

# Public Sector AI Adoption: Regional Government Efforts in Improving Organizational Performance

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**Abstract.** In recent years, public sector organizations have been attempting to carry out digital transformation through the use of Artificial Intelligence (AI) technology. The government realizes that changing operational activities digitally through AI is necessary for public organizations to provide quality services. Furthermore, the implementation of AI technology in the public sector in developing countries still faces many obstacles, such as limited resources, lack of technological infrastructure, and different socio-cultural problems, and not much research has discussed these issues. Therefore, research is needed on public sector AI adoption. In this study, researchers highlight the extent to which AI is used to support government functions in policy making, public service delivery, and internal management, as well as illustrating the potential impact of applying AI with several cases. This research uses a qualitative approach with an exploratory method. The analysis was carried out using secondary data and literature related to the application of AI in improving the performance of public organizations. Then, exploration was carried out through in-depth interviews of several examples of AI applications in several public organizations, such as the DKI Jakarta Province Transportation Service (Dishub), the DKI Jakarta Province Communication, Informatics and Statistics Service (Diskominfotik), the West Java Province Communication and Information Service (Diskominfo), and the Regional Civil Service Agency (BKD) of West Java Province.

**Keywords:** Artificial intelligence; Public Sector; Organization Performance

## 1. Introduction

Public sector organizations have undergone significant digital transformation through the use of Artificial Intelligence (AI) technology [2]. AI is an autonomous system that can operate without human intervention, learn, and identify patterns to make decisions and reach different conclusions based on the analysis of various situations [15]. AI is considered a 'special form' of Information and Communication Technology (ICT), capable of performing intelligent behavior and completing tasks that require human intelligence [6]. It is believed that AI can enhance the performance of public organizations in responding to rapidly changing operational environments and improve the quality and speed of service delivery to stakeholders [13].

AI technology has a wide range of uses, such as process automation, virtual agents, predictive analytics, recommendation systems, and speech analytics [3], all of which offer various potential benefits in the public sector. AI technology can free up resources, improve accuracy, and reduce administrative burdens. Governments are beginning to realize that transforming operational activities digitally through AI is a necessity for public organizations

to provide quality services to citizens and stakeholders [6]. The integration of AI technology in public services can provide increased public value to citizens, depending on the process of use.

In developed countries, AI has been widely implemented to enhance the performance of public sector organizations. For instance, in Australia, the tax services have utilized a virtual assistant named "Alex," which can respond to over 500 questions, has been involved in 1.5 million conversations, and has successfully resolved over 81% of inquiries on first contact. Conversely, in developing countries, services are still predominantly reliant on traditional methods. This is evident in the allocation of public budgets, with the majority of resources directed towards Legacy Systems. Such practices can erode citizens' trust and satisfaction with public services, particularly when compared to services provided by the private sector [7]. The Asian Development Bank (ADB) measured the quality of government performance in 1998 and 2011, using composite indicators for each country. The results indicated that in developing countries, scores were predominantly negative or below zero, suggesting lower government performance. This lower performance can lead to slower growth and lower income levels. Therefore, developing countries need to strive to improve government performance to achieve more effective governance, better quality regulations, the rule of law, and tighter control of corruption.

		Voice and Accountability	Political Stability	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Developing Asia	1998	-0.22	-0.27	-0.29	-0.37	-0.20	-0.33
	2011	-0.32	-0.12	-0.32	-0.45	-0.30	-0.42
Europe: Middle income	1998	-0.19	-0.36	-0.54	-0.26	-0.54	-0.58
	2011	-0.01	-0.19	-0.24	0.10	-0.25	-0.38
Latin America and Caribbean	1998	0.36	0.03	0.06	0.29	-0.06	0.00
	2011	0.35	0.17	0.13	0.09	-0.06	0.15
Middle East and North Africa	1998	-0.91	-0.43	-0.30	-0.47	-0.20	-0.33
	2011	-1.04	-0.72	-0.26	-0.26	-0.29	-0.35
OECD: High income	1998	1.27	1.00	1.49	1.27	1.39	1.57
	2011	1.25	0.84	1.41	1.34	1.42	1.39
Sub-Saharan Africa	1998	-0.69	-0.62	-0.72	-0.70	-0.77	-0.62
	2011	-0.64	-0.56	-0.79	-0.71	-0.75	-0.61

