The Forecast: How Artificial Intelligence Can Strengthen Sustainable Development and E-Government?

I Gede Eko Putra Sri Sentanu[1*], Aulia Rahman[2], Gadang Ali Syariati Pradono[3]
*sentanu@ub.ac.id
ORCID: 0000-0003-4167-7758

Universitas Brawijaya, Indonesia[1,2,3]

Abstract. Artificial intelligence has emerged as a pivotal technology within Indonesia's National Electronic-Based Government System master plan, playing a crucial role in driving sustainable development and enhancing the efficiency of Electronic-Based Government. This study will analyze and forecast the impact of artificial intelligence on assisting sustainable development and e-government as a pipeline to strengthen the public sector. Moreover, the research draws on how the adoption of artificial intelligence in Indonesia can be carried out by issuing specific artificial intelligence (AI) regulations. This research is expected to produce descriptions that can explain in-depth social reality from the reader's perspective in the observed research context. The research findings show that the emergence of AI waves has brought new hope for sustainable development for Indonesia. Artificial intelligence adoption in e-government will assist the public sector in providing services and will advance significantly in the future. However, the government has to implement specific regulations to govern artificial intelligence thoughtfully. To fully take advantage of the benefits and tackle the obstacles that come with artificial intelligence, the Indonesian government must collectively build specific regulations with other stakeholders to ensure its prudent and sustainable utilization.

Keywords: artificial intelligence, e-government, regulations, forecast, and electronic-based government

1. Introduction

The digitization of the Indonesian government has reached a significant milestone with the issuance of Presidential Regulation Number 95 of 2018. This regulation, which focuses on the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronik* - SPBE), sets a new benchmark in digitizing government in Indonesia. The Electronic-Based Government System in Indonesia aims explicitly to enhance governmental services by using Information and Communication Technology for the community as an end-user. The advancement of this technological infrastructure has been a pivotal area of concentration in the progression of the E-Government System, resulting in noteworthy technological advancements.

Artificial intelligence (AI), one of the technologies listed in Indonesia's National Electronic-Based Government System master plan [1], has great potential when implemented in the public domain. As an emerging set of technologies garnered considerable attention in society owing to its immense potential, AI can offer substantial advantages to public administrations when adopted [2]. In the Indonesian context, the Deputy for Public Service of the Ministry of

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State Empowerment and Bureaucratic Reform of the Republic of Indonesia has emphasized the significance of artificial intelligence in providing comprehensive and high-quality data and information. From the perspective of government administration, AI can be used effectively in various document processing tasks, including speech recognition and text or script analysis. Moreover, AI can be employed in the service unit's help desk to enhance complaint management by analyzing and directing complaints to the appropriate agency and even generating automated responses.

Additionally, implementing artificial intelligence in other public service sectors can aid in numerous areas, including identifying possible instances of tax fraud, managing traffic flow, and even being leveraged in the tourism industry to forecast the number of visitors and their economic impact. In another public administration output, in terms of international development, for example, there has been increasing academic interest in the intersection of artificial intelligence conceptual thinking and international development policies. A particular research endeavor exemplified the potential of AI to significantly and comprehensively influence the advancement of Sustainable Development Goals (SDGs). Empirical evidence suggests that artificial intelligence can facilitate 134 targets (79%) encompassing all SDGs, primarily through technological advancements [3].

However, on the other hand, the promising potential of AI technology also goes hand in hand with the risk sides. The use of AI may lead to enormous individual, organizational, and societal risks. For example, facial recognition payments (FRP), as one of the forms of AI development, have significant risks since the human face contains personal information. [4]. The risk is a substantial concern due to its potential to infringe upon personal privacy. Additionally, it is a matter of concern from a legal and regulatory standpoint, with ongoing discussions surrounding AI moral dilemmas, AI discrimination, and AI fairness in generating recommendations [5]. A concrete example of AI biases in the public sector may be exemplified by racial bias in the health algorithms used by US Governments.

Commercial algorithms that the US Government uses in the health sector present a racial bias in labeling patients based on skin color between white and black citizens. The algorithm reviewed shows bias as black patients of equal risk to white patients are perceived to be sicker. The research published in the publication "*Dissecting Racial Bias in an Algorithm Used to Manage the Health of* Populations" identifies patients enrolled in risk-based contracts for primary care between 2013 and 2015. The study aimed to discern disparities between white and African-American patients by establishing racial classifications based on hospital records. The final results from this research found that the prejudice arises due to the algorithm's anticipation of healthcare expenses rather than illness. Nevertheless, the inequitable availability of medical services results in allocating fewer financial resources toward the treatment of Black patients compared to their White patients. [6]. If we are not careful, this problem could occur in Indonesia.

