

E-Government and Artificial Intelligence in Electronic Administration: A Normative Legal Analysis of Modern Government Digitalization

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Abstract

Digital transformation is a central pillar of Society 5.0; however, translating technological advancements into sustainable public value within public administration remains limited, particularly in terms of legal readiness. Although existing scholarship on e-government and Artificial Intelligence (AI) predominantly focuses on technological efficiency and service innovation, there remains a significant research gap concerning the absence of a robust and comprehensive legal framework governing AI-based e-government in Indonesia, which represents the central problem and novelty addressed in this study. This research examines the application of AI in e-government from a normative legal perspective, focusing on Indonesia's regulatory preparedness. It employs normative legal methods through conceptual, statutory, and comparative approaches. The findings demonstrate that AI possesses substantial potential to enhance electronic administration by improving efficiency, accuracy, and responsiveness in public services. Nevertheless, Indonesia currently lacks a comprehensive and binding legal framework specifically regulating AI implementation in e-government, particularly in relation to accountability, transparency, data protection, and legal safeguards for citizens. This regulatory deficiency generates legal uncertainty and risks undermining public trust in digital governance. A comparative analysis with the United States reveals a more structured regulatory approach to AI-based e-government, supported by clearer data protection and accountability mechanisms. This research contributes a novel legal analysis by positioning regulatory readiness as a prerequisite for responsible AI-driven governance, arguing that technological transformation must be institutionally anchored within a coherent legal framework. Strengthening Indonesia's legal infrastructure is therefore essential to ensure accountable AI implementation and to realize sustainable digital government transformation.



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INTRODUCTION

The expansion of the internet has been in line with the rapid advancement of technology. Since the advent of the internet, globalization has become much more convenient for us. Information and communication infrastructure, consisting of computer networks and mobile devices, is integral to every aspect of our existence in the digital age. Information and communication technology experienced significant progress during the first decades of the 21st

century. The global population with internet connections increased from 350 million to over 2 billion between 2010 and 2015. Technological and scientific advancements are progressing rapidly in today's digital age. Many previously unimaginable aspects of human life have been significantly transformed by technological and scientific advancements.¹

Digital transformation is a crucial element of Society 5.0, as the unparalleled speed and power of digitalization have permeated and dominated our lives. Furthermore, many local governments are unable to accommodate these changes. In theory, the government sector, particularly local governments, is encouraged to improve service performance and governance to be more efficient, clean, transparent, accountable, and participatory as a result of substantial technological advances. One such initiative is through e-government.² The goal of e-Government is to improve the relationship between local governments and their constituents by leveraging advanced electronic and mobile services. This will increase the responsiveness, accessibility, and effectiveness of public service delivery to community needs, as well as enhance participation in decision-making and make public institutions more transparent and accountable.³

Local governments in Indonesia are developing the concept of digital government transformation as a way to address challenges related to their vast territory and large population. The digital transformation from e-Government to digital government requires the implementation of initiatives that will facilitate a deeper transformation in the provision of online services through government portals, thus impacting the broader government business.⁴ New and “transformed” technology-based systems must not only be user-friendly, strategy-oriented, and capable of delivering a superior experience for those interacting with the government, but must also improve the efficiency of government operations. Furthermore, this transition will enable the government to simultaneously address the challenges faced by public sector employees and policymakers, and deliver benefits to all citizens, while meeting public sector requirements.⁵

In 2021, government spending was directed towards accelerating digital transformation, increasing human resource productivity through the knowledge economy, and developing digital infrastructure. Given the persistent disparity in internet access in Indonesia, developing digital infrastructure, including the internet, is crucial. The average percentage of households in West Java Province with internet access in both urban and rural areas is 31.65%. Meanwhile, in Papua, East Nusa Tenggara, and Maluku Province, the figures are 10.06%, 13.73%, and

¹ Venni Vidya Febiandini and Morina Shelvia Sony, “Analysis of Public Administration Challenges in the Development of Artificial Intelligence Industry 4.0,” *LAIC Transactions on Sustainable Digital Innovation (ITSDI)* 4, no. 2 (March 2023): 164–68, <https://doi.org/10.34306/itsdi.v4i2.586>.

² Dian Balta et al., “How to Streamline AI Application in Government? A Case Study on Citizen Participation in Germany,” 2019, 233–47, https://doi.org/10.1007/978-3-030-27325-5_18.

³ L. A. Voskobitova and V. I. Przhilenskiy, “Transformation of Legal Reality under the Impact of Digitalization,” *Kutafin Law Review* 9, no. 2 (July 2022): 251–76, <https://doi.org/10.17803/2713-0525.2022.2.20.251-276>.

⁴ Fajar Ramadhan Kartabrata, Moch Erick Ernawan, and Irfan Alfieansyah Dwinanda, “Harmonisasi Sistem Hukum Peradilan Tata Usaha Negara Dalam Mewujudkan Kepastian Hukum Tenggang Waktu Gugatan,” *LITIGASI* 26, no. 2 (October 2025): 1–36, <https://doi.org/10.23969/litigasi.v26i2.26164>.