**Figure 1. Comparison of the Quality of Government Work.**

*Source: The Asian Development Bank.*

Efforts to enhance the performance of public sector organizations in developing countries have been pursued through various means, including the utilization of AI or artificial intelligence technology. Recent reports and empirical studies have revealed that many public organizations in developing countries are encountering challenges in developing their AI applications [9]. A report by Gartner (2021) emphasizes that despite increased investment in AI, several core areas are still delaying its adoption, posing challenges for researchers and practitioners in utilizing AI applications to achieve organizational goals and document performance improvements. Inadequate organizational capabilities have been identified as a key factor preventing organizations from identifying, implementing, and leveraging appropriate AI technologies [10].

The development and application of AI technology in the public sector in developing countries face numerous challenges and obstacles, such as limited resources, lack of technological infrastructure, and different socio-cultural problems and not much research has discussed these issues in developing countries [1]. Several developing countries, including Indonesia, have attempted to adopt AI, with prospects comparable to those in developed

countries. Nevertheless, there is a lack of focused studies on the adoption and application of AI in several public organizations in Indonesia. Therefore, research is needed to address the implementation of AI, the challenges in its application, and the factors influencing the adoption and application of AI technology in these organizations.

This research aims to highlight the extent to which AI is used to support specific government functions, namely in aspects of policy making, public service delivery, and internal management, as well as illustrating the potential impact with several cases. The research involved a literature review and exploratory study on the application of AI in the public sector in several developing countries, as well as an analysis of the factors influencing its implementation in Indonesia. This is followed by an overview of the specific benefits and risks of using AI for these three key government governance functions. This research seeks to answer the key question, namely how AI is implemented in several public organizations in Indonesia? To then conclude, outline key findings, and draw some recommendations for future policy and research.

## **2. Literature Review**

China is one of the countries that has adopted AI technology in the public sector, as demonstrated by the related research 'Public and private value creation using artificial intelligence: An empirical study of AI voice robot users in Chinese public sector' [4]. The study explores the relationship between the use of AI and value creation from a citizen's perspective, shedding light on the role of effective AI use in value creation and how gender moderates the relationship between the use of AI and the value of public services (public value and private value). The research reveals that private values have a greater effect on value creation than public values, and that gender and level of experience influence the use of AI robots. This suggests that service provision should prioritize individual values (private values) before addressing the needs of the wider society.

In a related study, 'Smart Technology and the Emergence of Algorithmic Bureaucracy: Artificial Intelligence in UK Local Authorities' [5], it is suggested that the wider introduction of computational and algorithmic tools across service areas in local authorities reflects the changing nature of public administration towards algorithmic forms of bureaucracy. This transformation does not entail a wholesale replacement of public administrators and traditional organizational mechanisms in public administration, but rather a reconfiguration of socio-technical relationships between workers and their tools, as well as the way work is organized in the public sector. Algorithmic bureaucracies are capable of handling greater complexity in decision-making environments and simultaneously enhancing the competence of individuals and administrators when addressing problems.

The research titled "Human-centered artificial intelligence for the public sector: The gate keeping role of the public procurement professional" [8] explores the role of public procurement in the human-centered AI (HCAI) discourse, with a focus on developing countries. The study is based on an exploratory investigation and collected data among procurement practitioners in Uganda and Kenya, which have similar state procurement regimes. These countries predominantly rely on traditional forms of competition in procurement, as opposed to newer pre-commercial procurement mechanisms aligned with AI procurement. The principles of HCAI are superficially represented in the Procurement Laws (UU) in Uganda and Kenya, posing a challenge for these developing countries in applying AI. The existing laws, such as Uganda's

Public Procurement and Disposal of Assets Act 2003 and Public Finance Procurement Regulations 2000, and Kenya's Public Procurement & Disposal of Assets Act and Kenya's Public Procurement Act 2007, have not been updated to address general AI resource challenges. They categorize AI procurement under the Information And Communication Technology (ICT) procurement category, creating ambiguity in AI procurement. Procurement professionals recognize the importance of HCAI to the public interest and safety but are constrained by weak Procurement Laws, skills shortages, and knowledge gaps within AI procurement teams, including procurement leaders, data scientists, IT professionals, and AI solution vendors.

