Development of the Use of Artificial Intelligence (AI) Technology and Jakarta Smart City (JSC)

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ABSTRACTS: The research aims to explain the use of Artificial Intelligence (AI) and Jakarta Smart City (JSC) technology, which was first implemented in Indonesia in 2014, starting in the Jakarta City Region (DKJ), followed by 100 cities, carried out to overcome the technology gap between regions. Use of AI and JSC by the government for public services, such as smart environment; people's economy; government; population mobility, and branding. Research methodology uses qualitative with a descriptive approach using observation instruments and direct interviews. The research period is three months (March to April 2024). Locations in seven JSC management units. The research population was in five JSC divisions, using a snowball pattern sample. The research results show that there has been an increase in the efficiency of public services using AI and JSC technology in transportation management; rubbish; city security defense; and improving the quality of resources. Traffic congestion research recommendations, DKJ must develop innovations for all integrated public transportation facilities, by expanding the Integrated Highway (MRT) and Light Rail Transit (LRT) networks. For flooding problems, DKJ must use early digital detection technology for flood monitoring. In the future, DKJ hopes to implement an integrated digital payment system between the Resident Card and: Taxpayer Identification Number (NPWP), digital lifetime extension of the Driving License (SIM), processing of annual Vehicle Registration Certificates (STNK), and Vehicle Tax Proof Bermptor (BPKB) five-yearly all two-wheeled vehicles online (digitally) without queuing at the location

Keywords: Technological Development, AI and JSC

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INTRODUCTION

The development of the use of technology in human life has changed the way humans view life and made technology a tool to facilitate daily life through Information and Communication Technology (ICT). Including the use of ICT in the era of disruption used by the government to facilitate public services for community participation. One of them is the use of Artificial Intelligence (AI) technology and Jakarta Smart City (JSC). The city of Jakarta as a modern city is the first city since 2014 to use AI and smart city technology in its government to facilitate and serve community participation (Guo et al., 2024). Followed by big cities such as: (1) Surabaya City and Yogyakarta City in 2015; (2) Bandung City in 2016; (3) Denpasar City in 2018; and others who have used AI and smart city technology for government services for their communities (Andriyanti et al., 2023).

Artificial Intelligence (AI) technology or computerized artificial intelligence, is a technology designed to create a computerized system that can imitate human intellectual abilities ten times the intelligence capabilities possessed by humans. At the same time, a smart city is defined as a smart city area that has integrated Information and Communication Technology (ICT) in the governance of everyday life for the community (Liang et al., 2022). Jakarta, which has used the Jakarta Smart City application, is a city that has optimized the use of information and communication technology to find out, understand, and control various resources in the city more effectively and efficiently to maximize public services, provide solutions to problems, support sustainable development and realize better public services (Setyasih, 2022).

The smart city concept will also increase community and government participation in utilizing data, and applications and providing input and criticism easily. The development of the use of Artificial Intelligence (AI) technology and Jakarta Smart City (JSC), has now become a tool to help facilitate all human life activities or become a close friend of humans in the development of the use of application-based technology in everyday life (Mandal & Mukhopadhyay, 2020). Therefore, AI and Jakarta Smart City (JSC) can change the understanding and use of technological developments for the community by automating all daily life behaviors. Jakarta Smart City makes Jakarta a better, more informative, transparent, and collaborative city or province by using the help of information and communication technology. The use of ICT and the construction of Jakarta Smart City not only play a role as a "command center", but can change the government system and realize New Jakarta (Supriyadi & Asih, 2021a).

The development of AI and JSC technology has become a very valuable tool in the modern era of 2024. Therefore, entering the modern era, there are many security solutions offered in the most popular technology today. This happens because of the many requests and adoption of transformation technology that is increasingly flexible in the use of AI-based network devices and platforms that have a significant impact. The impact is that integration with the application of Jakarta Smart City in various big cities has begun to mushroom to serve citizens, start interacting with each other, the way of doing business between citizens, and communicating is all influenced by the development of current technology (Nuryanto, 2021).

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The use of AI technology and Jakarta Smart City (JSC) offers convenience and is increasingly popular in application devices due to its increasingly flexible nature and the increasing demand and adoption of transformation technology. AI-based network devices and platforms have a significant impact on everyday life. The impact is that integration with Smart City applications in various cities is starting to mushroom. Starting to interact with each other in doing business, and communicate between residents effectively and efficiently. The capabilities of smart city technology and AI also help human life in a better and more modern direction (Supriyadi & Asih, 2021b).

The concept of Jakarta Smart City (JSC) currently has six targets in its implementation, namely: Smart Governance or transparent, informative, and responsive government; Smart Economy or can grow productivity with entrepreneurship and a spirit of innovation; Smart People or improving Human Resources and decent living facilities; Smart Mobility or providing transportation and infrastructure systems, and Smart Environment or environmentally friendly natural resource management; and Smart Living or realizing a healthy and livable city (Jakarta Government, 2021).