⁵ Bjorn Kleizen et al., “Do Citizens Trust Trustworthy Artificial Intelligence? Experimental Evidence on the Limits of Ethical AI Measures in Government,” *Government Information Quarterly* 40, no. 4 (October 2023): 101834, <https://doi.org/10.1016/j.giq.2023.101834>.

20.26%, respectively. Digital transformation requires inclusive internet access; however, this is not the sole determining factor. Research and development (R&D) capabilities, production innovation capabilities, and talent capabilities are other important factors. However, Indonesia's performance across these metrics has not been very promising.

Indonesia has significant potential to develop and capitalise on digitalisation opportunities. The assumed contribution of the digital economy in 2020 is 3.17%, as stated in the 2020-2024 National Medium-Term Development Plan (RPJMN). It is estimated to reach 4.66% in 2024. The GDP growth rate of the information and telecommunications sector is projected at 7.12%-7.54% in 2020, and 7.54%-8.78% in 2024. Furthermore, the digital program of the Indonesian Ministry of Communication and Informatics continues to increase its contribution to Non-Tax State Revenue (PNBP). The Ministry of Communication and Informatics' PNBP totalled IDR 106.1 trillion at the end of 2020. The Ministry's PNBP experienced an average annual growth rate of 3 per cent from 2015 to 2019.

The government has allocated infrastructure funds to build a robust and inclusive digital infrastructure through the State Budget and Public-Private Partnership (PPP). However, there have been many positive developments in recent years that have the potential to catalyse digital transformation in Indonesia. This is evident in the collaboration between policymakers, fiscal advocates, and infrastructure developers. In addition, government agencies from various sectors, including the Ministry of State Apparatus and the World Bank, the Ministry of Communication and Informatics, the Ministry of National Planning, the Ministry of Finance, the Ministry of Home Affairs, the Agency for the Assessment and Application of Technology (BPPT), and the National Cyber Agency and the National Cryptography Agency (BSSN), are involved in the implementation of Indonesia's e-government system (SPBE). Collaboration in governance implies that all parties involved bear equal responsibility for decisions made. Therefore, collaboration requires all parties involved to sit at the same table and have the same level of decision-making authority.⁶

Based on a survey conducted by the E-Government Development Index (EGDI), Indonesia ranked 107th in the EGDI this year, up nine places from 116th in 2016. This survey provides an overview of e-Government in Indonesia in 2018. Its position is still the same as in 2016, namely seventh in ASEAN after Vietnam. Indonesia's ranking is still much lower than that of other ASEAN countries, including Singapore (ranked 7th in EDGI), Malaysia (ranked 48th in EDGI), Brunei Darussalam (ranked 59th in EDGI), Thailand (ranked 73rd in EDGI), the Philippines (ranked 75th in EDGI), and Vietnam (ranked 88th in EDGI). Indonesia's average EGDI score is still below the average for the Southeast Asian region. Indonesia's EGDI is 0.5258, while the average EGDI for the Southeast Asian region is 0.5555. Furthermore, the United Nations (UN) E-Government Survey 2022 ranked Indonesia 77th for its performance in the development and implementation of Electronic-Based Government Systems (ESGs). These survey results moved Indonesia up 11 places from 88th in 2020 and

⁶ Al Fauzi Rahmat and Ulung Pribadi, "Delivering Artificial Intelligence for Electronic Traffic Law Enforcement in Yogyakarta Region: Current Effort and Future Challenges," *IOP Conference Series: Earth and Environmental Science* 717, no. 1 (March 2021): 012016, <https://doi.org/10.1088/1755-1315/717/1/012016>.

107th in 2018. Overall, Indonesia scored 0.71600 in the High EGDI group in the United Nations E-Government Survey 2022.⁷

Quantitative achievements show significant progress; however, the quality remains unsatisfactory due to the lack of infrastructure, human resources, and regulations. Therefore, it is crucial to further develop strategies and concepts for implementing e-Government from various perspectives. E-Government has emerged as a significant milestone in the modernisation of public services and government administration. Presidential Instruction of the Republic of Indonesia Number 3 of 2003 concerning National Policies and Strategies has regulated the development of e-Government in Indonesia. The process of implementing e-Government in Indonesia includes the development of information and communication technology infrastructure, the development of e-Government applications, the integration of e-Government applications, the development of service-based applications, and the development of community-based systems. The government's efforts to improve public services more effectively are reflected in the use of artificial intelligence (AI) in e-Government.⁸

In an effort to improve open government development, many institutions require Big Data Processing, including High Performance Computing (HPC). The main challenge to AI implementation in Indonesia is the high cost of installing AI equipment. As a result, not all industries can afford to invest in AI. AI implementation varies widely across organizations, and in general, AI is considered an organizational strength that improves the efficiency and effectiveness of process procedures. To ensure that AI technology remains relevant and does not become obsolete, rapid product development must be implemented in conjunction with AI implementation.⁹ This will help reduce data security vulnerabilities and efficiently meet user or consumer needs. Furthermore, the highly competitive AI technology market makes it easier for foreign markets to dominate. Consequently, if continuous system improvements and increased collaboration between organizations are not implemented, AI and local developers will be vulnerable. The application of artificial intelligence has a productive impact by reducing waiting times and improving the quality of processes or service outcomes. However, artificial intelligence faces numerous obstacles in many developing countries, as it requires significant investment and can impact workforce absorption. Therefore, collaboration between the use of AI in e-government is necessary to achieve the government's goal of improving electronic administration. This is because the use of AI and big data in e-government plays a significant role in helping to streamline administrative activities in the government sector.¹⁰

⁷ Rofi Aulia Rahman et al., "Constructing Responsible Artificial Intelligence Principles as Norms: Efforts to Strengthen Democratic Norms in Indonesia and European Union," *PADJADJARAN Jurnal Ilmu Hukum (Journal of Law)* 9, no. 2 (2022): 231–52, <https://doi.org/10.22304/pjih.v9n2.a5>.

