

The Implementation of Artificial Intelligence in Indonesia's Public Service: Challenges and Government Strategies

Dr. Augustin Rina Herawati, Mrs Nina Widowati and Mrs Maesaroh

Lecturer

Public Administration, Faculty of Social and Political Science

Universitas Diponegoro, Indonesia

augustinrina@lecturer.undip.ac.id, ninawidowati@lecturer.undip.ac.id,

maesaroh@lecturer.undip.ac.id

Abstract

Artificial intelligence is one of the important parts of Industrial Revolution 4.0 which has huge potential in public service because it can accelerate processes, automate user tasks, and reduce the number of errors. Not only that, but AI could also give \$366 billion to Indonesia's GDP in 2030. In Indonesia, the implementation of AI in public services—known as e-government—is carried out with the application of information technology. Thus, the objective of this article is to explain the implementation of AI in Indonesia, especially in public services. This article used the qualitative research method with a literature review design. In examining the materials related to the topic, the authors more focus on secondary data in the form of journal articles, online articles, or government documents. This article showed a result that there are several challenges in AI development in Indonesia, including an unsupportive environment, lack of awareness and readiness among Indonesian people to use AI technology, inadequate human resources, and poor information and communication technology infrastructures. Besides that, Indonesia is still depending on imported technology and data misuse happened. To cope with these challenges, Indonesia has a plan to use AI technology in several priority issues, such as health, finance, defense, education, tourism, as well as food and biotech. Indonesia has invested heavily in media, telecommunications, and information technology. AI can be applied in the help desk in the service unit, analysis of service complaints, directing complaints to the intended agency, and even answering complaints. Furthermore, Indonesia has succeeded in integrating the government system as a database in the implementation of e-government. Its implementation also give a positive impact on local government performance, particularly in four aspects, namely costs, budget, time, and human resources. These four aspects become more efficient and effective in terms of assurance, infrastructure, and employment, so the community needs can be responded—and even fulfilled. The Indonesian government needs a regulatory framework that directly supports the requirements and implementation of e-government technology.

Keywords

Artificial intelligence, information and communication technology, e-government, Indonesia

1. Introduction

Industrial Revolution 4.0 triggered the appearance of the automatization era which makes human life became easier with a system that needs less contribution from humans (Tektona et al. 2021). This era was then connected to artificial intelligence (AI) as a method of simulating human intellect in computers to be able to match human intelligence. Although AI technology is not a new concept due to the development of technology since the 1950s, the use of AI is more advanced in the Industrial Revolution 4.0. The idea behind AI subjects started in 1955, especially when John McCarthy had an assumption that all well-known aspects of intelligence and learning domains can be simulated by machines (Maulana et al. 2022). At the beginning of its development, AI aimed to solve traditional problems on reasoning, learning, planning, representation of knowledge, natural language processing, and the ability to move and manipulate objects (Gati et al. 2021). In this contemporary era, AI has the more unique ability by providing an in-depth study. The most interesting fact about AI is not about its ability to imitate human intelligence, but its ability to view the world differently from the perspective provided by humans (Arief and Gustomo 2020). Thus, AI can identify several patterns in big data volumes that are different and will help the company or organization to overcome communication crises and potential risks that may give a negative impact on

their reputations. This is because AI can use algorithms, to learn from various data, and then use what it has learned to create proper decisions.

Since its inception, AI has progressed rapidly. It has been integrated into many aspects, including social, economic, business, education, and medical (Williams and Bangun 2022). Some research showed that information provided by AI has gained three new skills, namely (1) the skill to read and speak because AI has the capability in natural language processing and speech recognition, in which it can read, listen, and process things that had been heard or read; (2) the skill to see because AI can recognize an image which driven by neural networks that can be applied in medical applications and self-driving vehicles; and (3) the skill to track and process because AI has digital chips which are affordable and smaller, and a wide range of sensors can be implemented to various things (Zuliarti et al. 2022). AI is rapidly being deployed and developed by governments to improve their operations, public services, and security activities (Henman 2020). In public services, AI can be used at the help desk of the service unit, to analyze complaints from society, direct complaints to the appropriate agency, and give responses to objections. Therefore, it is very crucial to increase the use of AI to make public service more effective. For instance, technical labor—such as data processing and administration within the government agency—can be done more efficiently and in less time by utilizing related technology. The government can apply AI to provide high-quality and integrated information and data. Besides that, leveraging technology within public services will remove bureaucratic roadblocks, so allowing the government to act more flexibly and create decisions more quickly (Supriyanto & Saputra 2022). By doing this, the government has a wide opportunity to deliver the best service possible through bureaucracy.

In Indonesia, the implementation of AI in public services—known as e-government—is carried out with the application of information technology. The introduction of e-government was first conducted in developed countries in the 1990s by applying information technology to support the government in providing more efficient and effective public services. E-government can be defined as an internet application that assists governments to provide public services, so they can build good interaction with citizens while facilitating access to the government's information and documents (Hafel et al. 2022). By implementing e-government, Indonesia can provide services to the public that is more professional, accountable, qualified, and transparent. This implements e-government becomes one of the integral and essential parts to create good governance (Putra et al. 2018). However, the government should remember that AI-based public service must be provided for all people, not only for people in specific layers (Hening and Kumara 2019).