The main problem in this study with the development of the use of Artificial Intelligence (AI) technology and Jakarta Smart City (JSC), is expected to reduce public service problems that are often complained about by Jakarta residents, especially the two main problems, namely (1) traffic congestion; and (2) Flooding problems. The other four problems are: (1) Reporting and complaints of problems by the public; (2) the problem of illegal levies; (3) the problem of public data access; (3) the problem of budget transparency (Guo et al., 2024). In addition to following the technological developments mentioned above, the Jakarta City Region has also implemented various solutions to the main problems mentioned above, including issuing: the Jakarta Smart Card (KJP) to provide a guarantee of 12 years of education; the Jakarta Healthy Card (KJS) as a guarantee of health facilities; Child-Friendly Integrated Public Space (RPTRA) as a children's play facility to realize Jakarta as a livable city; Public Infrastructure and Facilities Handling (PPSU) which is ready to handle problems reported by residents such as repainting walls due to vandalism, road repairs, cleaning clogged gutters and other problems. PPSU officers themselves consist of 40-70 personnel in each region; flood prevention; and provision of cheap public transportation with Transjakarta buses. Meanwhile, in terms of the Information Communication and Technology (ICT) system, the Jakarta City Region already has the Jakarta Smart City Portal (JSC), Regional Development Planning Forum (Musrenbang), disaster reporting telephone 112, Qlue application, budget monitoring and Open Data. In addition, the Jakarta City Region in collaboration with Non-Governmental Organizations (NGOs) for the protection of women and one part of the United Nations (UN) already has a protection system for women from criminal acts and sexual crimes (Hashim, 2024). Meanwhile, some examples of previous research that have been carried out in implementing AI and smart cities are: First: Muhammad Dandy (2022), Utilization of IoT in Smart City, the results of the Internet of Things (IoT) must be able to handle heterogeneous systems transparently and stably by providing open access to selected data subsets for the large-scale development of many digital services. Second: Vina Ayumi (2022), Jakarta Smart City: Development of a Smart Mobility Prediction Model Using Ghmm-Arima. The results of the Jakarta City Provincial Government have used digital infrastructure, such as online platforms and

software applications, to implement these elements. However, there is still room for improvement in maximizing benefits for the city and its residents. One area that needs to be optimized is the development of intelligent mobility prediction models and improving the performance of existing models (Abdullah, 2020).

Third: Firman Firman, etc. (2021), Smart Governance: A Study of the Jakarta Smart City during the Covid-19 Pandemic. The results of the study show technical aspects that influence the development of smart city governance, both in terms of the foundation of government digitalization leading to urban intelligence, as well as institutional and human resource aspects are also needed to support the success of a smart city (Giammanco et al., 2024)..

International institutions such as the Centre for Liveable Cities (CLC) and the Urban Redevelopment Authority (URA) (2018), Singapore. Where research was conducted on the use of Artificial Intelligence (AI) in the development of smart cities in Singapore. This research explores how AI can be used to improve efficiency in various aspects of city life, including transportation, energy management, and public services. Examples of implementations include a transportation system that is regulated based on real-time data to reduce congestion, the use of sensors and AI to improve energy efficiency, and the use of technology to provide more responsive and effective public services to city residents (Muhammad Ghifary et al., 2023).

The research mentioned above is very important in supporting Jakarta's transformation into a smart city that is more sustainable, efficient, and responsive to the needs of its residents. The development of AI-based solutions in the context of smart cities can also be a relevant example for other cities in Indonesia facing similar challenges (Nuryanto, 2021).

The city of Jakarta, which since February 15, 2024, has no longer been the Special Capital Region of Jakarta, but will become the Jakarta City Region (DKJ) (losing the special character of the capital city to the Jakarta City Region) is made an Agglomeration City (Zhu et al., 2024). Agglomeration City is a city center followed by surrounding cities or becomes the center of Indonesia's economy and trade with the increasingly sophisticated use of technology in serving its people. So that as a center of economy and trade it will become a megapolitan city, therefore it is a requirement with the benefits of use AI technology and smart cities, to help develop Information and Communication Technology (ICT) as a necessity in the process of advancing resource development to prosper society (Wahyunengseh et al., 2022).

The city of Jakarta which has become an Agglomeration City is the center of economy and trade in Indonesia like the capital city of New York City, United States from 1785 to 1790. Then moved to Washington DC from 1790 until now. The state of New York, which was previously the capital of the United States, is currently the center of the international economy and trade it has long developed AI and smart city technology and is the largest city in the world with around 800 of the most diverse languages in the world (Almeida et al., 2023).

