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Smart City development in "Nusantara", the new capital of Indonesia: local government and community readiness

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Abstract: The smart city concept must be implemented in Nusantara, the new capital of Indonesia. This study aims to define the concept of a smart city for "Nusantara" and assess the readiness of the local government and community. The primary data was collected using questionnaires, focus group discussions, and in-depth interviews. In addition, secondary data were extracted from the smart city master plan's design. The findings of this study are the concept of the smart city already known by most local government officials. The community and local government are enthusiastic and well-prepared to develop Nusantara Capital City and implement the smart city concept. In Nusantara Capital City, the potential of adequately managed human and natural resources becomes an asset and an opportunity for implementing the smart city concept. However, preparations must be made for various supporting factors, including physical infrastructure, digital infrastructure, human resources, the environment, disasters, and partnerships.

Introduction

The Government of the Republic of Indonesia has formulated a plan to relocate the Capital from Jakarta to East Kalimantan. As a result, the government's decision must be based on systematic and exhaustive measurements of social, political, and economic factors. In addition, one must consider defence and security, geography,

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logistics, communication, government, and diplomacy (Salya, 2022). Preparations have been made for human resources, infrastructure, and information and communication technology (ICT) in this regard. Numerous regional development concepts, including smart city, are included in the Master Plan for the Capital City.

Jakarta, the state capital, is currently experiencing several complex problems, including flooding and traffic congestion (Caljouw et al., 2009; Wismadi et al., 2013; Yudhistira et al., 2017). Complex urban issues necessitate effective and efficient city planning and management, as well as the implementation of the smart city concept (Suprayitna et al., 2021). The concept of smart cities is one of the most critical aspects of studying the development of Indonesia's new capital city (Rachmawati et al., 2021b). In the era of ICT and smart cities, the delivery of city services and their management in urban management has undergone significant changes (Suprayitna et al., 2021). The implementation of smart city can be tailored to the city's characteristics, its natural features, and the culture of its inhabitants. One method is initiating the Nusantara Capital City Smart City model (Cakti & Ihsan, 2022).vSmart city planning requires sectors including government, health, education, taxation, public complaints, licensing, and planning.

The most important aspect of a smart city for preparing a new capital city in Indonesia is smart governance, specifically developing efficient and effective public services (Rachmawati et al., 2021c). In addition, government support for data disclosure is crucial (Monti et al., 2015; Sunindyo & Amrita, 2019). Implementing electronic government as part of smart governance can present socioeconomic and political challenges to cities. Consequently, interpretive and inductive indicators of critical success are required to measure the success of their implementation (Napitupulu & Sensuse, 2014). The element of smart environment must also be a top priority to prevent environmental damage that could occur during the construction of the new capital city. By establishing data disclosure, smart environments can support efforts to implement green cities by focusing on local socio-ecological conditions and community engagement in addition to providing green open spaces (Amalia et al., 2020; Rusadi et al., 2016; Zain et al., 2022). Previous research has demonstrated that implementing the concept of a smart city can increase urban eco-efficiency by 16%-18% (Yao et al., 2020).

Additionally, Jakarta's "World City" trajectory can continue (Indraprahasta & Derudder, 2019). The Nusantara Capital City has aspirations of becoming a global metropolis. Nonetheless, the development scenario must be designed so the city can become a pleasant place to live. Therefore, the capital city of Jakarta will not fail. The Jakarta Metropolitan area has become the region's economic centre, which is one of the reasons why Jakarta has become such a large metropolis. This metropolitan region in Java has the highest economic sustainability index (Pravitasari et al., 2020).

Consequently, it is essential to conduct studies and develop scenarios for smart yet sustainable city development from the outset. The would-be capital city, in its future position as a government and business hub, must be analysed in terms of its potential, problems, and obstacles. In addition, the implementation of public services, the provision of supporting facilities and infrastructure, the function and role of the city, and the intercity connections must also be analysed.

Moreover, the subsequent research questions arise: 1) How does the smart city concept support the capital city? 2) How well prepared is the region to support Nusantara as Indonesia's capital city? This research will identify the concept of smart city for capital cities and assess the readiness of local government and community to support the development of capital cities by analysing the case of Nusantara, Indonesia.

Materials and methods

The concept of smart city in the nation's capital arose from a review of relevant literature. Analyse the readiness of the region to support the development of the capital city using the case of Nusantara, Indonesia. This research is based on a case study of the new issues (Yin, 2009) concerning the capital city of Nusantara. This study's data were collected via questionnaire distribution, focus group discussion, and in-depth interviews. The questionnaire was then filled out by 53 people consisting of 42 people from the Implementing Team of Smart City and 11 people from the Smart City Forum of the Regency of North Penajam Paser as an area in which the Nusantara capital city is located.

Table 1 shows that the 53 people who filled out the questionnaire were representatives from each regional apparatus in North Penajam Paser Regency. The Communication and Informatics Office was the regional apparatus that filled in the most questionnaires with 13 people, the Environmental Office 4 people, and the Women's Empowerment, Child Protection, Population Control and Family Planning Office 3 people.