The study "Artificial Intelligence and Thai Government's Adaptation to the Future of Social Work" demonstrates that Thailand has also embraced AI in the public sector. This research aimed to analyze the Thai government's adaptation using AI to make it effective and to identify the AI approach for adapting the Thai government's work to society in the future. The research results indicate that transforming government institutions into digital government is an idea to promote digital adoption, supporting the digital economy and society. These reforms begin with infrastructure development, innovation, data, human resources, and other resources, leading to the stability of the country's economic and social development in line with government policies. The use of AI is becoming increasingly significant, especially in developed countries, with various purposes tailored to each country's needs, all aimed at improving services to the community.

In addition, the specific benefits and risks of using AI for the three main government governance functions are categorized as: policy making, public service delivery, and internal management [6]. The policy issued by the government serves as a benchmark for improving government performance, which also depends on the public's assessment [14]. Trust is closely linked to government performance, and factors such as the level of education and income also influence perceptions of government performance [12]. Therefore, in implementing AI to enhance government performance, high levels of public trust are essential, achieved by fulfilling all the promises made by the government, which will shape the public's perception. Based on the previous research, the author will conduct an analysis of Public Sector AI Adoption: Regional Government Efforts in Improving Organizational Performance, driven not only by the claimed benefits of technology but also by citizens' trust in improving government performance.

### **3. Research Methods**

This research uses a qualitative method with an exploratory approach. The use of this qualitative approach is considered the basis for solving problems through semi-structured interview methods, literature reviews, and case studies related to the use of AI in the public sector [11]. Furthermore, an exploratory approach is used to research something that is not known to many people and has not been researched by others to get something new. Therefore, this analysis process requires mapping reviews of the latest research literature related to AI in the public sector, both in developing and developed countries, as well as other secondary data sources. The first data source is conducting interviews, observations, and documentation studies at Ministries/Institutions and at several agencies that have used AI in Indonesia. The goal is to research something that has never been researched and gain novelty.

According to Sugiyono, the data collection in this research aims to gain a deeper understanding of the application of AI in the public sector in Indonesia. Therefore, in-depth interviews with stakeholders in Ministries/Institutions and several agencies in Indonesia were

conducted. The interviews referred to the specific benefits and risks of using AI for the three main government governance functions, categorized as: policy making, public service delivery, and internal management [6].

In the aspects of Policy Making, Public Services and Internal Management, in-depth interviews are needed with the DKI Jakarta Transportation Service (Dishub) regarding usage, the DKI Jakarta Province Communication, Informatics and Statistics Service (Diskominfo), the West Java Province Communication and Informatics Service (Diskominfo), then the Agency Regional Civil Service (BKD) West Java Provincial Government.

This research uses the data analysis technique proposed by Sugiyono. The data collection aims to gain a deeper understanding of the application of AI in the public sector in Indonesia. The technique involves three steps: (1) Data Reduction, which means summarizing, selecting important things, mapping important data, and searching for themes; (2) Data Display, which means displaying data in the form of short descriptions, tables, flow charts, etc. After the data is collected, it will be presented in narrative form; and (3) Conclusion Drawing, which means inferring data that has been collected and analyzed, then producing conclusions containing new findings in the form of descriptions or images of objects. This research will be carried out from February to August 2023, from the process of finalizing research instruments and data collection to finalizing the final report.

## **4. Results and Discussion**

Based on the theory, the specific benefits and risks of using AI for the three main government governance functions are categorized as: policy making, public service delivery, and internal management [6]. The following is an analysis that has been carried out using this theory.

### **4.1. Policy Making**

The view of the DKI Jakarta Transportation Agency (Dishub) regarding the implementation of AI is that the entire program system for the sectors at the Transportation Agency will lead to an Intelligent Transport System (ITS) which will later connect Vehicle to Vehicle (V2V), Vehicle to Infrastructure (V2I), and Infrastructure to Infrastructure (I2I). DKI Jakarta already has a digital-based public transportation sector system called JakLingko, from ordering travel tickets, planning trips, to payments can be made using E-Money and QR Code. This is one of the agendas carried out by DKI Jakarta to transform from digitalization to AI, the ultimate goal of which is to lead to ITS. In the future, the DKI Jakarta Transportation Agency will develop a transportation system that focuses on digitalization, especially AI in all sectors. The factors that influence the implementation of AI in ITS at the DKI Jakarta Transportation Agency are: Policy, Good Will, Technical, Funding, Human Resources, Stakeholders Involvement, and Technology.