Frequent to the abovementioned issues, AI bias would lead to discrimination and violation of public service principles, exclusively for equal treatment/non-discriminatory actions. According to Chapter II Article 4 of Indonesian Law No. 25 of 2009, public services are considered good if they adhere to certain principles. These principles include fulfilling public interest, providing legal certainty, equal rights to all citizens, balancing rights and obligations, professionalism, participation, non-discriminatory actions, transparency, accountability, exceptional facilities and treatment for individuals belonging to vulnerable groups, punctuality, and lastly, providing speed, convenience, low-cost services.

Despite these problems, the development of AI in developing countries, including Indonesia, has increased significantly. A recent survey conducted by *Institut Public de Sondage*

d'Opinion Secteur (IPSOS) on a 31-country Global Advisor Survey found that Indonesians hold the first position regarding AI understanding and usage in daily lives [7]. The development of AI in developing countries holds significant advantages in fostering progress and promoting equitable growth [8]. The Indonesian government has released the National Artificial Intelligence Strategy document as a preliminary guide for advancing and applying Artificial Intelligence in Indonesia. The document is a comprehensive national policy framework encompassing the vital focal points and priority domains of artificial intelligence (AI) technology. It serves as a reference point for various entities, including ministries-institutions, local governments, and other stakeholders involved in implementing AI-related initiatives within Indonesia from 2020 to 2045 [1].

Even though the Indonesian government has released the National Strategy for AI development, specific regulations have yet to govern this emerging technology [9]. Sooner or later, the Indonesian government must issue regulations that can precisely regulate the existence of artificial intelligence in terms of its use, ethics, safety, and protection. As long as Indonesia does not have a specific law on AI, the development and utilization of AI in Indonesia are regulated through several laws that cannot clearly and sensibly regulate such matters. From a legal and institutional perspective, this problem will only hinder Indonesia from achieving some of the expected goals, such as one of the SDGS targets, especially those underlining Peace, Justice, and Strong Institutions (Number 16).

In comparison, other developing countries, such as Brazil, have adaptively established regulations to govern the existence of artificial intelligence. The Brazilian Congress considers the urgency of proposing a national framework to regulate the use of artificial intelligence on September 29, 2021. Brazil's Congress, represented by The Chamber of Deputies, approved a bill regulating the use of Artificial Intelligence, establishing foundations and principles for the application and development of Artificial Intelligence systems. The project lists several aspects that will depend on regulation by the Federal Executive through sectoral bodies and entities with technical competence. The proposal signals that Brazil is attentive to innovation and artificial intelligence by stressing the main goals that uphold the outlined principles: government duties and responsibility work for civil rights.

In this particular case, Indonesia must adapt to effectively implement regulations that can comprehensively govern the utilization of artificial intelligence. Strengthening legal aspects is undoubtedly intended to support further the use of artificial intelligence, which has benefits in many areas, especially for the e-government (to help public services). Ensuring the success of artificial intelligence initiatives depends significantly on all stakeholders' commitment, including businesses, governments, and society [10]. Establishing regulations that specifically regulate the utilization of AI will not only help strengthen institutions and protect people's rights but also encourage public institutions to innovate and improve their public services through e-government. With the help of Artificial intelligence, public service can provide more solutions and offer unprecedented improvement that can significantly help all walks of society, including e-government services [11]. Nevertheless, all these achievements require robust legal guarantees.

Over a while, the Indonesian government has encountered numerous obstacles in delivering e-government services for its citizens. With the adoption of the smart governance concept, Indonesia's Electronic-Based Government System aims to guarantee that public service reaches the last person in society. Based on the research, the government must identify and address the primary obstacles to achieve a comprehensive transformation. Additionally, the government should focus on developing and delivering E-government services, utilizing AI to optimize efficiency and effectiveness. This approach will enhance the associated benefits and

lead to a more streamlined and effective government [11]. Therefore, this study will describe and forecast the impact of AI on sustainable development and the existence of e-government. Besides, the research also draws on how adopting artificial intelligence in sustainable development and E-government can be carried out by strengthening AI regulations.

2. Research Method

The study used a qualitative descriptive research approach. By investigating the phenomenon of forecasting artificial intelligence adoption in the Electronic-Based Government System, this research is expected to produce descriptions that can explain in-depth social reality from the readers' perspective in the observed research context. The researchers endeavor to furnish a detailed analysis of the phenomena without resorting to numerical or symbolic representations. The primary method of data collection for this study was through conducting interviews. To enhance the comprehensiveness of the research, the researcher also obtained relevant documents such as reports, data, and other materials to complete the substantive aspects of the research.