Nevertheless, in implementing e-government or AI-based public service, the Indonesian government has faced some challenges, mostly in the context of budgeting and human resources. To cope with these challenges, the government decided to create the Indonesia AI Strategy to promote effective public service. Particularly, the Ministry of Communication and Information will continue to enhance the use of AI technology in a thrifty, trustworthy, and prudent manner while adhering to the national identity. This is carried out through three important steps, namely creating digital talent that is capable of AI technology, facilitating the development of the AI ecosystem, and preparing the supporting legislation (Supriyanto and Saputra 2022). Therefore, this research is needed because it gives a broader picture of challenges of the AI implementation in Indonesia's public service, as well as the government's strategies to cope with these challenges.

1.1 Objectives

This research aimed to explain several challenges faced by the Indonesian government in implementing e-government or AI-based public service. Not only that, but this research also aimed to analyze strategies developed by the government to deal with these challenges.

2. Literature Review

The Industrial Revolution 4.0 era has increased the demands for transparency and accountability of the government as well as fast and high responsiveness. Thus, the government should apply major reforms in order to implement their functions and duties successfully in this contemporary era (Ismail 2019). Regarding those matters, AI can help public leaders to create the best policies, given that the implementation of public services requires fast and appropriate decision-making because it is a community demand (Supriyanto et al. 2021; Supriyanto and Saputra 2022). Therefore, AI technology must be utilized and adapted by Indonesia because if it is not utilized, Indonesia will lag behind other countries. AI has a positive impact to increase the creative economy and recover the national

economy. It can encourage sales of products to enter a wider market and increase the productivity of actors in the creative economy sectors (Kasnely 2022).

Besides that, AI also offers great potential to improve the public health sector, especially in terms of patient care, either in diagnosis or disease treatment (Hakim et al. 2021). The use of AI technology in Indonesia's medical sector as a support for medical service providers will be more useful and appropriate. This is because AI can accelerate the invention of new vaccines and medicines by predicting and modeling essential information that can help to develop new drugs (Nurmaini 2021). The government also uses telemedicine as an online application used in public health services between patients and hospitals. This effort is very crucial to prevent the spread of Covid-19 cases in Indonesia (Machmud et al. 2020). In addition, AI also can address transportation problems concerning traffic safety, traffic management, urban mobility, and public transportation. Unfortunately, the implementation of AI in Jakarta needs some improvement to ensure the system is fully integrated with various types of public transport that are available (Solihati and Indriyani 2021).

Indonesia has given great concern to realizing the e-government program under the framework of *Telematika*. This talks about the use of information and communication technology in government administration to support the implementation of good governance, optimize the participation of people in several government programs, and maximize the quality of public service (Dahlan 2008). Digital tools have changed the Indonesian government's way of providing public services. This is also influencing the process of public policy-making, including agenda setting, policy formulation, implementation, and evaluation (Hening and Kumara 2019). Besides that, the public relations job in Indonesia has been replaced by the tool development of AI, such as in news clipping, news analysis in the media, photos and videos, release distribution, media relations, and content of social media management (Arief and Gustomo 2020). In e-government, the utilization of information and communication technology can enhance public service quality and performance. This will help the government to implement its program more successfully because the implementation will be more efficient and accurate (Utama 2020). Thus, Indonesia needs to develop an e-government system to answer the growing demands of modernization and globalization. Most districts or cities in Indonesia had their website, but they more focus on promoting a linkage between business and government. Meanwhile, the effectiveness in the delivery of frontline services was less prioritized (Wahid 2008).

However, the implementation of e-governments in Indonesia has some problems, so it still needs improvement in many areas. AI systems in Indonesia still do not yet have specific laws in ensuring the security and protection of citizen data. Besides that, there are also some challenges faced by Indonesia, such as the digital skills of Indonesian people are still middle level, lack of telecommunications infrastructure, limited budget support, and low socialization of e-government programs (Gati et al. 2021; Hafel et al. 2022). In the district government, the utilization of information and communication technology has not yet had a significant impact on its productivity. This is because there is a lack of synchronization of the purposes of district government programs with the purposes undertaken by the central government in providing the best services to society (Putra et al. 2018). In addition, the privacy paradox will exist in the context of AI-based public services. Thus, the government or public administration should monitor potential privacy concerns while implementing AI technologies closely (Willems et al. 2022).

To cope with existing problems, the Indonesian government should allocate funds that are sufficient to provide the technology, provide informal education or training regarding information and communication technology within the society, build digital society or virtual communities, provide incentives needed by AI owners and programmers to stimulate future investment and development in AI, design the new legislation as the basis and guidance for the use of AI, and create strong leadership in implementing e-government (Pamoragung et al. 2002; Huda & Yunas 2016; Hakim et al. 2021; Tektona et al. 2021). Furthermore, it is important to gain trustworthiness concerning the potential use of AI in the public sector through the perceptions of people, because people's perceptions of AI are affected by their trust toward the government and AI itself (Chen and Wen, 2020; (Gillath et al. 2020; Setyaningtyas and Hizkia 2020; Maulana et al. 2022). In terms of the governance system, Indonesia should change its patterns of logic as well as allow more fact and knowledge-based action instead of mere political calculations (Behrens 2012). However, the Indonesian government has already tried to increase awareness among the apparatus and society. Diagnostic on the current status of e-government has also been conducted and followed by the establishment of special National e-Government Task Force (Harijadi and Satriya 2000).

