

Green communication on the concept of a smart city among all stakeholders in Surabaya

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Abstract

The development of the Smart City concept in Indonesia shows a positive trend, including in the city of Surabaya as one of the pioneers of digital transformation in governance and public services. However, the implementation of a smart city does not only depend on the availability of technological infrastructure, but also on the understanding, acceptance, and involvement of all stakeholders. This study aims to identify the level of understanding of various actors—government, academics, the private sector, communities, and the general public—regarding the concept of Smart City in Surabaya, as well as to analyze communication and education barriers that hinder the dissemination of this understanding. Using a descriptive qualitative approach through in-depth interviews, observations, and documentation studies, this study found that understanding of Smart City is still uneven. The government has strong technical capacity, but its socialization strategy is not yet inclusive; the general public tends to understand Smart City only as the use of public service applications; while cross-sector collaboration is not yet optimal. The main obstacles include low digital literacy, lack of collaboration platforms, minimal two-way communication, and limited access to technology in certain areas. This study recommends community-based promotion and education strategies, strengthening collaboration forums, providing participatory platforms, and conducting sustainable digital literacy campaigns to increase public understanding and involvement in Smart City development in Surabaya.

Keywords: smart city, Surabaya, digital literacy, public communication.

1. Introduction

Green communication is a type of communication related to environmental and sustainable issues [1]; [2]. This includes the use of communications to convey information, education and messages that support environmentally friendly actions and contribute to sustainability. Green communication can be applied by organizations, companies, governments and individuals to educate, influence behavior and promote more sustainable practices in society [3].

The smart city concept has nevertheless always been more complex than the above-mentioned technocratic interpretations would suggest. To mention just a few, the 2007 definition of a smart city by Rudolf Giffinger and his colleagues, considered to be one of the origins of the academic discourse on the smart city concept, undoubtedly focuses on smart industries operating in the field of information and communication technologies and using ICT solutions in their production processes. However, a number of other aspects are also mentioned, such as *"a well-educated population"*, *"good governance"*, and the concepts of *"safety"*, *"green"*, *"efficient and sustainable"* and *"energy"* [4]. But we could also refer to another basic definition of the smart city discourse, which stresses the importance not only of *"modern (ICT) communication infrastructure"* but also of *"investments in human and social capital and traditional (transport) (...) infrastructure"*,

while identifying “*wise management of natural resources through participatory governance*” as a means to achieve the smart city, and “*sustainable economic growth and a high quality of life*” as an end [5]. Or even more generally, “*the smart city represents a complex ecosystem of people, processes, policies, technology, facilitators working together in view to deliver a set of outcomes*” [6].

The development of information and communication technology (ICT) has brought significant changes to city management in various parts of the world. The concept of Smart City has emerged as an innovative approach to address the challenges of urbanization, public service efficiency, and improving the quality of life of the community. In Indonesia, this concept has been widely adopted by local governments, including the City of Surabaya as one of the pioneers of Smart City at the national level.

The Surabaya City Government has developed various technology-based programs such as Surabaya Single Window, E-Klampid (online population administration services), WargaKu (public service application), and a smart environmental management system like shown in Figure 1 to 3. These initiatives are steps forward towards a more transparent, efficient, and sustainable city.