⁸ Andrey Skorobogatov and Alexandr Krasnov, "Law Nature of Artificial Intelligence," *Problems of Information Society* 14, no. 1 (January 2023): 3–13, <https://doi.org/10.25045/jpis.v14.i1.01>.

⁹ Diogo Leocádio et al., "Customer Service with AI-Powered Human-Robot Collaboration (HRC): A Literature Review," *Procedia Computer Science* 232 (2024): 1222–32, <https://doi.org/10.1016/j.procs.2024.01.120>.

¹⁰ Aphra Kerr, Marguerite Barry, and John D Kelleher, "Expectations of Artificial Intelligence and the Performativity of Ethics: Implications for Communication Governance," *Big Data & Society* 7, no. 1 (January 2020): 205395172091593, <https://doi.org/10.1177/2053951720915939>. mechanisms and issues which structure societal expectations around artificial intelligence (AI)

Governments face challenges in strategy development, proper project planning, strategy implementation, and a lack of organised information and expertise. However, success can be achieved by enhancing the capabilities of the future workforce, developing future leaders, developing digitalisation capabilities, and achieving goal-oriented digitalisation before digital government transformation. In general, digital government transformation generates value, improves relationships, enhances service delivery, stimulates economic activity, increases citizen engagement, improves the implementation and efficiency of public policies and administration, and has a beneficial impact on business development.¹¹

Looking at developments in the United States, the country has seen accelerated development of AI applications in e-government, with a variety of applications being used to improve government services and enhance citizen engagement. AI is being used to streamline decision-making processes, optimise resource allocation, analyse large data sets, forecast scenarios, and automate e-government services. The National Artificial Intelligence Initiative Act of 2020 was passed by the United States government to facilitate coordination of AI research and implementation efforts among federal agencies, as it underscores the importance of accelerating AI and machine learning initiatives. This is because AI in e-government has the potential to improve service delivery, enhance public trust, and increase efficiency in sectors such as healthcare, education, and social services, although challenges remain in addressing concerns about privacy and transparency, as well as the need for an effective governance framework.¹²

Artificial Intelligence (AI) technology in public administration is gaining increasing attention due to its potential benefits in improving government operations. However, translating technological opportunities into tangible public value for public administration remains limited. One factor hindering this progress is the lack of AI capabilities within public organizations.¹³ The future of e-administration is heavily influenced by the challenges of integrating AI into e-government, which presents both growth opportunities and obstacles. Beyond its potential to automate and improve e-government services, AI also poses significant challenges, including the need for democratic governance to mitigate bias and ensure transparency, as well as the dehumanization and loss of human control.¹⁴ To address these barriers, a framework incorporating AI technology has been suggested as a means to optimize e-government operations, automate services, and enhance citizen satisfaction. By leveraging established AI techniques, e-government systems can reduce costs, minimize processing times, and ultimately enhance citizen trust and satisfaction, thus influencing the future of e-administration. Therefore, it is crucial to examine

¹¹ Julija Kiršienė, Darius Amilevičius, and Dovilė Stankevičiūtė, “Digital Transformation of Legal Services and Access to Justice: Challenges and Possibilities,” *Baltic Journal of Law & Politics* 15, no. 1 (October 2022): 141–72, <https://doi.org/10.2478/bjlp-2022-0007>.

¹² Rubina Shaheen and Mir Kasi, “Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies, a Case of USA,” *European Journal of Technology* 5, no. 1 (January 2021): 1–15, <https://doi.org/10.47672/ejt.641>.

¹³ Colin van Noordt and Luca Tangi, “The Dynamics of AI Capability and Its Influence on Public Value Creation of AI within Public Administration,” *Government Information Quarterly* 40, no. 4 (October 2023): 101860, <https://doi.org/10.1016/j.giq.2023.101860>.

¹⁴ Munagala Bala Seshagiri Prasad and B.Reddemma, “Automatic E-Governing System Using ML & AI,” *International Journal of Engineering Technology and Management Sciences* 6, no. 5 (September 2022): 632–44, <https://doi.org/10.46647/ijetms.2022.v06i05.100>.

the collaboration between AI and e-government applications as an effort to digitize the legal transformation of modern governance.

