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Artificial Intelligence in Public Governance: Assessing Indonesia's Readiness and Regulatory Framework

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ABSTRACT: Governance constitutes a fundamental component of public administration and plays a decisive role in determining the quality, accessibility, and accountability of public services in Indonesia. As social needs and technological capabilities continue to evolve, the government is required to adapt its institutional structures, administrative mechanisms, and regulatory frameworks to ensure that public services remain effective, inclusive, and responsive. This requirement has become increasingly significant following the transformation of conventional government administration toward the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronik* or SPBE). Although digital transformation provides opportunities to improve administrative efficiency, transparency, and coordination, it also generates new challenges concerning state responsibility, data sovereignty, cybersecurity, personal data protection, and the safeguarding of citizens' rights in cyberspace. These challenges have become more complex with the emergence of Artificial Intelligence (AI), which enables automated data processing, predictive analysis, and decision-support mechanisms within governmental institutions. Accordingly, this study examines the urgency of governmental adaptation and the strategies required to establish AI-based governance that is consistent with the principles of legality, accountability, transparency, social equity, and public welfare. This research employs a doctrinal legal research method through a literature-based study, utilizing statutory, conceptual, and analytical approaches to examine the relevant legal framework, governance principles, and implications of AI adoption in public administration. The findings indicate that AI offers substantial opportunities to improve the efficiency, accuracy, responsiveness, and accessibility of public services. Nevertheless, its implementation may also generate algorithmic bias, limited decision-making transparency, cybersecurity vulnerabilities, privacy violations, and uncertainty regarding legal responsibility for AI-assisted administrative decisions. These risks demonstrate that technological advancement alone cannot guarantee the realization of effective and accountable governance. Government readiness must therefore be strengthened through regulatory adaptation, institutional capacity-building, the development of secure and equitable digital infrastructure, continuous evaluation of AI systems, and meaningful public participation. Furthermore, Indonesia requires clearer legal standards governing the responsible use of AI, including human oversight, accountability mechanisms, data protection, and legal remedies for individuals affected by automated decisions. This study argues that the integration of AI into SPBE should be understood not merely as a technological modernization initiative but as a legal and institutional transformation that must remain oriented toward the public interest. Ultimately, adaptive AI-based governance requires a balanced approach that maximizes technological benefits while ensuring legal certainty, ethical responsibility, social inclusion, and the protection of fundamental rights in Indonesia's evolving digital society.

KEYWORDS: Artificial Intelligence; Electronic-Based Government System; Digital Transformation; Public Governance; Legal Accountability.

I. INTRODUCTION

In the implementation of public governance, the state plays a highly significant role. This aligns with the concept of "*Gouverner C'est Prévoir*" put forth by Pierre Mendès in 1963. The principle also resonates with the legal maxim "*Salus Populi Suprema Lex Esto*", meaning that the prosperity and welfare of the people must be the highest law in a country (Cicero, 1928). Accordingly, every policy adopted must be based on the principles of social justice and sustainability, aiming to create conditions that foster a better quality of life for all members of society, without exception.

This construction is in line with the theory of governance as articulated by Inu Kencana Syafi'ie, who argued that all state affairs are intended to promote welfare, preserve security, maintain the dignity of society, and safeguard the nation's core interests (Syafi'ie, 2003). In order to achieve this, the state must implement a model of public service that upholds social justice, ensuring equitable distribution of services without discrimination (Frederickson, 1971). Moreover, from a legal enforcement perspective,

Satjipto Rahardjo emphasizes that the law must be progressive, not only rooted in formal written norms but also responsive to the evolving needs of society and the changing times.

In the current era of globalization, the process of digital transformation continues to develop across various sectors, including education, healthcare, business, and public governance. This transformation not only alters how organizations operate but also opens new opportunities across these sectors. Digitalization refers to the shift from traditional or analog processes to digital formats, enabling computers to assist in accessing, storing, and transferring information (Bloomberg, 2018). Leveraging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), cloud computing, and big data, digital transformation enhances operational efficiency (Sinaga & Azzura, 2024). However, this process also presents challenges related to data security, digital inequality, and cultural adaptation in the workplace.

To achieve social welfare through improved citizen satisfaction, digital transformation in public services becomes a necessary adaptive response. It aims to ensure equitable access to essential public services, such as education, healthcare, and administrative functions, while enhancing the efficiency and effectiveness of service delivery. This transformation involves utilizing technology to reform how governments operate, engage with citizens, deliver services, and manage data and information (Cahyono, et. al., 2023). For example, digital platforms can simplify licensing applications, tax payments, access to public information, and facilitate public participation in decision-making processes.

As mandated by Law Number 25 of 2009 on Public Services, the government holds the responsibility of providing services that align with public needs, including technology-based services. The law underscores the importance of delivering services that are fast, accessible, and transparent while encouraging the government to utilize information technology to improve service quality for the public.

The legal framework for digital transformation in Indonesia's public sector is supported by Presidential Regulation Number 95 of 2018 on the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronik*/ SPBE). This regulation serves as a key foundation for ensuring the integration of digital processes in the administration of public services. Additionally, the government's commitment to accelerating digital transformation has been strengthened by the issuance of Presidential Regulation Number 82 of 2023 concerning the Acceleration of Digital Transformation and the Integration of National Digital Services. This regulation emphasizes the development of priority SPBE applications to support the integration and interoperability of digital services. The ultimate goal is to build a more effective, responsive, and citizen-centric government administration.

