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Smart City Innovation in Local Government: A Stakeholder Analysis

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Abstract

Smart city innovation has emerged as a strategic concept in urban governance to improve the quality of life, requiring collaboration among diverse stakeholders. This study examines smart city development from a stakeholder perspective, focusing on Malang City, Indonesia. A qualitative approach was employed, including in-depth interviews, policy document analysis, and field observations, guided by stakeholder theory to understand how various actors influence policy and implementation. The findings indicate that Malang has implemented several smart initiatives, including e-government services, digital infrastructure, traffic management, and environmental monitoring. These efforts are generally perceived to enhance efficiency and transparency. However, challenges persist, particularly in ensuring inclusivity, strengthening inter-agency coordination, and improving digital literacy. The local government plays a leading role, while the private sector, academia, and civil society contribute technical expertise and community engagement. Overall, smart city innovation in Malang is progressing but remains in its early stages and requires stronger collaboration, institutional capacity, and accountability. This study underscores the importance of stakeholders as supporting actors in advancing collaborative and inclusive smart city governance.

Keywords: smart city; stakeholder analysis; local government; urban governance

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1. Introduction

Urbanization and globalization have transformed urban spaces worldwide, creating new demands for adaptive, innovative urban governance. According to the United Nations (2023) [1], more than 56% of the world's population now lives in urban areas, and the figure is expected to reach 68% by 2050. This situation poses significant challenges to infrastructure capacity, environmental sustainability, and equitable public services [2].

As digital technology rapidly advances, the need for efficient, participatory, and data-driven urban governance models has become increasingly urgent [3]. This need led to the development of the concept of the smart city, a strategic approach that combines technological innovation and collaborative governance to address the complexities of modern urbanization [4–6].

Smart city concepts have grown from global efforts to address urban challenges, focusing on public service efficiency, inclusivity, and sustainability [7,8]. This concept integrates information and communication technology (ICT), the Internet of Things (IoT), and artificial intelligence to support urban development grounded in data, innovation, and public participation [3,9]. Various cities around the world have developed smart city concepts, including Barcelona, Amsterdam, Kocaeli, and Ankara. According to a study by Demirel & Mülazımoğlu [7], the development of information and communication technology has been divided into three categories: early-stage, intermediate, and advanced. Furthermore, other cities in Latin America include Buenos Aires (Argentina), Medellín (Colombia), and Mexico City (Mexico), whose smart city development characteristics focus on technology-based solutions and community participation [10]. Studies in other countries, such as the UK and South Korea, have found that transformational institutions strongly influence the development of smart cities [11,12]. Several cities in Southeast Asia, such as Singapore and Kuala Lumpur, have also successfully developed smart cities tailored to their communities' characteristics and needs [13,14]. However, the success of implementation depends not only on technology but also on institutional capacity and collaboration among actors [15]. Considering these insights, it can be inferred that the social, governance, and organizational readiness dimensions are important pillars that determine the success of the transformation toward a smart city [16,17].

Indonesia stands among the developing countries that continue to promote smart city implementation as part of the government's digital reform agenda. Through the *Gerakan Menuju 100 Smart City* (Movement Toward 100 Smart Cities) program launched in 2017, the government aims to strengthen bureaucratic efficiency, data transparency, and innovation in public services [18,19]. Until 2024, as many as 251 regencies/cities participated in this program, with support from the central government, in preparing the Smart City Master Plan [20]. Pratama & Imawan (2019) [21] and Pereira et al. (2018) [22] reported that these initiatives could promote bureaucratic efficiency, improve public services, and optimize the use of digital data. However, regional readiness gaps, human resource quality, and inter-agency coordination remain challenges to realizing smart cities in Indonesia [23,24].

Malang City has emerged as one of the Indonesian cities that have made considerable progress in implementing their smart city programs, with direct support from the central government since 2021. The city government has shown significant progress, as evidenced by its 2024 Indonesian Digital Society Index (IMDI) score of 52.64, the highest among 514 regencies/cities, and a 'Satisfactory' rating with an Electronic-Based Government System (SPBE) index of 4.24 [25]. Malang is also among the top 10 nationally in the 2024 Digital Government Award, demonstrating its strong commitment to digital transformation [26]. However, the implementation of a smart city in Malang has faced persistent challenges, including cross-sector coordination and engagement with diverse actors, such as the government, academia, the private sector, and civil society. These conditions indicate that, despite its relatively strong digital governance performance, Malang continues to experience governance and stakeholder coordination challenges. Therefore, rather than representing an exemplary smart city, Malang provides a transitional case for examining how relatively advanced digital governance coexists with persistent institutional and stakeholder-related constraints.

Studies on smart cities over the past decade have generally focused on technology implementation, digital infrastructure, and economic impact [27,28]. On the flip side, studies on the dynamics of actors and relationships among stakeholders in the context of local government remain limited, particularly in developing countries such as Indonesia [29,30]. Various previous explorations have shown that the success of a smart city is largely determined by coordination and role-sharing among the government, local communities, and the private sector [31,32]. Kamil et al. (2025) [24] in Malang also reported that the effectiveness of a smart city is highly dependent on smart governance practices, particularly coordination among local government agencies and the inclusion of local stakeholders. Therefore, understanding how these actors interact and collaborate is essential to creating adaptive and sustainable city governance.

Given the context presented, this study aims to examine how stakeholders are organized and the roles they play in implementing a smart city in Malang. The main focus is on identifying the actors, the forms of collaboration established, and the dynamics of the implementation process. This investigation is particularly important for providing conceptual contributions to building a strong framework of shared responsibility and collaborative governance among local government, the private sector, academia, and the public. Through this study, Malang is positioned as a transitional case that provides empirical insights into how stakeholder interactions shape smart city implementation in a city with relatively strong digital governance foundations but continuing coordination and collaboration challenges.

Stakeholder inclusiveness is essential to ensuring the success of digital transformation at the local level in smart city initiatives. Referring to the Stakeholder Theory introduced by R. Edward Freeman, stakeholder analysis aims to understand and manage the relationships between organizations and various interested parties with different interests, influences, and roles in achieving organizational goals [33,34]. This approach emphasizes that public policies and strategies cannot be implemented unilaterally by the government but should take into account the interests of other parties. Therefore, by understanding the positions and needs of each stakeholder, governments can integrate their perspectives into the formulation of more inclusive and sustainable smart city strategies [35].

Digital transformation, particularly through smart city initiatives, requires strong public participation to promote inclusive governance. As stated in previous studies, public policymaking cannot be viewed solely as a technocratic process but rather as the result of social interaction and negotiation among actors with diverse interests [36,37]. Therefore, stakeholder analysis is necessary to identify the parties that are influential and affected in the formulation and implementation of SPBE policies. According to Bryson (2004) [38], stakeholders can be categorized into four main groups: key players, context setters, subjects, and crowds. This classification helps local governments understand each actor's strategic position and design management strategies aligned with their level of interest and power.