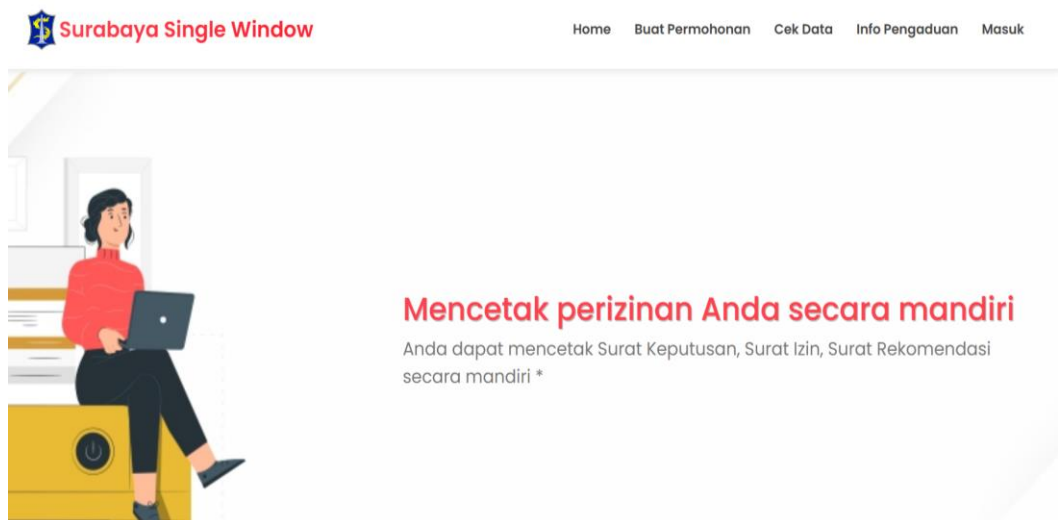


Fig. 1. Surabaya Single Window
Source: <https://sswalfa.surabaya.go.id/>

APLIKASI PENDAFTARAN KEPENDUDUKAN



Fig. 2. E-Klampid

Source: <https://klampid-dispendukcapil.surabaya.go.id/>

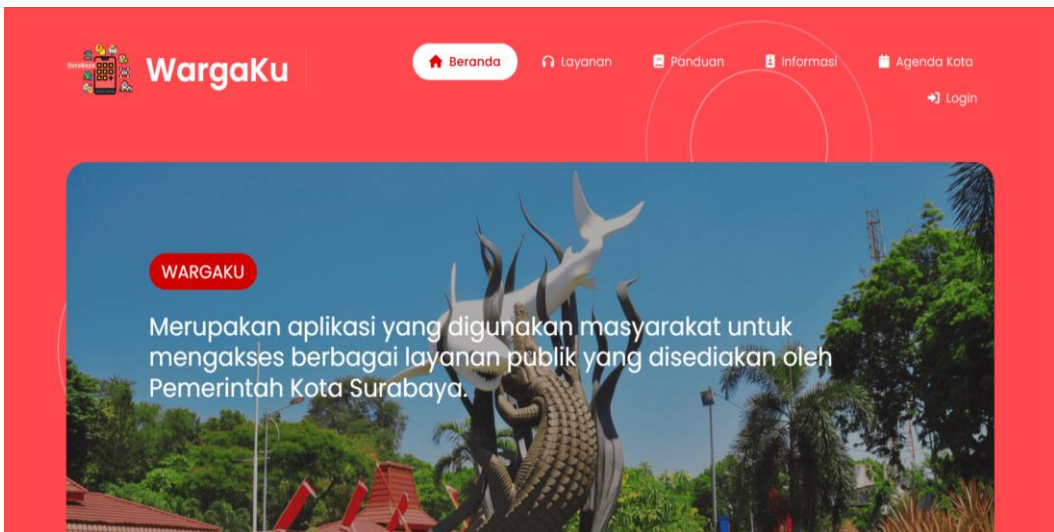


Fig. 3. WargaKu

Source: <https://wargaku.surabaya.go.id/>

However, the implementation of Smart City is not enough with only the provision of digital infrastructure. The main challenge lies in the social aspect — namely, the understanding, acceptance, and active participation of all stakeholders. Many people do not yet understand what Smart City is, how it benefits them, and how they can play a role in supporting it. This condition creates a gap between government policy and community behavior.

This research focuses on developing communication and digital literacy in the context of smart cities in Indonesia. An in-depth understanding of understanding and involvement of

stakeholders in the development of Smart City in Surabaya is necessary to formulate relevant and applicable strategies. This is important for developing countries with limited financial and technological resources [7]; [8]. Theoretically, this research can enrich academic literature on development communication and digital literacy in the context of smart cities in Indonesia. Practically, the results of this research are expected to serve as recommendations for the Surabaya City Government in formulating effective public communication policies to strengthen community participation in smart city development.

2. Literature review

The Concept of Smart Cities According to the Ministry of Communication and Information Technology, a Smart City is a city that utilizes information and communication technology to improve efficiency, improve public services, and encourage sustainable development. The ultimate goal is to create a better environment for citizens through data-driven decision making. In general, the concept of a smart city encompasses six main pillars [9]:

- Smart Governance, according to Nurlita et al., is one of the components of Smart City, with several experts providing different definitions of Smart Governance. Mellouli and Cellary share the same opinion that Smart Governance refers to the extensive use of technology by the government to carry out governmental tasks. Garcia also explains that "Smart government is a creative mix of emerging technologies and innovation in the public sector. More specifically, they claim that smart government is a continuous effort and not a specific goal, which is supported by a set of emerging technologies (i.e., big data, open government data, social networking, blogs, Really Simple Syndication (RSS) feeds, web design and programs (i.e., html5, xhtml, SQL, and more), mobile government, smartphone applications, cloud computing, and sensors." In other words, smart government is an innovative combination of various new technologies and innovations in the public sector. Specifically, smart government is an effort that does not focus on a specific goal and is carried out continuously. It is supported by various new technologies, such as blogs, big data, open government data, social networking, Really Simple Syndication (RSS) feeds, web design, and various new programs, as well as mobile government applications, cloud computing, and sensors. Meanwhile, Scholl explains that Smart Government as a smart city government is when local governments implement policies to develop smart regions by involving various stakeholders. Therefore, based on the experts' definition of Smart Governance, it is clear that Smart Governance is a source of smart public services involving public participation and city administration. The goal of Smart Governance is to build effective, efficient, communicative local government administration and governance, and to continuously strive to improve bureaucratic performance through the use of integrated technology. Although there are many ways to change conventional governance patterns, the adoption of technology will accelerate the process. In the concept of smart governance, three elements of governance must be applied: service, bureaucracy, and policy [10]. According to Bilgah, et al., the main key to successful governance is Good Governance. That is, a paradigm, system, and process of governance and development that respects the principles of the rule of law [11].

- Smart Economy (digital and innovative economy), According to Bilgah, et al., Smart Economy is the development of economic governance that is able to face challenges and adapt to changes so as to create an ecosystem that supports community economic activities in line with the region's leading economic sectors. This means that the higher the level of innovation, the more new business opportunities will be created and the more competition in the business/capital market will increase. A region can be said to have implemented the Smart Economy concept based on its economic values, the level of income and welfare of its people, economic development, and also its economic or trade relations with other countries or regions, both locally and internationally. Regions that have implemented this concept are usually supported by the advanced intelligence or mindset of their people and widespread technological progress in the region [11].
- Smart Mobility (efficient transportation and connectivity), According to Bilgah, et al., Smart Mobility is the management of urban infrastructure developed in the future as an integrated management system to ensure public interest [11]. Meanwhile, according to Kaledi, S. et al., Smart Mobility is a concept of urban development as part of the Smart City concept, which is a concept of transportation development based on information and communication technology that is expected to make public transportation services easy, safe, comfortable, fast, and affordable for the community. Smart cities with smart transportation will provide ease of travel for city residents (citizens) through the availability of innovative and sustainable public transportation that can have a low environmental impact. There are three main variables in Smart Mobility, namely Accessibility, Availability of Information Technology (ITS), and Integration (between modes and ITS) [12].
- Smart Environment (sustainable environmental management), according to Bilgah, et al., Smart Environment, also known as smart environment, means an environment that can provide comfort, resource sustainability, physical and non-physical beauty, visual and non-visual, for the community and the public [11]. Meanwhile, according to Rahayu, W.D. et al., Smart Environment is one of the main pillars of Smart City that emphasizes technology and data-based environmental management to create a sustainable and responsible management system [13].
- Smart Living (quality of life for citizens), According to Bilgah, et al., Smart Living can be interpreted as being cultured, meaning that humans have a measurable quality of life (culture) [11]. Meanwhile, according to Darmawan, I., et al., Smart Living refers to the integration of technology into everyday life to improve quality of life, efficiency, and sustainability. This concept is inseparable from the broader framework of Smart City, which aims to provide solutions to the challenges of urbanization, environmental issues, and increasingly complex resource management. In this context, Smart Living is one of the key elements capable of creating harmony between humans, the environment, and technology. Indonesia, as a developing country with a growing population and increasing urbanization, faces significant challenges in resource management, infrastructure, and public services. Major cities such as Jakarta, Surabaya, and Bandung have begun to adopt elements

of Smart Living, such as smart transportation systems, technology-based energy management, and digital public services. However, challenges such as the digital divide, inadequate infrastructure, and low public awareness of technology are obstacles to realizing the full potential of this concept. The development of information and communication technology (ICT) has brought significant changes to various aspects of human life. This opens up great opportunities for Indonesia to utilize technology in creating a better quality of life. With the right integration of technology, Smart Living is expected to not only be a solution to urban problems, but also to empower communities at various social and geographical levels [14].