In this era of accelerating technological innovation, particularly during the transition from the Fourth Industrial Revolution (Industry 4.0) to Industry 5.0, AI has emerged as a key enabler of transformation across multiple sectors. AI possesses the ability to process data rapidly and efficiently, allowing for the automation of routine and repetitive tasks such as data management, while freeing human labor to focus on more complex and strategic functions. The implementation of AI has been shown to improve operational efficiency, reduce turnaround times, and cut production costs (Nurhaliza & Hendra, 2025).

With such advancements, AI not only supports digital transformation in public services but also offers innovative solutions that can improve the overall quality of service delivery. The integration of digital technologies, including AI, is becoming a critical foundation for the government to build governance that is modern, efficient, and inclusive, capable of meeting public needs in the digital era (Suriadi, dkk, 2024).

AI has become a driving force in the transformation of various sectors, including public administration. However, despite its immense potential, the government's response to AI's positive impacts often appears slow and insufficient. While AI brings clear benefits to many institutions, numerous government agencies remain entrenched in rigid bureaucratic structures. To maximize the potential of AI, the Indonesian government must take proactive steps, beginning with equitable investment in digital infrastructure to avoid a growing urban–rural divide in internet access, a critical issue that, if left unaddressed, will have serious implications.

It would be regrettable if the government fails to respond promptly to the rise of AI, especially considering that, as of 2023, Indonesia ranks fourth globally in AI adoption in daily life. According to the latest survey by Statista Consumer Insights, 41% of Indonesian respondents expressed strong interest in AI technologies, including ChatGPT, to fulfill a wide range of needs (Istia, 2024).

The growth of AI in Indonesia is closely linked to the country's digital engagement. In 2023, more than 213 million people, over 77% of the national population, were internet users, and the number of startups leveraging AI to support business operations continues to rise. One example of AI adoption that reflects this growing interest is the Indonesian Ministry of Education, Culture, Research, and Technology (MoECRT), which recently issued official guidelines on the use of Generative Artificial Intelligence (GenAI) by students, lecturers, and higher education institutions. These guidelines acknowledge the substantial impact of GenAI on how people process and access information. Nevertheless, their effectiveness will depend heavily on implementation and the readiness of all relevant stakeholders. Without firm regulation and ongoing oversight, the guidelines risk remaining a mere formality, with little real impact on the governance of AI use in education (Istia, 2024).

A similar situation can be observed in the context of combating online gambling in Indonesia, where technologies such as machine learning are beginning to be used to detect and block illegal websites. Online gambling represents a significant and rapidly growing threat in digital spaces, with annual financial turnover reaching hundreds of trillions of rupiah. The use of machine learning to combat online gambling demonstrates how technology can provide innovative solutions to complex problems in today's digital landscape (Kominfo, 2024).

In the case of Indonesia's new capital city (IKN) development, for example, the area is being designed as a smart city integrated with AI and autonomous vehicles. This project aims to create an efficient, sustainable, and citizen-responsive urban environment. Through the application of smart city concepts, IKN will integrate the Internet of Things and big data to build an intelligent urban ecosystem. In governance, AI-based smart governance systems will enhance the transparency and efficiency of public services (IKNGo, 2024).

In the transportation sector, IKN will utilize autonomous vehicles and AI-based traffic systems to create more efficient and environmentally friendly mobility solutions. These technologies enable real-time traffic data analysis and automatic traffic management, reducing congestion and lowering carbon emissions (IKNGo, 2024).

With the continued expansion of artificial intelligence across various sectors, it is inevitable that government services will be affected, both in the short and long term. AI can be a powerful tool for automating government functions, improving service efficiency, responsiveness, and overall quality for the public.

However, this technological advancement also brings urgent challenges, especially the need to mitigate risks related to AI use in public services. The most significant threats involve data security and privacy, as AI has the potential to produce wide-ranging legal consequences for society, particularly concerning liability and legal protection. AI-driven data processing is highly sensitive to risks of data leakage and misuse of personal information.

To date, Indonesia still lacks specific legal frameworks governing AI. Although electronic governance is addressed in Law Number 19 of 2016 (amending Law Number 11 of 2008 on Electronic Information and Transactions) and Government Regulation Number 71 of 2019 on the Implementation of Electronic Systems and Transactions, none of these laws contain explicit provisions on artificial intelligence. Therefore, comprehensive regulatory development is urgently needed to address data protection concerns, ensure accountability in AI use, and promote public service delivery that meets the demands of the digital era.

This study employs a doctrinal legal research method, also referred to as normative legal research, which focuses on examining legal norms, principles, and regulatory frameworks governing the integration of Artificial Intelligence (AI) into Indonesia's public administration. Normative legal research is employed to understand the law as a system of rules and principles while developing legal arguments in response to emerging societal challenges (Soekanto, 2014). Accordingly, this research is not limited to describing existing legal provisions (*lex lata*) but also seeks to formulate prescriptive recommendations concerning the legal and institutional requirements for responsible AI-based governance. This approach is considered appropriate because the central issues examined involve regulatory adequacy, governmental authority, legal accountability, and the protection of citizens' rights within the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronik* or SPBE).

