Opportunities and Challenge for the Application of Artificial Intelligence (AI) in Public Policy in Indonesia

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Abstract

Artificial intelligence (AI) in public policy refers to the use of AI technology to improve decision-making processes and governance. AI analyzes data that can make it easier for the government to see the current problems of Indonesian society to find effective solutions, so that the resulting policies are more evidence-based and accurate to the needs of the community. With the ability to process and analyze information quickly and accurately, AI can automate tasks so that government employees can focus on more complex and strategic issues. The type of basic research used in this study is qualitative research that aims to describe and reveal descriptive data as an approach to generally understanding the problems of AI in public policy in Indonesia. To obtain relevant, accurate and accountable data, the author uses data collection techniques, namely by using literature review techniques from various relevant sources. The results of the analysis show that the application of artificial intelligence (AI) in public policy in Indonesia has various opportunities to increase efficiency and effectiveness in decision-making. AI has the potential to help the government analyze big data, recognize patterns of community behavior, and provide more responsive services. However, it is not without challenges, including lack of algorithm transparency, bias in data, privacy issues, and limited human resource skills.

Keywords: Opportunities, challenges, artificial intelligence (AI), Public Policy, Indonesia

1. Introduction

The state is obliged to support and ensure that the national development process can be implemented properly. Development is an activity carried out simultaneously, consistently, and continuously by various parties such as the government, private sector, and society with the aim of achieving shared prosperity both materially and spiritually. In this modern era, the transformation of public services is at a crucial point. This change is marked by technological advances, changes in the global environment, and the increasing need for digitalization in society. Technology in Indonesia has developed rapidly and become an important part of everyday life, affecting various sectors such as education, health, economy, and government. In this case, technology is not only limited to hardware and software, but also includes innovations in the way we interact and manage information. Internet usage has increased significantly, with the number of users reaching around 196.7 million in 2023, indicating high internet penetration in society. Technology provides various tools and solutions for the government that can increase transparency, efficiency, and effectiveness in overall governance to access services online. In this modern era, the integration of technology in government activities is not only limited to digitalization. The use of technology includes a comprehensive approach to the provision of public services, policy formulation, and interaction between the community and the government. The

increasingly widespread development of digitalization shows the importance of improving the decision-making process. This is important to ensure that the policies and decisions that have been set are in accordance with the needs and aspirations of the community as a whole. The government must be able to provide excellent services because of the demands of the community who want fast, effective, and efficient services (Harahap, 2023). In line with this, Presidential Regulation Number 95 of 2018 concerning the Electronic-Based Government System (SPBE) was issued. The use of artificial intelligence (AI) allows for increased ease of service, and through this policy it is hoped that digital integration can be realized in public services, especially in Indonesia (Atmaja, 2024). Several AI applications that have been implemented in public services in Indonesia include the use of metaverse technology for public service communication (Afifah et al., 2023) and the use of AI for the provision of data in digital public service communication (Johansah & Efda, 2023).

Artificial Intelligence (AI) is becoming an important element in public policymaking, offering both opportunities and challenges. The use of AI in the public sector can improve decision-making processes, enhance service delivery, and solve complex social problems. The integration of AI technology in public policy can be found in various contexts, including in governance and data analysis frameworks. The application of AI in public policymaking has the potential to change the way decisions are made, increase efficiency, and improve the overall quality of policy outcomes. AI technology can be applied at every stage of the policy cycle, providing a framework for understanding the complexity of the policy process and helping policymakers analyze and improve policy effectiveness. This emphasizes the importance of evidence-based decision-making, stakeholder engagement, and continuous evaluation and learning to ensure that the resulting policies are responsive, efficient, and achieve the expected results.

In line with that, according to Brewer and De Leon (1983) explained that decision-making is the process of choosing between various policy alternatives that have been proposed, considering the consequences of each estimated choice. Each policy alternative has different implications, including economic, social, and environmental impacts that must be carefully evaluated. Then the Theory of Bounded Rationality explains that humans cannot always make optimal decisions due to limited cognitive abilities and available time. This shows that in complex decision-making situations, individuals tend to use heuristic strategies or simple rules of thumb to solve problems, instead of looking for the most optimal solution. As a result, the decisions taken may not fully consider all the information or implications of each policy alternative. Therefore, it is important to have the right tools to analyze all the factors involved in making the right and sustainable decisions. Data-driven decisions, modeling, and predictive analysis can be made by involving AI in the policy cycle approach. With the support of algorithms and machine learning, AI allows governments to conduct predictive analysis to predict potential future scenarios and make policy decisions proactively.

