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Research Article

Examining of E-readiness in the Local Government toward Smart City: A Study from Balangan Regency

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Abstract

Many local goverment in Indonesia faces challenges in implementing the Smart City program due to limited technology, infrastructure and human resources. This research aims to analyze inhibiting factors and provide suggestions for increasing government technology readiness (e-readiness) towards a Smart City. The locus of research is Balangan Regency, South Kalimantan. The research method involves interviews and observations of relevant Stakeholders. Data was collected from interviews with high-ranking government and community officials, as well as observations of infrastructure and technology services in Balangan Regency. The research results show that limited internet services, inadequate hardware and software infrastructure, limited budget, and lack of competent human resources are the main obstacles dalam mewujudkan smart city di Kabupaten Balangan.Based on these findings, other regional governments that are creating or plan to create Smart Cities may find these findings concerning. This research implies that in order for local government to implement a smart city, other players must also collaborate with the government to provide the components that are needed

Keywords: *Smart City, E-readiness, Infrastructure, Technology, Balangan Regency*

INTRODUCTION

The increase in population growth in urban areas has prompted the government to consider innovative solutions to improve the quality of life for residents (Anthony Jnr et al., 2021). Moving towards smart cities, as proposed by the Indonesian Government through the 100 Smart City Movement program, is a key strategy to address these challenges (Bappenas, 2019). This program embodies a concept that integrates the development and application of technology in urban areas, aiming to enhance the quality of life for communities and the efficiency of urban systems (Grossi et al., 2020). This concept involves complex interactions among various systems (Ali, 2022). Bitjoli et al. (2017) state that a Smart City is a concept that encompasses the use of technology as complex interactions among various systems in a given region.

Smart Cities are expected to address various issues such as urbanization, clean water availability, waste management, education, transportation, socio-economic welfare, healthcare, and public services (Anggraini Bonde, 2020). This aligns with the national development focus set forth by Presidential Regulation Number 2 of 2015, which emphasizes enhancing economic competitiveness based on natural resources, quality human resources, and advancing science and technology capabilities (BPK RI, 2019b). Through the Smart City program, it is envisioned to be a key driver in digital governance transformation and urban development, with local governments playing a central role in addressing issues affecting daily community life (Lnenicka & Saxena, 2021). This program is a crucial strategy in the current era of digitalization, designed to aid Government and Community activities by facilitating efficient information exchange (Sugandha et al., 2022), and it represents a shift towards the 4.0 digitalization or Internet of Things (IoT) era, leveraging the power of information technology to enhance quality of life (J. Park & Yoo, 2022; Sulistyaningsih et al., 2023).

Meijer & Bolívar (2016) identifies six key dimensions of Smart Cities, including Smart Governance, Smart Economy, Smart Society, Smart Mobility, Smart Environment, and Smart Living. This concept is aligned with its implementation in Indonesia, which focuses on six main pillars: Smart Governance through Electronic-Based Government Systems (SPBE), Smart Society by maintaining cultural values and norms, Smart Living by ensuring adequate infrastructure, Smart Economy to utilize technology in boosting the economy, Smart Environment to create a comfortable environment, and Smart Branding to build regional identity (Setiawan & Aindita, 2022).

The implementation of Smart Cities begins with the creation of urban digital space involving the agglomeration of hardware and software as well as data collection from various sources such as public administration, sensors, digital security measuring devices, social media, and electronic services (Komninos et al., 2019; Spicer et al., 2023). This process aims to optimize various aspects of the city including economy, livelihood, utilities, and governance. Additionally, Smart City development integrates the previously known concept of E-government in Indonesian governance (Joseph 2017). E-government, which involves the use of information technology in public services, has led to innovations such as online service systems, online licensing, and online complaints (Subekti & Gustomy, 2018). Based on the United Nations (UN) E-government Survey 2022, Indonesia has shown significant improvement in the implementation of Electronic-Based Government Systems (SPBE), rising to rank 77 from the previous positions of 88 in 2020 and 107 in 2018 (BPK RI, 2019a). This improvement aligns with the successful implementation of Government Regulation Number 71 of 2019 regarding the Implementation of Electronic-Based Government Systems (BPK RI, 2019a). This survey involves assessments of the online service index (OSI), telecommunication infrastructure index (TII), and human capital index (HCI) (MENPANRB).

This is also in line with President Joko Widodo's expectations for digital-based services, as regulated in Presidential Regulation Number 95 of 2018 regarding Electronic-Based Government Systems, to be continuously promoted to realize sustainable development in every District or City (Kemenparekraf, 2018). Cities such as Surabaya, Bandung, DKI Jakarta, and Yogyakarta, which have implemented Smart City programs, have experienced positive impacts (Anggraini Bonde, 2020). Therefore, the enthusiasm for implementing Smart City policies is increasingly emphasized by the central government to equalize access to technology and information between large and remote cities, in accordance with Law Number 23 of 2014 concerning Regional Governments (BPK RI, 2014). Similarly, Balangan Regency in South Kalimantan Province has endeavored to implement the Smart City Program despite experiencing setbacks in 2019, but remains committed to gradual improvement efforts since 2020 until now.