The research applies statutory, conceptual, and analytical approaches. The statutory approach is undertaken by examining Indonesian legislation relevant to public services, government administration, electronic governance, and the protection of personal data. The primary legal materials include Law Number 25 of 2009 concerning Public Services, Law Number 30 of 2014 concerning Government Administration, Law Number 27 of 2022 concerning Personal Data Protection, Presidential Regulation Number 95 of 2018 concerning the Electronic-Based Government System, and Presidential Regulation Number 82 of 2023 concerning the Acceleration of Digital Transformation and the Integration of National Digital Services. The conceptual approach is employed to examine the principles of good governance, legal certainty, accountability, transparency, and social justice, particularly in relation to technological developments that may influence administrative decision-making. Meanwhile, the analytical approach is used to assess the relationship between existing legal provisions and the opportunities and risks arising from AI adoption, including algorithmic bias, cybersecurity vulnerabilities, and the limitations of human oversight in automated administrative processes.

The research materials are collected through library research involving primary and secondary legal sources. Primary legal materials consist of relevant laws and regulations, while secondary materials include academic books, scholarly journal articles, legal commentaries, and institutional publications addressing digital transformation, artificial intelligence, and public governance. These materials are examined through qualitative legal analysis by identifying, interpreting, and systematically relating the applicable legal provisions to the theoretical foundations and practical challenges of AI implementation. Particular attention is given to identifying potential regulatory gaps and inconsistencies that may affect the government's ability to implement AI while maintaining administrative accountability and protecting fundamental rights.

The analysis is conducted through descriptive, interpretative, and prescriptive legal reasoning. First, the existing regulatory framework is examined to establish the legal foundations of digital government in Indonesia. Second, the relevant legal principles are interpreted in relation to the characteristics and risks of AI-assisted public administration. Finally, the findings are synthesized to formulate recommendations for strengthening regulatory preparedness, institutional capacity, and accountability mechanisms.

Through this process, the study seeks to provide a coherent legal assessment of Indonesia's readiness for AI-based governance and identify the normative measures necessary to ensure that technological innovation remains consistent with the principles of good governance and the public interest.

II. RESULT AND DISCUSSION

A. THE RELEVANCE OF ELECTRONIC-BASED GOVERNMENT SYSTEMS AMIDST THE RAPID DEVELOPMENT OF ARTIFICIAL INTELLIGENCE IN INDONESIA

Public services constitute one of the fundamental responsibilities of the state and serve as an important measure of the quality of governance. In Indonesia, this responsibility is closely associated with the constitutional objectives established in the Preamble to the 1945 Constitution of the Republic of Indonesia, particularly the obligation to protect the people, promote public welfare, and advance national education. Accordingly, public administration should not be understood merely as a series of bureaucratic procedures but as an institutional mechanism through which the state fulfills its obligations to society. The effectiveness of government administration must therefore be evaluated not only through administrative efficiency but also through its ability to ensure legal certainty, accessibility, transparency, and equitable public services. These considerations become increasingly relevant as technological developments transform the relationship between government institutions and the communities they serve.

The relationship between public services and governmental responsibility can be understood through the concept of *good governance*, which emphasizes accountability, transparency, participation, effectiveness, and the rule of law. Good governance requires public institutions to exercise their authority in accordance with established legal principles while remaining responsive to societal needs. Sadjijono (2007) explains that good governance reflects governmental activities carried out in accordance with public interests and prevailing norms to achieve the objectives of the state. This understanding demonstrates that administrative effectiveness cannot be separated from the legitimacy and accountability of governmental action. Similarly, the realization of good governance requires public participation and equitable access to public services, ensuring that government policies accommodate the interests of different social groups rather than merely prioritizing institutional convenience (Tirka, 2022).

Within this framework, technological innovation should be viewed as an instrument for improving governance rather than as an independent objective of administrative modernization. The transformation of public administration must remain consistent with the principles of public accountability, social justice, and legal protection. Dewi and Suparno (2022) emphasize the relationship between good governance and the quality of public service delivery, particularly regarding the government's responsibility to establish effective and accountable administrative mechanisms. Consequently, the integration of digital technology into public institutions should be assessed according to its contribution to public welfare and the protection of citizens' rights. A technologically advanced administrative system cannot automatically be regarded as an improvement in governance if its implementation produces unequal access, reduces transparency, or creates uncertainty concerning governmental responsibility.

The development of information and communication technology has encouraged governments worldwide to reconsider conventional administrative structures and adopt more integrated digital service mechanisms. In Indonesia, this transformation initially developed through the implementation of electronic government, or *e-government*, as reflected in Presidential Instruction Number 3 of 2003 concerning the National Policy and Strategy for E-Government Development. The policy provided an initial direction for government institutions to utilize information technology in administrative processes and public service delivery. However, the development of electronic services also revealed structural challenges, particularly the fragmentation of digital applications, limited interoperability among government institutions, and inefficiencies resulting from independently developed information systems. These challenges highlighted the importance of establishing a more coordinated national framework for digital governance (Putra & Adhi, 2023).

In response to these institutional challenges, the Indonesian government established the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronik*, hereinafter referred to as SPBE) through Presidential Regulation Number 95 of 2018. SPBE represents a systematic effort to integrate information and communication technology into government administration to improve public service quality, institutional coordination, and administrative accountability. Unlike fragmented digital initiatives that operate independently across government agencies, SPBE emphasizes the development of an interconnected administrative environment capable of supporting more effective information management and service delivery. Its implementation is intended to improve coordination between central and regional government institutions while reducing unnecessary administrative duplication. In this regard, SPBE provides an institutional foundation for developing government services that are more accessible, integrated, and responsive to public needs (Choirunnisa et al., 2023).