3. Methods

This research used the qualitative method which has been defined as the investigation of phenomena, particularly in a holistic and in-depth fashion, through the collection of numerous narrative materials using a flexible research design. The method is aiming to provide an in-depth understanding and insights into real-world problems. Different from quantitative research, qualitative research does not use manipulation, treatment, or quantifying predefined variables (Moser and Korstjens 2017a). In particular, this research is gathering and interpreting non-numerical data in order to give an understanding of the human and social environment. The progenitors of the qualitative research method can be related to philosophy, history, psychology, sociology, and anthropology, with the main purpose to focus on the systematic explanation and analysis of related phenomena. Nowadays, the method has been attracting much attention in tourism and hospitality management.

The qualitative research method has strength in its ability to provide a complex textual description of a specific topic or phenomenon. This method is also effective in identifying and analyzing several intangible factors, such as gender roles, socioeconomic status, religion, social norms, and ethnicity, whose role in the research problem or issue may not be readily visible (Mack et al. 2005). Besides that, qualitative research is flexible. Indeed, the research must have a clearly-defined object of study or investigate something specific, but the researchers can carry out the research without any theory at the beginning. They can simply conduct the research because of their interest in a certain issue or topic. In this research, the influence of the researcher is inevitable during the process of investigation or analysis of the context. This is because most qualitative researchers assumed that reality is constructed by our historical, cultural, individual, and social contexts. Therefore, by applying a qualitative method, the researcher can explore why and how practitioners act that way (Korstjens and Moser 2017).

4. Data Collection

Qualitative research can move from virtual to digital. In this context, virtual means the approaches that import traditional methods of data collection into an online environment, while digital means the approaches that take advantage of the unique capabilities and characteristics of the Internet (Moser and Korstjens 2018). This research then reveals contextual-holistic aspects because it will collect genetic data and use the researcher as the instrument to collect those data. It explains the activities and impacts of research as well as represents the identification of the essential matters with the proper meaning (Sundari and Suswanta 2021).

In collecting data, researchers do not interact directly with the participants, but we were studying numerous existing sources, such as journal articles and conference proceedings. The study design was also iterative, in which research questions and data collection can be adjusted according to what has been learned. Although this article used qualitative research methods, the researchers were also studying the articles that used quantitative and mixed-method. This is because we searched for literature that can provide broader insight, knowledge, and understanding about our topics. These literatures can give the researchers a picture of the qualitative research questions and the empirical knowledge gap that may lead to new and useful concepts, models, or theories for studying the topic (Korstjens and Moser 2017).

5. Results and Discussion

5.1 The Development of Artificial Intelligence in Indonesia's Public Service

AI offers a huge advantage in increasing performance and productivity, allocating resources more efficiently, and reducing costs by eliminating administrative tasks. It could even add \$366 billion to Indonesia's GDP in the next decade and almost \$1 trillion to the Southeast Asia region (Maulana et al. 2022). In the public sector, the implementation of AI is known as the concept of e-government. To further develop AI in its public services, Indonesia used the application of information and communication technology that is in line with the development of the Industrial Revolution 4.0. In order to handle public demand and pressures on resources, AI gives an important opportunity for the government to increase the quality of public services (Berryhill et al. 2019).

Therefore, President Joko Widodo decided to enhance Indonesia's capabilities in AI to keep up with the other countries that have started to apply AI in various fields. The President warned that the world today is in a 'war situation' to obtain the capabilities of AI, so the competition in controlling AI is similar to the space race that happened in the Cold War (Zuliarti et al. 2022). In Indonesia, AI will be applied in public service, particularly for job simplification by decreasing the numbers of civil servants in the administrative work that can be carried out by AI. Indonesia had the plan to implement e-government by formulating Presidential Instruction Number 3 Year 2003.

Through this regulation, the Indonesian government will address all levels of government, not only the central government but also the local and provincial government. After that, several local governments in Indonesia then prepared an e-government network, such as Semarang, Sulawesi, Gorontalo, Gianyar, and Denpasar. In East Kutai Regency (East Kalimantan Province) and Takalar Regency (South Sulawesi Province), the two governments have collaborated with the Indonesia Telecommunication Company in developing their e-government. These regencies provided information to the public in the form of the Management Information System (MIS) and Geographic Information System (GIS) (Dahlan 2008).

By applying AI in public services, the government can improve the responsiveness and quality of services to the public, allowing the public to access the government services more transparently and efficiently, and leveraging the scope and accessibility of government’s services and public infrastructures. The implementation of e-government can also handle the government management’s information that needs to ensure public accountability and accelerate administrative processes. This is crucial things because there is a growing public demand for accountability and transparency in the public sector in Indonesia (Utama 2020). In April 2004, Indonesia started to implement e-government in the form of a single identification number (SIN) for all Indonesian citizens, tax numbers, driving licenses, and passports. Moreover, during the Indonesia Industrial Summit of 2019, President Joko Widodo introduced a roadmap to Indonesia 4.0 as a national plan for the Industrial Revolution 4.0 (Utama).

5.2 Challenges

As a developing country, Indonesia is lagging in the adoption of e-government compared to developed countries. According to the United Nations survey in 2016, Indonesia ranked 116 in the Government Development Index (EDGI)—previously, Indonesia ranked 106 in 2014 (Utama 2020). This becomes the task for Indonesia to improve its ranking in EDGI for the future years, in which Indonesia must give greater attention to increasing its performance, transparency, accountability, and inclusiveness in public institutions. The assessment of EDGI is carried out every two years based on three critical aspects of e-government, namely human capacity, telecommunication connection, and online service provision. Most developed countries, such as the United States, South Korea, and Denmark were ranked at the top of the EDGI in 2020. Meanwhile, Indonesia’s position is lower than these countries (see Figure 1).