AI is included in the ITS development agenda in DKI Jakarta. Even though there are still many who do not understand the concepts of AI and ITS in depth, ITS continues to be developed by the DKI Jakarta Transportation Agency and stakeholders who are helping to realize an integrated public transportation system in DKI Jakarta. The Regional Civil Service Agency (BKD) of West Java Province in using AI is more focused on how leaders make decisions using AI. West Java BKD has a collection of personnel data of more than 40,000 data of different nature and tries to collect employee information to meet the interests of its employees. This data

is processed by this system which will produce data on employees who are suitable for promotion or job rotation, for example based on work location, interests, skill background, etc.

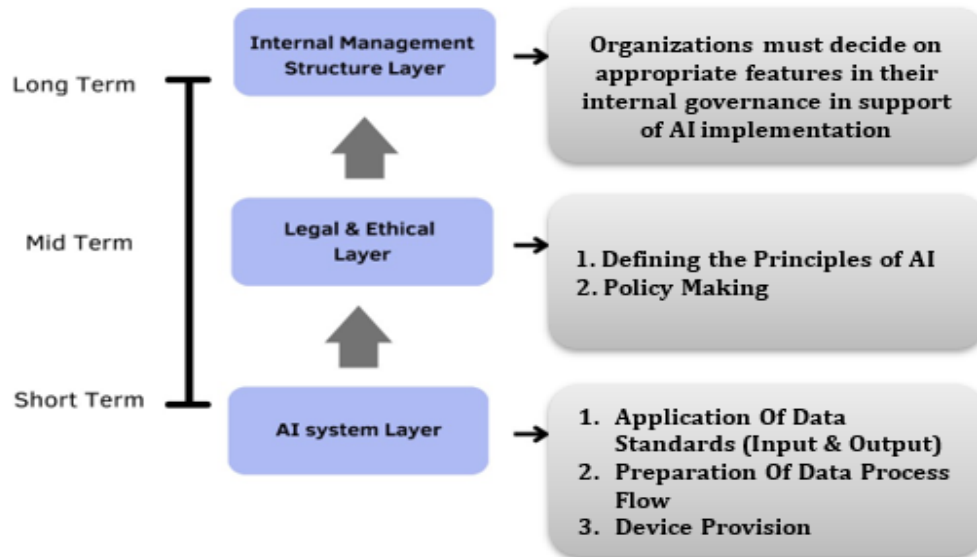
#### **4.2. Internal Management**

Department of Communication, Informatics and Statistics (Diskominfo) DKI Jakarta Province The potential for implementing AI in improving organizational performance in government agencies is very large, such as improvements in efficiency and productivity, public services, transparency and accountability, decision making and cost control. To implement AI in government agencies, commitment from the government, adequate resources and supportive policies are needed. In this case, collaboration with the private sector and academia can also help accelerate the implementation of AI in government agencies. Implementing AI in government requires several factors that can influence its success, such as the availability of adequate data, infrastructure readiness, availability of skilled human resources and regulations and policies. The application of artificial intelligence in the field of public services can be applied to help desks in service units, analyzing service complaints, directing complaints to the target agency, and even answering complaints. As a legal basis, Law no. 25/2009 concerning Public Services which contains the use of information technology to make it easier for the public to access information and interact with electronic service systems. In its implementation, the transformation of public service delivery will be optimal if there is integration of business processes and systems. For this reason, Presidential Decree no. 95/2018 concerning The Electronic Based Government System (SPBE) is here to oversee the integration of the digitalization process of public services in Indonesia. AI implementation can improve public services in several ways, including: Business Process Automation, Analysis *Big Data*, Application Development and Event Prediction.

#### **4.3. Public Services**

In general, AI is more directed towards public services, so it is very useful in improving organizational performance, according to the West Java Province Communication and Informatics Service (Diskominfo). This can speed up the data processing process and convey information to the public. In terms of decision making, it also has an important role for leaders. So, with the help of employees supported by AI, the Governor can make decisions more effectively and efficiently based on data. There are four factors that influence the implementation of AI in Diskominfo, namely: Human Resources, Infrastructure and Technology, Policies and Regulations, and Finance.