The relevance of SPBE has become increasingly significant following the emergence of Artificial Intelligence (AI), which introduces new possibilities for processing information and supporting government decision-making. Whereas conventional electronic government systems primarily facilitate the digital execution of established administrative procedures, AI enables more sophisticated activities, including automated data analysis, pattern recognition, predictive modeling, and decision support. These capabilities potentially allow public institutions to identify administrative problems more efficiently, anticipate changes in public

service demand, and formulate policies using broader informational resources. Vatamanu and Mihaela (2025) examine the integration of AI into public administration and identify both the opportunities associated with technological advancement and the vulnerabilities that may arise from its implementation. This development suggests that the transformation of public governance requires not only the availability of digital infrastructure but also the capacity to manage increasingly complex technological systems within established legal and institutional boundaries.

From the perspective of public administration, AI may strengthen the implementation of good governance when its use is directed toward improving service quality, institutional responsiveness, and administrative oversight. The ability to process substantial volumes of information can support the identification of public needs and facilitate more timely administrative responses. For instance, AI-based analytical systems may assist government institutions in evaluating service applications, managing administrative information, and identifying patterns that require further institutional attention. However, these potential benefits should not be interpreted as evidence that automated systems inherently produce more accurate or equitable administrative outcomes. The reliability of AI depends on the quality of its underlying data, the appropriateness of its computational models, and the institutional mechanisms through which its outputs are evaluated. Consequently, the effectiveness of AI-assisted governance must remain subject to legal standards and human accountability rather than being determined exclusively by technological performance.

The integration of AI into public administration also requires a clear understanding of how intelligent systems operate. Russell and Norvig (2010) describe artificial intelligence within a broader framework of computational systems designed to perform tasks associated with intelligent behavior. In practical applications, AI development involves interconnected processes, including data collection, preprocessing, model development, evaluation, implementation, and subsequent monitoring. These processes influence the reliability and usefulness of the resulting system because inaccurate data or inappropriate computational assumptions may produce misleading outcomes. Putri and Munawar (2019) explain the general mechanisms underlying artificial intelligence systems, illustrating the importance of systematic development and evaluation in their operation. In the governmental context, these technical characteristics create legal implications because errors generated during computational processing may influence decisions affecting public interests and individual rights.

The practical relevance of AI in Indonesian public governance can be observed through initiatives intended to integrate intelligent technologies into administrative and public service functions. One example concerns the development of Indonesia's new capital, Nusantara, which incorporates the concept of a smart city supported by interconnected digital technologies. The planned integration of AI, big data, and intelligent mobility systems reflects an effort to develop urban administration capable of responding more efficiently to changing public needs. The application of AI-based traffic management, for instance, illustrates how automated analysis may contribute to transportation coordination and the development of more sustainable urban services (IKNGo, 2024). Nevertheless, such initiatives should be distinguished from evidence of comprehensive institutional readiness. The successful introduction of individual technological applications does not necessarily establish that the broader administrative system possesses sufficient regulatory safeguards, technical capacity, or accountability mechanisms.

Beyond the development of smart cities, the Indonesian government has also explored the use of AI in addressing problems arising within digital environments. The utilization of machine learning to identify online gambling activities demonstrates the potential role of intelligent technologies in supporting governmental monitoring and enforcement functions (Kominfo, 2024). Such applications illustrate the increasing relevance of AI as a supporting instrument in public administration. At the same time, their implementation raises questions concerning the accuracy of automated identification, the proportionality of governmental intervention, and the possibility of errors affecting legitimate activities. These considerations become particularly important when technological outputs influence administrative measures with legal consequences. Therefore, AI-based monitoring must operate within clearly defined institutional authority and remain subject to appropriate human supervision.

Despite these potential advantages, the integration of AI into SPBE also introduces significant challenges concerning data protection, cybersecurity, and institutional accountability. AI systems commonly depend on substantial quantities of information, which may include personal data collected through public service applications. The integration of government databases and the expansion of automated processing may consequently increase the consequences of unauthorized access, data misuse, or deficiencies in information security. These risks are particularly important because government institutions process information that citizens are frequently required to provide when accessing essential public services. Therefore, the implementation of intelligent technologies must be accompanied by appropriate safeguards to ensure that technological efficiency does not compromise the confidentiality, integrity, and lawful processing of personal information.

Indonesia's experience with cybersecurity incidents demonstrates the importance of strengthening digital governance before expanding the use of increasingly sophisticated technologies. Previous incidents involving the exposure of personal information held by public institutions have raised concerns about the effectiveness of governmental data protection mechanisms. Reported cases include the unauthorized disclosure of population-related information and other personal records associated with public administration (CNN Indonesia, 2020). Although such incidents do not necessarily arise from the use of AI, they demonstrate vulnerabilities within the broader digital infrastructure upon which AI-based services would depend. The relevance of

these incidents lies in their implications for institutional preparedness: expanding automated data processing without adequately addressing existing cybersecurity weaknesses may increase the scale and complexity of risks faced by government institutions and citizens.