Table 1. Distribution of Research Respondents Based on Regional Aparaturs Organisation (OPD) and Position: Smart City Implementation Team (SCIT) Smart City Forum (SCF)

| No	Regional Aparaturs Organisation/OPD	Position	Total
1	Communication and Informatics Office	SCIT	13
2	Environmental Office	SCIT	4
3	Women's Empowerment, Child Protection, Population Control and Family Planning Office	SCIT	3
4	Social Office	SCIT	2
5	Library and Archives Office	SCIT	2
6	Housing, Settlement Areas, and Land Office	SCIT	2
7	Community and Village Empowerment Office	SCIT	2
8	Inspectorate	SCIT	2
9	Public Relations and Protocol Section	SCIT	1
10	Planning, Research and Development	SCIT	1
11	Regional Disaster Management Agency	SCIT	1
12	Department of Cooperatives, SMEs, Industry and Trade Office	SCIT	1
13	Fire and Rescue Office	SCIT	1
14	Fisheries Office	SCIT	1
15	Public Health Office	SCIT	1
16	Transportation Office	SCIT	1
17	Manpower and Transmigration Office	SCIT	1
18	Api-Api Village Government	SCIT	1
19	Bangun Mulya Village Government	SCIT	1
20	Suka Raja Village Government	SCIT	1
21	Indosat Ooredoo	SCF	2
22	JAMRIDE	SCF	2
23	Indonesian National Bank (BNI)	SCF	1
24	Indonesian *People's* Bank (BRI)	SCF	1
25	PPU Regency Ministry of Religion	SCF	1
26	Indonesian Council of Ulama of PPU Regency (MUI)	SCF	1
27	PPU Regency District Court	SCF	1
28	PPU Regency Resort Police	SCF	1
29	Telkomsel	SCF	1
	Total		**53**

Source: Questionnaire results, 2022
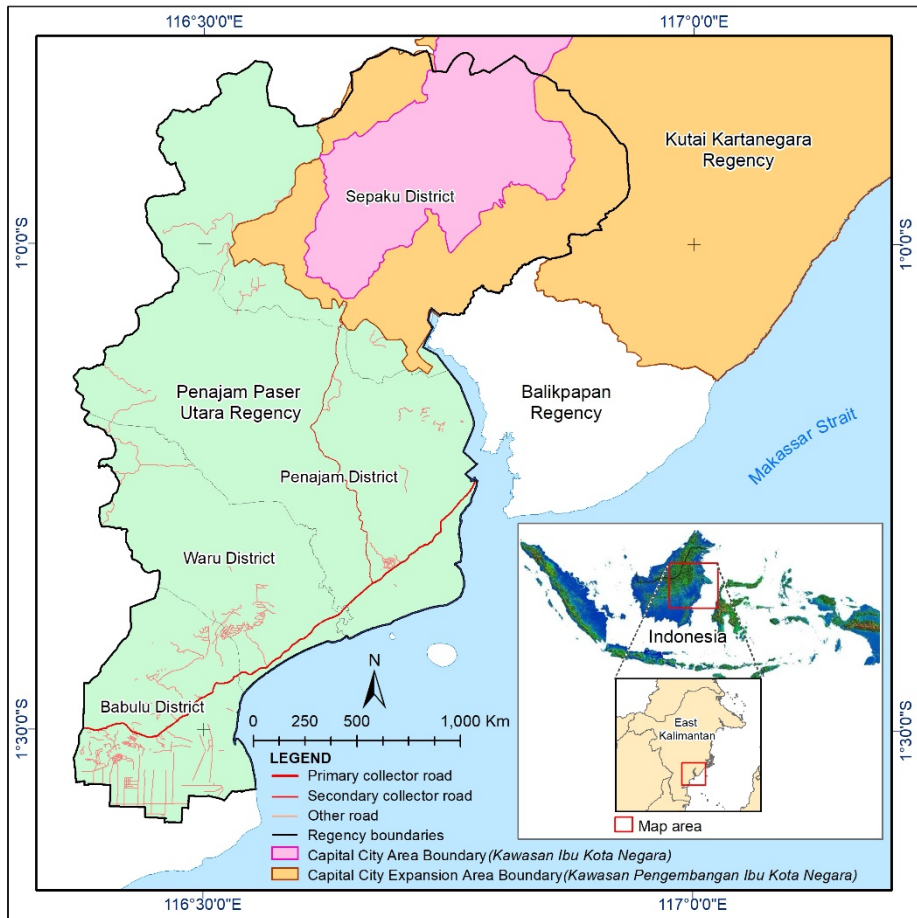
Figure 1. A Map of The Study Area

The data were also obtained by doing observation. The concept of triangulation (multiple sources of evidence) is applied in the case study (Gerring, 2006) to obtain the accuracy of the data. As a complement to the analysis, the data of this study were also obtained from the provincial level, namely the Provincial Government of East Kalimantan, which is currently preparing itself to become a smart province. In more detail, a general description of the study area can be seen in Figure 1.

Results

The Concept of Smart City in the Capital City

The capital city serves as the centre of government. To realise this function, a city governance system relying on a country's bureaucracy and administration is necessary (Gottmann, 1983; Okunev, 2021; van der Wusten, 2012). In addition to being the centre of government, the capital city is also a symbol of the country and becomes the primary window through which to view the condition of a country as a whole (Paquet, 1993; Parkinson, 2009). The smart city concept can operationally support the functions of the country's capital city, as seen in Table 2.