Based on the analysis above, the researcher formulated an implementation model *Artificial Intelligence* (AI) which can be applied in the public sector, especially in Indonesia. The following is a model that has been formulated.



**Figure 2. Layered model for AI-based governance.**

Instruments mapped to layers can be developed at different times. In the near future, it can concentrate on developing data standards, establishing data processing flows (AI algorithms), and providing devices. In the medium term, institutions can develop principles/SOPs for implementing AI and develop policies/ regulations governing AI-based government governance. In the long term, institutions can adapt their organizational structures to support the application of AI in their environments.

## 5. Closing

### 5.1. Conclusion

The implementation of AI in public organizations has helped the government improve performance, manage, and meet community needs. The following is an overview of the public organizations that researchers have chosen as research loci: a) DKI Jakarta Transportation Agency (Dishub): The agency aims to carry out transportation system development by focusing on digitalization, especially AI in all sectors; b) Department of Communication, Informatics and Statistics (Diskominfo) DKI Jakarta Province: The potential for implementing AI in improving organizational performance in government agencies is significant, such as increasing efficiency and productivity, improving public services, increasing transparency and accountability, improving decision making, and controlling costs; c) Regional Civil Service Agency (BKD) of West Java Province: AI helps expedite the process of selecting employee qualifications for specific positions, avoiding favoritism, and increasing employee motivation for better performance and equal opportunities for promotion; d) West Java Province Communication and Information Service (Diskominfo): AI is highly beneficial in improving organizational performance by expediting data processing and information dissemination to the public, making it easier for leaders to make decisions. Researchers have also formulated models

that suit the AI topics discussed. With this model, public institutions can adapt their organizational structures to support the application of AI in their environment.

The following are three models that have been formulated and can be adopted by public sector organizations: a) AI System Layer: This model serves as the foundation of the AI governance ecosystem, encompassing algorithms and data creation, and includes principles of justice, transparency, trustworthiness, and accountability; b) Legal & Ethical Layer: Public organizations must formulate provisions aimed at regulating AI, including special regulations, limits, and standards, in addition to referring to existing national and international legal frameworks; c) Internal Management Structure Layer: Organizations must have internal governance structures and measures to ensure strong oversight of AI use. The organization's existing internal governance structure can be adapted, and new structures can be implemented if necessary.

## **5.2. Suggestion**

Based on the explanation above, several factors influence the success of AI implementation in government. Therefore, the government needs to take several steps to support this success, including.

1. Establishment of regulations regarding the use of AI: The government needs to collaborate with stakeholders to design effective and efficient AI regulations to protect the interests of society, reduce the risk of negative impacts, and ensure that AI technology is used for the common good. AI regulations are also needed to ensure that all data collected and used by AI systems is done so with permission and adequate privacy protection, as well as preventing potential security breaches and misuse of data;
2. Training and development of organizational human resources related to AI technology: Organizations must invest in intensive, relevant training for employees to develop a deep understanding of AI and recognize its potential application in their work. They can also establish partnerships with educational institutions, research institutions, and the private sector to leverage external expertise in the field of AI; and
3. Budget planning that focuses on efficiency and smart financing: Overcoming the financial challenges of adopting AI requires an approach that focuses on efficiency, smart financing, and creativity in resource management. Organizations must conduct a cost-benefit analysis to assess the costs of introducing AI technology and the expected benefits in the short and long term. By adopting AI in stages and focusing on applications that provide substantial and immediate benefits, organizations can increase their competitiveness and efficiency.

By adopting AI in stages, organizations can reduce the large financial impact while gaining benefits from the early stages of implementation. Focusing on AI applications that provide substantial and immediate benefits can increase an organization's competitiveness and efficiency. Implementing savings and efficiency policies throughout the organization is also a necessary step. Such policies can help organizations save resources and allocate them more efficiently. Additionally, public sector organizations can also seek partnerships with other organizations or the private sector that have AI expertise and technology. Such partnerships can help organizations gain access to resources, technology and expertise that may be difficult to obtain independently. By combining these strategies, public sector organizations can overcome the financial challenges of adopting AI wisely.



## Acknowledgements

The research is funded by the NIPA School of Administration Jakarta Campus through the Research and Community Service Center for the 2023 Fiscal Year.

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