These concerns became particularly apparent following the ransomware attack against Indonesia's Temporary National Data Center (*Pusat Data Nasional Sementara* or PDNS) in June 2024. The incident disrupted a range of governmental services and exposed weaknesses in the security and resilience of nationally significant digital infrastructure. As reported by Akbar (2024), the attack affected government information systems and generated concerns regarding the protection and availability of public sector data. From a governance perspective, this incident demonstrates that digital transformation cannot be measured solely through the number of applications developed or the extent of technological integration. Effective digital governance also requires institutional resilience, continuity of public services, reliable cybersecurity measures, and clearly established responsibilities for responding to technological failures. These requirements become increasingly important when AI systems are introduced into administrative processes that depend on continuous access to accurate and secure data.

Apart from cybersecurity, algorithmic transparency represents another fundamental concern in the development of AI-based public governance. Certain AI models operate through complex computational processes that may be difficult for users and public officials to interpret. This difficulty becomes legally significant when algorithmic recommendations influence administrative decisions concerning licensing, public assistance, regulatory supervision, or access to essential services. In such circumstances, affected individuals must be able to understand the legal and factual grounds underlying governmental decisions and, where applicable, challenge decisions that adversely affect their rights. The use of automated technology should therefore not eliminate the government's obligation to provide accountable administrative reasoning. Rather, technological systems must be designed and supervised in a manner that enables responsible officials to evaluate their outputs and ensure compliance with applicable legal standards.

The potential for algorithmic bias further demonstrates why technological innovation must be assessed through the principles of good governance. AI systems trained on incomplete, inaccurate, or unrepresentative information may produce outcomes that disadvantage particular individuals or communities. In public administration, this risk has implications for equal treatment and the accessibility of government services. An automated system that improves procedural efficiency but generates discriminatory consequences would contradict the objectives of equitable public service delivery. Accordingly, the application of AI must incorporate mechanisms for evaluating data quality, monitoring system performance, and correcting outcomes that are inconsistent with the principles of fairness and legal accountability. These safeguards are necessary to ensure that automated administrative processes remain responsive to the diversity of social conditions encountered in Indonesia.

From a normative legal perspective, the application of AI within SPBE must be understood in relation to existing Indonesian legislation governing public services and electronic administration. Law Number 25 of 2009 concerning Public Services establishes the responsibilities of public service providers and the importance of service standards in governmental administration. Article 20 paragraph (1) requires public service providers to formulate and establish service standards by considering institutional capacity, public needs, and environmental conditions. This provision is relevant to the introduction of AI because the use of intelligent technologies should remain consistent with legally established service obligations. Accordingly, the adoption of automated systems must be evaluated according to whether they improve the fulfillment of service standards rather than merely accelerate administrative processing.

The implementation of AI also intersects with the broader regulatory framework governing electronic information, electronic systems, and personal data protection. Relevant instruments include Law Number 11 of 2008 concerning Electronic Information and Transactions, as amended, Government Regulation Number 71 of 2019 concerning the Implementation of Electronic Systems and Transactions, and Law Number 27 of 2022 concerning Personal Data Protection. These legal instruments provide important normative foundations for assessing aspects of electronic system operation and personal data processing. Nevertheless, the existence of general digital regulations does not automatically resolve legal questions arising from AI-assisted administrative decisions. Specific issues concerning algorithmic accountability, the transparency of automated processes, institutional responsibility, and effective remedies for affected individuals require further examination. Ravizki and Yudhantaka (2022) demonstrate that the development of artificial intelligence raises conceptual legal challenges that cannot be addressed solely through conventional understandings of technological systems.

The need for regulatory adaptation is also associated with the relationship between technological development and the lawmaking process. Technological innovation frequently advances more rapidly than the establishment of legal rules designed to govern its application. Consequently, regulatory frameworks must be sufficiently responsive to emerging risks without undermining legal certainty or institutional legitimacy. Dianisa and Suprobowati (2022), in their examination of legislative theory and the formation of Indonesian legislation, provide a relevant basis for understanding the importance of coherent legal regulation. Within the context of AI-based governance, regulatory responsiveness should be directed toward establishing clear institutional authority, defining standards of responsible technological use, and ensuring that the protection of citizens' rights remains an essential consideration in administrative modernization.

Furthermore, Presidential Regulation Number 82 of 2023 concerning the Acceleration of Digital Transformation and the Integration of National Digital Services reinforces the government's commitment to developing more coordinated digital public services. Read together with Presidential Regulation Number 95 of 2018, this policy direction demonstrates the continuing relevance of SPBE as a framework for integrating technological innovation into public administration. However, the acceleration of digital transformation must be accompanied by legal and institutional mechanisms capable of addressing the distinctive characteristics of AI. These include the need for adequate human supervision, clearly defined administrative responsibilities, secure information processing, and transparent procedures for evaluating automated recommendations. Without these safeguards, the expansion of intelligent technologies may create new forms of administrative uncertainty rather than strengthen the effectiveness of governmental services.

Ultimately, the relevance of SPBE amidst the rapid development of AI lies in its potential to function as an institutional and legal foundation for more adaptive public governance. AI may improve the capacity of government institutions to process information, anticipate public needs, and deliver services more efficiently, but these advantages depend on the reliability of digital infrastructure, the adequacy of legal safeguards, and the accountability of public authorities. The transformation of SPBE toward AI-assisted governance should therefore not be understood merely as a transition from conventional electronic applications to more advanced computational systems. It represents a broader transformation in the relationship between technological capability, governmental authority, and the rights of citizens. Consequently, the successful integration of AI into Indonesian public administration requires an approach that places the principles of good governance at the center of technological development. Only through such an approach can SPBE remain relevant as a mechanism for improving public welfare while preserving legal certainty, administrative accountability, social justice, and public trust.