So Jakarta, which has become an Agglomeration city by using Artificial Intelligence (AI) and

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Jakarta Smart City (JSC) technology in the development of technology use, will be increasingly imitated by other big cities in Indonesia. So the Jakarta City Region in the future is expected to become an example of a profile for cities in Indonesia with the use of AI and smart cities that increasingly follow technological developments. The development of the use of Artificial Intelligence AI Jakarta Smart City (JSC) technology is very clearly a solution towards a better direction in public services for the community (Astuti, 2021). The public services in question include: (1) increasing the efficiency of public services; (2) Smart City Qlue (2) transportation management; (3) waste management; (4) city security; (5) improving the quality of life of residents. The benefits of its use are: (1) having significant results in the development of life; (2) Jakarta will continue to gain great benefits from AI and JSC technology in increasing efficiency and quality of life; (3) realizing the vision of a modern, inclusive, sustainable city of Jakarta (Anschütz et al., 2024). Therefore, this study takes the title: Development of the Use of Artificial Intelligence Technology and Jakarta Smart City by taking the research location in seven Jakarta Smart City (JSC) Service Units, namely in the form of smart Qlue services, such as: (1) smart city; (2) environment; (3) economy; (4) people; (5) governance; (6) mobility; (7) living and branding. Jakarta, which has utilized AI technology and Jakarta Smart City, already has a regulatory basis for utilizing AI and JSC, namely: (1) Law Number 23/2014 concerning regional government; (2) Government Regulation Number 80 of 2019 concerning the Regional Government Management Information System; (3) Regulation of the Minister of Home Affairs Number 99 of 2018 concerning Technical Guidelines for the Preparation of the Regional Development Master Plan (Dai et al., 2024). The results and discussion of the study explain five things, namely: (1) History of the Development of Artificial Intelligence (AI) Technology and Jakarta Smart City (JSC); (2) Benefits of Using AI and JSC Technology; (3) Use of AI-JSC Technology, and Development Plan; (4) Optimizing Jakarta's Resources to Realize City Development; (5) Improving the Welfare of Jakarta's People (Darmawan, 2020).

METHOD

The study used a qualitative method methodology with a descriptive research design, namely using interview instruments and direct observation in the field which took three months (March to April 2024) from preparation to the end of the study. The location of the study was in seven Jakarta Smart City management units, located at the DKI Jakarta City Hall Building, Jl. Medan Merdeka Sel. No.8-9 Block B Floor 3, Neighborhood Association (RT) 11 and Citizens Association (RW) 2, Gambir, Gambir District, Central Jakarta City, Special Capital Region of Jakarta 10110. The Jakarta Smart City management unit is the subject and population in the study, while sampling uses a snowball pattern (Hasan, 2023). Qualitative research is research that uses a research approach by emphasizing the disclosure of phenomena according to the perceptions of research subjects who are related to the research object understand the problem and are competent to analyze the research object in depth. The research was carried out through in-depth interviews with stakeholders by distributing questionnaires as instruments in the survey method. Research

data were obtained from primary and secondary data. Primary data is data obtained directly from users and managers of JSC by following the snowball sampling pattern. Secondary data is data obtained from certain sources, such as regulations, guidelines, journals, and other related documents (Sandu, 2022).

Data analysis can be carried out and utilized to conclude the problems raised and the results of the research and its discussion are presented systematically in compiling the results of the research writing that previously carried out data analysis, namely data reduction, data display, and conclusion/verification. Its use refers to Davi's Kean, P.E. which explains: Equally, all qualitative research traditions give as much attention to the inner as well as the outer states of human activity, Jacob (2020), for instance, notes the "subjective perceptions," "emotions," "reflective interpretations," and "mental standards," that can be included within the "characteristics" of qualitative research (Dewi Rokhmah, Iken Nafikadini, 2009). The research was carried out with a view that refers to the view of Creswell, John. W., namely: (a) Qualitative researchers are concerned primarily with the process, rather than outcomes or products; (b) Qualitative researchers are interested in meaning – how people make sense of their lives, experiences, and structures of the world; (c) The qualitative researchers are the primary instrument for data collection and analysis. Data are mediated through this human instrument, rather than through inventories, questionnaires, or machines; (d) Qualitative researchers involve fieldwork. The researcher sprucely goes to the people, setting, site, or institution to observe or record behavior in its natural setting; (e) Qualitative research is descriptive in that the researcher is interested in process, meaning, and understanding gained through world or picture; and The process of qualitative research is inductive in that the researcher builds abstractions, concepts, hypotheses, and theories from detail (Dewi Rokhmah, Iken Nafikadini, 2009).

RESULTS AND DISCUSSION

History of the Development of AI Technology and JSC

The history of the development of artificial intelligence or Artificial Intelligence, commonly called AI, has involved many important figures and events in the international world and in Indonesia. Where the development of the history of AI in the International and in Indonesia has provided its own history in developing concepts and their implementation for human life and the development of Information and Communication Technology and Technology (ICT) in everyday life for humans (Khamaj et al., 2024). The development of Artificial Intelligence (AI) in Indonesia is still continuing to develop, with many new studies and applications that continue to emerge. Synergy between academics, the Industrial and Business World (DUDI), and the government is expected to encourage more rapid Information and Communication Technology (ICT) in the future will have a positive impact on the development of technology and human life, especially in the world

of research and the world of business and industry today in the digital era (Chen et al., 2024).