Studies on smart cities in Indonesia have been widely discussed from the perspectives of policy, legal reform, and grand design [39,40], smart city and pandemics [41], smart city inclusivity [42], and future city development [43,44]. However, studies on stakeholder analysis in the context of digital transformation remain relatively unexplored. Hoblos et al. [45] conducted a study in Australia and reported that the success of digital transformation largely depended on effective cooperation and communication among stakeholders to build shared understanding and minimize the risk of project failure. Meanwhile, da Costa Filho et al. (2021) [46] emphasized the importance of accurate mapping, mindset shifts, and stakeholder competence in analyzing digital project metrics to ensure the transformation process runs effectively. Both studies emphasized that the success of digital transformation

is not only a matter of technology but also of active inclusiveness, open communication, and stakeholder management strategies that adapt to the dynamics of change.

A mechanism involving stakeholders who share a common vision will increase the chances of a project's success [34], including for smart city programs. The success of stakeholder inclusiveness in smart city development largely depends on the ability of local governments to create open, sustainable spaces for collaboration [22]. This collaboration includes coordination among Local Apparatus Organizations (OPDs), partnerships with the private sector to provide digital infrastructure, and the inclusion of the public and local communities as users and supervisors of technology-based public services. As emphasized by Meijer et al. (2018) [47], effective smart city governance requires interdependent networks among actors with diverse resources and interests, enabling innovation that adapts to local needs. In this context, the government acts not only as a regulator but also as a facilitator, bridging the interests of various actors to achieve common goals in a smart city.

2. Methods

This study adopted a qualitative approach to explore a stakeholder phenomenon in the implementation of a smart city [48]. Malang was selected as the study site (see Figure 1) because the city had been designated by Komdigi RI (Indonesian Ministry of Communication and Digital) since 2021 to develop a smart city. The city was selected as a medium-sized city case because it combines relatively strong digital governance indicators and institutional foundations, as reflected in its high SPBE performance, with persistent challenges in stakeholder coordination and cross-sectoral integration. Moreover, Malang is a fast-growing city distinguished by its education sector and tourist attractions, which attract visitors from across Indonesia. The study design comprised in-depth interviews, policy document analysis, and field observations. Data collection was conducted between September and November 2025. In-depth interviews were conducted with 12 key informants from different stakeholder groups, including local government officials (6 informants), private-sector representatives (2 informants), academia (1 informant), media (1 informant), and citizens (2 informants). Informants were purposively selected, while interviewees were selected for their direct participation in or expertise in Malang's smart city initiatives. We conducted semi-structured interviews with each informant lasting 30–60 min. The interview was recorded on a mobile phone's voice recorder and subsequently transcribed verbatim. The interviews focused on understanding stakeholders' perceptions, roles, and experiences of inclusion in the development and implementation of smart city programs. The semi-structured interview guide is provided in Appendix A Table A3.

This study adhered to institutional ethical standards for research involving human participants. Ethical approval was obtained from the Research Ethics Committee of Universitas Muhammadiyah Malang (Approval No. E.2.9/122/.03//LPPM-UMM/V/2025). All informants were informed of the purpose of the study and provided informed consent before participating. Participation was voluntary, and anonymity and confidentiality were maintained throughout the research process. To ensure confidentiality, informants were anonymized and are referred to only by their institutional affiliation or stakeholder category. The interview process continued until sufficient information redundancy was achieved across stakeholder groups and no substantially new themes emerged from subsequent interviews. The number of informants was considered sufficient because similar information and recurring themes consistently emerged across stakeholder groups. When differences in participants' responses were identified, the researchers validated these findings by comparing them with documentary evidence and field observations before determining the final interpretation. The government informants consisted of representatives from key institutions involved in smart city governance and SPBE implementation, including Diskominfo,

Bappeda, BKPSDM, DPMPTSP, and the SPBE coordination team. Private-sector informants were representatives from PT Telkom Indonesia and Bank Jatim, while non-government informants included a university academic specializing in digital governance, a local media representative, and community members who actively used and interacted with digital public services in Malang.

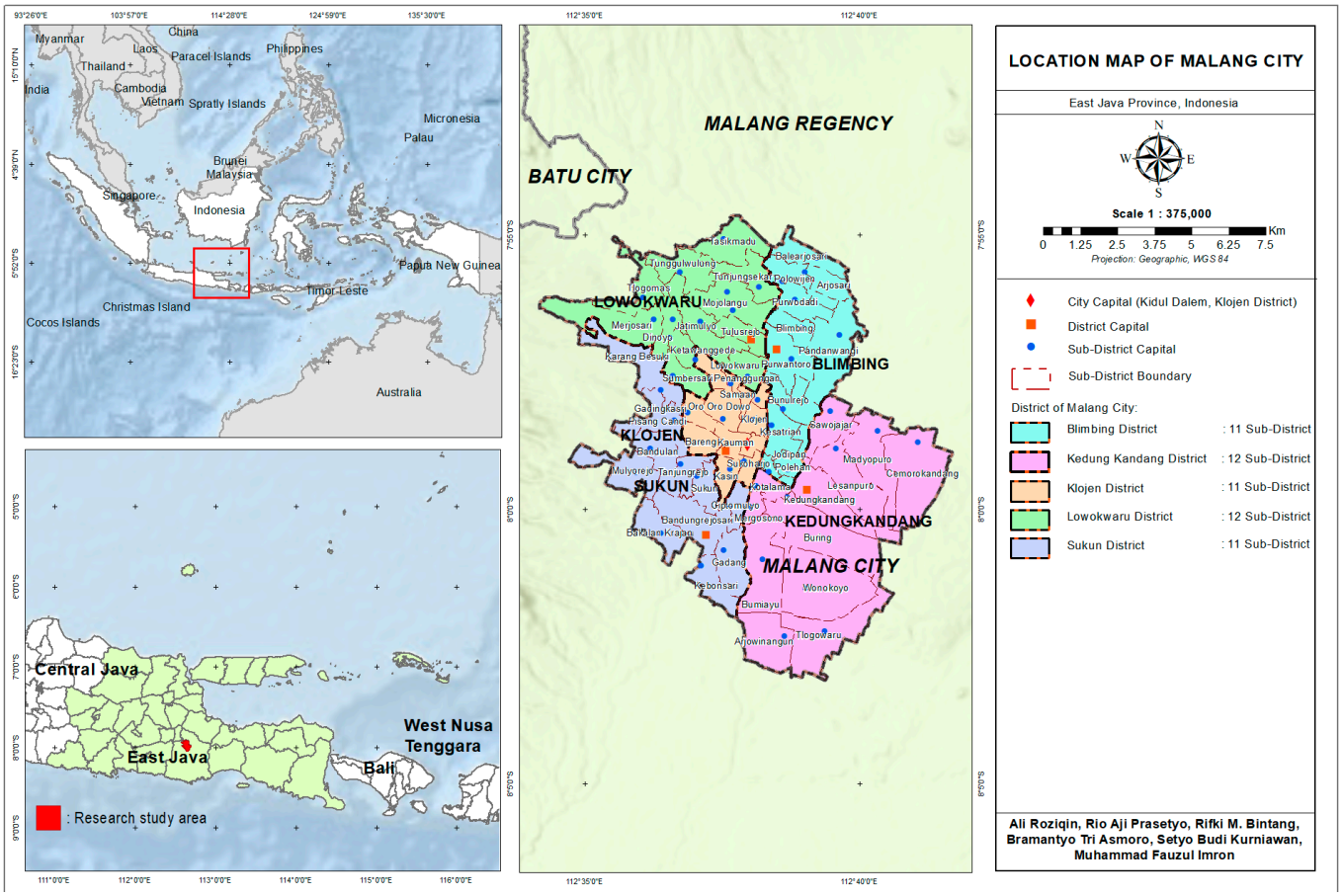


Figure 1. Location of research.

