique tale. Despite this diversity, Semarang remains unified in its commitment to intercultural harmony. The city proudly celebrates its past through traditions such as the *Gambang Semarang*, which blends Javanese and Chinese songs, and the age-old *Dugderan* event, which combines Islamic and Javanese influences [33]. With the municipal government's unflinching backing, these traditions continue to thrive, spanning generations and conserving Semarang's diverse cultural tapestry.

During Indonesia's urban transition, Semarang stands out as a beacon of innovation, embracing the potential of smart city initiatives. With visionary policies like Semarang Mayor Regulation No. 26/2018 and the ambitious Semarang Smart City Master Plan, the city is charting a route for a brighter, more sustainable future [34]. By leveraging technology and prioritizing inclusivity, Semarang ushers in a new era of urban living characterized by seamless integration and enhanced standards. Let us go on this transforming journey to a smarter, more dynamic Semarang, where the echoes of the past meet the promise of the future [35].

Semarang's policy-making process reflects the city's distinctive qualities and local wisdom, involving the community from the bottom up. This approach is consistent with Angelidou's [36] perspective, which emphasizes the role of smart governance policies in arranging services and fostering local growth. Such policies, as underlined by Angelidou [36], and Sancino and Hudson [37], are critical in defining government actions and enhancing citizen welfare.

The Semarang Smart City Action Plan incorporates this ideology, acting as a model for smart government and best practices in Indonesia. It blends technical breakthroughs with environmentally friendly growth to improve the efficacy and efficiency of local management. The primary purpose is to promote openness, foster community involvement, and create seamless integration inside Semarang using sustainable development practices. To properly implement the Semarang Smart City Action Plan, numerous critical tasks are identified, including monitoring, direction-setting, engagement, transparency, and integration. By following to these operating principles, Semarang hopes to accomplish its ambition of being a wiser, more sustainable city that promotes the well-being and prosperity of its citizens. The Semarang Smart City Action Plan operationalized as shown in Table 1.

**Table 1.** The smart local governance of action plan

| | |
|---|---|
| Smart City Master Plan | = 10i<br>= 4k<br>= 6s<br>= 10p |

Source: Regulation of the Mayor of Semarang Number 26 of 2018

Smart cities integrate various indicators, dimensions, and initiatives to enhance urban living. These include human capital development, social integration, and economic sustainability. Guided by principles like sustainability and social cohesion, smart cities chart a forward path. Semarang Smart City, for instance, emphasizes smart governance, ensuring transparency and accessibility in government operations. Priority programs, meticulously chosen by the mayor, drive progress by addressing critical challenges. This reflects Semarang's commitment to leveraging innovation for inclusive and sustainable urban development. The quality of leadership is shown by the strategy of translating the long-term development plan into an action plan [37]. Figure 7 shows the integration of the long term development plan with the action plan.

Figure 7 illustrates the preparation of a smart city master plan that refers to the long-term development plan (RPJP) and medium-term development plan (RPJMD), which prioritizes sustainable development. The strategy includes 10 priority programs from the mayor, 10 performance indicators and 68 sub-indicators, covering all units in the local government.

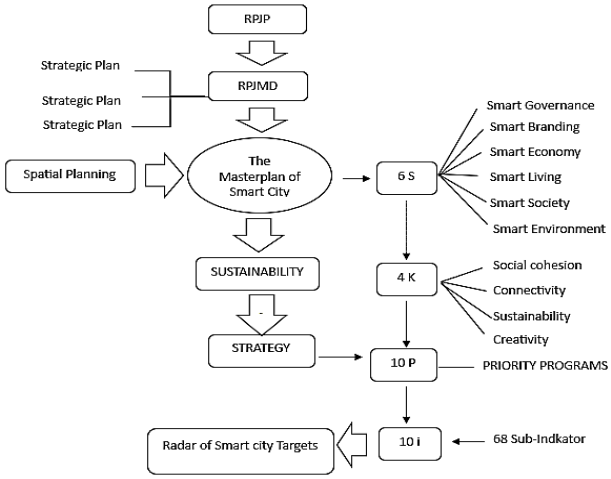


**Figure 7.** The leadership strategy in Semarang City

Fairness, accountability, and transparency are priorities in bureaucratic capacity building. These principles are integrated into IT-based systems for planning, finance, monitoring, evaluation, and reporting. Fairness ensures that all citizens have equal access to government services and facilities, whereas accountability necessitates response to stakeholders, such as the local council and the public, with the mayor providing detailed annual reports on bureaucratic performance. Transparency encourages transparency in information, job programs, and government performance. The growth of information technology has considerably improved bureaucratic service delivery, making critical information more easily accessible to the public.