In the journey towards Smart City implementation, it is important to consider technological readiness in a government. The results of the Indonesian E-government Ranking (PeGI) show that most local governments are still not optimal in implementing e-government, with the national index score averaging in the category of less than 2.6 (Nugroho & Purbokusumo, 2020). This

failure is often caused by government's lack of understanding of e-readiness and decision-making without adequate evidence (Elbahnasawy 2018). E-readiness is a systematic measurement of an organization or entity's maturity in utilizing information and communication technology (ICT) to achieve specific goals (Al-Osaimi et al., 2008; Crumpton et al., 2021). Measuring e-readiness is important as an indicator of access and infrastructure, human resource skills and knowledge, and ICT usage in government, business, and society. Data on e-readiness can be used by the government to identify deficiencies and take steps to improve them to achieve Smart City development goals, as stated by (Bitjoli et al. 2017).

Models of e-readiness include the Digital Access Index from the International Telecommunication Union (ITU), the Networked Readiness Index (NRI) from the Center for International Development (CID) at Harvard University, as well as models developed by the Economist Intelligence Unit (EIU) and research by (Mutula & van Brakel, 2006). These e-readiness models demonstrate the complexity in evaluating the readiness of an entity to adopt information and communication technology (ICT) for specific purposes (Dias, 2020; Gunawong & Gao, 2017). These models are crucial in determining strategies for implementing Smart City initiatives as they can provide a comprehensive understanding of organizational readiness, human resources, infrastructure, information, and the external environment in facing challenges and opportunities related to digital transformation. For example, the model by (Mutula and van Brakel 2006) emphasizes five aspects of electronic readiness: organizational readiness, human resources, information, ICT, and the external environment. This underscores the need for an integrated approach to comprehensively understand the readiness of an entity in adopting ICT.

Government e-readiness assessments can identify constraints, design appropriate alternative strategies, and provide information for decision-making by both private and public sectors in making appropriate investments (Pardo et al. 2018). Although e-readiness implementation often encounters failures in developing countries, this concept provides an important framework for measuring the readiness for e-government implementation, especially at the local level. The readiness of a local government in implementing Smart City initiatives can be measured across several aspects, starting with ICT infrastructure, access and use of ICT, ICT policies and regulations, readiness in adopting technology, and budget readiness (Julianto P et al. 2022). However, Human Resources (HR) as smart users (Smart People) are the most crucial aspect in determining the success of Smart City implementation (Kamatula, 2019). Active participation and

involvement of the community are essential for the successful implementation of e-government and Smart City development. Human Resources (HR), both internal and external, are crucial factors in technological readiness (e-readiness) of governments towards Smart City (S. Park et al., 2013).

The majority of Government and Community HR have not fully acquired the necessary skills in utilizing information and communication technology (ICT) (Zulfadli, 2019). Evaluating the capabilities of HR is essential to enable them to work optimally in supporting Smart City implementation. In addition, ICT infrastructure, including the availability of fast and stable internet network services, is also a crucial aspect of government technology readiness, especially in Balangan Regency. Since varying degrees of preparedness will affect governance success, evaluating e-readiness or level of readiness is a crucial first step in constructing a smart city (Potnis & Pardo, 2011).

Several previous studies have investigated the level of government readiness in adopting e-government and Smart City programs in various regions of Indonesia. For instance, research by (Anjani et al. 2019) evaluated the readiness level of Batu City Government in implementing e-government using the ICT Readiness Assessment model, showing that several departments in Batu City were at different readiness levels. On the other hand, Herlambang et al. (2018) evaluated the implementation readiness of Smart City programs in Malang Regency Government using an e-readiness approach, concluding that Malang Regency Government had high technological readiness to implement the program. Another study conducted by (Majapahit et al. 2021) in Panyocokan Village, West Java, also measured the e-readiness level of village government devices for the use of Information Technology, highlighting the importance of information needs in improving the effectiveness of public services. Furthermore, Nugroho & Purbokusumo (2020), explained that overall national readiness in the e-government program is quite adequate, although several factors including budget, digital infrastructure and apparatus competency still need to be improved.

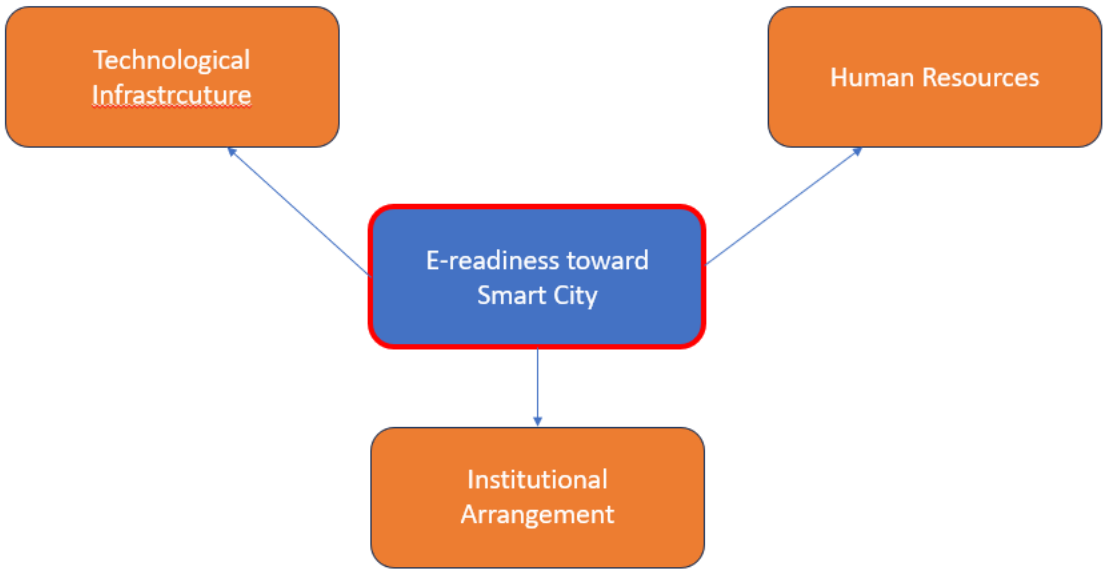
Numerous research have demonstrated that e-readiness variables must be thoroughly prepared before implementing e-government and smart cities. Studies on local governments' preparedness to execute smart city initiatives, particularly with regard to citizen and government issues, are still scarce, nonetheless. The primary requirement for societal acceptance of digital service improvements, like those included in the Smart City idea, is e-readiness. In order to provide an