B. ASSESSING THE READINESS AND STRATEGIES OF THE GOVERNMENT FOR ARTIFICIAL INTELLIGENCE-BASED GOVERNANCE

The readiness of the government to implement Artificial Intelligence (AI)-based governance must be assessed not only in terms of technological availability but also through institutional capacity, human resource development, regulatory preparedness, and the ability to maintain public trust. The transition from conventional administration toward intelligent governance requires a comprehensive transformation of the mechanisms through which public services are designed, delivered, monitored, and evaluated. In this regard, AI should be understood as an instrument for strengthening public administration rather than as a substitute for the government's legal responsibilities. Its implementation must remain consistent with the fundamental objectives of public service delivery, namely accessibility, efficiency, reliability, accountability, and the fulfillment of societal needs.

Public service delivery consists of several interconnected components that determine the effectiveness of administrative processes. The first is the service provider, which refers to the institution or individual responsible for delivering a particular service. Within public administration, this role is primarily performed by government institutions and their authorized personnel, who are responsible for ensuring that services comply with applicable legal standards and respond to public needs. The second component is the service recipient, encompassing individuals, communities, and other parties entitled to obtain government services. As the primary beneficiaries of public administration, service recipients must be able to access services fairly and without unjustified discrimination. The third component concerns the type of service provided, which may include administrative documentation, licensing, public information, social assistance, and other essential government functions. These services must be designed according to their specific purposes and the circumstances of their intended recipients.

The fourth component is customer satisfaction, which reflects the extent to which the quality of a service corresponds to the expectations and requirements of its recipients (Silaban,2014) emphasizes the importance of service quality in determining satisfaction, particularly through reliability, effectiveness, and efficiency. In public administration, however, satisfaction cannot be measured exclusively through speed or convenience. Public services must also satisfy requirements concerning fairness, legal certainty, accessibility, and accountability. The fifth component, which becomes increasingly important in digital governance, is the service delivery mechanism. This encompasses the procedures, organizational arrangements, and technological systems through which services reach their intended recipients. The sixth component is evaluation and accountability, which ensures that the performance of service providers can be assessed against established standards and that deficiencies can be corrected. These six components collectively demonstrate that successful public service delivery requires coordination between institutional responsibilities, public needs, service design, quality assurance, technological infrastructure, and continuous evaluation.

The advancement of information and communication technology has created opportunities to improve these components through the development of Electronic-Based Government Systems, commonly known as Sistem Pemerintahan Berbasis Elektronik (SPBE), or electronic government. SPBE represents an administrative approach that integrates digital technologies into governmental processes to improve efficiency, transparency, coordination, and service quality. Through electronic platforms, government agencies, civil servants, businesses, and citizens can interact more efficiently, access administrative information, and complete certain procedures without relying entirely on conventional face-to-face arrangements (Ibrahim et al.2020). identify the

implementation of technology-based governance as an important means of facilitating public access and improving the delivery of government services.

The legal foundation for SPBE was strengthened through Presidential Regulation Number 95 of 2018 concerning the Electronic-Based Government System. This regulation provides a framework for integrating electronic systems into government administration and supporting the development of a more effective, transparent, and accountable bureaucracy. Before the adoption of this regulatory framework, digital administration in Indonesia was commonly discussed under the broader concept of e-government. Although the terminology and institutional arrangements have developed, the fundamental objective remains the modernization of public administration through information technology. SPBE consequently provides an important institutional foundation for the subsequent integration of AI into government operations. Nevertheless, the existence of digital platforms does not automatically establish readiness for AI-based governance, since intelligent systems require more sophisticated data management, technical expertise, risk assessment, and institutional coordination.

The emergence of AI and big data has expanded the possibilities for further developing SPBE into a more adaptive and data-driven governance system. Unlike conventional digital applications that primarily facilitate the electronic processing of predetermined procedures, AI-based systems can analyze information, identify patterns, generate predictions, and assist decision-making. Big data, meanwhile, can provide a broader informational basis for identifying public needs and evaluating policy outcomes. When these technologies are appropriately integrated, government institutions may be able to identify emerging social problems earlier, allocate resources more effectively, and develop public policies based on a more comprehensive understanding of existing conditions. However, the usefulness of these systems depends on the accuracy, completeness, relevance, and representativeness of the data being processed.

Government readiness therefore requires a clear strategy for developing the competencies of the State Civil Apparatus (Aparatur Sipil Negara or ASN). Civil servants remain essential to the implementation of AI because they determine how technological outputs are interpreted, translated into administrative decisions, and incorporated into public service procedures. The Ministry of Administrative and Bureaucratic Reform (PANRB) has recognized the importance of preparing civil servants to respond to digital transformation. One initiative involves training on AI and big data applications in governance in collaboration with the Digital Government Cooperation Center (DGCC). These programs are intended to strengthen the capacity of public officials to utilize digital technologies for data-based decision-making and to improve the efficiency and effectiveness of public services (Humas MenpanRB, 2024).