Despite the growing discourse on digital government and the increasing adoption of Artificial Intelligence in public administration, existing studies remain fragmented, often examining AI, e-government, or legal governance as separate domains. The primary research gap addressed by this study lies in the absence of an integrated normative-comparative legal analysis that systematically examines the deployment of AI within e-government frameworks, particularly in the Indonesian context, where a comprehensive and binding legal framework for AI-based public administration is still lacking. The novelty of this research resides in its interdisciplinary synthesis of AI technology, e-government implementation, and normative-comparative legal analysis, using the United States as a comparative benchmark to evaluate regulatory readiness, legal safeguards, and governance principles. Accordingly, this study is oriented toward answering the following research questions: how is AI currently positioned within Indonesia's e-government legal framework; what regulatory deficiencies hinder the responsible and accountable use of AI in electronic administration; and how can comparative legal insights inform the development of a robust legal framework for AI-based e-government in Indonesia. By addressing these questions, the study seeks to contribute to the formulation of a legally sound, accountable, and citizen-oriented digital government model capable of supporting sustainable digital transformation.

RESEARCH METHODS

This research employs normative juridical legal research, focusing on the analysis of legal norms governing the implementation of e-government and Artificial Intelligence (AI) in electronic administration. The research adopts a conceptual approach to examine fundamental legal concepts related to digital governance, AI accountability, data protection, and public administration transformation. In addition, a statutory approach is applied to analyze relevant laws, regulations, and policy instruments governing e-government and AI in Indonesia, identifying regulatory gaps and normative inconsistencies. Furthermore, a comparative approach is utilized by examining the United States as a reference country, selected due to its advanced and structured regulatory framework for AI governance in the public sector, as well as its extensive experience in integrating AI into e-government services supported by legal instruments such as federal AI policies and data protection standards. The United States is also chosen because it represents a mature digital government ecosystem that emphasizes accountability, transparency, and legal safeguards, making it a relevant benchmark for assessing Indonesia's regulatory readiness. Through this integrated normative-comparative analysis, the research aims to formulate legal insights and recommendations for strengthening the regulatory framework of AI-based e-government to support the digital transformation of modern government.¹⁵

¹⁵ Fadhel Arjuna Adinda et al., "The Challenge of Admitting Electronic Evidence in Civil Procedure Law," *Jurnal IUS Kajian Hukum Dan Keadilan* 13, no. 3 (December 2025): 656–80, <https://doi.org/10.29303/ius.v13i3.1873>.

ANALYSIS AND DISCUSSION

Collaboration between AI technology and e-Government in realizing electronic administrative efficiency

Information and Communication Technology (ICT) platforms and e-Government, which are electronic media, play a crucial role in reducing corruption and increasing government transparency. The implementation of e-government systems can enhance transparency, accountability, and public engagement in the budget process. Furthermore, the implementation of digital technologies such as e-procurement platforms has been linked to increased efficiency, lower prices, increased bidder participation, and improved information availability in the public procurement process, thus promoting transparency and accountability in government operations.¹⁶ In addition, decentralization of power through e-Government and external regulatory pressure have been identified as important factors in the development of digital transparency and corruption prevention in the public sector.¹⁷

Government institutions must adapt to the diverse technologies emerging in the Industrial Revolution 4.0. To sustainably improve the quality of human existence, it is crucial to consider the social and technical aspects of technology. Society 5.0 is a concept believed to have the potential to reveal the humanistic aspects of technology application in the Industrial Revolution 4.0. E-Government is considered related to society 5.0, which is characterized by the use of technology for the benefit of its citizens.¹⁸ Currently, various public services utilize information and communication technology to innovate, as a result of the efforts of government institutions.¹⁹ E-Government is considered an innovation that transforms the government system towards more efficient and high-quality services by utilizing information and communication technology.²⁰

In today's digital era of global hegemony, the role of digitalization, such as electronic media, in government, often referred to as e-government, is increasingly important and necessary. The use of technology originating from the Industrial Revolution is the reason why e-government is considered more innovative. Technological advances during the Industrial Revolution 4.0

¹⁶ Tolu Olarewaju, Ibrahim Rufai, and Samanthika Gallage, "E-transparency and Government Budgetary Corruption: A Social Marketing and Transformation Case from Nigeria," *THE ELECTRONIC JOURNAL OF INFORMATION SYSTEMS IN DEVELOPING COUNTRIES* 87, no. 3 (May 2021), <https://doi.org/10.1002/isd2.12167>.

¹⁷ Felipe Herman, Francisco Paulo Jamil Marques, and Edna Miola, "What Factors Influence the Quality of Local Governments' Digital Transparency? Evidence from the Brazilian Case," *Opinião Pública* 28, no. 3 (September 2022): 857–84, <https://doi.org/10.1590/1807-01912022283857>.

¹⁸ Alex Ingrams, Wesley Kaufmann, and Daan Jacobs, "In AI We Trust? Citizen Perceptions of AI in Government Decision Making," *Policy & Internet* 14, no. 2 (June 2022): 390–409, <https://doi.org/10.1002/poi3.276>.