The interview data were complemented by an analysis of relevant policy documents, such as Presidential Regulation Number 95 of 2018 concerning SPBE, Malang Mayoral Regulation Number 8 of 2023 concerning SPBE, Malang Mayoral Regulation Number 7 of 2022 concerning One Data, the SPBE Architecture Decree, the SPBE Roadmap Decree, strategic planning documents, SPBE evaluation reports, and official reports published by the Malang City Government. Documents were selected based on their direct relevance to digital governance, stakeholder involvement, and smart city implementation. Field observations were also conducted to gain firsthand insight into the implementation of smart city initiatives and their impact on the urban landscape and the public. Participatory observations were conducted throughout the data collection period at relevant government offices and public service facilities involved in smart city implementation. Observation findings were documented through field notes and subsequently compared with interview and documentary evidence. The data collected from these multiple sources were then analyzed using a thematic approach to identify key themes and patterns arising from the stakeholder perspective.

The analytical process involved data familiarisation, initial coding, category development, theme identification, and interpretation. Coding was conducted manually by the research team based on the study objectives and stakeholder analysis framework adapted

from Bryson (2004) [38]. Coding (Appendix B Table A5) was conducted collaboratively by the research team, and any differences in coding were resolved through discussion until consensus was reached. Rather than relying on statistical measures, coding consistency was established through iterative discussions until agreement was achieved. No qualitative data analysis software was used in this research. Stakeholder categories such as key players, context setters, subjects, and crowds were assigned by comparing evidence from interviews, policy documents, and field observations. To enhance the credibility of the findings, methodological triangulation was employed by comparing information obtained from interviews, documents, and observations. Emerging themes were continuously cross-checked across data sources to ensure consistency and reduce interpretative bias. We also conducted data checks amongst the researchers to ensure that the data obtained corresponds to the phenomena under investigation.

This study has both potential and limitations in its exploration of the smart city phenomenon from stakeholders' perspectives. The potential of this study lies in providing an exploratory overview of the stakeholders involved and an analysis of their dynamics. It is hoped that the stakeholder analysis presented here will break down the sectoral silos that have long characterized the implementation of Malang's smart city initiative. The development of the smart city is also expected to be more targeted, with a clear division of roles and responsibilities. However, this study has limitations; for example, the qualitative approach, obtained through interviews with 12 informants, does not provide statistical data. Furthermore, stakeholder representation is uneven across various groups, with government actors dominating the majority of interview participants. This composition reflects the dominant role of the local government in initiating and coordinating the smart city program in Malang. This study also focuses on a single-city case, which may limit the transferability of the findings to other urban contexts with different governance structures, socio-economic characteristics, and levels of technological development. Therefore, the findings should be interpreted as analytically transferable rather than statistically generalizable to other urban contexts.

3. Results

3.1. Identification and Role of Stakeholders

In implementing a smart city in Malang, stakeholder inclusiveness is an essential factor, particularly in determining the effectiveness of program implementation. Smart city development requires not only technical readiness and digital infrastructure but also cross-sectoral collaboration among government, the business sector, academia, communities, and the media. According to Agné et al. [49], organizations, as stakeholders, have the authority and legitimacy to manage their respective operations independently, including supporting technology-based government agendas. Furthermore, Clarkson [50] argued that organizations have a significant public responsibility to ensure every policy implemented benefits the wider public. This perspective underpins Malang's efforts to build participatory and inclusive digital governance.

In the context of a smart city, SPBE serves as a foundational pillar for strengthening digital governance in Malang. The implementation of SPBE is regulated by Malang Mayoral Regulation Number 8 of 2023 on Electronic-Based Government Systems, which serves as a guideline for system integration, service architecture, data security, and coordination among local government agencies. This policy refers to Presidential Regulation Number 95 of 2018 on SPBE, which emphasizes the importance of inter-agency collaboration and the participation of non-governmental stakeholders. In Malang, this policy translates into partnerships and synergies between OPDs and other non-governmental institutions, both for system development and the provision of digitally based public services. The identifica-

tion of stakeholders participating in smart city implementation and digital government in Malang can be categorized into several categories as follows:

The stakeholder classification presented in Table 1 was derived from the triangulation of interview findings, policy document analysis, and field observations. Stakeholders were identified based on their formal responsibilities, degree of involvement in smart city implementation, and their interactions within the SPBE governance process. The aim of identifying these stakeholders is to assist policymakers in improving organizational performance through an authorizing environment [36]. Therefore, the roles presented in Table 1 represent the dominant functions of each stakeholder group, although in practice, several actors perform overlapping and complementary roles within the smart city ecosystem.

Table 1. Identification of Stakeholders in Smart City Implementation in Malang.

Stakeholder Groups	Actors Included	Main Role
Government	Malang City Government, Regional Secretariat, Diskominfo, Bappeda, BPKAD, BKPSDM, Dispendukcapil, Manpower Service (Disnaker), DPMPTSP, Organizational Division of the Malang City Regional Secretariat, and other OPDs	Policymakers, digital infrastructure providers, system and data managers, and the main coordinators of SPBE
Business	PT Telkom Indonesia Tbk, PT Bank Pembangunan Daerah Jawa Timur (Bank Jatim), Gojek (GoTo Group), Grab	Network providers, cloud services, electronic payment systems, and application-based technology support
Public/Communities	Malang Public, STASION Community (Malang Startup), Public Information Group (KIM)	Digital service users, local innovation developers, and public information disseminators
Academia	Surabaya State Electronics Polytechnic (PENS)	Study and technical consulting support for system architecture and security
Media	Malangkota.go.id	The main channel for public information dissemination and digital literacy promotion

Source: author analysis.

As shown in Table 1 and Figure 2, within the government sector, the Communication and Information Service (Diskominfo) plays a prominent role, leading system management and integration among OPDs. Diskominfo is responsible for providing ICT infrastructure, developing government applications, and maintaining data security and interoperability between agencies. Meanwhile, the Malang City Government and the Regional Secretariat serve as primary stakeholders, providing strategic direction to ensure all SPBE policies remain consistent with the principles of bureaucratic reform and digital public services. Other OPDs, acting as secondary stakeholders, provide support by carrying out their respective duties and functions.

The inclusiveness of other sectors, such as the business sector, contributes significantly to strengthening infrastructure and innovating digital public services. PT Telkom Indonesia is a key partner in providing primary networks, closely related to the need for digital solutions. Bank Jatim supports digital financial transformation by integrating electronic systems for regional tax and revenue payments, particularly for Urban Land and Building Tax (PBB-P2) payments. Furthermore, partner platforms like Gojek and Grab are collaborating with the Malang City Government to digitize payments and strengthen the digital economy. This collaboration exemplified public–private partnership (PPP) practices, strengthening service innovation while increasing efficiency and accessibility for the public.