Nevertheless, the development of digital competencies should extend beyond basic familiarity with AI applications. Civil servants must understand the capabilities and limitations of these systems, including the possibility of inaccurate outputs, biased predictions, and inappropriate recommendations. They should also possess sufficient knowledge to assess whether AI-generated results are relevant to the legal and factual circumstances of a particular administrative matter. Training should therefore combine technical knowledge with legal literacy, ethical awareness, data protection principles, and the capacity to exercise independent judgment. Without these competencies, the adoption of AI may create excessive dependence on automated outputs and weaken the quality of administrative decision-making.

One technological approach relevant to AI-based governance is the Artificial Neural Network (ANN), a computational model inspired by the interconnected structure of the human brain. ANNs process information through interconnected computational units that adjust internal parameters during training to identify patterns in historical data. Once trained, these systems can generate predictions or classifications when presented with new information. Their capacity to identify complex relationships makes them potentially useful in various governmental activities, including forecasting public service demand, identifying irregularities in administrative transactions, supporting economic and social policy analysis, and assisting with the prioritization of public resources**.**

The development of ANN technology can be traced to foundational work by McCulloch and Pitts, which contributed to the conceptual basis of artificial neural computation. Subsequent developments in computing power, data availability, and machine learning have expanded the practical applications of neural networks. In public administration, these systems may support predictive analysis by examining historical information to identify patterns associated with unemployment, public health needs, population growth, or demand for administrative services. They may also assist in identifying inconsistencies in public expenditure records or detecting unusual patterns in applications for government assistance. Such applications could help officials allocate investigative resources more effectively and develop interventions based on identifiable risks.

However, the use of ANN must be distinguished from the assumption that AI can invariably outperform human reasoning. Discussions concerning technological singularity explore the possibility that artificial intelligence could eventually surpass human intellectual capabilities in particular domains. In the context of neural networks, the increasing capacity to process large datasets and perform complex computational tasks illustrates the potential for substantial technological advancement (Salman & Prasetio, 2010). Nevertheless, the prospect of singularity should not be treated as an established description of current AI capabilities or as a sufficient justification for transferring governmental authority to automated systems. Contemporary AI

remains dependent on human decisions concerning system design, training data, performance objectives, deployment conditions, and oversight arrangements.

This limitation is particularly relevant to the concept of bounded rationality. In administrative decision-making, bounded rationality refers to the limitations faced by decision-makers when processing information, evaluating alternatives, and acting under conditions of uncertainty and limited resources. Although AI can expand analytical capacity, its outputs remain constrained by the information available to the system and the assumptions embedded in its design. A neural network trained on incomplete, outdated, or unrepresentative data may generate predictions that fail to reflect the circumstances of particular communities. Similarly, historical data containing patterns of discrimination may reproduce or intensify existing inequalities when used to train predictive models. Computational complexity does not eliminate these limitations; in certain circumstances, it may make them more difficult to identify.

The black-box problem presents another challenge for AI-based governance. Some AI systems, particularly complex neural networks, do not provide easily interpretable explanations for their outputs. This creates difficulties when public officials must explain why an application was rejected, why a particular risk classification was assigned, or why certain individuals were selected for additional administrative scrutiny. Government decisions must remain explainable to the extent necessary to satisfy applicable legal requirements, enable meaningful review, and protect the rights of affected individuals. Therefore, the implementation of AI should be accompanied by appropriate documentation, human review, performance monitoring, and mechanisms through which citizens can question or challenge decisions affecting their interests.

From a legal perspective, Law Number 25 of 2009 concerning Public Services provides an important normative foundation for assessing the use of AI in public administration. The legislation emphasizes the government's obligation to deliver services in accordance with public needs and applicable service standards. Accordingly, the integration of AI into SPBE must contribute to the realization of accessible, reliable, transparent, and accountable services. Automated systems should not create additional barriers for citizens who lack digital literacy, have limited internet access, or require assistance in completing administrative procedures. Maintaining alternative service channels and providing appropriate assistance are therefore important measures to ensure that digital transformation promotes inclusion rather than generating new forms of exclusion.

Law Number 30 of 2014 concerning Government Administration is also relevant because it establishes a legal framework for the exercise of governmental authority and the implementation of administrative decisions. The use of AI must remain consistent with the principles of legality, accountability, and the public interest. AI-generated recommendations cannot independently establish the legal basis for an administrative decision, nor should technological convenience be used to justify decisions that cannot be adequately explained or reviewed. Government officials must retain responsibility for ensuring that decisions are made by authorized institutions, follow applicable procedures, and respect the rights of affected parties. In this respect, AI should function as a decision-support mechanism whose outputs are evaluated within the relevant legal framework rather than as an independent source of governmental authority.

Based on these considerations, several strategic priorities are necessary to strengthen the government's readiness for AI-based governance. First, Indonesia should develop governance standards that address responsible AI use, cybersecurity, data management, and interoperability. International standards and recognized best practices may provide useful references, but their adoption must be adapted to Indonesia's legal system, administrative structure, and social conditions. Technical interoperability is particularly important because fragmented information systems may prevent government institutions from exchanging data securely and efficiently. At the same time, integration should be governed by clear rules concerning data access, authorized purposes, information retention, and institutional responsibility.