examination of local government e-readiness for integrating smart city technology, this research was conducted. This study makes a significant contribution to our knowledge of the conditions that local governments must meet in order to successfully deploy smart cities.

RESEARCH METHODS

The concept to be investigated refers to the E-readiness theory by Mutula and Brakel, with the establishment of indicators including Government Technology Readiness Assessment Factors (E-readiness), and assessment factors comprising technology factors, human resource factors, and institutional factors. These are considered aligned and relevant to the characteristics of the research object for this study. Through the utilization of a qualitative approach(Creswell, 2013), this research emphasizes social phenomena and data was collected from interviews, direct observations, and official documents related to the phenomenon under study. The research type employed is descriptive with a case study of Balangan Regency Government regarding technology readiness (e-readiness) towards Smart City implementation, wherein the obtained data will be qualitatively analyzed, subsequently yielding descriptive data in both written and oral forms.

Figure 1. The framework of Government E-readiness toward Smart City



Source: Adopted from Mutula & van Brakel (2006)

Data was collected by primary data which obtained observations, interviews, and

documentation with direct informants from the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency, the Regional Development Planning Agency Research and Development of Balangan Regency, as well as several community figures of Balangan Regency. Secondary data was obtained from documents and literature studies related to the research. Data collection techniques include observation, interviews, literature review, and documentation. The research location is conducted at the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency as well as the Regional Development Planning Agency Research and Development of Balangan Regency. The selection of research informants was carried out purposively involving several relevant officials and community figures. Data analysis used the model proposed by Miles et al. (2014) with stages of data collection, data reduction, data presentation, and conclusion and verification.

RESULTS AND DISCUSSION

A) Government Technology Readiness Assessment (E-Readiness)

The "Movement Towards 100 Smart City" program is a joint initiative involving the Ministry of Communication and Informatics (Kominfo), the Ministry of Home Affairs (Kemendagri), the National Development Planning Agency (Bappenas), the Presidential Staff Office, and the Ministry of Public Works and Housing (Ministry of PUPR). This program aims to advance urban development and management through the implementation of the Smart City concept, which is expected to assist the Government and the public in accessing information and providing better services. Balangan Regency, one of the 13 regencies in South Kalimantan Province, is also striving to implement the Smart City Program.

According to Mutula & van Brakel (2006), the readiness of information and communication technology (ICT) in the context of regional governments, especially regarding the implementation of Smart City programs, can be assessed based on several factors, Figure 1. Firstly, ICT infrastructure is a primary aspect that needs to be evaluated, including the availability of internet services, hardware, software, and the expertise of human resources in managing such technology. Secondly, access to and the utilization of ICT by the public are also essential indicators in measuring the e-readiness of regional governments (Agrawal et al., 2022). Thirdly, the readiness of governments to adopt ICT technology can be seen from the technical and managerial capabilities

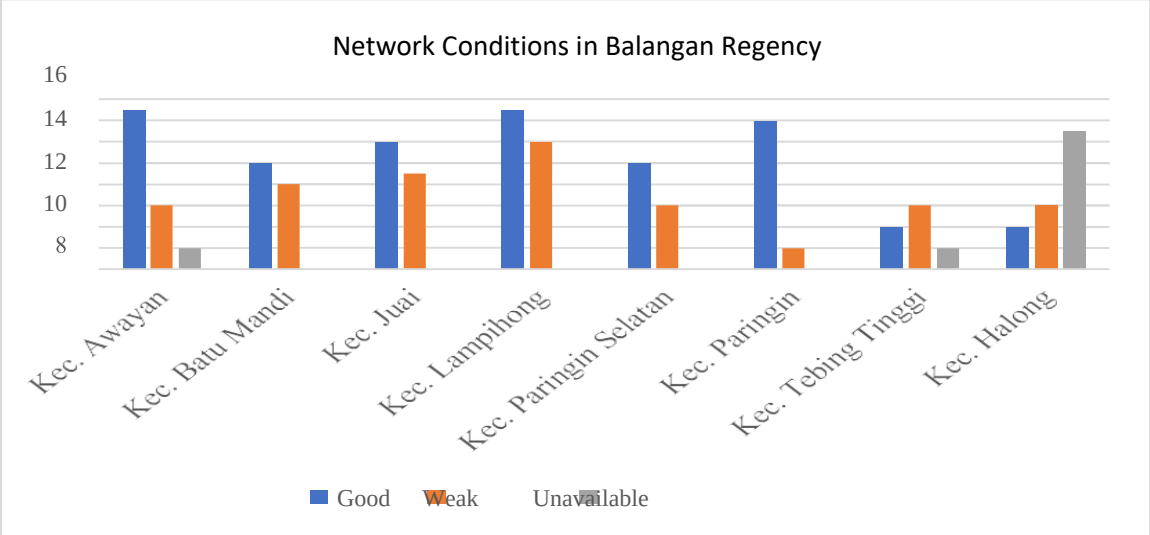
of human resources. Lastly, financial readiness for investment in ICT development is also a significant factor. Before implementing Smart City initiatives, it is essential for regional governments to evaluate the readiness of ICT infrastructure, the access and utilization of ICT by the public, the capabilities of human resources, and the available budget.