The history of the development of Artificial Intelligence (AI) in Indonesia records various important milestones including the development of technology, research, and the application of AI in various fields, such as several key moments in the history of AI in Indonesia: (1) 1980s: the introduction of the concept of AI in Indonesia began in the late 1980s. One of the figures involved in introducing AI in Indonesia was Prof. Dr. Ir. Sritrusta Sukaridhoto from the Bandung Institute of Technology (ITB) (Mulianingsih et al., 2020). He became a pioneer in the field of artificial intelligence and encouraged the development of AI in Indonesia. Meanwhile, the development of Artificial Intelligence (AI) in Indonesia is as follows: (2) 1990s: In the early 1990s, there was an increase in interest in AI in Indonesia, especially in academic and research environments. Several universities and research institutions began to study and develop AI technology for applications in various fields, including information systems, natural language processing, and pattern recognition; (3) 2000s: The development of AI in Indonesia has grown rapidly in the early 21st century (Sanjaya, 2022). The government and private sector began to recognize the great potential of AI in increasing efficiency and innovation. Several AI research and developments continue to be carried out in universities and research institutions, with a focus on the development of algorithms, intelligent systems, and AI applications; (4) In the 2020s, Indonesia began to see wider adoption of AI technology in various sectors. Technology companies began to integrate AI into their products and services, while the government began initiatives to utilize AI in public services and infrastructure development (Lee et al., 2024).

Development of JSC Technology Usage

The development of Smart Cities internationally is growing along with the advancement of Information and Communication Technology (ICT). One of the figures often associated with this concept is Professor William J. Mitchell from MIT (Massachusetts Institute of Technology). Mitchell is one of the pioneers in introducing the concept of a digitally connected city and utilizing technology to improve efficiency and comfort for city dwellers. For example, in 1999, Mitchell published a book entitled "e-topia: "Urban Life, Jim--But Not as We Know It" in which he discussed how digital technology can change urban lifestyles. In Indonesia, the history of the development of smart cities began to be adopted seriously after the government launched the 2015-2019 National Medium-Term Development Plan (RPJMN). In this document, the government emphasizes the importance of developing smart cities as part of the national development strategy (Astuti, 2021).

During the leadership of President Susilo Bambang Yudhoyono (SBY), Jakarta Smart City began to be developed in Indonesia and began to receive serious attention. At that time, Jakarta Smart City (JSC) began to be seen as a solution to overcome various urban challenges such as congestion, air pollution, waste management, and inefficient public services (Raspopov & Belousov, 2020).

The use of artificial intelligence technology or Artificial Intelligence or AI in the development of

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Jakarta Smart City (JSC) has provided various significant benefits, including increasing efficiency, comfort, security, and sustainability of the city. Several arguments about the benefits of using AI in the context of developing Jakarta Smart City (JSC) along with concrete examples of its application in Indonesia: First: Optimization of Transportation Management, the use of Artificial Intelligence (AI) technology can be used to optimize the transportation system in the city, including traffic management, route planning, and public transportation fleet management. With real-time data analysis, AI can help reduce congestion, optimize travel time, and increase the availability of public transportation. An example of its application in Indonesia is Jakarta Smart City which uses AI technology to regulate traffic lights and optimize Transjakarta bus lanes (Roustaei et al., 2024).

Second: Improving City Security, the use of AI technology can be used to improve city security through intelligent CCTV surveillance systems and anomaly detection. With real-time data analysis capabilities, AI can detect suspicious behavior or criminal incidents quickly and provide a more efficient response. An example of its use in Indonesia is the application of AI technology in security surveillance systems in strategic areas such as downtown Jakarta. Third: More Efficient Public Services, by utilizing AI in public services, cities can provide faster, more responsive, and more personalized services to their citizens. AI-based chatbots, for example, can be used to answer general questions and provide assistance to citizens in real-time. An example of its implementation in Indonesia is the application of chatbots in customer service for telecommunications and banking companies (Roustaei et al., 2024).

Benefits of Using AI and JSC Technology

The benefits of the development of Artificial Intelligence (AI) technology that has made its mark in the international world have succeeded in continuing to develop the concept and implementation of AI technology, including according to the founding fathers of AI such as, First: Alan Turing (1936) as one of the most important figures in the development of the AI concept. Alan Turing developed the concept of the "Turing machine", which is the basis for modern computers and paved the way for thinking about computing and artificial intelligence. Second: John McCarthy (1956): McCarthy is considered the father of modern artificial intelligence. At the 1956 Dartmouth Conference, he and his colleagues introduced the term "Artificial Intelligence" and paved the way for further research in this field. Third: Arthur Samuel (1959), the first person to use the term "machine learning". He developed a program for a chess game that used the concept of machine learning to improve the performance of the program from playing experience (Guenduez et al., 2024).