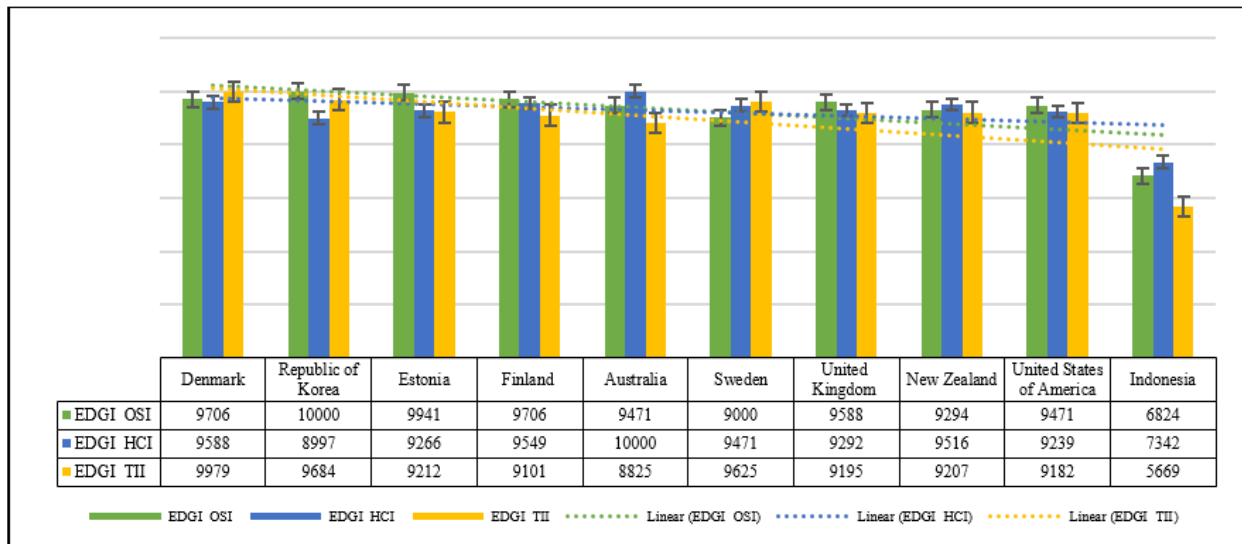


Figure 1. E-Government Development Index (EDGI 2020)
Source: EDGI United Nations 2020 (cited in Supriyanto & Saputra 2022)

Furthermore, based on data from the Government AI Readiness Index in 2019, the top rankings were dominated by countries that have strong economies, innovative private sectors, and good governance. Meanwhile, Indonesia has ranked 57 out of 194 countries with a score of 5.42 and ranked 5 within ASEAN. Nevertheless, the development of information and communication technology in Indonesia still lags behind other G20 countries. The position of Indonesia is 114 with an index of 4.33 points (see Figure 2). However, in 2020, Indonesia has a position of 62 out of

172 countries with a score of 47,52 (Gati et al. 2021). The indicator of assessment consists of four clusters, including skills and education, infrastructure and data, government and public services, and governance.

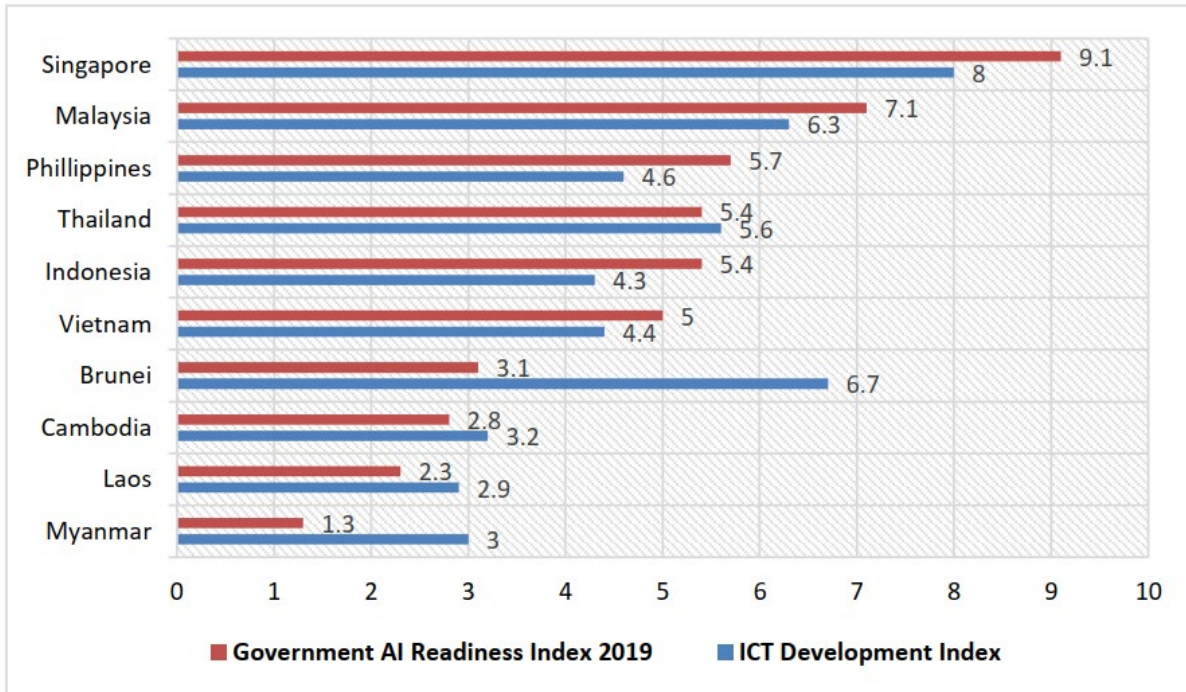


Figure 2. Government AI Readiness Index vs ICT Development Index 2019 in ASEAN Countries
Source: Nurmaini 2021