However, the application of data-based decision making and predictive analysis in public policy also faces a number of challenges. These challenges include issues regarding data quality, privacy, ethics, and the need for skilled experts to analyze and interpret data. The government needs to ensure transparency, accountability, and fairness in the use of data and algorithms to maintain public trust.

Based on previous research entitled "Public Policy Dynamics and Artificial Intelligence Innovation in Indonesia" it states that the application of Artificial Intelligence (AI) in public policy in Indonesia faces various significant challenges, including limited adequate technological infrastructure, gaps in internet access between urban and rural areas, and lack of human resource capacity (HR) skilled in AI technology. In addition, issues of privacy and data security are also major concerns, given that the implementation of AI requires the collection of large amounts of data that are vulnerable to leakage. Considering this, the novelty of this study offers a new perspective by combining the analysis of opportunities and challenges of implementing AI in public policy in Indonesia. Therefore, the author's desire arose to analyze the problems of Artificial Intelligence contained in the title "Challenges and Opportunities for the Application of Artificial Intelligence in Public Policy in Indonesia".

Based on the background that has been described above, the formulation of the problem in this study is:
1. What are the opportunities offered by the application of Artificial Intelligence in public policy in Indonesia?

2. What are the main challenges faced in the application of Artificial Intelligence in public policy in Indonesia?

2. Methods

In this study, a basic research type with a qualitative approach is used. The main focus of the study is to describe and reveal relevant descriptive data, as an initial effort to understand various problems related to the application of artificial intelligence (AI) in public policy in Indonesia. This study aims to provide a deep understanding of how AI has and will continue to influence various aspects of public policy, including but not limited to the creation, implementation, and evaluation of policies in Indonesia. With this approach, it is expected that various challenges, opportunities, and recommendations will be found that can be taken to optimize the use of AI in public policy in the future. The further explanation is as follows:

a. Database Search:

Articles were collected through searches in various academic journal databases and trusted research repositories such as Google Scholar, JSTOR, ScienceDirect, and national journal portals. This search aims to find articles that are relevant to the topic being studied.

b. Keywords:

In the search process, specific keywords were used such as "Challenges and Opportunities of Artificial Intelligence", "AI in Public Policy", "AI Innovation in Indonesia", and "Data-Based Decision Making". These keywords are designed to narrow the search results to be more relevant to the focus of the research.

c. Selection Criteria:

-Relevance to the topic of implementing AI in public policy.

-Contains an analysis of the opportunities and challenges faced.

-Published in an accredited or reputable journal.

d. Article Period

The articles collected cover the period from 2019 to 2024. This time span was chosen to ensure that the information obtained is up-to-date and reflects the latest developments in the application of AI in public policy.

e. Article Type

-Research article: Article containing empirical research results or case studies related to the application of AI in public policy.

-Review article; Article reviewing literature related to the application of AI in public policy, providing an overview of trends, challenges, and opportunities.

f. Article Language

Articles are collected in two languages, namely Indonesian and English. This is done to get a broader perspective from various international and local sources.

g. Journal Name

1. Interdisciplinary Journal of Social and Political Sciences

2. Public Policy Journal

3. AMIKOM Surakarta National Seminar (SEMNASA)

4. Management and Business Journal

5. Journal of Internet and Software Engineering

h. Number of Articles

There are around 5 to 10 articles relevant to the title "Challenges and Opportunities of Artificial Intelligence in Public Policy" from trusted journals in the specified period. This number includes articles that have been identified through the search method above.Result and Discussion

3. Results and Discussion

1. Opportunities for applying AI in public policy in Indonesia

Artificial intelligence (AI) has great potential to transform public policy in Indonesia, offering a variety of opportunities to improve the effectiveness and efficiency of decision-making. One of

the main arguments is the ability of AI to perform in-depth data analysis, allowing the government to identify relevant patterns and trends from various sources of information. According to the article "Utilization of Artificial Intelligence in the Public Policy Cycle" AI can analyze big data from social media and administrative records to provide valuable insights for policymakers, so they can make more informed and evidence-based decisions. This concept of data-driven decision-making is central to public governance theory, which emphasizes the use of accurate information to formulate policies that are responsive to the needs of the community.