Table 2. Functions of the Capital City and Aspects of Smart City

No	Functions of the State Capital City	Dimensions of Smart City	Aspects of Smart City
1	Center of Government	Smart Governance	- Participation in decision-making, public and social services, transparent governance, and political strategies & perspectives (Giffinger et al., 2007) - Public services, bureaucracy, and public policy (Kemenkominfo Republik Indonesia, 2021) - Online services, infrastructure, and open government (Cohen, 2013) - Smart governance is required for efficiency in the policy-making process (Rachmawati et al., 2021b) - Basic service using ICT (Rachmawati et al., 2021a)
2	Center of Economy	Smart Economy	- Innovative spirit, entrepreneurship, economic image & trademarks productivity, labour market economic flexibility, international embeddedness, and ability to transform (Giffinger et al., 2007) - Industry, welfare, and transaction (Kemenkominfo Republik Indonesia, 2021) - Entrepreneurship & innovation, productivity, and local & global connection (Cohen, 2013)
3	Country Symbol	Smart Branding	- Tourism, Business and City Appearance (Kemenkominfo Republik Indonesia, 2021) - *Kukar Asia Wonder* is a branding in Kutai Kertanegara (Kukar) Regency (the second ring in the capital city area, a partner in the development of the capital city, with high tourism development potential (Rachmawati et al., 2021c))
4	National Hub	Smart Mobility	- Local and international accessibility, availability of ICT-infrastructure, and sustainable, innovative and safe transport systems (Giffinger et al., 2007) - Efficient transport, multi-modal access, and technology infrastructure (Cohen, 2013) - Providing bus and mass transportation with GPS, wi-fi, and cashless payment system (Rachmawati et al., 2021c) - Accessibility and integrated transportation (Rachmawati et al., 2021a)
5	Settlement Center	Smart Living	- Cultural facilities, health conditions, individual safety, housing quality, education facilities, tourism attractivity, and social cohesion (Giffinger et al., 2007)
		Smart Environment	- Harmony, health, and mobility (Kemenkominfo Republik Indonesia, 2021) - Culture and well-being, safety, and health (Cohen, 2013) - Attractivity of natural conditions, pollution, environmental protection, and sustainable resource management (Giffinger et al., 2007) - afety, waste, and energy (Kemenkominfo Republik Indonesia, 2021) - Smart buildings, resources management, and sustainable urban planning (Cohen, 2013) - Smart environment to manage garbage and waste (Rachmawati et al., 2021b)

Sources: (Cohen, 2013; Giffinger et al., 2007; Kemenkominfo Republik Indonesia, 2021; Rachmawati, et al., 2021b; Rachmawati, et al., 2021a; Rachmawati, et al., 2021c)

Table 3. The Understanding of the Concept of Smart City

No	Emphasis on the Concept of Smart City	Concept Descriptions
1	Smart governance	Smart city is a governance in all its aspects by implementing ICT as the backbone of its management
2	Smart city future	Smart city is a form of future city based on technology and renewable resources, and they can be obtained from the potential existing in the respective region
3	Smart society	Smart cities are materialised by technology-literate people and regencies/cities that have a mission of urban development to use information and communication technology, particularly for public services
4	Smart infrastructure and services	The concept of modern city/region development can help manage various resources effectively and efficiently to solve various challenges and provide innovative, integrated, and sustainable solutions to provide better infrastructure, quality of services for the community, etc.
5	Smart institutional collaboration	Smart city constitutes a sustainable concept involving various related sectors, namely government, private and community in smart governance, and it is supported by adequate intellectual intelligence and technology

Sources: Results of questionnaire data processing, 2022

The smart city concept can be interpreted as an intelligent effort to manage a city (Rachmawati et al., 2021c). Smart city predictions can be divided into three categories: bottom-up smart city predictions, beneficial smart city predictions, and technological smart city predictions (Mohseni, 2021). As a result of questionnaire data collection for the case of Regency of North Penajam Paser, the buffer zone of Nusantara Capital City, 89% of the 53 respondents understand the concept of the smart city. They stated that the definition of a smart city is the realisation of a city/regency that maximises the region's potential using technology (Table 3).

The establishment of smart city institutions is an essential component of smart city implementation. Technology (hardware and software infrastructures), people (creativity, diversity, and education), and institutions (government and policy) comprise the main conceptual components of Smart City (Nam & Pardo, 2011). Regional Smart City Councils, Regional Smart City Implementation Teams, and Regional Smart City Forums can be established to manage smart city ecosystems in the regions (Kemenkominfo Republik Indonesia, 2021). On the other hand, the role of the community in the development planning process to support the development of the smart city in Nusantara, the capital city of Indonesia, is of paramount importance. The development of a smart city without community participation is impossible (Kusumastuti & Rouli, 2021; Simonofski et al., 2019).