Given that Indonesia is a very large and heterogeneous country, the development of e-government is not easy. The disparity in e-government development and implementation between regions in Indonesia is still huge because of some reasons, such as infrastructure, management, and human factors. According to the World Bank (2005 cited in Wahid 2008), content and services offered by the Indonesian government via the website are poor, and Indonesia's ranking in the governmental web presence is lower than other Asian countries, except Sri Lanka, Bangladesh, and Bhutan. Moreover, the implementation of e-government becomes a challenge for local governments in Indonesia because of the archipelagic characteristics attach to them. One of the problems faced by Indonesian regions is concerns a lack of information and communication infrastructure as well as sea transportation infrastructure between islands (Hafel et al, 2022).

In addition, there are several challenges faced by Indonesia in implementing e-government or AI-based public services. First, the technological literacy of public apparatuses is still low. In 2019, there are 4.3 million civil servants in Indonesia, but only 572,000 people or 13.3% fully understand information and communication technology (Hening and Kumara 2019). Second, the inter-governmental system is not integrated. This is because there is no national policy that specifically regulates the implementation of e-government. The scope of responsibilities on that matter is still fragmented between the ministry lines. As consequence, the coordination and implementation of e-government are not integrated because the policy is not synergic and each institution develops its platform (The Prakarsa 2019). Third, lack of fiscal support. The budget that is available to develop e-government mechanisms is limited, especially at the sub-national level. The amount of budget to implement e-government properly is also huge because it must cover the investments in human/operator and tool/computer (Rose 2013). Fourth, translating the National Development Planning System into digital space is difficult. Anything that has been operated manually by the state administration is not easily transformed into digital practice. Fifth, access to the Internet is still limited. This access limitation is caused by a lack of support and infrastructure that is required in applying e-government, including Internet network, hardware, and digital literacy and capability (The Prakarsa 2019). Sixth, lack of e-leadership. This factor becomes a key to a fundamental change in the e-government implementation. Unfortunately, some leaders are still unaware of the critical role of e-government. Many regional leaders also did not pay much attention to the e-government movement because their region faced other problems,

such as health, education, disasters, food, and poverty (Pamoragung et al. 2006). Seventh, conflict of interest. In Indonesia, misuse of communication media or social media is still happening, particularly for political purposes.

5.3 Government Strategies

To cope with the existing challenges, the Indonesian government, through the Ministry of Information and Communication, has created a scheme for the national information system. This scheme mentioned the relations established by e-government that involved three stakeholders, namely the government, business sector, and citizens (see Figure 3). The government has a position as the center of information and public services, so more information should be provided to society (Rose 2003). E-government also has the role as a communication tool between the government and its society. Besides that, the Indonesian government has also created several laws to support the implementation of AI-based public services, including (1) Government Regulation Number 82 Year 2012 on the Implementation of Electronic Systems and Transactions (PP PSTE); (2) Law Number 19 Year 2016 on the Amendments to Law Number 11 Year 2008 on the Information and Electronic Transactions (ITE); (3) Presidential Regulation Number 133 Year 2017 on the Amendments to Presidential Regulation Number 53 Year 2017 on the National Cyber and Crypto Agency (BSSN); and (4) Presidential Regulation Number 95 Year 2018 on the Electronic-Based Government Systems (Gati et al. 2021).