3. Literature Review

3.1 Artificial Intelligence

In conducting the data research, the author primarily adopted the definition of Artificial Intelligence proposed by Alan Turing in 1950, widely regarded as the father of modern computer science. This concept defines Artificial Intelligence as 'the science and engineering of creating intelligent machines, especially intelligent computer programs.' Artificial Intelligence, when operational, can mimic human abilities such as learning from past experiences, adapting to new situations, and utilizing its knowledge to execute given tasks similar to human sensory perception [12]. Furthermore, as one of the technologies listed in the Electronic-Based Government System's master plan, it is defined as 'an artificial technology in machines that possess cognitive functions to carry out learning and problem-solving as humans do [1]. It is perceived to be able to solve complex problems related to societal issues, health, and financial transactions. Globally, to embrace the rapid development of Artificial Intelligence, the Organization for Economic Cooperation and Development (OECD) has developed policy standards related to public policy. This system is influential in formulating options through predictions and recommendations for a given set of objectives [13].

3.2 Public Policy and Public Policy Analysis

Public policy can essentially refer to the deliberate actions or decisions made by governments, encompassing both the choices they make and those they opt not to pursue. This term refers to how the government decides whether its actions or inactions will have an impact or consequence on society. This broad definition concentrates on government actions and highlights the significance of government inaction. It argues that government inaction can have just as significant an impact on society as government action. Furthermore, scientist James E. Anderson [14] refined the definition through systematic analysis, defining public policy as a purposive course of action or inaction followed by an actor or a group of actors in dealing with a problem or matter of concern. Anderson's definition emphasizes what is actually done instead of what is only proposed or intended. It differentiates a policy from a decision, essentially a specific choice among alternatives, and views policy as something that unfolds over time.

The literature review was followed by a policy analysis process, which serves as a multidisciplinary inquiry to assess and communicate policy-relevant knowledge. This process is a problem-solving discipline that draws on social science methods, theories, and substantive findings to address practical issues. The policy analysis process is partly descriptive, relying on traditional social science disciplines to describe and explain the causes and consequences of policies. In this research, William N. Dunn's policy-analytic methods are adopted. These methods have five stages: 1) problem structuring to produce knowledge about which problem to solve; 2) forecasting to produce knowledge about expected policy outcomes; 3) prescribing to create knowledge about preferred policies; 4) monitoring to produce knowledge about observed policy outcomes and last; and 5) evaluation to produce knowledge regarding the usefulness or worth of observed policy results and how they affect the effectiveness of policies [15].

4. Results and Discussion

4.1. Sustainability Through Artificial Intelligence: A Cross-Sector Transformation

Over the past years, the technology sector in Indonesia has experienced substantial growth, garnered global recognition and bestowed upon the nation the accolades of Asia's "sleeping giant" and "next AI startup hub." Notably, in 2020, Indonesia became the second member country of the Association of Southeast Asian Nations (ASEAN) to unveil its National Strategy on Artificial Intelligence 2020-2045, following in the footsteps of Singapore [16]. Although the National Strategy for Artificial Intelligence 2020-2045 document was released as an initial reference for developing and utilizing artificial intelligence (AI) in Indonesia, a specific regulation still needs to be implemented to govern this emerging technology.

Despite this, artificial intelligence has already been utilized in various sectors throughout Indonesia and even snowballs. For the financial and business sectors, the artificial technology market values in Indonesia are forecasted to increase, as predicted by Statista continually [17]. This growth in the artificial technology market suggests expanding opportunities and demand for businesses to invest in and leverage artificial technology solutions in Indonesia. Businesses that effectively incorporate artificial technology into their operations and offerings can gain a competitive edge and better meet the evolving needs of the Indonesian market. According to a report by the Asian Development Bank, stakeholders expect more advanced artificial intelligence technologies to improve production efficiency in Indonesia through real-time decision-making in the next decade [18].

Meanwhile, in the public sector, artificial intelligence has been used in public services in several ministries, such as the Ministry of Education, Ministry of Agriculture, and Ministry of Informatics and Communication. Based on the interviews conducted by the researcher, it is evident that the development of the Electronic-Based Government System is closely linked to the goal of social welfare, as defined in various contexts. This is reflected in the implementation of artificial technology by ministries stated above as they execute their programs with the integration of AI. The private sector in Indonesia also adopts this technology to support their business purposes.