Public groups and digital communities also play a significant role in bridging smart city policies with public needs. For example, the STASION (Startup Singo Edan Innovation) community helps the government ensure that public service applications developed by the Malang City Government satisfy quality standards and are appropriate for the public. The

Public Information Group (KIM) plays a central role in disseminating public information and educating the public on the use of digital services at the village level. The active participation of these communities showed that the development of a smart city ecosystem extends beyond technology to include social empowerment and citizen participation. Beyond their role as users of digital services, community groups also contribute by providing feedback on government applications, identifying implementation challenges, facilitating public adaptation to digital services, and supporting the adoption of digital innovations at the local level. This indicates that citizens and community organizations function not only as beneficiaries of smart city programs but also as contributors to the co-creation of digital governance.

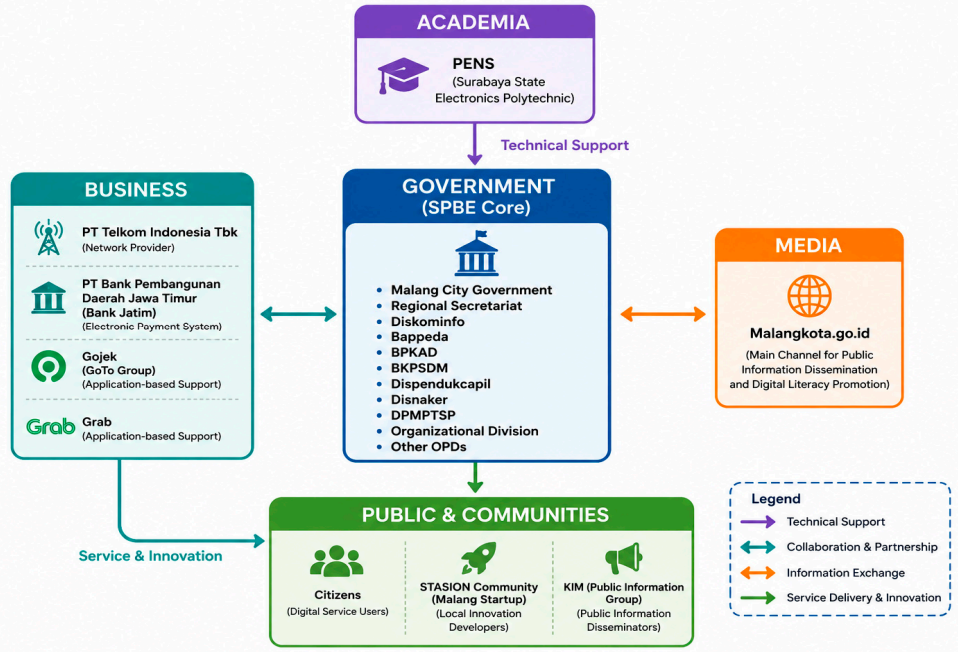


Figure 2. Network role among stakeholders. Source: Author analysis.

The contributions of academia and media are crucial to supporting the sustainability of smart city implementation in Malang. The Surabaya State Electronics Polytechnic (PENS), as a technical partner, assisted in developing system architecture designs, including the Malang Smart City Plan Map Decree and the Malang SPBE Architecture Decree, and provided input on data management and interoperability between platforms. On the other hand, government media outlets, such as Malangkota.go.id, help ensure transparency in public information by providing accurate, inclusive, and easily accessible digital content. Academia and media play different roles in supporting the implementation of the government's digital programs in Malang. Essentially, academia assists the city government in implementing and developing the SPBE program while the media serves as a liaison, conveying service information to the public. In addition to disseminating information, media actors contribute to transparency and public accountability by communicating government initiatives, raising public awareness of digital services, and facilitating broader public scrutiny of smart city programs.

3.2. Stakeholders Analysis

Stakeholder analysis is an essential step in understanding how the implementation of smart city initiatives in Malang is unfolding, as each actor has distinct positions, interests, and capacities to influence the direction of the local government's digital transformation. In this context, a smart city serves as a key foundation for digital governance, supporting the

smart city agenda. By examining power relations, interests, and levels of interdependence among actors, the success of smart city implementation becomes not simply the result of technological innovation but rather a product of the roles established by the government, business sector, academia, communities, and the wider public. To facilitate understanding, we have identified several categories as proposed by Eden & Ackerman [51] and Bryson [38], namely Key Players, Context Setters, Subjects, and Crowd. The stakeholder categories were determined by comparing evidence from interviews, policy documents, and field observations, with particular attention to each actor's formal authority, influence over strategic decision-making, and level of interest in implementing smart city initiatives. These criteria were used to assess stakeholders' relative positions within the smart city governance structure before assigning them to the categories proposed by Bryson and by Eden & Ackermann.

Key Players in smart city implementation through SPBE are central to the control center because they hold technical, policy, and budgetary authority that directly impacts the course of digitalization. This group consists of Diskominfo, Bappeda (Regional Development Planning Agency), BKAD (Regional Finance and Assets Agency), BKPSDM (Human Resources Development and Personnel Agency), Dispendukcapil (Population and Civil Registration Service), DPMPTSP (One-Stop Investment and Integrated Services Agency), and the Organizational Division, all of which have interrelated functions, ranging from planning and data integration to application development and improving the competency of civil servants (ASN). These institutions also control key governance resources, including budgeting, policy direction, and system integration, making other stakeholders dependent on government decisions for smart city implementation. OPDs are considered key players because the success of smart city implementation in Malang depends heavily on their ability to coordinate digital architecture, ICT budgets, and cross-sectoral needs. This statement was further supported by an interview with an informant from the Malang City Diskominfo, who stated:

> "We implement governance, develop applications, integrate government services, and act as a liaison between the central government and OPDs in Malang. The duties of the Diskominfo are specifically stipulated in the Mayoral Decree on the Electronic-Based Government System (SPBE) Coordination Team Number: 100.3.3.3/74/35.73.112/2024".
>
> (3 September 2025)

The context-setters are the Mayor and the Regional Secretary, who determine the overall direction and institutional framework governing the implementation of smart cities and the digital transformation of local governments. These context-setters establish the legal basis, priority standards, and bureaucratic expectations through the SPBE Mayoral Regulation, the One Data policy, and instructions for strengthening service integration. Although not included in the technical details, they are included in this category because strategic decisions determine whether OPDs move in harmony or operate sectorally. The mayor plays a role in establishing strategic policies that underpin smart city development in Malang. At the same time, the Regional Secretary formulates derivative policies to implement digital governance in local government.

As part of their role, the mayor has issued several key policies that serve as the formal foundation for implementing digital government transformation in support of smart city governance in Malang. These policies focus on data integration, public service innovation, and strengthening technology-based governance, with SPBE serving as a key instrument for advancing digital governance in local government. Initially guided by Mayoral Regulation Number 55 of 2019 and subsequently strengthened through Mayoral Regulation Number 8 of 2023, the SPBE framework emphasizes transparency, effectiveness, system integration,

and information security. This framework is further supported by Mayoral Regulation Number 7 of 2022 on One Data, which regulates data standardization, interoperability, metadata management, and data-sharing mechanisms, as well as by Mayoral Decrees Number 188.45/195/35.73.112/2023 on SPBE Architecture and Number 188.45/196/35.73.112/2023 on the SPBE Roadmap, which define system design, digital service integration, application development, and evaluation mechanisms that support the strengthening of Malang's smart city ecosystem.