Furthermore, automation of processes driven by AI also has the potential to improve the quality of public services. By utilizing technologies such as chatbots and virtual assistants, the government can provide information services quickly and responsively. In this context, the article "Utilization of Artificial Intelligence Towards Innovative and Accountable Governance" notes that AI allows for faster document processing and acceleration of public services. The theory of innovation in government supports this idea by emphasizing the importance of adopting new technologies to improve the efficiency of public administration.

AI can also serve as a tool to simplify bureaucratic processes, thereby increasing the accessibility of services for the public. For example, AI-based applications can facilitate online registration for education and business permits, making the process more interactive and responsive. The article "Utilization of Artificial Intelligence in the Public Policy Cycle" emphasizes that the use of AI can reduce the cost and time required to obtain services. In this context, public service theory highlights the importance of increasing public satisfaction through better service provision.

Furthermore, AI has the potential to support sustainable development programs by managing natural resources more efficiently. With its ability to monitor environmental quality and predict the weather, AI can help the government take proactive steps in achieving sustainable development goals. Quoting the article "Secretary General of Communication and Information: The Use of AI Must Be in Accordance with Ethical Values in Indonesia," the use of AI must be accompanied by regulations that pay attention to ethical values so that it is not misused. In this case, sustainability theory emphasizes the importance of integrating social and environmental values in every policy taken.

Overall, the application of artificial intelligence in public policy in Indonesia not only offers opportunities to improve government efficiency and responsiveness, but also presents challenges related to ethics and transparency. Therefore, it is important for governments to develop a framework that ensures that AI is used responsibly and in accordance with societal values. The article "The Use of Artificial Intelligence in the Public Policy Cycle" emphasizes that a data-driven approach must be balanced with ethical considerations so that this technology can be used optimally to improve policy outcomes. Good governance theory emphasizes that accountability and transparency are key to building public trust in the use of new technologies in government.

2. **Challenges of applying artificial intelligence (AI) in public policy in Indonesia**

Although there are many opportunities for AI in public policy making, the application of artificial intelligence (AI) in public policy decision-making in Indonesia also presents many challenges. There are 09 (Nine) main challenges that need to be given more attention, namely:

1. **Algorithm Transparency**

The main challenge in the application of AI is algorithm transparency. Many algorithms function as "black boxes", making it difficult for the public to understand the decision-making process carried out by the AI system. This ambiguity can reduce public trust in the policies implemented. According to the article entitled "Utilization of Artificial Intelligence in the Public Policy Cycle", it is important for the government to create a system that supports transparency so that the public can understand how algorithms work and increase their trust in the use of AI in decision-making. This concept of transparency is in line with the theory of public accountability, where stakeholders must be able to be held accountable for the decisions taken.

2. **Tendency of Bias in Data**

The quality of the data used to train the algorithm greatly affects the results obtained. If the data is not representative or biased, the resulting decisions can be detrimental to certain groups. The article emphasizes that to reduce the potential for bias, it is important for the government to ensure that the data used includes various perspectives and represents all levels of society. This is related to the theory of distributive justice, which emphasizes the need for fair distribution of resources and benefits in society.

3. **Privacy and Data Security**

The application of AI often involves the collection of personal data, raising concerns about privacy and information security. The government has a responsibility to protect citizens' personal data from misuse. In the article "Utilization of Artificial Intelligence Towards Innovative and Accountable Governance", it is explained that data protection measures must be implemented through strict regulations and good security systems. This is related to the theory of human rights, where every individual has the right to privacy and protection of personal data.

4. **Workforce Skills**

The lack of knowledge about AI among government employees is a barrier to its implementation. The article states that it is important to develop capacity through training so that employees can utilize this technology effectively. This is in line with the theory of human resource development, which emphasizes the importance of investing in the skills and knowledge of the workforce to increase productivity.