1. Technological Factors

a. Availability of Internet Network Services

According to the IT Expert at the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency, out of a total of 157 villages in Balangan Regency, internet network services are already available in 148 villages, encompassing technologies ranging from 3G, 4G, to 5G. Only 9 villages remain uncovered by internet network services, known as blank spots. Therefore, the overall condition of internet network services in Balangan Regency is considered good, with the majority of villages having access to internet services. (Interview conducted on October 12, 2023) The graph below illustrates the data on the Distribution of Internet Network Services per Sub-District in the Balangan Regency Area:

Table 1. Network Conditions in Balangan Regency in 2022



Source: Department of Communication and Informatics Statistics and Coding Balangan Regency, 2022

The presented graph regarding the network condition per Sub-District in Balangan Regency indicates that the majority of villages have been covered by internet network services. Out of the 157 existing villages, 148 villages already have internet access, while 20 villages gained access to the internet in 2022, and only 9 villages remain without internet coverage. This data reflects the commendable attention from the Balangan Regency Government towards providing internet network services, which is a crucial aspect of governmental technological readiness towards Smart City implementation. However, there are still 9 villages lacking internet access, such as Tundakan Village, Ajung Village, Buntu Pilanduk Village, Hauwai Village, Karya Village, Mamigang Village, Marajai Village, Padang Raya Village, and Suryatama Village.

Despite some villages still lacking internet network services, the Balangan Regency Government, through the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency, is collaborating once again with Private Parties to reach the villages without internet network services to ensure that all villages in the Balangan Regency area are provided with internet network services for accessing information technology. Equitable internet provision can build trust and communication patterns between the community and the government (Hong, 2013). The IT Expert further elaborated:

"In addition to the Government, the responsibility for providing internet network services also lies with the Providers. Providers are entities such as Telkomsel, XL, IM3, who offer services. For instance, if a village remains a blank spot, we from the Government invite Representatives from outside to visit our office to propose the construction of towers or Base Transceiver Stations (BTS) in that village." (Interview conducted on October 2, 2023).

Thus, the internet network service condition in Balangan Regency can be categorized as fairly good, where only 9 villages out of a total of 157 villages remain uncovered by internet network services. However, some of the 148 serviced villages still encounter challenges with weak network access, which is the focus of improvement efforts to be undertaken by the Balangan Regency Government through the Department of Communication and Informatics Statistics and Cryptography. According to statements from one of the IT Experts at the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency, the Balangan Regency Government has made efforts to enhance network infrastructure by massively deploying point-to-point towers every year. Although there is already free network access in some green open areas, it is still unevenly distributed, hence further collaboration with private entities will be

pursued to improve the availability of internet network services, supporting the implementation of the Smart City Program in Balangan Regency.

b. Hardware and Software Availability

Preparation of hardware and software infrastructure is essential for a District or City before implementing a Smart City Program. Although all Units of Regional Apparatus (SKPD) in the Balangan Regency Government have been using desktop computers or notebooks in their administrative operations, the presence of such hardware alone is not sufficient to declare the readiness of an area to run such a program. Additional hardware such as Smart Sensors and Cameras are required to collect real-time data such as temperature, air pollution, and traffic. Additionally, fast network infrastructure including fiber-optic networks, cyber security devices such as firewalls and data encryption, as well as central servers and computers to run Smart City applications and services, are also integral parts of such preparations.