The subject group further includes 23 other OPDs (see Appendix A Table A1) and technical partners such as Telkom, Bank Jatim, PENS, Grab, and Gojek, all of which have a significant stake in implementing smart city and digital government services but lack the authority to determine policy direction. This group depends on the standards, applications, and integration systems developed by key players, thereby acting primarily as implementers within the established governance framework. Although these actors possess important technical resources, expertise, and infrastructure that support smart city implementation, strategic authority remains concentrated within local government institutions, creating an asymmetric relationship in which non-government stakeholders contribute operational capacity and specialized knowledge while key decisions regarding budgeting, system integration, and program priorities remain under government control. In practice, their role is reflected in OPD's participation in developing sectoral digital services and in external partners' contributions to supporting digital governance.

PENS acts as an academic partner in developing the SPBE Architecture and Roadmap; Telkom provides network infrastructure and technical input through SPBE forums; Bank Jatim supports digital payment systems for public services and local taxes, and Grab and Gojek strengthen the digital ecosystem through service payment integration, MSME promotion, and digital economy training. However, despite the involvement of private-sector actors, collaboration remains largely operational and service-oriented. Formal public–private partnership (PPP) mechanisms for smart city governance have not yet been fully institutionalized; private-sector actors primarily provide implementation support rather than participate directly in strategic decision-making processes.

> "Academics mainly provide technical recommendations and policy input. However, broader collaboration in evaluating smart city implementation could still be strengthened".
>
> —academic informant, PENS (October 2025)

> "Our collaboration mainly focuses on providing technical support and digital infrastructure. Strategic planning and policy decisions remain under the authority of the local government".
>
> —representative of PT Telkom Indonesia (3 September 2025)

Despite the involvement of private-sector actors, collaboration remains largely operational and service-oriented. Formal PPP mechanisms for smart city governance have not yet been fully institutionalized, so private-sector actors primarily provide implementation support rather than participate directly in strategic decision-making. This indicates that private-sector participation remains largely contractual and consultative, contributing technical expertise and infrastructure while strategic decisions on budgeting, system design, and policy remain under government authority.

The crowd group consists of the public, KIM, the STASION community, and the media, whose direct policy influence is limited but whose role in ensuring that digital services are used and accepted by the public is significant. They are included in this category because of their supportive role and serve as service recipients, such as helping disseminate information, providing user input, and driving the adoption of digital services. The crowd

group ensures that government-designed digital innovations do not stop at the policy level but actually reach the public and are used in everyday practice.

In this context, the public refers to users of digital government services and information. KIM supports information dissemination, digital literacy, and communication between the public and the government (see Appendix A Table A2 for KIM's distribution in Malang), while the STASION community provides technical input and recommendations to improve digital services. Local media outlets such as Malang Posko Media help disseminate information on government digital applications and policies, promoting wider public awareness and adoption. Although their formal influence on policy decisions is limited, these actors play an important role in shaping public acceptance, digital literacy, user feedback, and service utilization. This indicates that while decision-making authority remains concentrated within local government institutions, the effectiveness of smart city programs depends heavily on external stakeholder participation and support.

> "The local government has become more open in disseminating information digitally, although public communication regarding several smart city programs could still be improved".
>
> —media representative (October 2025)

3.3. Stakeholder Dynamics

The dynamics of relationships among stakeholders in smart city implementation in Malang, particularly through digital government systems such as the SPBE, showed structural barriers, specifically sectoral egos among local government agencies. Although the SPBE formally requires cross-OPD integration, field practice shows that each OPD continues to prioritize its sectoral interests, particularly in application management and data authority. This makes coordination lengthy, and even simple technical decisions are often hampered by numerous approval stages. One informant from Diskominfo stated:

> "Some OPDs still want to have their own applications even though they should be able to be combined".
>
> (3 September 2025)

The majority of local government agencies consider implementing a smart city to be the sole responsibility of the Department of Communication and Information. However, if we consider the concept of a smart city in its entirety, the Department of Communication and Information is merely a facilitator, whilst all local government agencies are key actors who enable urban transformation through the smart city initiative. This misunderstanding often poses a challenge on the ground when formulating both strategic and technical matters. Furthermore, because the smart city initiative was initially implemented top-down, all actors adopted a passive stance, awaiting instructions from local authorities or the central government. The role of non-governmental entities remains minimal, as they have yet to fully grasp the concept of the smart city.

> "The majority of local government agencies do not yet have a full understanding of the implementation of the smart city initiative in Malang. They do not regard this as a strategic program and see no connection with their core duties and functions. This was evident when we convened a coordination meeting; those who attended were not from middle management or senior leadership".
>
> —anonymous informant from Diskominfo (4 November 2025)

Beyond sectoral egos, institutional dynamics are also shaped by the private sector's role in supporting the smart city ecosystem and local government digital governance. Although Telkom and several ICT vendors provide infrastructure, their strategic inclusiveness

in the form of consultation, audits, or co-creation remains relatively low. Participation of the private sector in supporting the smart city initiative in Malang remains relatively low. Most of them believe that these smart city programs are not long-term initiatives; in other words, they are merely following a trend and lack a clear vision from local leaders. As they are viewed as political programs, their sustainability cannot yet be guaranteed. This clearly contrasts with their profit-oriented principles. Furthermore, local governments tend to engage them only at the technical stage, rather than in long-term planning, resulting in a lack of sustained mentoring. This pointed to a lack of sustainable partnerships necessary to strengthen smart city implementation in Malang.

The commitment of regional leaders constituted a critical factor shaping stakeholder dynamics. Smart city implementation in support of digital transformation is highly dependent on the direction and consistency of the regional head and the Regional Secretary, as they are key players in determining SPBE implementation. However, shifting policy priorities and changes in officials make this commitment less stable. When this commitment is strong, OPDs are encouraged to move more quickly and consistently. On the flip side, when leadership is distracted by other agendas, the pace of digital governance implementation slows. This observation indicates that leadership is a factor influencing performance in smart city implementation at the local government level.

Overlapping roles among OPDs are a prominent dynamic in implementing the government's digital system in Malang. Based on observations and documentation, for example, Diskominfo often performs technical tasks that should be the responsibility of other OPDs, resulting in duplication of work and slowing down the coordination process. This situation showed that functional boundaries between OPDs remained unclear, particularly regarding application development, system maintenance, and data management. The unclear division of authority has led some OPDs to create their own applications despite the availability of similar systems that could be integrated, thereby exacerbating fragmentation in the smart city ecosystem's digital services. In addition to overlapping roles, serious issues arise in the sustainability and maintenance of applications.