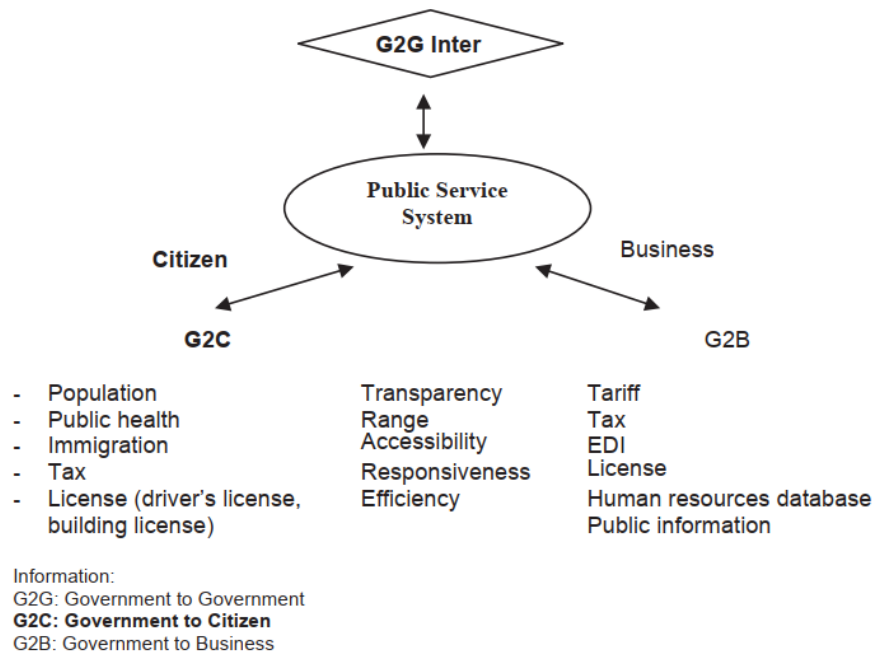


Figure 3. Relationship in the Implementation of E-government
Source: Rose 2013

In August 2020, Indonesia then published the National Strategy for AI (Stranas KA) 2020-2045 which is in line with the agenda of Vision Indonesia 2045. The government believed that this national strategy can provide a blueprint for AI development's long-term strategy in Indonesia. This strategy identified four key areas that become its priority, such as talent development, industrial research and innovation, infrastructure and data, and ethics and policy (Supriyanto and Saputra 2022). The government has also facilitated the development of public cloud services, so it will provide AI services for the public in a wider scope. This service will also provide shared platforms and infrastructure, in which digital companies can distribute data examples, metadata, learning, and computing services that are free to use by the developers of AI. President Joko Widodo even stated that Indonesia will create a citizen-centric digitized service government. Besides that, the Ministry of Communication and Information will contribute to improving the utilization and adoption of AI technology in a trustworthy, thrifty, and prudent manner while adhering to the national identity. This is carried out through three strategic steps, namely creating digital talent that

is capable of AI technology, facilitating the ecosystem of development, and preparing legislation and good governance (Supriyanto and Saputra 2022).

Moreover, the Indonesian government has established a roadmap for the successful deployment of e-government programs (see Figure 4). This roadmap contains an evolutionary framework that incorporated the current activities of the Indonesian government and charts a direction toward realizing the e-government vision as well as sustaining the benefits of a mature e-government environment. Nowadays, Indonesia is still in phase two. In order to move toward phase three, Indonesia tends to focus on the five critical steps, including (1) creating e-leadership by establishing a core high-level e-government body to coordinate and facilitate e-government activities within all government levels; (2) enabling the environment by developing appropriate cyber laws and e-government legislative; (3) improving the infrastructure of information and communication technology by leveraging the utilization of current technology capacity and developing technology infrastructure more efficiently; (4) developing a prioritized list of pilot projects; and (5) carrying out change management practices as an integral part of the implementation of e-government programs (Harijadi and Satriya 2000).

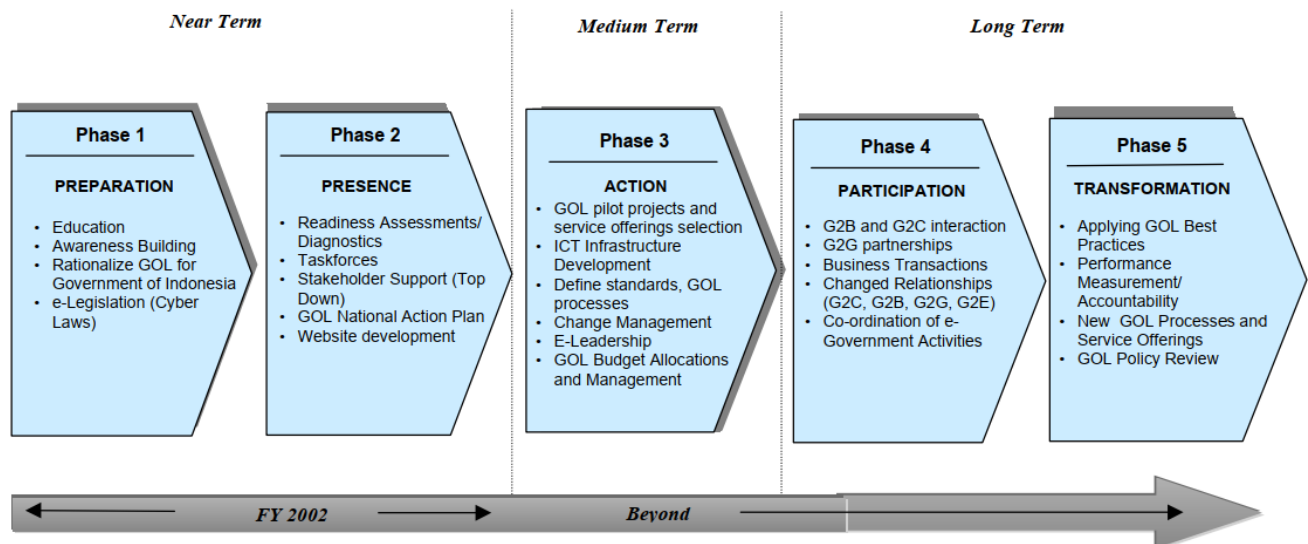


Figure 4. Indonesia's Roadmap to e-Government
Source: Harijadi and Satriya 2000

6. Conclusions

The implementation of e-government or AI-based public services in Indonesia is conducted through the application of information and communication technology. Indonesia decided to enhance its AI capabilities to keep up with the other countries that have started applying AI in various fields. By implementing AI in public services, the Indonesian government can increase its responsiveness and quality of service to the public, allowing the public to access the governments services more transparently and efficiently, and leveraging the scope and accessibility of government's services and public infrastructures. However, Indonesia is lagging in the adoption of e-government compared to developed countries. This is Indonesia still struggles to fight some challenges, including (1) the technological literacy of public apparatuses is still low; (2) the inter-governmental system is not integrated; (3) lack of financial support; (4) difficulty to translate the National Development Planning System in digital space; (5) limited access to the Internet; (6) lack of e-leadership; and (7) conflict of interest.