- Smart People (technologically literate and actively participating communities), according to Bilgah, et al., are an important pillar because development always requires capital, whether economic, human, or social [11]. Meanwhile, according to Akbar, D.N., et al., smart communities, or smart people, are one of the six key indicators of the success of the Smart City concept. Smart communities are not solely measured by their level of formal education or qualifications, but rather by the quality of social interactions within the community and their openness to change and the outside world. The presence of an inclusive community with good social interactions is an important element in supporting the creation of a sustainable smart city [15].

Stakeholders in Smart City Development, Smart city development involves various stakeholders. The quadruple helix model emphasizes the importance of collaboration between four main sectors:

- Government as policy makers and public service providers;
- Academics as providers of research and innovation;
- The business world as a driver of investment and technology;
- The community as users and beneficiaries.

Collaboration between these four elements is key to the successful implementation of a sustainable Smart City.

Smart City Literacy and Education, According to UNESCO, digital literacy is the ability of an individual to use information technology critically, creatively, and ethically in daily life. In the context of Smart Cities, digital literacy enables the community to understand technology-based city services and encourages active participation in public decision-making processes [16].

3. Methodology

This research uses a descriptive qualitative approach to describe the level of understanding of stakeholders and identify promotional strategies that are appropriate to the local context of Surabaya. Primary data was obtained through interviews with city government officials, academics, technology startup entrepreneurs, and community members. Secondary data comes from official documents such as the Surabaya Smart City Masterplan, Bappeda reports, and scientific literature related to the concept of smart cities. Data collection techniques using three methods like in-depth interviews, field observations of digital

literacy activities and Smart City public forums and documentary studies of policies and official publications. While Analysis was conducted using the Miles and Huberman model, which consists of three stages: data reduction, data presentation, and conclusion drawing [17].

4. Discussion

Green communication in the concept of a smart city among all stakeholders in Surabaya City, is the result of a complex interaction of various influencing factors. These factors cannot be separated from each other as they form a multidimensional and interconnected system, such as;

Level of Understanding of Stakeholders, there are several result from this study that show:

- The results of the study show that understanding of the Smart City concept in Surabaya is not yet widespread.
- The city government has a high level of understanding of the technical aspects, but its communication strategy has not fully reached the lower levels of society.
- The private sector and startups understand digital business opportunities, but collaboration with the government is still limited to short-term projects.
- Academics play a role in research, but research results are often not integrated into policy.
- The general public tends to understand Smart City only in terms of using public service applications without knowing its grand vision.

Barriers Factors, there are also several barriers factors that show in this study like:

- Inconsistent public outreach.
- Low digital literacy among certain groups in society.
- Lack of cross-sector collaborative platforms.
- Limited access to technology in suburban areas.
- Insufficient two-way communication between the government and citizens.

Based on this study there are some Recommended Promotion and Education Strategies that show such as:

- "Surabaya Smart for All" Educational Campaign, the government can organize public campaigns highlighting the tangible benefits of Smart City for the community, using social media, local television, and community events.
- Community-Based Digital Literacy Program, training at the village or school level to introduce how to use government digital services.
- Smart City Collaboration Forum, establishing a cross-sector forum that brings together the government, academics, business actors, and communities to formulate city innovations.
- Citizen Innovation Lab, a participatory platform for citizens to share ideas and solutions related to urban issues, such as waste, transportation, or public services.
- Smart City Festival, an annual event showcasing citizen innovations and local technologies, as well as a platform for public education.

5. Conclusions

The success of Smart City implementation in Surabaya is not only determined by technology, but also by the level of understanding and involvement of all stakeholders. The gap in understanding remains a major obstacle that needs to be overcome through inclusive public education and communication efforts. With good digital literacy and cross-sector collaboration, Surabaya has the potential to become a smart city that is not only technologically efficient, but also socially just and participatory.

From this study, several recommendations should be made by all stakeholders in Surabaya city to create and maintain green communication on the concept of a smart city, such as:

- The Surabaya City Government needs to develop a sustainable and community-based Smart City Communication Strategy.
- A collaborative digital platform should be established to enable citizens to interact directly with policymakers.
- Digital literacy programs in schools and neighborhoods should be made a regular agenda.
- Academics and local media should be actively involved in the process of disseminating information and public education.
- Annual evaluations of public understanding levels should be conducted to assess the effectiveness of implemented communication programs.

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