Transparency, a core value, is critical to ensure openness in information transmission, program accessibility, and government performance exposure. Information technology (IT) development has significantly improved bureaucratic service delivery by making it easier for the public to access critical information. Information Technology makes information easily accessible, allowing the public to receive required data quickly and efficiently. Thus, integrating IT across government tasks not only develops bureaucratic capability but also increases transparency and accountability in the delivery of public services.

With the support of state-of-the-art techniques, the Semarang City administration has mapped out a daring plan for smart city government. This plan outlines bold goals intended to revolutionize governance practices. The 2017–2021 smart governance strategy, which was painstakingly crafted via extensive data analysis, places a premium on strengthening the internal bureaucratic framework, increasing worker capability, and improving the standard of public services. It also promotes the use of technology-driven services and the smooth integration of cutting-edge information communication data systems. Apart from these unique projects, the Semarang City administration has led many creative efforts under the smart governance framework. These innovative steps include improving information technology infrastructure, training personnel in advanced digital literacy skills, and leading the development of user-friendly online platforms for public service delivery. The government intends to develop a dynamic ecosystem that accommodates the growing requirements of all stakeholders by promoting service interconnection, improving service accessibility, and cultivating a culture of openness and accountability.

Table 2 contains data on the purpose and form of services in the smart governance framework.

**Table 2.** Purpose and form of services

| No. | Public Service Objectives | The Form of Services |
|---|---|---|
| 1 | Conduct supervision | Supervision with Information Technology, such as:<br>E-planning (*simperda* and *e-pokir*)<br>Emergency call centre<br>Portal smart city<br>E-Monev<br>CCTV Analytic<br>Complaints to the Mayor through social media |
| 2 | Accelerate the flow of community aspirations | During the recess period, the DPRD captures the aspirations of the community in the form of the DPRD's Principles of Thought (Pokir). During the COVID-19 pandemic, DPRDs are capturing community aspirations through e-Pokir.<br>Public policy-making has integrated e-Pokir with the results of the Development Planning Conference (Musrenbang) through a bottom-up mechanism |
| 3 | Simplifies interaction | The interaction between the city government and the community (G to C) mostly uses IT, but there is a possibility of direct interaction. The following are the city government's interactions with the community (G to C), both with the help of IT and directly:<br>Spatial digitization<br>Portal "*Semarang Satu Data*"<br>Akses Bus for public transportation (*Trans Semarang Bus*)<br>Information on the availability of hospital rooms<br>Highway light controller information<br>Blackout information<br>Ambulance Contact "*SiCepat*"<br>Family visits within the framework of the Healthy Indonesia Program<br>Universal Health Coverage<br>24-hours Semarang Digital Creative<br>Semarang Creative Gallery<br>A program to improve the aesthetics of the city, from slums to attractive places to visit, such as revitalizing rivers, bridges, roads, and waterways.<br>Car-free night in the old city area |
| 4 | Establishing transparency | Public works information system (*Simojan, SIM Sidewalk, SIM River, SIM Way, SIM Drainage, SIM Irigasi*)<br>Local tax revenue information (real-time)<br>Food price information<br>Transparency of local expenditures<br>Business License Transparency (*Sistem IUMK*) |
| 5 | Enhancing integration | Access to Capital for Micro, Small and Medium Enterprises<br>Integration of local planning with budgeting (*simperda dan simanggaran)*<br>E-SAKIP (E-accountability system)<br>E-Reporting) |

Source: Dinas Kominfo Semarang City, 2021


**Figure 8.** Results of city regulation through smart city governance

One of the functions of government is to bring services closer to citizens. Public services should correlate with a sense of security and comfort for all city residents. This goal is in line with efforts to improve access to information and quality of life [38]. Figure 8 shows the city's view from before the city government organized the city with an action plan and after its development through the concept of smart governance.

### 4.2 The impact of smart city governance

The success of the smart city initiative can be demonstrated in the attainment of the Semarang City development indicators, which show positive growth, as shown in Table 3 below.