Indonesia then implemented several strategies to cope with those challenges. The Ministry of Information and Communication has created a scheme of the national information system which mentioned the relations established by e-government that involved three stakeholders, namely the government, the business sector, and citizens. Indonesia then published the National Strategy for AI (Stranas KA) in August 2020 to provide a blueprint for AI development's long-term strategy in Indonesia. Besides that, the Ministry of Communication and Information will contribute to improving the utilization and adoption of AI technology in a trustworthy, thrifty, and prudent manner while adhering to the national identity. The government also established a roadmap for the successful deployment of e-government programs in Indonesia.

Therefore, it can be said that this research has fulfilled the objective to explain several challenges faced by the Indonesian government in implementing e-government or AI-based public service, as well as analyze strategies developed by the government to deal with these challenges. This research can be useful material or reference for policymakers, especially the Indonesian government, in developing and implementing AI in the public sector. Through this research, the policymakers will be able to better understand about challenges in implementing AI and strategies that have been applied by the government.

References

- Arief, N. Nurlaela and Gustomo, A. Analyzing the Impact of Big Data and Artificial Intelligence on the Communications Profession: A Case Study on Public Relations (PR) Practitioners in Indonesia, *International Journal on Advanced Science Engineering Information Technology*, vol. 10, no. 3, pp. 1066–71, 2020.
- Behrens, C. Success Factors for an E-Government Strategy: Austrian Experiences, Indonesian Challenges, *Jurnal Studi Pemerintahan*, vol. 5, no. 1, pp. 32–48, 2012.
- Berryhill, J., et al. Hello, World: Artificial Intelligence and Its Use in the Public Sector, *OECD Working Papers on Public Governance*, no. 36, 2019.
- Chen, Y. K and Wen, C. R. Impacts of Attitudes Toward Government and Corporations on Public Trust in Artificial Intelligence, *Communication Studies*, pp. 1–17, 2020.
- Dahlan, N. Development of E-Government in Indonesia: A Strategy and Its Achievements, *Ritsumeikan Journal of Asia Pacific Studies*, vol. 24, pp. 35–46, 2008.
- Gati, R. A., et al. Readiness of Artificial Intelligence to Accelerate Bureaucratic Reform in Indonesia, *Jurnal Penelitian Administrasi Publik*, vol. 1, no. 1, pp. 1–23, 2021.
- Gillath, O. et al. Attachment and Trust in Artificial Intelligence, *Computers in Human Behavior*, pp. 1–47, 2020.
- Hafel, M. et al. Challenges of E-Government Implementation in The Region Archipelago Characteristics, *Jurnal Analisis Kebijakan Dan Pelayanan Publik*, vol. 8, no. 1, pp. 44–58, 2022.
- Hakim, H. A., et al. THE URGENCY ON DESIGNING THE LEGISLATION FOR THE USE OF ARTIFICIAL INTELLIGENCE IN INDONESIAN MEDICAL PRACTICE, *Jurnal Penelitian Hukum De Jure*, vol. 21, no. 4, pp. 541–549, 2021.
- Harijadi, D. A. and Eddy S. Indonesia's Road Map to e-Government: Opportunities and Challenges, *APEC High-Level Symposium on e-Government*, pp. 1–8, 2000.
- Hening, P. and Kumara, G. H. Public Sector Transformation in the Digital Age: Obstacles and Challenges for the Government of Indonesia, *Proceedings IAPA Annual Conference*, pp. 75–87, 2019.
- Henman, P. Improving Public Services Using Artificial Intelligence: Possibilities, Pitfalls, Governance, *Asia Pacific Journal of Public Administration*, pp. 1–13, 2020.
- Huda, M. and Yunas, N. S. The Development of E-Government System in Indonesia, *Jurnal Bina Praja*, vol. 8, no. 1, pp. 97–108, 2016.
- Ismail. GOVERNMENT GOVERNANCE IN THE INDUSTRIAL REVOLUTION ERA 4.0, *JISPO*, vol. 9, no. 2, pp. 218–30, 2019.
- Kasnelly, S. ARTIFICIAL INTELLIGENCE DEVELOPMENT AS A BASIS FOR CREATIVE ECONOMIC GROWTH AND RECOVERY OF INDONESIA'S NATIONAL ECONOMY, *AKTUALITA: Jurnal Penelitian Sosial Dan Keagamaan*, vol. 12, no. 1, pp. 1–11, 2022.
- Korstjens, I. and Moser, A. Series: Practical Guidance to Qualitative Research. Part : Context, Research Questions and Designs, *European Journal of General Practice*, vol. 23, no. 1, pp. 274–279, 2017.
- Machmud, M. et al. Artificial Intelligence In The Public Health Sector: The Use Of Telemedicine In Indonesia During Covid-19, *PalArch's Journal of Archaeology of Egypt/Egyptology*, vol. 17, no. 7, pp. 10106–10118.
- Mack, Natasha, et al. *Qualitative Research Method: A Data Collector's Field Guide*. Family Health International, North Carolina, 2005.
- Maulana, A. O. et al. Perceived Trustworthiness of Artificial Intelligence Implementation in Indonesia Public Sector Services: Gen Z and Millennial Perspectives, *Jurnal Akuntansi Dan Auditing Indonesia*, vol. 26, no. 1, pp. 65–75, 2022.
- Moser, A. and Korstjens, I. Series: Practical Guidance to Qualitative Research. Part 1: Introduction, *European Journal of General Practice*, vol. 23, no. 1, pp. 271–73, 2017.
- Moser, A. and Korstjens, I. Series: Practical Guidance to Qualitative Research. Part 3: Sampling, Data Collection and Analysis, *European Journal of General Practice*, vol. 23, no. 1, pp. 9–18, 2018.
- Nurmaini, S. The Artificial Intelligence Readiness for Pandemic Outbreak COVID-19: Case The Artificial Intelligence Readiness for Pandemic Outbreak COVID-19: Case of Limitations and Challenges in Indonesia,