¹⁹ Chairul Huda, Puan Dinaphia Yunan, and Zulhilmi Bin Paidi, "Discourse Using Blockchain Technology for the Enforcement of Money Laundering Crimes in Indonesia," *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, December 2025, 553–72, <https://doi.org/10.24090/volksgeist.v8i2.13376>. which has become increasingly difficult to detect with the growth of digital transactions and cryptocurrency use. Blockchain, as a distributed ledger technology, can record transactions permanently, transparently, and securely, making it a promising tool to support Anti-Money Laundering (AML)

²⁰ Shiddiq Sugiono, "Peran E-Government Dalam Membangun Society 5.0: Tinjauan Konseptual Terhadap Aspek Keberlanjutan Ekonomi, Sosial, Dan Lingkungan," *Matra Pembaruan* 5, no. 2 (November 2021): 115–25, <https://doi.org/10.21787/mp.5.2.2021.115-125>.

provide opportunities to accelerate the implementation of e-government and the development of e-governance, along with the increasingly digitalization of data and information, including in the form of e-budgeting, e-reporting, and others through electronic methods. Furthermore, the application of AI technology in government has seen significant progress in the field of government functions. AI technology is often referred to as the Fourth Industrial Revolution and is believed to have the potential to revolutionize government and significantly improve its administrative capabilities to address the complex challenges of 21st-century society.²¹

The application of artificial intelligence (AI) technology is expected to replace machine-driven public service delivery, thereby increasing organisational efficiency. AI has the potential to build automated and personalised e-government, enabling machines to tailor services to meet the unique needs of each user. Government agencies can analyse public sentiment regarding their services on social media using AI and Big Data.²² The application of AI in the public sector has evolved beyond its status as a mere component of digitalization initiatives and has become a critical force driving this transformation forward. Through the integration of cutting-edge technological innovations, it serves as a catalyst, accelerating the pace and scope of digitalization. This shift in global governance is characterized by the use of AI to optimize government operations, improve public services, enhance electronic media, and address complex societal challenges.²³ AI requires additional technologies that will enhance its effectiveness. The rapid rise of “AI” in today's environment is facilitated by the exponential growth of data, the emergence of machine learning, and the affordability of global storage. The remarkable empirical success of artificial neural networks has significantly advanced the field, as neural networks can now be trained with vast datasets and large-scale computing. The effectiveness of AI is significantly enhanced by technologies such as Big Data, Cloud Computing, and IoT. Without relevant data, it is difficult to imagine effective AI systems, algorithms, or machine learning.²⁴

The proliferation of IoT and cloud computing is, in turn, increasing the availability of data. The emergence of 5G networks, coupled with IoT and cloud computing, has the potential to create a continuously connected, monitored, and increasingly controlled infrastructure. Big data analytics and machine learning will enable the development of training algorithms from this data, which will provide predictable and tailored services to meet the diverse needs of society. AI technology will evolve from task-specific “narrow AI” or “weak AI” designed to perform specific and narrow tasks to Artificial General Intelligence (AGI) capable of applying its algorithms to a wide range of different activities, making it autonomous in decision-making, and improving

²¹ Michael J. Ahn and Yu-Che Chen, “Digital Transformation toward AI-Augmented Public Administration: The Perception of Government Employees and the Willingness to Use AI in Government,” *Government Information Quarterly* 39, no. 2 (April 2022): 101664, <https://doi.org/10.1016/j.giq.2021.101664>.

²² Anneke Zuiderwijk, Yu-Che Chen, and Fadi Salem, “Implications of the Use of Artificial Intelligence in Public Governance: A Systematic Literature Review and a Research Agenda,” *Government Information Quarterly* 38, no. 3 (July 2021): 101577, <https://doi.org/10.1016/j.giq.2021.101577>.

²³ Vincent J. Straub et al., “Artificial Intelligence in Government: Concepts, Standards, and a Unified Framework,” *Government Information Quarterly* 40, no. 4 (October 2023): 101881, <https://doi.org/10.1016/j.giq.2023.101881>.

²⁴ Prithi Samuel et al., “AI-Based Big Data Algorithms and Machine Learning Techniques for Managing Data in E-Governance,” 2023, 19–35, <https://doi.org/10.4018/978-1-6684-7697-0.ch002>.

its effectiveness over time with experience, thanks to increasing amounts of data and advanced big data analytics and machine learning.²⁵

The limited application of AI has begun to introduce AI into our society, and the list continues to grow. AI has the potential to improve governments' understanding of their citizens, their needs, and their problems, thus facilitating the search for more effective solutions and their timely implementation. Governments will be able to predict the future and identify significant trends with the help of big data analytics and algorithms. Governments will be able to manage emergencies more effectively and plan and implement urban policies with the help of augmented reality. However, as we have seen in the context of e-Government, the full potential of new technologies is greatly influenced by how they are adopted and implemented. In this context, the perceptions and attitudes of government employees toward new technologies are expected to be significant factors.²⁶

Governments are gradually adopting AI technology as standard practice. The significant transition from the computer/internet-based era of “programming (commanding) and executing (following)” e-government to the era of “smart government” has been facilitated by the increasing adoption of a wide range of narrow AI applications and algorithms. This transition has given rise to a variety of new practices, including smart cities, smart transportation, smart energy, smart resource allocation, and smart disaster prevention and management. The list of these practices continues to grow. These technologies are “smarter” than previous generations because they have access to larger amounts of data, allowing them to understand ongoing events more accurately and in real time.²⁷ Furthermore, it has algorithms that can identify patterns and, based on those patterns, predict a series of possible future events. These improvements will significantly enhance the effectiveness of public administration. AI has the potential to improve governments' understanding of their citizens, their needs, and their problems, thus facilitating the identification of more effective solutions and their timely implementation. Various AI technologies have been adopted and implemented by early adopters and technology leaders in government, and countries around the world have developed their own national AI plans and strategies.²⁸