The development of Artificial Intelligence (AI) technology in Indonesia that has been successfully developed in Information and Communication Technology (ICT) which is beneficial for human life, including: First: Prof. Dr. Ir. Azhar Basyir, M.Eng (1995), one of the figures in Indonesia who plays an important role in the development and application of AI. He is the founder of the Intelligent System and Computational Lab (ISC Lab) at the Bandung Institute of Technology

(ITB). His research includes the development of intelligent systems for various applications such as pattern recognition, image processing, and speech recognition. Second: Dr. Bonifasius B. W. Sangaji (2020), as a lecturer at Satya Wacana Christian University, Salatiga, contributed to the development of AI in Indonesia. One of his main works is the development of an intelligent system to help diagnose heart disease through medical image processing. Third: Dr. Wisnu Jatmiko (1999), who is one of the pioneers of AI in Indonesia, Wisnu Jatmiko is a lecturer at Bina Nusantara University (Binus). He is active in research on modeling and simulation in the context of artificial intelligence (Lim & Hwang, 2024).

Benefits of Developing Smart Cities in Indonesia

In the era of President Joko Widodo's administration, in 2014, the Indonesian government launched the "100 Smart Cities Movement" program which aims to encourage the development of smart cities throughout Indonesia such as in Jakarta with Jakarta Smart City (JSC). This program is part of an effort to improve the quality of life of the community, support economic growth, and advance urban infrastructure. This concept has received serious attention as part of an effort to improve the competitiveness and quality of life of the Indonesian people. Some of the developments and implementations of the Smart City concept have been developed such as those carried out during the era of President Susilo Bambang Yudhoyono's administration with the Jakarta Smart City (JSC) program, namely: First: ICT infrastructure, President Jokowi's administration was indeed very intensive and focused on the development of Information and Communication Technology (ICT) infrastructure that supports the development of AI and smart cities. Development of faster and wider internet networks, including the installation of Wi-Fi hotspots in public places such as parks and strategic areas of the city. Second: Digital Public Services, the Indonesian government is intensifying the use of technology to improve public services. Examples include the creation of mobile applications for access to government services such as tax payments, business permits, or emergency reports. Third: Transportation Management, the smart city concept is implemented in the management of city transportation. This includes a real-time traffic monitoring system, applications to facilitate access and payment for public transportation, and the development of technology-based transportation such as high-speed trains or environmentally friendly transportation modes. Fourth: Waste Management, the Indonesian government is also directing efforts to improve smart waste management by using sensors and technology to monitor and optimize the process of collecting, processing, and recycling waste. Fifth: City Security, Implementation of city security technology to improve the security of cities in Indonesia, including the use of surveillance cameras (CCTV) connected to a central monitoring system for early detection of criminal incidents or other emergencies. Sixth: Energy and Environment, the Indonesian government is also focusing on the use of more efficient and environmentally friendly energy in big cities. The concept of smart grids and the use of renewable energy sources such as solar panels or hydroelectric power plants are part of this agenda (Anschütz et al., 2024).

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One of the smart city concepts that was applied at the beginning of its emergence was the integration of information and communication technology (ICT) in various aspects of city life, including: First: Information and Communication Technology (ICT) Infrastructure: Development of ICT infrastructure that includes a fast and wide internet network, as well as an integrated communication system to support connectivity between government institutions and the community (Anschütz et al., 2024). Second: Smart Transportation: Application of technology in the transportation system to reduce congestion and improve community mobility, such as the use of a real-time public transportation information system, the construction of special public transportation lanes, and the use of technology to manage traffic. Third: Digital Public Services Transformation of traditional public services into more efficient and easily accessible services through the use of technology, such as online tax payments, electronic population registration, and integrated city information centers. Fourth: Environmental Management: Utilization of technology to manage the city environment more effectively, including smart waste management, efficient energy use, and monitoring air and water pollution. Fifth; Community Participation: Encouraging active community participation in the development of Smart Cities through digital platforms, such as the use of applications to report infrastructure problems, provide input, and participate in the decision-making process. The development of smart cities in Jakarta has begun in recent years with the application of artificial intelligence (AI) technology to improve the efficiency of various aspects of city life. One of the institutions actively involved in the development of smart cities in Jakarta is Jakarta Smart City, which was founded in 2015. Here are some examples of the use of AI technology in the development of smart cities in Jakarta: First: Traffic Management: Jakarta Smart City uses AI technology to optimize traffic management. An example is the use of an intelligent traffic light control system, where AI monitors traffic in real-time and adjusts the timing of traffic lights to reduce congestion and smooth the flow of vehicles (Dai et al., 2024).