Mobile network operators play a vital role as primary investors in the development of telecommunications infrastructure, including the construction of BTS towers, which are crucial in providing cellular networks in an area. They are responsible for the costs of purchasing hardware, installation, and maintenance of BTS towers, often collaborating with local governments to improve connectivity in rural or remote areas. In collaboration with the Balangan Regency Government through the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency, mobile network operators also manage and maintain the BTS towers that have been built. Thanks to this collaboration, there has been an increase in the percentage of villages served by information and communication technology (ICT) from 2018 to 2021, as stated in the Strategic Plan Document of the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency for the Year 2021-2026:

Table 2. Realized Achievements of Villages Served by ICT in 2018-2021

No	Indicator	Strategic Plan Targets Regional Apparatus				Realization of Achievements				Achievement Projections			
		2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Percentage of villages served by Informatio	10	25	50	100	10	14	17	100	100 %	56%	34%	100 %

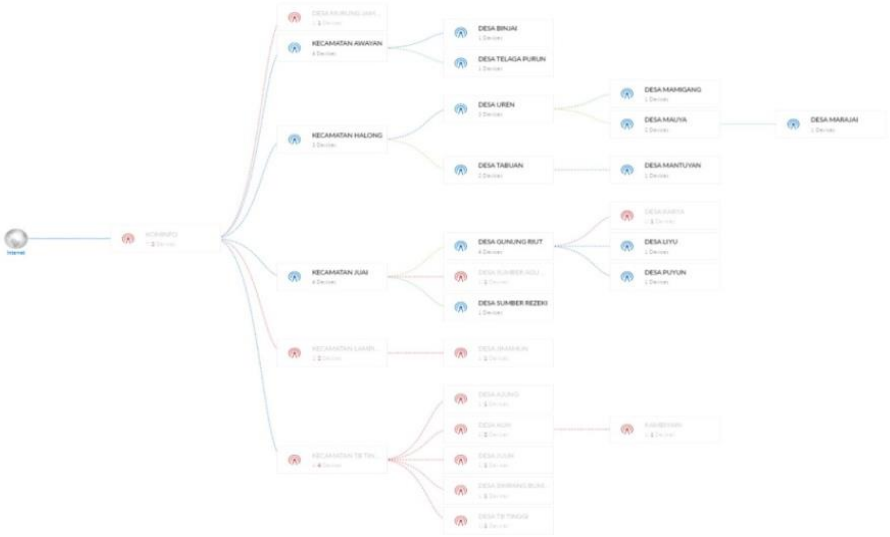
	n and Communi c-ation Technolog y												

Source: Strategic Plan for the Communication and Informatics Department of Statistics and Coding for Balangan Regency for 2021-2026

The Department of Communication and Informatics Statistics and Cryptography of Balangan Regency has also provided adequate internet access to several Regional Government Work Units (SKPD) through LAN and ISP networks, which support the acceleration of the Smart City program implementation. However, there are still constraints related to the hardware infrastructure in the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency that are not yet sufficient. Nevertheless, the government has taken steps by planning the construction of a Command Center as an initial step towards better infrastructure to support the success of the Smart City Program, with the hope of being able to help monitor, manage, and integrate data from various systems and services that support infrastructure in Balangan Regency.

Software plays an equally important role in supporting the implementation of the Smart City Program in Balangan Regency. Not only that, but also the software provided should be able to enable different application components to interoperate, in particular to be able to share data, functions, and communications across services in different agencies (Anthony et al., 2021). The close connection between hardware (such as BTS towers) and software allows for efficient network condition control remotely. The Department of Communication and Informatics Statistics and Cryptography of Balangan Regency manages various types of software that support ICT infrastructure, such as network monitoring systems, data management, and public service applications (Figure 2). The integration between hardware and software forms a technological ecosystem that enables the development of more effective solutions and services to meet the needs of the community and support digital transformation in Balangan Regency.

Figure 2. Network Condition Monitoring Software in Balangan Regency



Source: Department of Communication and Informatics Statistics and Coding Balangan Regency, 2023

The Government of Balangan Regency through the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency has been utilizing a website-based software called UISP as a tool to monitor the internet network conditions in their area since the beginning of 2021. Through UISP, which is integrated with BTS towers in each village, they can monitor network conditions in real-time. This software helps in managing network resources better, enhancing security, and improving overall operational efficiency. Villages or districts with blue-colored devices indicate good network conditions, while those in red indicate disruptions or maintenance. In addition to UISP, the Balangan Regency Government has also created innovation in the form of applications in each SKPD to enhance efficiency and public services. These innovations aim to accelerate task completion and provide better services to the public by leveraging technology.

Balangan Regency has directed its focus on regional innovations as part of the implementation of the Smart City program. These innovations include the implementation of digital signatures and digital-based applications in each SKPD, all coordinated by the Balangan Regency Department of Communication and Informatics Statistics and Cryptography. According to the Head of the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency, these innovations are steps towards the Digital Era reflected in the implementation of digital signatures and digital-based applications. These innovations aim to facilitate access and services

to the community. One Balangan Regency resident also stated that this program has been implemented with the use of applications provided by the Government, making it easier for the community to access administrative services and other services. One example of the application used is the Galuh Sanggam Application "*Digitalisasi Layanan Administrasi Kependudukan Harus Selesai Dalam Genggaman*". For detail, please see figure 3 as follow:

Figure 3. One of the software (applications) developed in Balangan Regency.

Source: Department of Communication and Informatics Statistics and Coding Balangan Regency, 2023

The Government of Balangan Regency has developed various innovations in the implementation of the Smart City program, one of which is through the Galuh Sanggam application provided by the Department of Population and Civil Registration of Balangan Regency.