Second, the SPBE governance framework should be evaluated to identify regulatory gaps associated with AI implementation. Existing regulations may provide a foundation for electronic administration, but specific technical and administrative guidance may be needed to address algorithmic accountability, risk classification, human oversight, and the review of AI-assisted decisions. Such guidance should be established through legally appropriate instruments issued by competent authorities. Ministerial regulations or other authorized regulatory instruments may be appropriate where permitted by the applicable legal framework. Circulars may communicate administrative guidance, but they should not be treated as substitutes for binding legal provisions when substantive rights, obligations, or restrictions require a stronger legal basis. This approach would enable regulatory adaptation while maintaining legal certainty and respect for the hierarchy of laws and regulations.

Third, the government should establish risk-based safeguards for AI systems used in public administration. Applications that perform routine administrative tasks may require different levels of supervision from systems that influence access to social assistance, healthcare, licensing, or other services affecting individual rights. Higher-risk applications should undergo more rigorous assessments of accuracy, fairness, security, and potential consequences before deployment. Regular audits and ongoing evaluations should be conducted to identify errors, discriminatory outcomes, and changes in system performance. Where appropriate, citizens should be informed when AI materially contributes to decisions affecting them and should have access to effective procedures for requesting explanations or reconsideration. Cybersecurity measures must also address unauthorized access, manipulation of training data, and other threats that could compromise the reliability of AI-assisted administration.

Fourth, investment in digital infrastructure and human resource development must be treated as complementary priorities. AI systems require reliable connectivity, secure data storage, appropriate computing resources, and effective information management. Unequal infrastructure between urban and rural areas may prevent government institutions and citizens in less-connected regions from benefiting equally from digital services. The government should therefore prioritize infrastructure development according to demonstrated needs and ensure that digital public services remain accessible to disadvantaged groups. Simultaneously, civil servants should receive continuous training tailored to their responsibilities, ranging from basic digital literacy to specialized skills in data analysis, AI governance, risk assessment, and information security. Institutional readiness depends on the ability to maintain and supervise technological systems over time, rather than simply acquiring them.

Fifth, meaningful public participation must be incorporated into the development and implementation of AI-based governance. Citizens are not merely recipients of technological innovation; they are rights holders whose interests may be affected by decisions concerning data collection, automated processing, and digital service delivery. Public consultation can help identify practical barriers, clarify community expectations, and reveal risks that may not be apparent during technical development. Accessible complaint mechanisms, transparent communication, and opportunities to provide feedback can also strengthen public confidence in government institutions. Participation is particularly important when AI systems are introduced into services used by vulnerable communities, since the consequences of errors or exclusion may disproportionately affect individuals with limited resources or restricted access to alternative services.

Finally, AI implementation should be accompanied by measurable performance indicators and continuous institutional evaluation. The success of AI-based governance cannot be determined solely by the number of applications deployed or the volume of administrative tasks automated. Evaluation should also consider service accessibility, processing accuracy, cost-effectiveness, complaint resolution, data security, public satisfaction, and the distribution of benefits across different population groups. Establishing clear indicators would allow the government to compare expected outcomes with actual performance and identify areas requiring corrective action. Pilot projects and phased implementation may further enable institutions to test systems under controlled conditions before expanding their use. Such an approach reduces the risk of large-scale failures and allows regulatory and operational arrangements to be refined through practical experience.

III. CONCLUSIONS

The development of Artificial Intelligence (AI) has created significant opportunities for transforming public governance in Indonesia, particularly through its integration into the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronik* or SPBE). As a regulatory and institutional foundation for digital government, SPBE remains relevant in facilitating the transition toward more integrated, efficient, and responsive public administration. The capacity of AI to process substantial volumes of information, identify patterns, and support data-driven decision-making offers considerable potential to improve public service delivery and strengthen the implementation of good governance. Nevertheless, the effectiveness of this transformation cannot be determined solely by technological advancement. The integration of AI into governmental functions must remain consistent with the principles of legality, transparency, accountability, social justice, and the protection of citizens' rights. Existing challenges involving fragmented digital infrastructure, cybersecurity vulnerabilities, personal data protection, algorithmic bias, and the limited transparency of automated systems demonstrate that technological innovation may generate legal and administrative risks when it is not accompanied by adequate institutional safeguards. Consequently, AI should function as an instrument supporting governmental decision-making rather than replacing the legal authority and responsibility of public officials.

Indonesia's readiness to implement AI-based governance therefore requires a comprehensive approach encompassing regulatory adaptation, institutional capacity, technological infrastructure, and public participation. Although existing legislation and policies provide an important foundation for electronic government and digital transformation, more specific governance standards are necessary to address the distinctive risks associated with AI-assisted administrative processes. Regulatory development should prioritize clear institutional responsibilities, human oversight, algorithmic accountability, cybersecurity, personal data protection, and accessible mechanisms for reviewing administrative decisions that affect individual rights. At the institutional level, strengthening the digital and legal competencies of civil servants, improving interoperability between government systems, and ensuring equitable access to digital infrastructure are essential to preventing technological disparities and maintaining public trust. Continuous evaluation, risk-based supervision, and meaningful public participation should also become integral components of AI implementation. Ultimately, the successful transformation of SPBE into AI-supported public governance depends on the government's ability to balance technological efficiency with legal certainty and public accountability. AI-based governance should therefore be understood not merely as an administrative modernization initiative, but as a continuing legal and institutional transformation directed toward achieving inclusive, accountable, and citizen-oriented public services in Indonesia.

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