The results of the Focus Group Discussion (FGD) show that the Concept of Smart City in the Capital City has not been fully understood by the government and the community, especially in implementing a smart city in North Penajam Paser. Furthermore, based on the results of the FGD and questionnaire, it can be seen that there are still some people who do not know about the smart city concept in the Nusantara Capital City, Indonesia.

In the interim, several proposals for the regional apparatus are involved in developing the smart city in the Nusantara Capital City. They include, among others, the following (questionnaire processing results, 2022): 1) the improvement of technology-based public services; 2) the provision of infrastructure to support institution performance; 3) budget support; 4) adequate infrastructure support; 5)

the development of human resources for quality; and 6) the incorporation of holistic planning between smart city planning in the state capital area and buffer zones. Regarding budgeting policy support and program priority locus, it is also necessary to accommodate central and provincial government intervention in planning for the development of a smart city in the state capital city, particularly in buffer zones. This is a result of the limited authority and resources of buffer zones.

Smart City Development of Capital City

The smart concept of the capital city is an opportunity to provide a model for a modern capital city that integrates ICT in optimising resources to create a comfortable, competitive, and sustainable city. The smart city concept is one of the alternatives for developing the capital city, especially related to governance. In line with this, smart governance in the new capital city is one of the most essential elements in achieving effective management, improving the performance of the government bureaucracy and the efficiency of public policies (Rachmawati et al., 2021b).

Smart city with a focus on ICT has more significant implications than before. Furthermore, globalisation, the advancement of ICT, and the high expectation of implementing ICT in urban areas have encouraged many cities around the world to adopt ICT such as the Internet of Things (IoT), Global Positioning System (GPS), and Artificial Intelligence (AI) for improved city management (Park & Yoo, 2023). Post-relocation, integrating smart dimensions into the process of relocating the state capital city enables the respective city to overcome its challenges. Multiple examples of best practices in new capital cities (Manan & Suprayitno, 2020; Rachmawati et al., 2021a) demonstrate that it has been implemented. Identifying problems and designing what a city requires are two of the most critical aspects of implementing the concept of a smart city (Rachmawati et al., 2021b). The presence of a new state capital city will result in new cross-sectoral issues and problems that must be addressed by the local governments in the state capital city's vicinity. Therefore, based on the results of the FGD, a joint secretariat and a joint communication forum must be established. In each regency they serve as a forum for collaboration, cooperation, and synergy in the implementation of the smart city development program in the State Capital City (Kemenkominfo Republik Indonesia & PT GMUM, 2021).

The results of the FGD show that the regional government's commitment to developing the Smart City Development of Capital City can be seen from the government's positive response to the capital city relocation, the readiness of the regional government, as well as strengthening the smart concept through the initiation of innovations proposed in the Smart City Masterplan. There are several examples of Smart City initiatives in North Penajam Paser Regency, namely the GO PPU Application, Tourism Promotion and Information Center (PUSPITA), Market Price Information System (SIHARPA), Call Center 112/Siaga PPU 112, Taman Rozeline Internet (InTan Rozeline), and One Hundred of Waste Bank Unit and Waste Alms Movement (SERBU GASS).

Local Government and Community Readiness in Supporting the Development Capital City

The Regency of North Penajam Paser is one of the selected regencies/cities for the Ministry of Information and Communication Republic of Indonesia's Implementation of the 2022 Movement Towards a Smart City. Sixty per cent or more of the government agencies surveyed in the Regency of North Penajam Paser

reported that they were prepared to develop a smart city. The readiness of a smart city necessitates the application of innovation in technology, information, and communication, particularly in the dissemination of information to citizens to improve their performance, service quality, and welfare (Enwereji & Uwizeyimana, 2022). In addition, the report places little emphasis on the city's preparedness to adopt the concept, focusing instead on concerns regarding the availability of infrastructure and the skills of the community.

The relocation of a capital city is a gradual process involving multiple levels of authority and function. One of the earliest preparations made by the Provincial Government of East Kalimantan was to address the issue of land conflicts that had a high probability of occurring, particularly in the vicinity of the future capital city. According to the findings of the FGD, the high rate of land use change in Nusantara Capital City has become a problem. The Provincial Government of East Kalimantan has responded by issuing Governor Regulation No. 6 Year 2020 regarding Transfer Control, Land Use, and Permits in the areas of the future State Capital Region and its buffer. All officials and authorities, from the regent to the notary level and PPAT (Pejabat Pembuat Akta Tanah / Land Deed Making Official), are prohibited from obtaining new permits in the areas where the future State Capital City was to be constructed, as stipulated by the norm in the regulation.

Concerning the communication sector, one of the issues and challenges currently facing the Agency for Communication and Information is that there are still many blank spots in East Kalimantan. Out of a total of 1,038 villages, 162 villages or around 15% still experiencing empty spots due to limited access and infrastructure in the respective villages. The large area of East Kalimantan with hilly topographical conditions and primary forest cover becomes its challenge in procuring and preparing infrastructure such as servers or command centres and fiber optics. The arising issues in the communication sector are literacy and digital transformation. One of the efforts made is to increase the number of digital features and replace manual features. Change and digital literacy are of primary importance in connection with the readiness of human resources in welcoming the new State Capital City. Besides, the Agency for Communication and Informatics also keeps promoting data integration through the provincial government's portal page.