This application allows residents to access population administration services independently, including birth certificates, death certificates, family cards, and others. Additionally, Balangan Regency has also implemented digital signatures in several SKPDs as part of efforts towards the digital era. However, despite progress in terms of software, the Government of Balangan Regency still faces challenges related to the availability of hardware. Although most SKPDs have been using computers in administrative activities, additional hardware provision such as CCTV, temperature sensors, traffic sensors, and cybersecurity devices is still necessary. Similarly, the availability of software is also inadequate, with Balangan Regency only having a few supporting systems such as the Geospatial Data Management System (GIS) and online service applications in each SKPD.

c. Cost

The e-readiness theory by Mutula and Brakel (2006) is utilized to measure the readiness of a region and its society in adopting and utilizing information and communication technology (ICT), including in the implementation of Smart City programs. One crucial aspect in assessing the readiness of a region in the Smart City program is the fiscal readiness of the Local Government. This budgetary readiness is pivotal to support investments in technology infrastructure, application development, and human resource training involved in the program (Virnandes et al., 2024). In this regard, the Researcher conducted an analysis concerning the budgetary readiness obtained during the course of the study based on the Financial Realization of Programs and Activities of the Department of Communication and Information Statistics and Cryptography of Balangan Regency in 2021.

Table 3. Financial Realization of the Communication and Informatics Department of Statistics and Coding for Balangan Regency Based on 2021 Direct Expenditure Budget

No	Activity Program	Fund Ceiling	Realization	
			Finance	%
	Application and Informatics Management Program			
1	Implementation of the Intra-Regional Government Network System	302.754.038	207.468.224	68,53
2	Management Activities E-government in the Regency/City Regional Government Scope	3.677.810.000	3.405.257.453	92,59

3	Coordination and Synchronization of Information Security Systems	87.060.000	65.614.000	75,37
4	System Maintenance Government Services Liaison	3.500.800.000	3.249.918.453	92,83
5	Management and Development of Smart Regency/City and Smart City Ecosystems	89.950.000	89.725.000	99,75
6	Domain Name Management Activities that have been determined by the Central Government and Sub Domains in scope of Regional Government Regency/City	302.754.038	207.468.224	68,53

Source: Work Plan Document for the Communication and Informatics Department of Statistics and Coding for Balangan Regency for 2023

The Work Plan document of the Department of Communication and Information Statistics and Cryptography of Balangan Regency for the year 2023 serves as the source for the financial realization data cited by the Researcher. From the data, it is evident that the allocated budget remains focused on e-government development, encompassing programs such as domain name management, the establishment of government service connection systems, information security synchronization, and the administration of intra-District Government network systems. Only one program refers broadly to the management and development of smart city programs. This indicates that the allocation of funds for the development of other hardware infrastructure to support Smart City programs has not been budgeted by the Government. However, the Balangan Regency Government has planned to propose a budget for Smart City Development.

From the statements of the General and Personnel Sub-Section Head as well as the Acting Head of the Application and Informatics Division at the Department of Communication and Information Statistics and Cryptography of Balangan Regency during the interview, it is apparent that the Balangan Regency Government is expected to focus the budgets of future years on programs aimed at Smart City development. Budget proposals have been submitted to the Balangan Regent, demonstrating seriousness in allocating funds for the development of such programs. The potential implementation of Smart City programs will likely require significant changes in budget allocation and expenditure policies, necessitating the readiness of the Local Government to adapt and revise budgets according to program developments. Partnership with the

private sector also emerges as a crucial strategy to support the sustainability of Smart City programs, involving joint financing schemes, private investment, and collaborative project management. This reflects the commitment of the Balangan Regency Government to realizing Smart City programs with support from various stakeholders.

2. Human Resources Factors (HR)

a. Readiness of Implementing Human Resources (Government)

Speaking about the readiness level of human resources to execute the program, in this case, the human resources of the Balangan Regency Government cannot yet be considered prepared to implement the program. Resource preparation is an important part of the program, smart city as a subject that creates innovation (Demirel, 2022). This can be attributed to the insufficient number of civil servants who possess the capabilities or competencies in utilizing technology itself. Below is the data on the number of civil servants in Balangan Regency categorized as graduates in the field of technology and information science in each Regional Working Unit of Balangan Regency, which play a key role in implementing the Smart City program:

Table 4. Tabulation of ASN Data for Technology and Information Science Graduates each Regional Work Unit in Balangan Regency, 2024

No	Work Unit	Number of state civil servants
1	Department of Communication and Information, Statistics and Coding	6 (six) people
2	Library and Archives Service	2 (two) people
3	Batu Piring Village Office	1 (one) person
4	The regional Secretariat	8 (eight) people
5	Department of Population and Civil Registration	1 (one) person
6	Regional Disaster Management Agency	2 (two) people
7	Department of Youth, Sports and Tourism	1 (one) person
8	South Paringin District Office	1 (one) person
9	Regional Inspectorate	1 (one) person
10	Batumandi District Office	1 (one) person
11	Department of Public Works, Spatial Planning, Public Housing and Settlement Areas	2 (two) people
12	Lampihong District Office	1 (one) person