Based on data compiled by Diskominfo, the Malang City Government has developed 42 public service applications and 25 internal government applications. However, not all applications have been fully integrated or utilized optimally, resulting in challenges with interoperability, data synchronization, and system maintenance across OPDs. A summary of the applications, their managing OPDs, implementation status, and operational conditions is provided in Appendix A Table A4. In addition, the discontinuation of some applications appears to be associated with governance capacity constraints, as several applications seem to have been developed in response to short-term administrative priorities without sufficient long-term maintenance and integration planning. On the other hand, government agencies also face technical maintenance challenges because most application developers are external private-sector contractors. These constraints indicate that the success of a smart city depends not only on the number of applications developed but also on their integration, sustainability, and actual benefits for the public. Therefore, stronger evaluation, management, and stakeholder collaboration are needed to improve the implementation of the smart city in Malang.

> "...Many apps created during and after the COVID-19 pandemic have disappeared or ceased operations. This is because they were developed merely to follow the trend, resulting in minimal maintenance and development".
>
> —anonymous informant from Bappeda (15 November 2025)

Finally, an information gap was observed to remain among the public regarding the existence and benefits of digital government services. The citizen informants indicated that awareness and use of digital government services remained limited, with some participants

continuing to prefer manual services over available online systems. One community informant explained that many citizens were familiar with digital services only when they required administrative assistance, while knowledge regarding the wider range of available applications remained limited. This finding suggests that public outreach and digital literacy programs may not yet have reached all segments of society equally. These findings indicate that digital literacy and the dissemination of digital services remain uneven among the participants interviewed. Therefore, crowd groups such as KIM, the media, and digital communities need to play a more active role in disseminating information and increasing public understanding of the use of digital services within a smart-city framework.

> "I usually use digital services only when handling administrative matters. Many people still do not know that other public services are already available online".
>
> —citizen informant (October 2025)

4. Discussion

Smart city implementation in Malang reflects a governance structure in which public institutions remain the dominant actors in directing digital transformation. The stakeholder mapping shows that actors occupying key player and context setter positions are primarily government institutions, while private-sector actors, communities, and media organizations play more limited roles in influencing strategic decisions [35]. In the context of stakeholder analysis, this division of roles according to the authorization held will help identify each stakeholder's position [35]. Similar patterns have been found by Meijer and Bolívar (2016) [4], who argued that smart city governance often remains state-led despite increasing stakeholder participation, particularly in developing governance contexts where governments retain control over strategic resources and policy direction. Freeman (2010) [33] further emphasizes that stakeholder relationships are shaped by differences in power and influence rather than participation alone. Moreover, public participation is expected to play an active role in implementing smart city initiatives [52]. These findings indicate that while stakeholder participation has been successfully institutionalized in Malang, governance authority remains largely concentrated within public institutions. Therefore, smart city development continues to follow a government-centric governance model in which decision-making power is not distributed proportionally among stakeholders [52].

The concentration of authority among government actors appears to contribute to the persistence of institutional fragmentation during implementation. The findings reveal sectoral ego, overlapping responsibilities, and fragmented digital applications across OPDs despite the presence of SPBE integration policies. These conditions indicate that organizations continue to prioritize institutional interests over collective governance objectives. In fact, digital transformation and the implementation of smart city initiatives in urban governance require a strong institutional framework [53]. A similar phenomenon was identified by Prakash (2025) [54], who found that fragmented governance structures and competing organizational priorities frequently undermine smart city implementation by weakening coordination and interoperability among institutions. Likewise, Nesti (2020) [16] argues that many smart city initiatives struggle not because of technological deficiencies but because institutional actors operate within separate organizational logics and policy interests. This finding suggests that the primary challenge of Smart City development in Malang is not technological readiness, but rather the ability to align institutional objectives and interests within the governance framework of digital transformation. Without the principles of coalition [35] and collaborative [49] amongst stakeholders, the success of a smart city will be more difficult to achieve.

The limited strategic involvement of private-sector actors represents another important characteristic of Malang's smart city ecosystem. Although companies such as Telkom, Bank

Jatim, Gojek, and Grab contribute to infrastructure provision and service delivery, their participation remains largely operational rather than strategic. This finding contrasts with the work of Fernando et al. (2025) [55] and Esteban-Narro et al. (2025) [56], who found that private actors in mature smart city ecosystems frequently act as co-creators of innovation and help shape governance priorities. Meijer and Bolívar (2016) [4] similarly emphasize that sustainable smart city development depends on governments' capacity to mobilize external knowledge, resources, and innovation capabilities through collaborative networks. When these insights are considered alongside the Malang case, a clear pattern emerges: limited private-sector influence narrows the innovation ecosystem and increases dependence on government-led initiatives. Thus, opportunities for knowledge exchange, collaborative experimentation, and cross-sector innovation remain constrained, thereby slowing the transition toward comprehensive smart city implementation.

More fundamentally, the Malang case raises questions about how influence is distributed across stakeholders within smart city governance. While existing studies emphasize the importance of multi-stakeholder participation in smart city development [35,40], the Malang case demonstrates that stakeholder inclusion does not necessarily translate into stakeholder influence. Based on the perspectives captured in this study, communities, media organizations, and private-sector actors participate in implementation processes; strategic decisions remain concentrated among key players and context setters. This finding supports Bryson's (2004) [38] argument that stakeholder significance is determined by the capacity to influence organizational outcomes rather than by participation alone. Therefore, power asymmetries among actors can constrain collaborative innovation, suggesting that the effectiveness of smart city governance should be assessed not only by the number of stakeholders involved but also by their ability to influence strategic decisions and shape digital transformation.

To provide an illustrative benchmark, the Malang case is compared with selected national and international smart city initiatives. While SPBE reflects digital government maturity, the Smart City Index (SCI) measures broader smart city performance. Therefore, these indicators are interpreted as complementary rather than directly comparable. Studies in leading Asian smart cities indicate that digital transformation is generally supported by stronger institutional integration and broader stakeholder influence. Smart city initiatives in South Korea have emphasized data integration, technological interoperability, and cross-sector collaboration through the National Strategic Smart City Program [57]. Similarly, Singapore's Smart Nation program has enabled cross-agency coordination and extensive collaboration among government, industry, and research institutions [13,14,58]. Meanwhile, smart city initiatives in Kuala Lumpur have focused on strengthening smart infrastructure and digital services to improve urban management and quality of life [14]. Compared with these illustrative examples, the Malang case exhibits fragmented digital systems, limited private-sector influence, and a governance structure dominated by public institutions. Rather than serving as a formal comparison, these examples provide contextual reference for understanding how relatively strong digital readiness may coexist with limited stakeholder influence and fragmented governance arrangements. These differences suggest that smart city maturity depends not only on technological adoption but also on the capacity to integrate institutions, coordinate stakeholders, build political will among Key Players, and foster cross-sector collaboration.

The Malang case also reflects a broader paradox in Indonesia's smart city development. Despite the widespread implementation of smart city programs through the national Smart City Movement coordinated by the Ministry of Communication and Digital Affairs (Komdigi), only three Indonesian cities were included in the SCI 2025 by IMD (International Institute for Management Development): Jakarta (103rd), Medan (113th), and

Makassar (114th). This limited representation is notable considering the large number of municipalities that have adopted digital governance initiatives and smart city frameworks. Komdigi reports indicate that major cities such as Jakarta, Surabaya, Bandung, and Makassar demonstrate relatively stronger levels of digital readiness and smart governance capacity. However, the absence of most Indonesian cities from the IMD World Competitiveness Center's SCI suggests a significant gap between policy adoption and internationally recognized smart-city maturity. In this context, Malang remains below the leading Indonesian smart-city performers, as institutional fragmentation, limited private-sector co-creation, and uneven stakeholder influence continue to constrain implementation outcomes. These illustrative benchmarks reinforce the argument that smart city maturity is determined not only by the diffusion of digital technologies but also by the quality of governance arrangements that enable institutional coordination, stakeholder collaboration, and collective value creation [4,17].