The development of a smart city in the Nusantara Capital City is also marked with the support from the central government by establishing telecommunication towers. This is aimed to reduce the empty spots in remote villages. In addition, BUMDesa empowerment activities with Bakti Kominfo and ISP are one of the efforts to overcome connectivity, including in North Penajam Paser Regency (FGD Results, 2022). The support is also in the forms of management, services, human resource planners, and the commitment of the regional heads to supporting the performance of the Agency for Communication and Information Technology (Questionnaire results, 2022). Besides, the existence of the regency and city smart city master plan in the Province of East Kalimantan can also be one of the efforts to support the development of a smart city in the Capital City.

The Regional Government of the Regency of North Penajam Paser supports the central government's plan to relocate the state capital city, and so does the community, giving a positive response. The regional readiness is stated in the revision of the RPJMD (Rencana Pembangunan Jangka Menengah Daerah / Regional Medium-Term Development Plan. Smart design in Nusantara Capital City has been proposed since 2019 by experts and involves cross-disciplinary collaboration (FGD Results, 2022). Various supporting aspects of the state capital

city have also been prepared, including infrastructure and human resources. The infrastructural condition of the Information and Communication Technology in the Regency of North Penajam Paser is improving. So far, the internet has covered 80% of the area. The KIPP (Kawasan Inti Pusat Pemerintahan / Central Government Core Area), covering an area of 6,500 ha or so, is a piece of land that will be used for palaces, ministry offices, defence offices for Police and TNI Headquarters, embassies, and employee housing as well.

At the sub-district level, the relocation of the capital city will also indirectly affect the social, cultural, economic, and other aspects of societal structure. In the meantime, the recent situation, such as (Results of in-depth interviews with the community and analysis, 2021 and 2022), can be used to analyze the readiness of the Sub-district of Sepaku as the location of the Nusantara Capital City; 1) Feeling anxious in the presence of newcomers and marginalized, 2) Improving human resources by increasing the community's knowledge and skills 3) No euphoria for life-changing events, 4) Agriculture, forestry, and fisheries are the fundamental sectors with the highest LQ index value and the highest rate of growth (Rencana Pembangunan Jangka Menengah Daerah Kabupaten Penajam Paser Utara Tahun 2018-2023, 2019) 5) The majority of land is devoted to plantations, of which oil palm remains the most valuable commodity 6) Tourism potential, particularly in coastal areas and mangroves 7) Mining and quarrying continue to dominate the economic structure of the business field (Badan Pusat Statistik, 2022), 8) Community expectations include special coaching for indigenous people, especially children, and participation in the development of the state capital city, 9) Lower employee wages than the standard in East Kalimantan, 10) Unclear land certification, 11) Natural disasters such as flooding and forest fire.

The local community has responded positively to the plan of relocating the Capital City. The concept of developing a new capital city is expected to be adapted to the community's sociocultural conditions without neglecting history, especially the arrangements in governance and culture in the Province of East Kalimantan. In the context of green development that is going to be launched, there is forestry potential around the area where the state capital city is being developed, namely the Bangkirai and Suharto Hills. Both areas have become natural attractions that show views of tropical rainforests (Binsar, 2020). The forestry tourism potential can become a preserved area that supports the spirit of going green in the Nusantara Capital City.

The infrastructure, human resources, and regional finances of the Regency of North Penajam Paser are analysed concerning the smart city development of Nusantara Capital City, the capital of Indonesian Nusantara. Physical and digital infrastructures comprise the readiness of ICT-supporting infrastructure in the North Penajam Paser regency. A number of 139 units of telecommunication towers, 256 points/spots for bandwidth system services provided by the Regional Government, 4G/3G network infrastructure of 51%-75% of the population, Fixed Broadband Access infrastructure of 26%-50% of the total number of households, a network infrastructure that can provide users with easy access, and a free hotspot in 26%-50% of public areas constitute the physical infrastructure (Kemenkominfo Republik Indonesia, 2022).

In addition, the Regency of North Penajam Paser's digital infrastructure readiness is realised via various applications. They are the Local Government Website Portal, Goods & Services Procurement Service Website Portal, Regional Planning Applications, Regional Financial Management Application, Online licensing system application, Personnel system application, Educational data application, and Application for garbage and B3 waste management: SMASH.id.

The Regency of North Penajam Paser is still understaffed in terms of the availability and quality of human resources in ICT, in which only fewer than 1% of the total number of employees with ICT skills. In this case, the availability and quality of human resources with master's degrees and above is below 1% of the total number of employees. Furthermore, the analysis of community readiness resources can be viewed based on the regional human development index (HDI) value of 71.41 (Badan Pusat Statistik, 2022).

Meanwhile, based on the regional financial capacity (KKD), it is viewed based on PAD of < 100 billion, with a percentage of KKD to APBD of 40%-50% (Kemenkominfo Republik Indonesia, 2022). The vision of the Regency Government of North Penajam Paser for 2018-2023 includes: "The Realization of an Advanced, Modern, and Religious Regency of North Penajam Paser". However, some of the challenges of Smart Governance in the Regency of North Penajam Paser are the preparation of infrastructure experiencing obstacles due to budget rationalization, many inactive applications, and the high sectoral ego of OPDs (Results of in-depth interview, 2022). Besides, concerns regarding data security are also an obstacle to implementing digital services in the Regency of North Penajam Paser.