5. **Lack of Policy and Regulation**

Ambiguity in policies regarding the use of AI can raise serious legal and ethical issues. The article "Utilizing Artificial Intelligence in the Public Policy Cycle" states that the government needs to set strong standards regarding transparency and accountability in the use of this technology. This relates to the theory of regulation, where having a clear legal framework can help prevent abuse of power.

6. **Legal Uncertainty**

Uncertainty regarding legal liability for AI-based decisions is an important issue. The article suggests that the government needs to establish a clear legal framework so that people feel safer using this technology. This is related to the theory of social responsibility, where all parties must understand their role in using technology ethically.

7. **Public Participation**

Public involvement is crucial in AI-based policy making. The article "Utilizing Artificial Intelligence in the Public Policy Cycle" emphasizes that active citizen participation can increase the legitimacy of decisions taken. This is in line with the theory of democratic participation, which states that public involvement in the decision-making process is key to creating policies that are responsive to public needs.

8. **Technological Infrastructure**

Technological infrastructure is a key factor in the implementation of AI. The article notes that there are still infrastructure gaps in several regions of Indonesia, thus hampering the widespread adoption of AI. This is related to the theory of economic development, where good infrastructure is needed to support economic growth and innovation.

9. **Organizational Culture**

Organizational cultural transformation is needed for the implementation of AI to run smoothly. Based on one of the articles analyzed by the author entitled "Utilization of Artificial Intelligence Towards Innovative and Accountable Governance" it states that government organizations must adapt to new data-based methods. This is in line with the theory of organizational change, which emphasizes the importance of an innovative culture in dealing with technological change.

By analyzing these opportunities and challenges through various theoretical perspectives, the Indonesian government can formulate effective strategies to utilize artificial intelligence in public policy to improve the efficiency, transparency, and accountability of public services.

4. Conclusions

Based on the description that has been explained, it can be concluded that the opportunity for AI is to increase the efficiency and responsiveness of the government in providing services to the public, where AI can help data-based decision making, improve the quality of public services through automation, and greatly support sustainable development programs. However, this is not without challenges, namely limited human resource skills, algorithm transparency, data bias, privacy and information security, and the lack of clear regulations to optimally utilize AI. The analysis of the application of artificial intelligence (AI) in public policy in Indonesia shows several important points: limitations of the study include a limited focus on public policy and data that may be biased. Theoretical implications support the theory of public governance and innovation in government, but highlight the challenges of transparency and algorithm bias. Practical implications include guidance for the government in formulating AI policies, such as regulations on privacy and data security and human resource training. Recommendations for further study include specific case analysis, public participation, social impact, and international comparisons to maximize the potential of AI in Indonesian public policy.

Reference

Agustini, P. (2023). Secretary General of the Ministry of Communication and Information: The use of AI must be in accordance with ethical values in Indonesia. Digital Economy, Governance.

Chairunisah, N., & Santoso, G. (2023). Character of Wisdom in Facing Challenges and Opportunities of the 21st Century in the Digital Era. *Journal of Transformative Education*, 2(5), 452-475.

Fajar, J. (2024). Utilization of artificial intelligence towards innovative and accountable governance. *Journal of Regional Innovation*.

Lubis, MSY (2021, August). Implementation of Artificial Intelligence in Integrated Manufacturing Systems. In Proceedings of the UISU National Engineering Seminar (SEMNASTEK) (Vol. 4, No. 1, pp. 1-7).

Martino. (2023). Utilization of artificial intelligence in the public policy cycle: Between opportunities and challenges. *Journal of Public Policy*.

Ramdhani, A., & Ramdhani, MA (2017). General concept of public policy implementation. *Jurnal Publik: Scientific Journal of Public Administration*, 11(1), 1-12.

Sallu, S., Qammaddin, Q., Ashari, A., & Nursamsir, N. (2023). Literature review: Digital learning of public administration based on artificial intelligence (AI). *REMIK: Research and E-Journal of Computer Informatics Management*, 7(1), 367-380.

Salsabila, TH, Indrawati, TM, & Fitrie, RA (2024). Improving the Efficiency of Public Decision Making through Artificial Intelligence. *Journal of Internet and Software Engineering*, 1(2), 21-21.

Utami, AT, & Pramuktisari, N. (2023). CHALLENGES AND OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE (AI) IN BUREAUCRATIC SYSTEMS. *Journal of Accounting and Taxation*, 24(2).