Second: Air Quality Monitoring: Jakarta Smart City also uses AI technology to monitor air quality in various locations in Jakarta. This system uses air sensor data and AI analysis to provide real-time information on air pollution levels to the public so that they can take appropriate action to protect their health. Third: Security Surveillance: Jakarta Smart City also uses AI technology in the city's security surveillance system. An example is the installation of CCTV cameras equipped with facial recognition technology and automatic monitoring by the AI system. This helps in detecting and responding to criminal incidents more quickly and efficiently.

Fourth: Digital Public Services: Jakarta Smart City has developed various mobile applications and digital platforms to provide public services to Jakarta residents. An example is the Qlue application, where residents can report problems in their environment directly to the government using location recognition and photo features. Fifth: Flood Monitoring: Jakarta Smart City uses AI technology in flood monitoring in Jakarta. This system utilizes weather data and flood sensors installed in various locations to predict and detect potential flooding so that the government can take necessary preventive measures (Gignac & Szodorai, 2024).

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Through the application of AI technology JSC aims to improve the quality of life of Jakarta residents, smooth the flow of transportation, improve security, and ensure that various public services can be accessed more easily and efficiently. The development of the use of AI technology by developing a smart city in Jakarta was first used in early 2015 until now in 2024 has shown some significant progress (Chen et al., 2024).

The use of Artificial Intelligence (AI) and Jakarta Smart City has been introduced since the launch of the Jakarta Smart City program in 2014. Until now there have been no special regulations in the form of Regional Regulations (Perda) that explicitly regulate the use of AI in the context of Smart City in Jakarta. The Jakarta Regional Government has so far adopted various initiatives to implement AI technology in various aspects of city life, such as Qlue Application; Transportation Management: Waste Management; and Public Service Systems.

Although there are no regional regulations (Perda) that regulate the use of Artificial Intelligence (AI) and Jakarta Smart City (JSC), the Jakarta government has adopted various initiatives to implement this technology in various aspects of city life. This development is supported by the government's commitment to improving the quality of life of residents and advancing the development of the City of Jakarta towards a more sustainable and efficient direction (Khamaj et al., 2024).

The use of Artificial Intelligence (AI) and Jakarta Smart City (JSC) has a crucial role in its development, including the use of Artificial Intelligence (AI) technology that allows the system to process, analyze, and make decisions from data obtained quickly and accurately, allowing the city to become more efficient, sustainable, and responsive to community needs. Here are some concrete examples of how AI is used in Smart City applications: First: Traffic Management, the use of Artificial Intelligence (AI) and smart city technology used to analyze data from traffic sensors, CCTV cameras, and other data sources to predict traffic patterns, detect congestion, and regulate traffic flow adaptively. An example is the use of an intelligent system to adjust traffic lights based on actual traffic volume. Second: in Waste Management, the use of Artificial Intelligence (AI) and smart city technology has been used to optimize waste collection by predicting waste volume in various areas of the city, determining efficient collection routes, and identifying full waste containers for faster collection. Third: Public Services, the use of Artificial Intelligence (AI) and smart city technology has been used in public service applications to facilitate communication between citizens and the government, process service requests automatically, and provide information needed by the public quickly and accurately. An example of the application is the use of chatbots to provide information about public services and answer public questions in real time. Fourth: Energy Management, the use of Artificial Intelligence (AI) and smart city technology has been used to optimize energy use in cities by predicting energy demand, regulating energy use at optimal times, and identifying potential energy efficiency through energy consumption data analysis.

Jakarta Smart City Use and Development Plan.

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Jakarta has successfully used the Jakarta Smart City (JSC) application for several things such as: implementing various smart city programs, such as (1) smart transportation systems; (2) digital public services; (3) use of technology to manage flooding and air pollution. Since early 2015, the Jakarta Government has launched the smart Qlue application, which allows residents to report city problems such as: (1) cleanliness; (2) security; (3) infrastructure through a digital platform. Second: (1) Use of Closed-Circuit Television (CCTV) cameras to monitor traffic and city security; (2) Smart street lighting program with the use of energy-efficient Light-Emitting Diode (LED) lamps and automatic brightness settings. So Jakarta will develop several smart city applications in the future that are considered to have benefits and effectiveness in their use (Mulianingsih et al., 2020).

After successfully using Jakarta Smart City (JSC) for the Qlue application; use of CCTV; smart street lighting; and transportation, then Jakarta plans to use the smart city concept for several things below: First: The development of Information and Communication Technology (ICT) Infrastructure The Jakarta government continues to strive to expand fast and wide internet networks throughout the city to support better digital connectivity. Second: Flood Management: Jakarta has a serious problem with flooding, and plans include the use of technology to monitor and manage flooding more effectively, including an early warning system. Third: Public Transportation: The government continues to develop the public transportation system by expanding the MRT, LRT, and other public transportation networks. The implementation of an integrated digital payment system is also a focus. Fourth: Digital Public Services: Jakarta continues to strive to improve public services through digital platforms, such as online tax payments, electronic population registration, and other applications to facilitate public access to city services. With the continuation of these projects, it is hoped that Jakarta can continue to develop as a smart city that can provide a better quality of life for its residents. However, it should be remembered that challenges such as congestion and air pollution are still the focus of attention that need to be addressed effectively (Darmawan, 2020).