Table 2 suggests that smart city maturity in Indonesia cannot be explained solely by the availability of digital platforms, command centers, or even high SPBE performance. Although several cities, including Surabaya and Bandung, demonstrate stronger digital governance capacity than Malang does, most Indonesian cities are absent from the SCI 2025 ranking. This pattern indicates that the challenge of smart city development extends beyond technological adoption and administrative digitalization. Otherwise, international recognition appears to be more closely associated with local governments' ability to translate digital readiness into integrated governance outcomes, stakeholder collaboration, and citizen-oriented innovation. In Malang, the relatively high SPBE score contrasts with the city's limited smart-city maturity, suggesting that institutional fragmentation, uneven stakeholder influence, and limited private-sector co-creation continue to constrain the broader impact of digital transformation.

Table 2. Malang smart city compared with other cities in Indonesia.

Indicators	Jakarta	Medan	Makassar	Surabaya	Bandung	Malang
SCI 2025	103rd	113th	114th	Not Listed	Not Listed	Not Listed
SPBE Score (Latest Available)	±4.7	±3.67	±4.02	±4.78	±4.66	4.24
Integrated Digital Platform	Jakarta Kini (JAKI)	Medan Smart City (Mercy)	Lontara+	Klampid, WargaKu	Bandung Sadayana	Malang Mbois
Command Center	Operational	Operational	Operational	Operational	Operational	Developing

Source: adopted from various sources.

5. Conclusions

In conclusion, the analysis conducted in this study of the implementation of smart city initiatives in Malang City showed that strengthening digital governance requires more than regulations and planning. It also requires all actors to work toward the same goals, especially among all stakeholders in city governance. The results show that Malang already has a strong institutional foundation, with SPBE regulations, a system architecture, and a clear roadmap. Regardless, implementation success still depended largely on the extent to which regional agencies could collaborate, jointly manage data, and integrate cross-sectoral tasks. Irregular coordination, unstable applications, and indications of limited public adoption observed during the investigation indicated that technical aspects did not fully align with the separation of roles and the behavior of actors operating the system.

Stakeholder analysis showed that inter-actor dynamics were among the most decisive factors in Malang's development as a smart city. The identification of stakeholders, referring to key players and subject areas, has not yet been consistent within a single vision for the development of a smart city in Malang. Key players such as Diskominfo and Bappeda play

a central role. Still, their success depends heavily on support from subject stakeholders, including other OPDs, technical partners, digital communities, and the business world. Achieving a comprehensive smart city requires the active involvement of the private sector as co-creators and strategic partners. However, the private sector in Malang remains largely confined to the operational level. Accordingly, limited space for the private sector to participate in design, innovation, and long-term planning implies that collaboration in Malang has not reached the stage of a sustainable strategic partnership. These factors contributed to slow innovation, a lack of long-term technical assistance, and the suboptimal use of external resources that could otherwise ease the government's burden.

The sustainability of a smart city depends on the consistency of local leadership's policy direction and on the ability of all actors to maintain collaboration. This is primarily because the leadership's vision for modernizing public services provides a strong initial impetus, but sustainability requires more than just regulations. Furthermore, the involvement of universities across Malang should be leveraged to enhance knowledge and develop a comprehensive smart city framework. Among other things, it requires strengthening civil servants' capacity, ensuring budget stability, establishing clear monitoring mechanisms, and maintaining uninterrupted coordination. Compared with cities such as Jakarta, Surabaya, and Bandung, Malang remains in the early stages of smart city development. Although it has established a solid institutional foundation through SPBE regulations, system architecture, and digital governance planning, challenges related to fragmented coordination, limited involvement from the private sector and academia, and uneven public adoption remain. Therefore, strengthening collaboration, system integration, and stakeholder participation will be essential to advancing smart city governance in Malang.

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Institutional Review Board Statement: Based on the Rector Decree of Universitas Muhammadiyah Malang (UMM) No. 8/SK/UMM/I/2025 concerning Guidelines for Research and Community Service Activities for Lecturers, social science research that involves interviews, surveys, focus group discussions, or the collection of non-sensitive, non-clinical information and does not involve medical interventions, biological sampling, experimental procedures, or vulnerable populations is exempt from formal ethical review and approval by an Institutional Review Board (IRB) or Research Ethics Committee.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Appendix A

Table A1. List of Other Regional Apparatus Organizations.

No.	Other Regional Apparatus Organizations (OPDs)
1.	Education and Culture Service
2.	Cooperatives, Industry, and Trade Service
3.	Youth, Sports, and Tourism Service
4.	Health Service
5.	Transportation Service
6.	Food Security and Agriculture Service
7.	Public Works, Spatial Planning, Housing, and Settlement Areas Service
8.	Social Service, Women's Empowerment, Child Protection, Population Control, and Family Planning Service
9.	Environmental Service
10.	Public Library and Regional Archives Service
11.	Malang City Inspectorate
12.	Regional Revenue Agency
13.	National Unity and Political Affairs Agency
14.	Regional Disaster Management Agency (BPBD)
15.	Civil Service Police Unit
16.	Malang City Regional House of Representatives Secretariat (DPRD Secretariat)
17.	Protocol and Leadership Communication Section (Prokopim)
18.	Public Welfare and Community Affairs Section
19.	Legal Section
20.	Economic, Infrastructure, and Natural Resources Section
21.	General Affairs Section
22.	Procurement Services Section (Goods/Services)
23.	Governance Section

Table A2. Name and Location of Public Information Group.

No.	Sub-District	Name of Public Information Group (KIM) and Sub-District Location
1.	Klojen Sub-district	KIM Samaan in Samaan Village KIM Cendrawasih in Kasin Village KIM Obama in Bareng Village KIM Gerabah in Penanggungan Village
2.	Blimbing Sub-district	KIM Andong Merah in Pandanwangi Village KIM Purwoagung in Purwoagung Village KIM Mbois Bunulrejo in Bunulrejo Village KIM Bois Ilakes in Blimbing Village
3.	Lowokwaru Sub-district	KIM Tlogomas in Tlogomas Village KIM Kanuruhan in Dinoyo Village KIM Lestari in Tunjungsekar Village KIM Ganjur in Tulusrejo Village KIM Lowokwaru in Lowokwaru Village
4.	Sukun Sub-district	KIM Bijak in Bandungrejosari Village KIM Kartika in Pisang Candi Village KIM Karangbesuki in Karangbesuki Village
5.	Kedungkandang Sub-district	KIM Parsehjaya in Bumiayu Village KIM Anugerah in Lesanpuro Village KIM Cemara Hijau in Cemorokandang Village KIM Gandang in Kedungkandang Village

Table A3. Summary of the Semi-Structured Interview Guide.