The integration of Artificial Intelligence into e-government fundamentally reshapes the exercise of administrative authority and therefore must be assessed through the lens of core administrative law principles. From a due process of law perspective, AI-driven decision-making in public administration raises critical concerns regarding procedural fairness, particularly

²⁵ Yan Sun et al., “Angiotensin II Inhibits Apoptosis of Mouse Aortic Smooth Muscle Cells through Regulating the CircNRG-1/MiR-193b-5p/NRG-1 Axis,” *Cell Death & Disease* 10, no. 5 (May 2019): 362, <https://doi.org/10.1038/s41419-019-1590-5>.

²⁶ Ines Mergel, Noella Edelmann, and Nathalie Haug, “Defining Digital Transformation: Results from Expert Interviews,” *Government Information Quarterly* 36, no. 4 (October 2019): 101385, <https://doi.org/10.1016/j.giq.2019.06.002>.

²⁷ amina adadi, Mohammed BERRADA, and Nabil EL AKKAD, “Artificial Intelligence Based Composition for E-Government Services,” in *Proceedings of the Third International Conference on Computing and Wireless Communication Systems, ICCWCS 2019, April 24-25, 2019, Faculty of Sciences, Ibn Tofail University -Kénitra- Morocco* (EAI, 2019), <https://doi.org/10.4108/eai.24-4-2019.2284071>.

²⁸ Karen Yeung, “Recommendation of the Council on Artificial Intelligence (OECD),” *International Legal Materials* 59, no. 1 (February 2020): 27–34, <https://doi.org/10.1017/ilm.2020.5>.

where automated systems influence or determine citizens' rights, obligations, or access to public services without adequate human oversight or mechanisms for appeal. In terms of accountability, the use of algorithmic systems challenges traditional doctrines of administrative responsibility, as opacity in AI decision-making may obscure liability and weaken the ability to attribute decisions to identifiable public officials or institutions. Furthermore, AI affects the scope of administrative discretion, as algorithmic recommendations and predictive analytics may either constrain human judgment excessively or, conversely, embed discretionary choices within technical systems without explicit legal authorization. Finally, transparency emerges as a central legal requirement, as the legitimacy of AI-based e-government depends on the explainability of algorithms, openness of data governance practices, and accessibility of information for citizens. Without a clear legal framework embedding these principles into AI governance, the deployment of AI risks undermining the rule of law rather than strengthening administrative efficiency. Accordingly, aligning AI implementation in e-government with fundamental administrative law principles is essential to ensure that digital transformation enhances, rather than erodes, legality, legitimacy, and public trust in modern government.

AI can be used in various ways to optimize electronic media in e-Government. First and foremost, AI technology can be applied to improve the efficacy and effectiveness of government services, ensuring that citizens are at the forefront of service design. Second, the application of deep-learning algorithms has the potential to revolutionize various e-Government services, reducing processing time and costs and increasing citizen satisfaction.²⁹ Additionally, the evaluation and development of AI applications in controlled environments can be facilitated by the use of standard artifacts at the technical, organizational, and semantic levels, thereby ensuring interoperability and transferability.³⁰

Furthermore, automation of e-Government services and data resource maintenance can be achieved through the implementation of AI-based deep learning models, such as convolutional neural networks. This results in the creation of a pioneering e-Government environment conducive to application development and implementation. Thus, e-Government can significantly improve its operations and services in the electronic media realm by incorporating this AI approach.

Comparison of AI Implementation in e-Government in the United States

The public sector has been actively involved in AI developments over the past few decades, as evidenced by the recent issuance of an Executive Order on AI to regulate the use of AI technologies and the development of AI strategies. Furthermore, government agencies have experimented with integrating AI and machine learning (ML) into their operations. Similarly,

²⁹ P. Chinnasamy et al., "E-Governance Services Using Artificial Intelligence Techniques," in *2023 International Conference on Computer Communication and Informatics (ICCCI)* (IEEE, 2023), 1–7, <https://doi.org/10.1109/ICCCI56745.2023.10128646>.

³⁰ Jérôme Duberry, "AI to Optimize the Effectiveness and Efficiency of Public Services," in *Artificial Intelligence and Democracy* (Edward Elgar Publishing, 2022), 14–39, <https://doi.org/10.4337/9781788977319.00006>.

organizations have expressed their focused visions for AI innovation, policy implementation, and governance.³¹

The US Algorithmic Accountability Act is one of many measures Congress enacted in 2022 to build trust in AI. The Government Accountability Office, the National Institute of Standards and Technology, and the General Services Administration, among other agencies, are actively advocating for public sector leadership to promote trustworthy AI to address public concerns about trustworthiness. Additionally, the 117th Congress established a task force to investigate how various federal financial regulators are leveraging AI technology to enhance their regulatory and oversight initiatives.³²