**Table 3.** Achievement of Semarang city development indicators

| No. | Indicators | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| 1 | Economic Growth Rate (%) | 6.86 | -1.85 | 5.16 | 5.73 |
| 2 | Contribution of categories related to trade and services to GRDP (%) | 30.74 | 30.74 | 28.12 | 28.70 |
| 3 | Contribution of the manufacturing industry category to GRDP (%) | 27.46 | 28.62 | 28.65 | 28.85 |
| 4 | Investment value (IDR trillion) | 36.534 | 21.842 | 22.538 | 24.6 |
| 5 | Percentage of flooded and tidal areas (%) | 4.00 | 1.30 | 3.4 | 3.2 |
| 6 | Human Development Index (HDI) (index) | 83.19 | 83.05 | 83.55 | 84.08 |
| 7 | Gender Development Index (GPI) (%) | 95.55 | 95.49 | 95.67 | 95.93 |
| 8 | Poverty Rate (%) | 3.98 | 4.34 | 4.56 | 4.25 |
| 9 | Open unemployment rate (%) | 4.54 | 9.57 | 9.54 | 7.60 |
| 10 | Bureaucratic Reform Index (score) | 69.46 | 55 | 57 | 60 |

Source: Kota Semarang dalam Angka, 2019-2022

Table 3 illustrates that development is sustainable and the community's quality of life has improved. However, several parameters are fluctuating as a result of the COVID-19 pandemic. For example, economic growth in 2022 amounted to 5.73%, which has not been able to match that of 2019, and in 2020, economic growth was negative; the poverty rate in 2022 decreased to 4.25%, which in the previous year was 4.56%. Likewise, the open unemployment rate has decreased in 2022 to 7.6%. Based on the comfort aspect of the city, Semarang City has improved the comfort of the environment around the city, such as the normalization of the river, the improvement of the environment around the bridge from shabby to cleaner and more comfortable, as well as the improvement of the condition of the old city from shabby and creepy to better and even become a tourist attraction, especially at night in the old city area.

## 5. DISCUSSION

The critical role of governments in ensuring the well-being of communities and their surroundings emphasizes the need for precise governance structures. This needs the creation of strong and discernible governance blueprints, particularly at the local level, to navigate regulatory, service-oriented, and developmental domains with ease. Regulatory imperatives act as linchpins in strengthening legal certainty and increasing political legitimacy, as demonstrated by Roos and Lidström [39] investigation of municipal policies and governmental legitimacy: The Swedish paradigm. Their findings highlight the symbiotic link between local legitimacy and the provision of essential services aimed at improving the well-being of indigenous inhabitants.

In summary, essential variables for the success of astute governance are governmental edicts through regional protocols, the proactive stewardship of bureaucracy as policy implementers, and the provision of public facilities designed to strengthen communal prosperity. This comprehensive approach is consistent with Kirkpatrick [40] foundational findings, which emphasize the importance of bureaucracy in providing public services. Prioritizing these essential factors within governance frameworks allows governments to not only assure timely service delivery but also foster an attitude of openness, accountability, and responsiveness to public requirements, therefore promoting sustainable growth and social advancement.

The government's accuracy in developing local policies is critical to achieving effective smart governance. By embracing a decision-making process that encourages tiered conversations and incorporates a bottom-up approach, the government not only receives deeper insights but also improves its ability to address the different demands of the community, resulting in a beneficial influence on their well-being. These decision-making processes, which include gathering community aspirations and considering important concepts at executive levels ranging from the grassroots to the pinnacle of local administration, establish the framework for

developing policies that are both appropriate and responsive to community needs.

Implementing this decision-making paradigm not only increases police accountability but also allows for mutual inspection and engagement between the community and politicians. As a result, this democratic and open decision-making process enhances the credibility of local government policies and programs in the eyes of the people. This, in turn, impacts the community's acceptance and support for initiatives and programs implemented by the local administration to improve collective well-being and progress.

This paradigm represents a crucial aspect of intelligent governance design, highlighting the imperative for seamless coordination across various dimensions and meticulous planning that encompasses both private and public sector involvement [13]. It stresses the importance of integrating diverse elements within the planning framework while fostering collaborative participation from business entities and governmental authorities in orchestrating and implementing a variety of programs and policies. Journalists play a critical role in disseminating information about municipal directives and programs, serving as an indispensable component of this effective government strategy. Furthermore, academic institutions and intellectuals contribute significantly to shaping the blueprint for comprehensive smart urban environments.

In the context of Semarang, the blueprint for smart city evolution revolves around grassroots-driven developmental strategies. Here, the municipal administration actively integrates various societal cohorts within the urban development framework, exemplifying a steadfast commitment to fostering inclusivity. Moreover, the municipal administration advocates for regional advancement by honouring indigenous wisdom and the distinctive ethos emblematic of Semarang's urban fabric. This ethos embodies a concerted effort to cultivate a cityscape that not only showcases technological prowess but also remains deeply rooted in Indigenous values while addressing the diverse array of communal needs comprehensively.