It is understandable that artificial intelligence is revolutionizing business and governmental policy at an unprecedented pace. Machines and robots with deep learning capabilities are causing disruptions and enabling significant impacts on businesses, governments, and society. The intelligence of these machines has created profound and far-reaching changes. Furthermore, artificial intelligence is also significantly impacting the broader

patterns of global sustainability [19]. A case from China, for example, can illustrate how using artificial intelligence can drive and promote Sustainable Development Goals holistically. In this case, Artificial intelligence has played a crucial role in reducing carbon intensity in Chinese industries [20]. With the help of artificial intelligence, China can help propel growth and make significant progress toward previously unattainable Sustainable Development Goals [21]. Hence, artificial intelligence offers diverse applications that can facilitate economic progress while addressing sustainability through all actors [19].

Retrieving from the emergence of artificial intelligence waves has brought new hope for sustainable development. Artificial intelligence, encompassing various methodologies and techniques, is widely acknowledged for its potential to significantly contribute to achieving Sustainable Development Goals. Artificial intelligence, in this case, has the potential to enable progress towards 79 percent across all SDGs and presents an opportunity to build better tools and solutions to help prioritize Sustainable Development Goals [3] [22]. The rise of artificial intelligence necessitates implementing a comprehensive national master plan to maximize its potential, especially in supporting sustainable development. Indonesia has developed an artificial intelligence National Strategy covering eight Sustainable Development Goals priorities. Therefore, Indonesia is already aligning its artificial intelligence National Strategy to support the Sustainable Development Goals [23]. To ensure effective implementation in the future, it is imperative to execute the proposed measures adequately.

Hence, artificial intelligence has gained more attention and even become a "hot-topic" issue in the public sector, especially in the current e-government era. Integrating artificial intelligence into various service pipelines, for instance, can significantly enhance the quality and efficacy of public services [11]. Artificial intelligence can also alleviate administrative burdens, address resource allocation issues, and tackle complex tasks within the public sector. Government offices around the world are currently experimenting with the use of artificial intelligence in their operations. One of the key applications of artificial intelligence in public services revolves around providing information and support to individuals [24]. The public has traditionally faced the inconvenience of long wait times on hold, personal visits to government offices, or searching through websites and third-party resources to find answers to their questions. However, the adoption of artificial intelligence in e-government can significantly enhance the pace and accuracy of public access to information. It can even generate and complete forms on behalf of citizens, making the process more efficient.

However, it is crucial to conduct a policy analysis due to the absence of specific regulations for artificial intelligence in Indonesia. Moreover, there is no significant push from society or political will to establish comprehensive regulations for adopting artificial intelligence in the E-Government system. Thus, this research conducts a public policy analysis with three critical stages or measurements that must be considered [15]: Problem Structuring, Descriptive Forecasting, and Prescribing. By systematically measuring these three key stages, the researcher comprehensively understood the regulatory landscape for Artificial Intelligence in Indonesia.

Problem structuring is a central guidance system that affects the success of other phases of policy analysis. The problems become public or policy problems if governments are supposed to deal with them. On this issue, the researcher highlights that the problem of regulating artificial intelligence law is due to data safety and data management and is intended to be "easy to find." This research also finds that the Legislation Committee does not have a mandate for regulating artificial intelligence technology due to jurisdictional considerations and the intricate nature of the Electronic-Based Government System's technical design. As such, regulating complex systems is the responsibility of institutions, particularly ministries, that address specific issues.

In this case, the Ministry of State Apparatus Empowerment and Bureaucratic Reform must address these artificial intelligence and E-government issues.

It is important to note that the existing technology-related laws should be considered if the Legislation Committee or the House of Representatives receives a proposal to formulate a new law that explicitly regulates the existence of AI. These laws should be harmonized with the existing ones to ensure compliance and consistency:

a. The Draft Law on One Data Indonesia (already at the Second-Level Discussion) proposed by the House of Representatives
b. The Draft Law on Data Protection and Personal Information (still ongoing) proposed by the Government
c. The Draft Law on Data Integration for Development (already at the Second-Level Discussion) proposed by the House of Representatives
d. The Draft Law on Personal Data Protection (already passed) proposed by the Government, the House of Representatives, and the Regional Representatives Council

Next, the fundamental principle underlying the forecasting process involves utilizing a predetermined set of assumptions or data to gauge the potential outcomes of prevailing or prospective policies, the substance of novel policies, or the conduct of relevant stakeholders. [15]. In this case, the author makes a forecast hypothesis by reflecting on the National Strategy on Artificial Intelligence 2020-2045 issuance. According to the report, artificial intelligence is predicted to enhance technological advancement and create a robust ecosystem for all stakeholders in Indonesia. The report emphasizes that the assumption-making process for artificial intelligence is grounded in Indonesia's National SWOT analytics, which assesses the country's strengths, weaknesses, opportunities, and threats. Based on the acquired data, it is evident that Indonesia has immense potential for growth in artificial intelligence, especially in integrating it into public services. The country can achieve this by creating an innovative ecosystem conducive to attracting investors, getting government support, fostering collaborations with the industry, forming partnerships with universities and research institutions, and engaging with NGOs.