The use of Artificial Intelligence (AI) tools in the United States e-Government sector is growing rapidly. Agencies are leveraging AI to enhance governance accountability, improve regulatory enforcement, ensure workplace safety, provide healthcare, protect the environment, safeguard intellectual property, analyze risks to public safety and health, and engage citizens about their rights and well-being.³³ The National Artificial Intelligence Initiative Act of 2020 was instrumental in the rapid advancement of AI research and implementation across the federal government.³⁴ The goal is to improve the efficiency and effectiveness of government services, prioritize citizen-centric service design, and enhance trust in government. e-Government uses AI to improve decision-making processes, knowledge management, risk mapping, data collection and analysis, as well as to automate tasks, forecast scenarios, allocate resources, and analyze large data sets. Ultimately, this approach improves public services and communication with citizens. Furthermore, integrating AI technology into e-Government operations can increase citizen satisfaction, reduce costs, and shorten processing times, thus advancing e-Government services.³⁵

Unlike in Indonesia, the application of AI in eGovernment in the United States is more targeted and maximizes policies to deliver benefits. In the United States, AI is used to enhance citizen-centered service design, optimize government services, and increase trust in government. Furthermore, AI improves citizen communication, data collection, analysis, decision-making, and risk mapping.³⁶ Meanwhile, Indonesia faces obstacles in implementing e-Government due to the relatively low level of AI readiness globally and information security vulnerabilities.³⁷ The incorporation of advanced AI in eGovernment in the United States facilitates efficient

³¹ Jascha Bareis and Christian Katzenbach, "Talking AI into Being: The Narratives and Imaginaries of National AI Strategies and Their Performative Politics," *Science, Technology, & Human Values* 47, no. 5 (September 2022): 855–81, <https://doi.org/10.1177/01622439211030007>.

³² Muhammad Salar Khan, Azka Shoaib, and Elizabeth Arledge, "How to Promote AI in the US Federal Government: Insights from Policy Process Frameworks," *Government Information Quarterly* 41, no. 1 (March 2024): 101908, <https://doi.org/10.1016/j.giq.2023.101908>.

³³ Duberry, "AI to Optimize the Effectiveness and Efficiency of Public Services."

³⁴ Pedro Robles and Daniel J. Mallinson, "Catching up with AI : Pushing toward a Cohesive Governance Framework," *Politics & Policy* 51, no. 3 (June 2023): 355–72, <https://doi.org/10.1111/polp.12529>.

³⁵ Shaheen and Kasi, "Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies, a Case of USA."

³⁶ Kridanto Surendro and Setiyo Cahyono, "Secure E-Mail Application Software for Government in Indonesia," *Information & Security: An International Journal* 15 (2004): 135–50, <https://doi.org/10.11610/isij.1509>.

³⁷ Denindah Olivia, "Legal Aspects of Artificial Intelligence on Automated Decision-Making in Indonesia," *Lentera Hukum* 7, no. 3 (November 2020): 301, <https://doi.org/10.19184/ejllh.v7i3.18380>.

resource allocation, analysis of large data sets, mitigation of talent shortages, scenario prediction, task automation, and data aggregation, thereby providing faster and higher-quality services to citizens.³⁸

By improving public services, electronically automating routine administrative tasks, providing personalized customer experiences, and enhancing decision-making processes, AI plays a vital role in driving citizen engagement in the United States' eGovernment model.³⁹ AI also facilitates effective individual engagement and the collection of their opinions through digital eavesdropping, mass surveillance, and digital advertising. However, to prevent civic technology tools from hindering citizen participation and further marginalizing certain populations, challenges such as limited internet access, digital skills, biased data processing, and privacy concerns need to be addressed. The United States can address these challenges and improve citizen-government relations while continuing to innovate through the use of AI in eGovernment. This will also enhance overall citizen engagement.⁴⁰ In addition, AI increases the efficacy and effectiveness of government programs and policies, thereby improving public service delivery, reducing costs, shortening processing times, and increasing citizen satisfaction.⁴¹

Furthermore, electronic media platforms such as social media provide a cost-effective, widely used, and generally easy-to-use tool, reducing the barriers between citizens and elected officials, at least for those who want to participate. This is a contributing factor to the broader e-Government trend, which is gradually but steadily increasing government responsiveness, despite the fact that the adoption and effectiveness of social media use vary widely. In 2005, eight percent of internet users used at least one social media platform. This figure increased exponentially from 2010 to 2019, then increased at a slower and more sluggish pace to reach 72% of US adults in 2019. Local governments, which have historically lagged behind in innovation, have been quick to embrace social media platforms.⁴² In 2019, 96.4% of local governments maintained a social media presence, and over 90% of these utilized Facebook and Twitter. It is important to note that the adoption rates of Facebook, Twitter, Instagram, and LinkedIn in US cities all exceed the US adult population using their respective platforms.⁴³

In its role as regulator, the United States government ensures AI aligns with societal values by maintaining environmentally friendly technology and focusing on improving the lives of all citizens. Furthermore, the government can dismantle, reduce, and minimize potential barriers and restrictions, support businesses, and facilitate the use and deployment of AI. The integration

³⁸ Febiandini and Sony, "Analysis of Public Administration Challenges in the Development of Artificial Intelligence Industry 4.0."