Stakeholder Group	Main Themes	Sample Questions
Local Government (Diskominfo, Bappeda, BKPSDM, DPMPTSP, Regional Secretariat, and related agencies)	Institutional roles, inter-agency coordination, system integration, organizational capacity, and smart city governance	(1) What are your institution's roles and responsibilities in implementing smart city initiatives and SPBE? (2) How is coordination carried out among government agencies? (3) What challenges arise regarding sectoral ego, system integration, and coordination? (4) How prepared are government human resources for digital transformation? (5) What strategies have been implemented to improve digital services and public participation?
Business/Private Sector (PT Telkom Indonesia, Bank Jatim, Gojek, Grab, ICT vendors)	Public–private collaboration, participation in planning, and implementation challenges	(1) What forms of collaboration exist with the Malang City Government? (2) To what extent is the private sector involved in planning and developing digital services? (3) What challenges are encountered in public–private collaboration?
Academia (PENS)	Academic contribution and governance improvement	(1) How do universities contribute to smart city and SPBE development? (2) Which aspects of smart city governance should be strengthened?
Communities and Citizens (Malang citizens, STASION Community, Public Information Group/KIM)	User experience, digital literacy, and accessibility of digital services	(1) What are your experiences in using government digital services? (2) Have citizens received sufficient information and education regarding smart city services? (3) What challenges do citizens face when accessing or using digital public services?
Media	Information dissemination and government transparency	(1) What is the role of the media in supporting smart city programmes? (2) How transparent is the local government in communicating information related to smart city implementation?

Table A4. Examples of Smart City Digital Applications and Programs in Malang City.

No.	Smart City Dimension	Application/Programme	Leading OPD	Operational Status	Affected Public Services
1	Smart Governance	SI APEL	Department of Population and Civil Registration	Integrated into MalangMbois	Birth Certificate, Family Card, Electronic ID Card (e-KTP), Child Identity Card (KIA), civil registration
2		SIMPATDA	Regional Revenue Agency (Bapenda)	Not Publicly Accessible/Replaced	Regional tax payment (PBB-P2, BPHTB, local tax administration)
3		P-Care BPJS Health	Health Office	Active	Primary healthcare and BPJS services
4		E-PDKRT	Social Affairs, Women's Empowerment, Child Protection, Population Control and Family Planning Office	Not Publicly Accessible	Domestic violence complaint services
5		SIMPEG	BKPSDM	Active (Internal System)	Civil servant administration and payroll
6		Panic Button	Malang City Police	Not Publicly Accessible	Emergency police reporting
7		ATCS	Transportation Office	Active	Traffic control and congestion management
8		RTTIC	Transportation Office	Integrated into MalangMbois	Real-time traffic information
9		Ngalam Command Center (NCC)	Diskominfo	Integrated into MalangMbois	Public complaints, CCTV monitoring, city information

Table A4. *Cont.*

No.	Smart City Dimension	Application/Programme	Leading OPD	Operational Status	Affected Public Services
10		SIMBADA	Regional Finance and Asset Agency	Active (Internal System)	Regional asset management
11		SIMBAHE	Youth, Sports and Tourism Office	Integrated into MalangMbois	Reservation of public sports facilities
12		Jatim Bejo	Procurement Service Unit	Active	Electronic procurement of goods and services
13		SRIKANDI	Regional Archives Office	Active	Electronic correspondence and archival services
14		JDIH	Legal Bureau & Diskominfo	Integrated into MalangMbois	Public access to local regulations and legal documents
15		Si-Izol	DPMPTSP	Integrated into MalangMbois	Business licensing and permit services
16		Malang Satu Data	Diskominfo	Integrated into MalangMbois	Government data integration and interoperability
17		Si-Dasty	Diskominfo	Active	Executive dashboard and government performance monitoring
18		Si-Mart	Diskominfo	Not Publicly Accessible	Smart city monitoring and coordination
19	Smart Economy	Sembako Information System	Department of Cooperatives, Industry and Trade	Active	Commodity price information
20		Job Fair	Department of Manpower, Investment and One-Stop Integrated Service	Integrated into MalangMbois	Employment and job vacancy services
21		Si-Bansos	Social Affairs Office	Not Publicly Accessible	Social assistance administration
22		e-RTB	Department of Cooperatives, Industry and Trade	Not Publicly Accessible	Market levy payment
23	Smart Living	SIAP	Public Works, Spatial Planning, Housing and Settlement Office	Active	Building permits and site plan services
24		Si Petarung	Bappeda	Active	Spatial planning information
25		SIKDA	Health Office	Active	Electronic medical records and health information
26		E-JKN	BPJS Health/Social Affairs Office	Active (National System)	National Health Insurance services
27		E-Parkir	Transportation Office	Active	Electronic parking payment
28	Smart Society	Ngalam 112	Diskominfo	Integrated into MalangMbois	Emergency and non-emergency reporting
29		M-Mobilib	Library and Archives Office	Active	Digital library services
30		SIMAK	Education Office	Planned (2027–2031)	Educational profile information
31		Singapol PP	Satpol PP	Active	Public order monitoring
32		Early Warning System (EWS)	Regional Disaster Management Agency (BPBD)	Active	Flood early warning and disaster mitigation
33	Smart Environment	TCC–SPAM SCADA	Perumda Air Minum Tugu Tirta	Active	Water supply monitoring and distribution

Appendix B

Table A5. Manual Coding Sample of Stakeholder Analysis.

Category	Codes	Example Quotations	Compared Documents
Local government	Leadership and vision	"The local government has a clear vision of becoming a smart city through digital transformation."	Master plan of Malang Smart city
	Policy, regulation and ecosystem	". . .Many apps created during and after the COVID-19 pandemic have disappeared or ceased operations. This is because they were developed merely to follow the trend, resulting in minimal maintenance and development."	Local regulation, (RPJMD Regional Medium-Term Development Plan)
	Budget allocation	"Budget constraints remain one of the main barriers to expanding digital programs."	Master plan of Malang Smart City
Business/Private Sector	ICT infrastructure	"Our collaboration mainly focuses on providing technical support and digital infrastructure. Strategic planning and policy decisions remain under the authority of the local government".	Master Plan of Malang Smart City
	Digital innovation	"Private companies provide digital platforms that support public services."	Performance Report by Malang City Government
	Public–private partnership	"Collaboration with technology firms accelerates smart city implementation."	
Academia	Pilot projects	"Academics mainly provide technical recommendations and policy input. However, broader collaboration in evaluating smart city implementation could still be strengthened."	Master Plan of Malang Smart City, News
	Capacity building	"Researchers regularly provide digital literacy and technical training for civil servants."	News, RPJMD Kota Malang
Communities/Citizens	Public participation	"Citizens participate through public consultations and digital reporting platforms."	News, Master Plan of Malang Smart City
	Digital Literacy	"Many elderly residents still experience difficulties using online public services."	Performance Report by Malang City Government
	Feedback mechanism	"Community feedback is collected through social media and public complaint applications."	News, Performance Report by Malang City Government
Media	Public Communication	"The local government has become more open in disseminating information digitally, although public communication regarding several smart city programs could still be improved."	News

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