Optimizing Jakarta's Resources to Realize City Development in Improving Community Welfare.

Optimizing Jakarta's resources is a key step in realizing sustainable and competitive city development. The following are details about several resources that can be developed in Jakarta and concrete examples of efforts to optimize these resources: Human Resources: Jakarta has a large and diverse population with great human resource potential. However, developing the quality of human resources is crucial in responding to the increasingly complex needs of the city. Concrete examples of optimizing Jakarta's resources in realizing city development using AI and smart city technology are by taking the following steps: (1) Education and Training: The government can develop skills training and education programs that are relevant to the needs of industry and the job market, both through government programs and cooperation with the private sector; (2) Entrepreneurship Development: Support for local entrepreneurs through startup incubators, facilities and access to funding, as well as the formation of cooperation and mentorship networks (Abdullah, 2020).

Infrastructure Resources: Jakarta's good infrastructure is an important foundation for the city's development. Jakarta has infrastructure challenges such as traffic congestion, air quality, and limited access to clean water. Concrete examples of the use of AI with smart cities in developing infrastructure resources are the following: (1) Public Transportation: Development of a more efficient and integrated public transportation system such as high-speed trains, Bus Rapid Transit (BRT) lines, and the use of technology for traffic monitoring and management; (2) Clean Water Provision: The government can invest in clean water supply infrastructure, as well as improving water management and distribution to meet the needs of the community. Environmental Resources: Healthy and sustainable environmental resources in the City of Jakarta are an important prerequisite for the sustainable development of the City of Jakarta to realize the sustainable development of Jakarta's infrastructure so that it has value for human life for welfare. Concrete examples of the use of AI and smart cities in developing environmental resources so that the city of Jakarta remains well maintained and the environment supports the development of the city of Jakarta, some of the steps that have been taken include: (1) Waste Management: Development of modern and systematic waste management infrastructure such as waste processing, recycling, and the use of renewable energy; (2) Greening the City: Efforts to increase green open spaces, plant trees, and revitalize polluted rivers to maintain environmental sustainability. Economic Resources: Jakarta's economic resources with the highest Regional Budget and Revenue Expenditure value in 38 Provinces in Indonesia, it is hoped that in the future, after no longer being the National Capital Region, Jakarta will become a Metropolitan City or a large economic and trade center in Indonesia, with various development potentials in the economic sector. Concrete examples of economic resources that will and have been carried out and must continue to be carried out by the Jakarta government with support from the central government are to do the following: (1) Business and Industry Center: The Jakarta City Government can develop industrial and business areas that are integrated with transportation infrastructure, as well as provide incentives for investment and business development; (2) Tourism: Developing tourism potential by improving tourism infrastructure, managing tourist destinations, and promoting tourism more aggressively to attract local and foreign tourists (Jaya et al., 2022).

Technology and Innovation Resources: Developing technology and innovation resources in Jakarta is the key to increasing the efficiency and competitiveness of the city with several cities throughout Indonesia. Therefore, developing technology and innovation resources is the main key so that the development of Jakarta into a political metro city or center of economy and trade can be carried out consistently and sustainably, resulting in the city center becoming a benchmark for the development of economic centers in Indonesia. A concrete example of the development of AI technology with a smart city that develops technology resources must have developed several things below, including (1) Smart City Initiatives: Utilization of Information and Communication Technology (ICT) and artificial intelligence (AI) to improve the efficiency of public services, transportation management, city security, and environmental management; (2) Technology and Innovation Areas: Development of special areas that encourage the growth of startups and creative industries, as well as collaboration between universities, industry, and government in supporting innovation and research (Muhammad Ghifary et al., 2023).

Development of the Use of Artificial Intelligence (AI) Technology and Jakarta Smart City (JSC)

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Optimizing Jakarta's resources requires strong collaboration between the government, private sector, community, and academics. By utilizing the potential of existing resources effectively and sustainably, Jakarta can become a better city in terms of development, services, and the welfare of its people.