³⁹ Fernando Marmolejo-Ramos et al., "AI-Powered Narrative Building for Facilitating Public Participation and Engagement," *Discover Artificial Intelligence* 2, no. 1 (December 2022): 7, <https://doi.org/10.1007/s44163-022-00023-7>.

⁴⁰ Jérôme Duberry, "AI and Civic Tech: Engaging Citizens in Decision-Making Processes but Not without Risks," in *Artificial Intelligence and Democracy* (Edward Elgar Publishing, 2022), 195–224, <https://doi.org/10.4337/9781788977319.00012>.

⁴¹ Hamirul et al., "The Role of Artificial Intelligence in Government Services: A Systematic Literature Review," *Open Access Indonesia Journal of Social Sciences* 6, no. 3 (May 2023): 998–1003, <https://doi.org/10.37275/oaijs.v6i3.163>.

⁴² Hariyanto et al., "Democratization of Village Autonomy in the Construction of Indonesian Administrative Law: Is It Possible?," *Jurnal Media Hukum* 32, no. 2 (July 11, 2025): 190–209, <https://doi.org/10.18196/jmh.v32i2.25216>.

⁴³ Ben Epstein, "Two Decades of E-Government Diffusion among Local Governments in the United States," *Government Information Quarterly* 39, no. 2 (April 2022): 101665, <https://doi.org/10.1016/j.giq.2021.101665>.

of AI into e-government in the United States has become increasingly widespread, resulting in the establishment of legal regulations and data privacy. Indonesia has an opportunity to learn from the United States' approach to AI in e-government, with its focus on data privacy and legal regulations.⁴⁴ The lack of strong legal protections for personal data and profiling hinders the facilitation of automated decision-making, while the United States has already implemented common practices in automated decision-making. Furthermore, the implementation of eGovernment in Indonesia is still in its infancy, necessitating a focus on information assurance to ensure business continuity and mitigate risks associated with information systems, as these systems are still in their infancy and face information security vulnerabilities.⁴⁵

Indonesia can enhance eGovernment initiatives and improve public services by strategically leveraging AI technology and developing a comprehensive legal framework similar to the European Union's General Data Protection Regulation (GDPR). AI should also be prioritized. Furthermore, Indonesia has the potential to enhance AI integration in eGovernment by creating an Information Assurance (IA) framework specifically designed for Smart Government. To ensure comprehensive information system security and business continuity, this framework should incorporate factors related to eGovernment, the Internet of Things (IoT), Big Data, and Open Data.⁴⁶

As demonstrated in the existing literature, Indonesia has the potential to improve various sectors, including education, health, transportation, and economic services, through the use of AI. Indonesia has the potential to increase public trust in government services by prioritizing AI readiness and implementation in public administration and e-Government services as part of AI integration efforts.

CONCLUSION

Digital transformation constitutes a fundamental pillar of Society 5.0, as the unprecedented speed and scale of digitalisation have reshaped contemporary governance. Artificial Intelligence (AI) in public administration offers significant potential to enhance efficiency, responsiveness, and citizen-centred service delivery. Nevertheless, the translation of technological capability into sustainable public value remains constrained, particularly due to limited institutional capacity and the absence of a comprehensive legal framework governing AI deployment in e-government. While AI technologies such as automated decision-making and deep-learning algorithms—can reduce administrative burdens, lower costs, and improve service quality, their implementation must be accompanied by clear safeguards to ensure accountability, transparency, and data protection. The comparative experience of the United States demonstrates that AI-driven e-government can develop more systematically when supported by structured regulatory frameworks, especially in the areas of data privacy and legal protection. In contrast, Indonesia still faces regulatory fragmentation and limited legal protection concerning personal data processing,

⁴⁴ Cindy Fabrizia Suling et al., "The Use of AI to Develop Smart Infrastructure in Indonesia," 2022, 208–17, https://doi.org/10.1007/978-3-031-05463-1_15.

⁴⁵ Olivia, "Legal Aspects of Artificial Intelligence on Automated Decision-Making in Indonesia."

⁴⁶ Rio Guntur Utomo, Rian Andrian, and Gary Wills, "An Overview on Information Assurance Framework for Smart Government in Indonesia," 2023, 020023, <https://doi.org/10.1063/5.0114460>.

profiling, and automated administrative decisions. This gap not only creates legal uncertainty but also risks undermining public trust in digital governance. Therefore, this study recommends several strategic measures. First, Indonesia should formulate a comprehensive and binding legal framework specifically regulating AI implementation in public administration, including provisions on accountability, algorithmic transparency, automated decision-making oversight, and citizens' rights to explanation and redress. Second, harmonisation between AI governance and personal data protection regulations must be strengthened to prevent regulatory overlap and ambiguity. Third, institutional capacity-building is essential, including the development of technical standards, ethical guidelines, and supervisory mechanisms to ensure responsible AI deployment. Finally, adopting a phased and risk-based regulatory approach drawing from comparative best practices would enable Indonesia to foster innovation while safeguarding democratic principles and fundamental rights. Through these measures, AI integration in e-government can move beyond technological adoption toward legally grounded, accountable, and citizen-oriented digital transformation.

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