Table 4. Smart City Targets in the Regency of North Penajam Paser and its Relevance to the Nusantara Capital City (IKN)

Dimension	Sub-Dimension	Target	Rationale	Relevance to IKN
Smart Governance	Public Services	Improving governance based on ICT	Electronically-based Government System Index (SPBE)	Demographical services in the area of IKN
Smart Governance	Bureaucracy	Obtaining good governance	Bureaucratic reform index	Staffing services, the development of integrated applications to business licenses in the area of IKN
Smart Governance	Policy design	Increasing laws and regulations enforcement	Reducing violations of the regional rules and the principles of the Regional Head	Online Tax Services
Smart Branding	Tourism	Improving tourist destination management	Increasing the quality of tourism accommodation facilities	Development and tourism promotion
	Business compete-tiveness	Increasing regional compete-tiveness	An increase in the number of competitive WUBs	The development of regional investment
	City appearance	Establishing the Regency of North Penajam Paser as the Nusantara Capital City of Indonesian	The number of people on vacation	The provision of creative spaces

Dimension	Sub-Dimension	Target	Rationale	Relevance to IKN
Smart Economy	Ecosystem of industry	An increase in investment in the industrial estates Obtaining reliable food security	Investment value The contribution of the agricultural and fishery sectors to GRDP and the achievement of the expected food pattern score	Obtaining a food buffer (agriculture in a broader sense) by developing food supply chains using ICT and developing an ecosystem of small industries involving small and micro enterprises without viewing the territoriality limit
	Public welfare	Improving the community's economy Reducing unemploy-ment	Economic Growth Rate (%) Open Unemployment Rate	Starting to impose cashless transactions on SMEs and government agencies
	Financial transaction ecosystem	Directing and optimising the use of digital financial service systems (cashless)	Number of digital payments	
Smart Living	Spatial harmony	Obtaining environmentally friendly infrastructure Controlling the use of space and the arrangement of housing and settlements	The % of Road Length in well-maintained condition The utilisation of space following its designation	The provision program for clean water
	Health	Improving health quality	Life Expectancy Rate	Strengthening health centre capacity and telemedicine services
	Mobility	Improving transportation infrastructure	Infrastructure quality index	The development of connectivity and transportation
Smart Society	Community interaction	Improving digital literacy level	Human Development Index (HDI)	Enhancing community and family endurance and developing employment service in the area of IKN.
Smart Society	Learning/ educational ecosystem	Improving education and health quality	% of average schooling Length (Years) Expected length of schooling (Years)	Establishing future competence training centres
Smart Society	Community security	Increasing tolerance and harmony among	Religious cases/conflicts	

Dimension	Sub-Dimension	Target	Rationale	Relevance to IKN
		religious communities		
Smart Environment	Environmental protection	Improving the quality of disaster prevention, response and recovery services in an integrated and sustainable way	The percentage of the improvement of regional capacity through disaster risk reduction efforts	Environmental education, training and counseling, climate village development in the area of IKN, and detecting integrated and collaborative joint mitigation
Smart Environment	Garbage and waste management	Increasing public awareness of garbage and waste management	The percentage of garbage management based on its kind	Integrated and collaborative garbage management
Smart Environment	Energy management	Strengthening the availability of renewable energy	The percentage of energy availability	

Source: (Kabupaten Penajam Paser Utara, 2022; Kemenkominfo Republik Indonesia & PT GMUM, 2021) and Analysis Results, 2022

Community participation in the Regency of North Penajam Paser is generally realized through the delivery of ideas, input, aspirations, and solutions for urban development in the Nusantara Capital City via community forums. However, community participation is not yet viewed as optimal (Results of Questionnaire Data Processing, 2022). This is due to the lack of community socialization, which has prevented them from contributing to implementing smart city in the Regency of North Penajam Paser. Therefore, socialization is required, particularly concerning the development of a smart city in the Nusantara Capital City (Results of questionnaire data processing, 2022). Smart cities are anticipated to maximise human and natural resource potential. All stakeholders can play an active role Rachmawati et al., 2021b; Supriyanto et al., 2022) if they can be determined from the implementation to be precisely on target. In addition, providing services to the community, particularly digital services, can boost the community's economy and make it more advanced in physical and non-physical quality.

Discussion

The direction of the development of urban areas referring to (Rencana Pembangunan Jangka Menengah Nasional Tahun 2020-2024, n.d.), the development of new cities and the development area of the state capital city become the indicators and priority targets for regional development (Berawi, 2022). Developing new cities or city improvement is one of the special urgencies in regional development (Berawi, 2022). New urban areas as part of urban settlement areas must be well planned, implemented and managed by including green and smart city elements (Kementerian PUPR Republik Indonesia, 2022).

This can support the realization of livable and sustainable residential areas (Kementerian PUPR Republik Indonesia, 2022).