Finally, from the results and discussion in the author's research, several important points are conveyed, namely regarding the implementation of research on the development of the use of Artificial Intelligence (AI) technology and smart cities that have been ongoing since 1980 by Prof. Dr. Ir. Sritrusta Sukaridhoto from the Bandung Institute of Technology (ITB) and in 1990 there was a surge of interest in the use of AI technology and smart cities, especially in academic and research environments. The Indonesian government under the leadership of President Joko Widodo since 2011 has rolled out the "100 Smart Cities Movement" program for 100 large cities as has been implemented by Jakarta with the Jakarta Smart City (JSC) program. To improve the quality of life of the community, support economic growth, and advance urban infrastructure. The programs are: First, Development of Information and Communication Technology (ICT) Infrastructure. (2) Digital Public Services; (3) Transportation Management; (4) Waste Management. AI technology and smart cities are seriously included in the National Medium-Term Development Plan (RPJMN) for the 2015-2019 period. The development of the use of AI and JSC Technology in 100 Indonesian cities has integrated Information and Communication Technology (ICT) in daily governance to increase efficiency in public services, transportation management, waste management; allocation of city security, and improving the quality of life of residents. While the benefits are: having significant results in the development of life, the government continues to obtain benefits and utility in terms of technology, realizing a modern, inclusive, sustainable city.

The optimization of Jakarta's resources that has been implemented is a key step in realizing sustainable and competitive city development with major cities in the world, especially since Jakarta has been designated as an agglomeration city. Increasing the development of the welfare of the people of Jakarta through the use of Artificial Intelligence (AI) technology and Jakarta Smart City is an effort to utilize technology to improve the quality of life, access to public services, and economic opportunities for Jakarta residents.

Other important things that need to be conveyed are: the development of Information and Communication Technology (ICT) Infrastructure in the Jakarta City Region (DKJ) must indeed expand the fast and wide internet network throughout the city to support better digital connectivity. In terms of traffic congestion which is a serious problem in Jakarta, then DKJ must continue to develop innovative public transportation facilities with an integrated public transportation system for all types of existing transportation services, including expanding the Mass Rapid Transit or Integrated Mass Transit (MRT) and Light Rail Transit (LRT) networks. As for the problem of flooding, DKJ must use more effective digital flood management monitoring technology, including an early warning system. For the public service that the people of Jakarta are

currently waiting for, the implementation of an integrated digital payment system between the Population Card and the Taxpayer Identification Number (NPWP), digital extension of the driver's license (SIM) for a lifetime period as has been implemented in Singapore and other major countries, online payments to take care of Motor Vehicle Registration Certificates (STNK) for all types of two-wheeled and four-wheeled vehicles.

CONCLUSION

The conclusion in the implementation of this research is as follows: the development of the use of Artificial Intelligence (AI) and smart city technology has been going on since 1980 by Prof. Dr. Ir. Sritrusta Sukaridhoto from the Bandung Institute of Technology (ITB) and in 1990 there was a surge of interest in the use of AI and smart city technology, especially in academic and research environments. The Indonesian government under the leadership of President Joko Widodo since 2011 has rolled out the "100 Smart Cities Movement" program for 100 large cities as has been implemented by Jakarta with the Jakarta Smart City (JSC) program. To improve the quality of life of the community, support economic growth, and advance urban infrastructure. The programs are: First, Development of Information and Communication Technology (ICT) Infrastructure. (2) Digital Public Services; (3) Transportation Management; (4) Waste Management. AI and smart city technology are seriously in the National Medium-Term Development Plan (RPJMN) for the 2015-2019 Period. The development of the use of AI and JSC Technology in 100 Indonesian cities has integrated Information and Communication Technology (ICT) in daily governance to increase efficiency in public services, transportation management, waste management; allocation of city security, and improving the quality of life of residents. While the benefits are: having significant results in the development of life, the government continues to obtain benefits and utility in terms of technology, realizing a modern, inclusive, sustainable city.

The optimization of Jakarta's resources that has been implemented is a key step in realizing sustainable and competitive city development with major cities in the world, especially since Jakarta has been designated as an agglomeration city. Increasing the development of the welfare of the people of Jakarta through the use of Artificial Intelligence (AI) technology and Jakarta Smart City is an effort to utilize technology to improve the quality of life, access to public services, and economic opportunities for Jakarta residents.

Meanwhile, the recommendations of the research results are: the development of Information and Communication Technology (ICT) Infrastructure in the Jakarta City Region (DKJ) must expand fast and wide internet networks throughout the city to support better digital connectivity. In terms of traffic congestion which is a serious problem in Jakarta, DKJ must continue to develop innovative public transportation facilities with an integrated public transportation system for all types of existing transportation services, including expanding the Mass Rapid Transit or Integrated Mass Transit (MRT) and Light Rail Transit (LRT) networks. As for the problem of flooding, DKJ must use more effective digital flood management monitoring technology, including an early warning system. For public services that are currently awaited by the people of Jakarta, the implementation of an integrated digital payment system between the Population Card and the

Taxpayer Identification Number (NPWP), digital extension of the Driving License (SIM) for a lifetime period has been implemented in Singapore and other major countries, online payments to take care of Motor Vehicle Registration Certificates (STNK) for all types of two-wheeled and four-wheeled vehicles.

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