13	Personnel and Human Resources Development Agency	3 (three) people
14	Department of Education and Culture	2 (two) people
15	Department of Small and Medium Enterprise Cooperatives and Manpower	2 (two) people
16	Department of Small and Medium Enterprise Cooperatives, Industry and Trade	2 (two) people
17	East Paringin District Office	1 (one) person
18	Tebing Tinggi District Office	1 (one) person
19	Regional Public Hospital	2 (two) people
20	Secretariat of the Regional People's Representative Council *(DPRD)*	1 (one) person
21	Civil Service Police Unit	1 (one) person
22	Batumerah Waste Landfill UPTD	1 (one) person
23	Juai District Office	1 (one) person
24	Department of Public Works, Spatial Planning, Public Housing and Settlement Areas	1 (one) person
25	Regional Financial, Revenue and Asset Management Agency	1 (one) person
26	Regional Development Planning, Research and Development Agency	1 (one) person
27	Department of Transportation	1 (one) person
The Total Number of State Civil Servants (*ASN*)		48 (fourty eight) people

Source: BKPSDM Balangan Regency 2024, and reprocessed by researchers

The data indicates that the Balangan Regency Government still requires an increase in the number of Human Resources (HR) qualified in the field of technology and information to support the implementation of the Smart City program. From the provided table, it is evident that there are only 48 (forty-eight) civil servants (ASN) categorized as graduates in the field of technology and information science across all Regional Working Units (*SKPD*) of Balangan Regency. However, this number is insufficient for all *SKPD*s in Balangan Regency, with only 27 (twenty-seven) *SKPD*s having civil servants as graduates in technology and information science. Furthermore, the Department of Communication and Information Technology Statistics and Coding of Balangan Regency, which plays a key role in the Smart City program, still requires more qualified IT experts who are civil servants.

b. HR Readiness of Beneficiaries (Community)

The success of the Smart City program implementation depends not only on the readiness of

Human Resources (HR) within the government environment but also on the readiness of HR among the community who will directly use and benefit from the program. Collaboration between the government and the community is a crucial element in determining the success of this program. The readiness of the community in this context involves their understanding and knowledge related to information and communication technology (ICT). The higher the level of understanding and knowledge of the community about ICT, the easier they will adapt to the changes and innovations required in the implementation of Smart City. Therefore, efforts to improve digital literacy among the community are essential as an initial step in ensuring their readiness. The Balangan Regency Government needs to ensure that its citizens have adequate understanding of the concept and benefits of the Smart City program. This can be achieved through education, training, and campaigns aimed at increasing awareness and skills of the community regarding the use of technology in daily life. Fundamentally, the community needs to understand the concept of a smart city and the benefits they can gain before implementing the program. One of the community figures in Balangan Regency explained:

"Starting from the villages, then to the urban neighborhoods, and districts. So, the Regional Working Units (SKPD) have tried to conduct socialization by directly visiting each region with the aim of making the community tech-savvy, so that the innovations from SKPD can be well accessed by the community." (Interview result on October 10, 2023).

The Balangan Regency Government has initiated efforts to socialize the importance of technology in the digital era by directly engaging with the villages, urban neighborhoods, and districts to interact directly with the community. Each SKPD has also organized socialization related to the innovations they have created to provide online services to the community and to provide knowledge and understanding to the beneficiaries so that these innovations can be utilized to the maximum extent. These steps, as explained by one of the community figures in Balangan Regency, have resulted in online administrative service innovations from each SKPD in Balangan Regency, with the aim of facilitating community access to these services. However, challenges are still encountered, especially in terms of hardware infrastructure to access services and skills in using technology. Factors such as age and education level of the community are the main obstacles to accessing online services. For some elderly or inadequately educated individuals, accessing online services can be difficult. Additionally, socio-cultural factors also play a role in hindering the readiness of the community to adopt technology. Despite socialization efforts, some people

still feel comfortable with manual processes in government administration. Efforts to improve digital literacy and technology skills among the community still need to be enhanced.

3. Institutional Arrangement

a. Legal Instruments

The development of legal instruments is a crucial step before implementing the Smart City program. These legal instruments encompass regulations, policies, and regulations governing the use of information and communication technology (ICT) as well as the implementation of digital governance. In 2019, Balangan Regency experienced failure in implementing the smart city program, partly due to the absence of established policies or legal foundations. The Acting Head of the Application and Informatics Division of the Balangan Regency Bureau of Statistics and Information Technology mentioned that the failure was also attributed to inadequate infrastructure, insufficient human resources, and budgetary constraints. In response to this failure, the Balangan Regency Government subsequently drafted several legal instruments related to the implementation of Smart Governance or E-government and the Implementation of Electronic-Based Government Systems or *SPBE*.

Table 5. List of Legal Instruments related to the Implementation of E-government and *SPBE* in Balangan Regency

No	Instrumen Hukum	Tentang
1	Balangan Regency Regional Regulation Number 7 of 2019	*Implementation of E-government within the Balangan Regency Government*
2	Balangan Regency Regent Regulation Number 31 of 2022	Electronic-Based Government System in Balangan Regency
3	Decree of the Regent of Balangan Number 188.45/594/Kum of 2022	Establishment of an Electronic-Based Government System Coordination Team in Balangan Regency
4	SPBE Draft Regional Regulation for 2023	Implementation of an Electronic-Based Government System (*SPBE*)