- Computer Engineering and Applications*, vol. 10, no. 1, pp. 9–19, 2021.
- Pamoragung, A. et al. Enhancing the Implementation of E-Government in Indonesia through the High-Quality of Virtual Community and Knowledge Portal Design, *The 6th European Conference on E-Government*, pp. 341–348, 2006.
- Putra, D. A. D. et al. TACTICAL STEPS FOR E-GOVERNMENT DEVELOPMENT, *International Journal of Pure and Applied Mathematics*, vol. 119, no. 15, pp. 2251-2258, 2018.
- Rose, M. Democratizing Information and Communication by Implementing E-Government in Indonesian Regional Government, *The International Information & Library Review*, vol. 36, no. 3, pp. 219–26, 2013.
- Setyaningtyas, C. T. and Hizkia, M. Artificial Intelligence: Obstacle or Opportunity? *Proceedings of the 2nd International Conference on Inclusive Business in the Changing World*, pp. 716-719, 2019.
- Solihati, K. D. and Indriyani, D. Managing Artificial Intelligence on Public Transportation (Case Study Jakarta City, Indonesia), *IOP Conference Series: Earth and Environmental Science*, pp. 1–9, 2021.
- Sundari, C. and Suswanta. Artificial Intelligence Innovation in Capsule Bus in Jambi City, *Proceedings of the International Conference on Public Organization (ICONPO 2021)*, vol. 209, pp. 104–10, 2021.
- Supriyanto, E. E. et al. Literature Study on the Use of Big Data and Artificial Intelligence in Policy Making in Indonesia, *Administratio: Jurnal Ilmiah Administrasi Publik Dan Pembangunan*, vol. 12, no. 2, pp. 139–53, 2021.
- Supriyanto, E. E. and Saputra, J. Big Data and Artificial Intelligence in Policy Making: A MiniReview Approach, *International Journal of Advances in Social Sciences and Humanities*, vol. 1, no. 2, pp. 58–65, 2022.
- Tektona, R. I. et al. Quo Vadis Undang-Undang Hak Cipta Indonesia : Perbandingan Konsep Ciptaan Artificial Intelligence Di Beberapa Negara, *Jurnal Hukum*, vol. 12, no. 2, pp. 285–305, 2021.
- The Prakarsa. *Implementation Of E-Government in Indonesia, What Is Necessary?* no. 17, 2019.
- Utama, A. A. G. S. The Implementation of E-Government in Indonesia, *Research in Business & Social Science*, vol. 9, no. 7, pp. 190–96, 2020.
- Wahid, F. EVALUATING FOCUS AND QUALITY OF INDONESIAN E-GOVERNMENT WEBSITES, *Seminar Nasional Aplikasi Teknologi Informasi 2008 (SNATI 2008)*, Yogyakarta, 2008.
- Willems, J. et al. AI-Driven Public Services and the Privacy Paradox: Do Citizens Really Care about Their Privacy? *Public Management Review*, pp. 1–19, 2022.
- Williams, A. and Bangun, C. S. Artificial Intelligence System Framework in Improving The Competence of Indonesian Human Resources, *International Journal of Cyber and IT Service Management*, vol. 2, no. 1, pp. 82-87, 2022.
- Zuliarti, W. O. et al. Artificial Intelligence: History and Its Legal Framework in Indonesia, *Scholars International Journal of Law, Crime and Justice*, pp. 191–96, 2022.

Biography

Dr. Augustin Rina Herawati is an associate professor at Department of Public Administration, Faculty Social and Political Science, Universitas Diponegoro, Semarang, Indonesia. She received her Dr. in Administration Science, Universitas Indonesia, Jakarta. She received an M.Si in Business Administration, Universitas Indonesia, Jakarta. She researches interest include public management, public policy, public service, e-government, etc. She has published several international refereed journals in innovation and creativity in public service domain. She is certified head of the public administration master's study program.

Dra. Nina Widowati, M.Si is a lecturer at Department of Public Administration, Faculty Social and Political Science, Universitas Diponegoro, Semarang, Indonesia. She received her M.Si in Public Management. She researches interest include public management, public policy, public service, e-government, etc.

Dra. Maesaroh, M.Si is a lecturer at Department of Public Administration, Faculty Social and Political Science, Universitas Diponegoro, Semarang, Indonesia. She received her M.Si in Public Service. She researches interest include public management, public policy, public service, e-government.