The forecasting of future developments in artificial intelligence in Indonesia is shaped by the country's delineation of national priority areas in crucial strategic planning documents, such as the National Medium-Term Development Plan (RPJMN), the Making Indonesia 4.0 Roadmap, and the National Research Master Plan (RIRN). These documents underscore Indonesia's unwavering commitment to fostering advancements across various sectors, spanning industry and the public sphere. The reciprocal connection emerges in how the government harnesses the benefits of AI, mainly as it engages in a significant discourse concerning the relocation of the national capital city from the Special Region of Jakarta to the Universally Inspired Ibu Kota Negara, Nusantara. Consequently, the Electronic-Based Government System Program places a substantial demand on AI expertise, as it assumes a central role in assisting the government in formulating sound policies.

The development of artificial intelligence has been greatly facilitated by various regulations, which in turn holds significant promise for the advancement of AI in the future. This is particularly beneficial in the context of E-Government Systems in Indonesia, as it aids their development and progress. For example, the government has started implementing the Indonesia One Data Program through Presidential Decree No. 39 2019 for the need to share for advancing research and developing technological innovations. With these regulations, the AI development process can be done more efficiently. Besides that, Indonesia Emas (2045), as a vision that aims to develop Human Development, Mastery of Science and Technology, and Sustainable Economic Development, also plays an essential role in accelerating Artificial

Intelligence development. Furthermore, establishing specific regulations to govern artificial intelligence in Indonesia can significantly improve the potential for its development, especially for the E-Government system.

In addition, it is also important to underline that artificial intelligence challenges and threats need further attention. As the use of artificial intelligence in the public sector is still relatively new, governments and public authorities must understand the opportunities and challenges that come with it. This is further complicated because research on artificial intelligence specifically for the public sector is still in its early stages and has yet to provide a comprehensive overview of its applications and challenges [25]. Additionally, the challenges posed by artificial intelligence are primarily in the public sector. Governments are responsible for protecting and educating citizens and providing goods and services individuals cannot provide. Keeping up with the rapid pace of artificial intelligence technology and implementing comprehensive regulations is daunting for any government. Furthermore, they must address various challenges, including ethical concerns and societal understanding and acceptance of artificial intelligence, all while creating a sense of security for citizens [25] [26].

To increase opportunities and face challenges, the Indonesian government must collaborate with other stakeholders, whether at the local, national, regional, or global level, to develop its human resources for more prospects. Last but not least, prescribing is necessary, necessitating policymakers to address the fundamental inquiry on the preferred policies that could be implemented, given that no definitive policy exists to resolve the identified issue. During the interview, a source argued that artificial intelligence may not be suitable for macro-level regulation. This viewpoint is based on the assumption that artificial intelligence can be considered a versatile tool that can be substituted, complemented, or replaced by other tools aimed at enhancing the functionality of the Electronic-Based Government System.

This type of "void" can indicate the necessity for collaboration and further investigation across all sectors to develop precise artificial intelligence regulations. To ensure the prudent and sustainable utilization of artificial intelligence, it is imperative to undertake the necessary measures collectively.

5. Summary

Artificial intelligence has already been extensively utilized in various sectors in Indonesia and Snowball. It is undeniable that artificial intelligence is causing disruptions and enabling significant impacts across all sectors. Artificial intelligence has brought about profound and far-reaching changes, holistically instilling a sense of hope. In the development context, artificial intelligence significantly influences the broader patterns of Sustainable Development. Consequently, it offers diverse applications that can facilitate economic progress while addressing sustainability concerns. Apart from development, artificial intelligence also plays a crucial role in enhancing public services. By integrating artificial intelligence into various E-government systems, the quality and efficacy of public services can be significantly improved, ensuring their effectiveness. However, it is imperative to establish specific regulations in Indonesia to address the absence of such measures.

Therefore, this research conducts a public policy analysis encompassing three critical stages: Problem Structuring, Descriptive Forecasting, and Prescribing. The researcher emphasizes that the challenge of regulating Artificial Intelligence in Indonesian law stems from preparedness and coordination. Nonetheless, artificial intelligence possesses numerous virtues that can contribute to the betterment of all sectors. To seize the opportunities and overcome the challenges associated with artificial intelligence, the Indonesian government must build specific

regulations collectively (with other sectors) to undertake the necessary measures to ensure its prudent and sustainable utilization.

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