Source: Processed by researcher, 2023

Subsequently, the Balangan Regency Government also issued Regulation Number 31 of 2022 concerning the Electronic-Based Government System in Balangan Regency and Decree of the Regent Number 188.45/594/Kum of 2022 concerning the Coordination Team for the Electronic-Based Government System in Balangan Regency. This is a follow-up to Regional Regulation Number 7 of 2019. The Regent Regulation serves as a guideline for the implementation of the Electronic-Based Government System in Balangan Regency, while the decree regulates the formation of a coordination team to facilitate coordination in the implementation of the Electronic-Based Government System. The team is divided into two groups, namely the working group and the secretariat team, and is tasked with activities ranging from planning to reporting the results of of the Electronic-Based Government System in Balangan Regency. Furthermore, in 2023, the Balangan Regency Government has also drafted a Regional Regulation Draft on the Implementation of the Electronic-Based Government System as a further follow-up to the previously issued regulations.

b. Political Will

The willingness of the Government or "political will" is a key factor in the successful implementation of Smart City programs in a region. Analyzing the level of Government's willingness is crucial as it directly impacts various aspects of program execution. To assess the Government's willingness, several indicators such as the Vision and Mission outlined in regional development planning documents can be examined. In Balangan Regency, the vision and mission in the Regional Medium Term Development Plan Document for the period 2021-2026 emphasize rural development, urban planning, and improving community welfare. Although this vision and mission do not specifically align with the Smart City program, there is support for the implementation of e-government, which can serve as an initial step towards Smart City development. Additionally, there are clear legal instruments such as Regional Regulations and Regent Regulations regarding the implementation of e-government. However, the current development focus leans more towards addressing pressing strategic issues deemed more urgent, while the Smart City program is not yet a top priority. Concrete actions from the Government, especially the Head of the Region, are needed to allocate adequate budgets and resources and to prioritize Smart City development. The Head of the Region and the Balangan Regency Government need to expedite steps towards Smart City development by considering infrastructure, budget, and the development of competent human resources in the field of technology.

4. Inhibiting Factors

a. Geographical Conditions of Balangan Regency

The availability of fast and stable internet network services is a priority before implementing the Smart City program in Balangan Regency. However, based on interviews with IT Experts from the Department of Communication and Informatics Statistics and Cryptography of Balangan Regency on October 12, 2023, geographical constraints such as mountainous areas make access to remote villages difficult for internet service providers. Out of 157 villages, 148 villages already have internet access, but it is still uneven. Some villages, especially those in highland areas, still face difficulties in obtaining adequate internet access. The Balangan Regency Government, together with private sector partners, is working to find solutions to ensure that all villages have internet access.

b. Infrastructure and Budget Availability (Cost)

The availability of infrastructure, both hardware and software, is essential to support the Smart City program. Currently, the focus of infrastructure development in Balangan Regency leans more towards BTS towers for internet networks rather than hardware such as sensors and smart cameras needed for the Smart City. Ms. Resty Fauriana, ST, MT, on October 26, 2023, explained that the Balangan Regency Government still lacks budget to provide such infrastructure. Additionally, the availability of software is not yet optimal. Balangan Regency only has a few supporting systems such as Geospatial Data Management Systems, but still limited to online service applications.

c. Human Resource Limitations

The availability of human resources, both from the government and the community, is also a hindering factor for the implementation of the Smart City program in Balangan Regency. The government still lacks employees with competence in the field of technology. Meanwhile, the community is not yet fully prepared to use technology due to several factors such as socio-cultural and economic issues. The Balangan Regency Government focuses on economic development and improving education to prepare the community for the Smart City program.

CONCLUSIONS

Based on the research findings, the government's technological readiness (e-readiness) towards Smart City implementation in Balangan Regency is still not ready. This is due to a number

of issues, including the village's location in the highlands (mountains), which makes it difficult for the government to construct a BTS tower to provide internet network services, and keeps the Balangan Regency Government from being technologically prepared to realize a Smart City. Inadequate hardware, software, and finance infrastructure to carry out Smart City initiatives

Although there are legal foundations related to the implementation of e-government and electronic-based governance systems in Balangan Regency, there are still several technological challenges. While the availability of internet services is relatively good, the infrastructure of hardware and software remains inadequate, and the budget is still limited. The lack of competent government personnel in the field of technology is also a major hindering factor, as well as the readiness of the community's human resources, which are not yet prepared to participate in the Smart City program. Therefore, the Balangan Regency Government should continue to collaborate with private parties and other local governments that have successfully implemented Smart City programs to further develop the implementation of Smart City programs and allocate more budget for their execution. Furthermore, it is essential to always involve employees in technical guidance related to the development of government human resource competencies to effectively implement technology within the scope of Balangan Regency Government and provide a platform for the people of Balangan Regency to participate in the periodic development of competencies, especially in the use of technology. It is also important to regularly monitor and evaluate the level of readiness of the community in adopting Smart City programs.

Practically, this research can serve as an evaluation material, especially for the Balangan Regency Government in South Kalimantan Province, regarding the government's technological readiness (e-readiness) that functions as a support for implementing Balangan Regency as a Smart City. Considering the importance of this research in identifying the readiness of several aspects that need to be addressed before a city or local government implements Smart City programs. Theroretically, this study adds to the framework discussion about the necessary preparations for putting the smart city concept into practice. As a result, in order for local government to implement a smart city, other players must also be involved and collaborate to prepare these required elements.

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