The standard development principle for the Capital City combines three urban concepts, namely the Nusantara Capital City as a forest city, a sponge city, and a smart city (Undang-Undang Nomor 3 Tahun 2022 Tentang Ibu Kota Negara, 2022). A smart, green, and sustainable city is defined as one that can efficiently manage resources, provide accurate and open information, and provide outstanding service to its citizens (Peraturan Presiden Nomor 63 Tahun 2022 Tentang Perincian Rencana Induk Ibu Kota Nusantara, 2022). Given that the state capital city is one of the mega infrastructure projects with extremely significant multi-dimensional impacts (Chen et al., 2022; Thounaojam & Laishram, 2022; Xiaolong et al., 2021), these three aspects are coherent in their implementation, including the physical environment (Teo et al., 2020), biological diversity (Liu et al., 2018), and sociocultural aspects of society (Hossain & Fuller, 2021; Mottee, 2022; Zamojska & Próchniak, 2017).

One of the strategies to mitigate these impacts is by applying a smart environment included in the smart city dimension. The implementation of environmental management as a smart environment strategy is also applied to Phnom Penh and Vientiane (Association of Southeast Asian Nations, 2018) to support the functions of the respective capital cities of Cambodia and Laos. The Regency of North Penajam Paser has also prepared, in terms of food, to implement it by applying the smart agriculture program as has been implemented in Nay Pyi Taw, the new capital city of Myanmar (Gonsalves et al., 2022). Applying a smart environment can also support IKN resilience in facing the threat of climate change (Aryblia et al., 2022; Cepeliauskaite et al., 2021).

The smart city concept is expected to be dynamic and inclusive, supported by the community, and ready to face the future. The smart city strategy has 3 main elements (Undang-Undang Nomor 3 Tahun 2022 Tentang Ibu Kota Negara, 2022). They are; 1) Vision and results aligned with IKN's overall strategic framework; 2) Smart areas and strategies that outline key digital opportunities for IKN; and 3) A long list of smart initiatives that provide various actualized development possibilities. Meanwhile, the smart initiatives that must be taken into priority in IKN are access and mobility; environment and climate; security and safety; public sector; urban system; and livability and dynamism. The government paradigm applied in IKN leads to the concept of Smart Governance. The three most important elements that must be fulfilled in implementing smart governance include (i) government organizations related to commitment, responsiveness, and operational management; (ii) public participation related to how and to what extent the forms of participation that the community can do in the administrative matters of government; and (iii) the use of technology related to how and what forms of use of digital technology in promoting participatory and collaborative governance.

In comparison, Malaysia has become one of the best practices in integrating ICT and the smart dimension with the relocation of the capital city. As of 2001, the capital city was relocated from Kuala Lumpur to Putrajaya, which was done simultaneously with the entry of ICT penetration into different aspects of people's lives. Putrajaya itself was built based on the vision to make it a smart green city (Lim et al., 2021). The integration of ICT into the aspects of urban life and smart dimensions in Putrajaya can be viewed, among others, through e-Participation as the realisation of the smart government dimension (Khadzali & Md Zan, 2019; Lim & Yigitcanlar, 2022).

In this case, the Regency Government of North Penajam Paser, the Agency for Research and Development, provide information and data in the respective regency (Results of in-depth interview, 2022). Meanwhile, some of the data provided include population data, area size, development plans, community conflict resolution, and approaches that can be taken to the community. Discussions on society and technology (Aggarwal et al., 2021; Temdee et al., 2020) include well-being (Varela-Guzmán et al., 2021), community interactions, community education (Auer & Kim, 2018; Kanti Podder et al., 2022), and community security in the concept of smart city development revealed in the discussion of the Smart Society dimension. The existence of the Nusantara Capital City provides job opportunities that are more open and competitive. One of the transformations or innovations implemented in the workforce sector is the initiation of the Labor System. This application can connect job seekers with work needs, containing employment data and the Smart Application of Industrial Relations that enables labour unions, workers and management to meet together so that it is expected to resolve problems and complaints submitted by employees to company management.

Employment is one of the priority issues often coming up in the discussions on relocating the Nusantara Capital City. The implementation of smart dimensions in smart cities can help facilitate the structure of the workforce by running the labour market (Miyahira et al., 2020; Tsymbaliuk et al., 2018). Implementing a smart economy can form a more flexible labor market and adapt to the challenges of a highly dynamic digital world (Jucevičius et al., 2014). Besides, concerning the development of the Nusantara Capital City requiring a large workforce, the development of the labour market through digital and ICT platforms such as the Work Platform can attract potential for the growth of the Nusantara Capital City itself. More importantly, this will even open up new jobs in technology (Albino et al., 2015; Ménascé et al., 2017).

The people coming to the location of the Nusantara Capital City will encourage the need for regional and infrastructure development to become one of the aspects that are the focus of the Agency for Housing, Settlement and Land Affairs of the Regency North Penajam Paser. To achieve this, it is necessary to revise the Regional Spatial Plan and the Detailed Spatial Plan, especially in changing the spatial pattern. For this reason, the Regional Regulation on the Revision of the Regional Spatial Plan is expected to be completed in 2023 (Results of in-depth interview, 2022). In line with the implementation of Smart Living in the Development of the Nusantara Capital City in Indonesia, the Agency for Public Works and Spatial Planning transforms by initiating innovation in the Spatial Planning Application, namely the Database of Spatial Data as a spatial data centre in IKN, and the database of a road and building infrastructure as well. In the future, the application is expected to be integrated with the data centre. This effort can be one of the empirical proofs for integrating ICT and smart dimensions into urban and regional spatial planning (Naydenov, 2018; Ng et al., 2022; Stephenne et al., 2016).