The city government developed the Collaboration of the Quadruple Helix as a form of government collaboration. The Quadruple Helix Collaboration involves the city government, private sector, academy, and media. The four elements grow in a civil society that supports city development. The Quadruple Helix of Collaboration is one of the principles of economic recovery following the COVID-19 pandemic in Indonesia [41]. The collaboration forms the city government and city leaders must work together to harmonize the interests and goals of various sectors, community institutions, the private sector, and all components of society to become a smart city [13]. Elements of collaborative governance in smart city development include ICT and technology, data and information, and participation and engagement [13, 42]. The city government and city leaders must work together to harmonize the interests and goals of various sectors, community institutions, the private sector, and all components of society to be a smart city. Collaborative governance elements in smart city development include ICT and technology, data and information, and participation and engagement [13].

The government must bolster media literacy and forge alliances with established media entities. This is critical in building an enabling atmosphere for smart city evolution, guaranteeing that all developmental activities and projects return maximum dividends for the people. Local governments must make significant expenditures in technology-driven urban infrastructure and provide necessary technical amenities in areas such as public services, commerce, and the economy [43]. Ultimately, the smart city's trajectory aims to augment residents' quality of life by harnessing urban resources to their fullest potential. Furthermore, community welfare should be paramount, with grants allocated to ameliorate the well-being of urban denizens [4]. The exigency of adequate budgetary provisions for smart city advancement remains a pivotal concern for the Semarang municipal administration.

### 5.1 Impact of smart city governance and sustainable development in improving quality of life

Urban development, when accompanied by efficient urban planning that includes all community elements, will promote program stability and sustainability. The planning method, which combines the city's medium-term development plan with the national long-term development plan, displays continuity in the development process. The master plan for a smart city, which combines the concept of six smart city dimensions (6s) with 4k, as shown in Figure 4, demonstrates the city government's sincerity and preparedness to develop a sustainable development agenda. The urban development framework, known as smart governance, integrates local and national development objectives while utilizing diverse local skills and deeply embedded cultural components of the community. This is consistent with the hypothesis made by Angelidou [36], Angelidou et al. [1], and Caragliu and Del Bo [44] that policymakers' position affects the effectiveness of smart city development by supporting more urban design based on social networks.

Improvements in the city's development indicator scores, as shown in Table 2, demonstrate the favourable influence of smart governance design on program stability and sustainability. Key metrics such as economic growth, GRDP, HDI, and investment climate have improved, while indices of poverty, unemployment, and inundated regions have decreased, demonstrating the successful implementation of wise governance concepts. The city's medium-term development plan is integrated with the national long-term development plan, emphasizing the developmental process's continuity and efficacy.

Besides economic and social considerations, environmental issues are increasingly gaining attention within the framework of smart cities. In addition to economic and social considerations, environmental issues are increasingly receiving attention within the context of smart cities. Initiatives like the Trans Semarang CNG Converter Kit Program, which aims to reduce carbon emissions and improve waste management in public transportation, are concrete steps toward carbon emission reduction. Similarly, efforts to promote sustainable waste management, such as the construction of the Electrical Energy Waste Processor (PSEL), demonstrate the city government's commitment to environmental conservation and development. This innovative project demonstrates the Semarang municipal government's efforts to efficiently process waste to generate electricity, thereby reducing negative environmental impacts and encouraging the use of more sustainable energy sources. The city government's agenda goes beyond simply reducing carbon emissions to include the implementation of solutions that have a broader positive impact on the environment.

Smart governance design is a city development plan, with short, medium and long-term development goals. From the aspect of public policy, the establishment of smart governance as a local policy is a guideline for the bureaucracy and the community in acting and making decisions. In this study, the factors that have a significant role in supporting the success of development are bureaucratic ability, environment, regional potential, civil society, mass media, and local wisdom. The increase in regional development indicators from year to year shows the government's success in implementing smart governance policies, which support sustainable development and the quality of life of the community.

## 6. CONCLUSIONS

The government's seriousness in improving the quality of life of the community is shown through sustainable urban development planning. Formulation in the preparation of a blueprint for urban development, as a local policy that suits the needs and conditions of the city will contribute to improving the quality of life of the community and the sustainability of the development of a city. The key components such as policy formation, bureaucratic efficiency, and public service delivery become critical pillars. Inclusive local policy formulation incorporates key pillars of smart city principles, the imperative of sustainable growth, and the convergence of national and local development goals, utilizing the revolutionary potential of information technology.

This study is a good case study in implementing sustainable development, so it has relevance in developing cities, especially in developing countries such as Indonesia. Good governance collaboration between the government, industries, universities, and the media plays an important role in successful development. In addition, the government can utilize local wisdom in maintaining a comfortable relationship between elements of society. However, this study has limitations in that the data is only taken in one city in Indonesia and one period of government. Future studies should expand the sample to several cities, with different city characteristics and local leadership factors.

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