Different sectoral developments run in Nusantara Capital City to the vision of Nusantara as a new centre of economic growth. The Egyptian government also sparked the vision of the capital city to become a center for the regional economic growth and regional development (Ghalib et al., 2020). The concept of smart infrastructure becomes a "legitimacy" applied as a direction for the development of New Administrative Capital (NAC) (Kaye-Essien & Bhuiyan, 2022). In the case of Egypt, NAC is prepared to support Egypt's ambition to become the central growth pole in the Middle East and North Africa (MENA) regions. The NAC design

is prepared to become a MENA science and technological hub with a technology centre design. The implementation of smart city at NAC of Egypt includes waste management, building management, smart transportation, and public wi-fi areas (Ali, 2022). All innovations and the application of smart dimensions are also directed at establishing NAC as a sustainable city integrated and resilient in facing social, political, and environmental challenges (Hamza, 2016; Schiavo & Magalhães, 2022).

The implementation of ICT can also be used to accelerate the life and functions of the post-relocation capital city. Kazakhstan is a country that has proven it. The capital city of this country was relocated in 1997 to Nursultan. Since 2010, the focus of development and development has only been on the physical infrastructure aspect (Mendybayev, 2022). Since 2017, the government of Kazakhstan has launched the 'Digital Kazakhstan' program to implement and change big cities like Almaty, Nursultan, and Shymkent into smart cities. The implementation was established to solve urban problems in Kazakhstan, such as government efficiency and urban environmental issues, such as pollution. Based on the case of NCA Egypt and Nur-Sultan, designed as their respective regional growth centres (Ghalib et al., 2021), they can be achieved by implementing ICT and smart dimensions. This requires solid political willingness and shared perceptions and policies that, in detail, prepare a city to become and achieve a smart city (Antoschin & Wimmer, 2021), especially in the case of a new capital city.

Local governments are essential collaborators and partners among Smart City stakeholders (Clement et al., 2022). The need for city development, particularly in the concept and implementation of Smart City, the Nusantara Capital City, necessitates diverse collaborations and synergies among various stakeholders, including the government, the private sector, and the community (Axelsson & Granath, 2018; Mayangsari & Novani, 2015). Private sectors in the Regency of North Penajam Paser are accelerating the development of digital infrastructure in rural areas. Telkom and Indosat are the only infrastructure providers in the Nusantara Capital City where infrastructure networks are available (Results of in-depth interview, 2022). Therefore, government stimulation of Fiber Optic penetration and underground cable networks is a requirement for development. Establishing the Agency for Telecommunication and Information Accessibility (BAKTI) can be one of the solutions (Shin et al., 2021) to the digital divide that still exists in Indonesia. One of the strategies is to provide the community with an ICT infrastructure and ecosystem, which is funded by four programs: providing internet access, providing BTS, palapa ring, and multi-function satellite. "Gojek" is no different. It plays a vital role in developing public services in the capital city of Nusantara. Gojek attempted to enter into an MOU with the Regency of North Penajam Paser in 2022. This will be continued in 2023, emphasising the development of Go Digital and Gopay SMEs in preparation for the North Penajam Paser Regency to support Smart City in the Nusantara Capital City (Results of in-depth interview, 2022). It is one of the smart economy's implementations aimed at empowering SMBs (Bălăceanu et al., 2015; Ridwan Maksum et al., 2020; Tyas et al., 2019). In addition, the development of public transportation as a form of smart mobility can be established as part of smart dimensions (Benevolo et al., 2016; Maldonado Silveira Alonso Munhoz et al., 2020; Pribyl et al., 2022). Smart mobility is one of the pillars supporting the Nusantara Capital City's Smart City. Specifically, as a partner of Nusantara Capital City, the Regency of North Penajam Paser must balance the needs for digital infrastructure, particularly the internet network and data centre.

Conclusions

As the new capital city of Indonesia, Nusantara Capital City needs support from the surrounding regions and cities. Support from these regions is essential to ensure that the relocation of the new capital city proceeds smoothly and that Nusantara's functions as the capital city can operate optimally. As a potential capital city, Nusantara must be ready to serve as the centre of government and economy, as well as the symbol and identity of the state. Implementing the smart city concept in every dimension can also attain these functions. Meanwhile, the Regency of North Penajam Paser has prepared various supporting aspects, including infrastructure, institutions, planning, food, and the area for the capital city's location. To support the capital city's development, the North Penajam Paser Regency still has gaps and unmet needs. To meet the needs and close the gap, coordination among stakeholders is required, and in this instance, the role of information and communication technologies is crucial. Since the beginning, the community has also made preparations for the future existence of the state capital city. In addition, several programs containing innovations and initiatives promoting sustainable urban development have been created and implemented.

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