

Transforming Government Decision-Making by Utilizing Artificial Intelligence (AI) in the Future

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Abstract

The development of AI utilization in the world is progressing very fast. Oxford Insight data in the Government AI Readiness Index 2023, globally Indonesia's index ranking is 42nd out of 193 countries in the world, with a total score of 61.03; and Indonesia is 8th out of 18 East Asian countries. The government (Indonesia) can use AI to transform decision-making into a policy. However, in utilizing AI, the government is still faced with the problem of the legal basis that still uses the Circular Letter of the Minister of Communication and Information Technology Number 9 of 2023 concerning Ethics of Artificial Intelligence, and the National Strategy document for Indonesian Intelligence 2020 - 2045 so that ethical issues need to be addressed. The government's challenge in transforming decision-making will indirectly impact the policy cycle that has been carried out so far. For this reason, a short-term strategy is needed, namely, the government needs to make a policy on the use of AI in the form of a Presidential Regulation. For the long term, the government can establish an Ethics Commission as an ad hoc supervisory institution, which can oversee the use of AI by ethics.

Keywords:

transformation; artificial intelligence

Introduction

The implementation of artificial intelligence (AI) in the public sector is now growing more rapidly, not only in the world but also in Indonesia. Based on data published by Oxford Insight in the Government AI Readiness Index 2023, in the global ranking index, Indonesia is 42nd out of 193 countries in the world, with a total score of 61.03 for the achievement of the government pillar indicator of 76.24; the technology sector pillar indicator of 43.48; and the data and infrastructure pillar indicator of 63.38. Meanwhile, at the East Asia level, Indonesia ranks 8th out of 18 countries. (Government AI Readiness Index 2023. Page 32).

In response to this rapid development of AI, the government issued provisions related to the use of artificial intelligence specifically, with the issuance of Circular Letter Number 9 of 2023 concerning the Ethics of Artificial Intelligence by the Ministry of Communication and Information Technology. This circular serves as a guideline for using artificial intelligence ethically. It regulates ethical values that should be considered such as inclusivity, humanity, security, democracy, transparency, credibility and accountability, personal data protection, environmental development and sustainability, and intellectual property rights. Although this Circular is not part

of the category of laws and regulations according to the Law on the Establishment of Laws and Regulations, it can serve as a guideline in the utilization of AI that must still be considered by all AI users, including the government.

Before the issuance of the Circular, the government had also formulated the National Strategy for Artificial Intelligence (Stranas KA) 2020-2045 as a national policy direction. The National Strategy contains focus areas and priority areas of artificial intelligence technology as a reference for each ministry, institution, local government, and other stakeholders in carrying out activities in the field of artificial intelligence technology in Indonesia from 2020 to 2045. Stranas KA is part of Indonesia's artificial intelligence strategy, which takes into account the issues in other countries' artificial intelligence strategies, both global and regional. For this reason, the government of Indonesia needs to consider aligning Indonesia's artificial intelligence missions with national interests to determine priority areas, especially when making decisions to become a policy.

The current state of the government's decision-making process tends to be based on various ideas/opinions and simple policy or regulatory literature, which does not consider the benefits of AI. The decisions made are sometimes less than optimal. As a result, decisions that are formalized into policies have many pros and cons. It is not uncommon for the policy to be legally flawed or even subject to judicial review.

Herbert Simon's theory of Bounded Rationality highlights that humans (governments) cannot always make optimal decisions due to limitations in cognitive abilities and available time. (Thalita, 2024). This means that in situations of complex decision-making processes, they tend to still use conventional strategies, namely using a collection of various ideas/opinions, and simple policy or regulatory literature, to solve problems rather than looking for optimal solutions. As a result, decisions made sometimes do not fully consider the data and information that develops to make the basis for policy alternatives.

The utilization of AI in the decision-making process to become a policy has the potential to change the governance landscape. The role of AI will be present as a new transformation force that will have a major influence on the decision-making process in the future. The transformation used will integrate conventional ways of making decisions to become public policy by prioritizing the governance framework and data analysis. It is also possible that the use of AI will potentially revolutionize the way decisions are made, to increase efficiency, and improve the overall quality of policy outcomes. This potential will provide new power to transform the decision-making process which will indirectly affect the existing policy cycle.

In the policy cycle, there are several stages, namely problem identification and agenda setting, policy formulation, policy making, policy implementation, monitoring and evaluation, and policy improvement or termination. (P. Sabatier, 1991). From the stages of the policy cycle, sometimes each stage is not always a linear process and often overlaps. For this reason, the transformation in the decision-making process with the use of AI is more data-based and can provide various modeling, up to predictive analysis in the policy cycle model. Predictive analysis in the use of AI, will interact between algorithms and machine learning that will provide the possibility for the government to estimate various scenarios in the future, and make policy decisions that are more insightful and more proactive.

The use of AI in the transformation of decision-making into policy does not come without challenges, especially related to data quality, privacy, ethics, and the need for skilled human resources to be able to analyze and interpret the available data. For this reason, the government needs to build a strong governance and policy design, and it becomes urgent to become a guide in the future. This is one of the strategies in utilizing AI so that the use of data and analysis to become policy can be more accountable, and more ethical in the policy-making process. In addition, transparency, accountability, and fairness in the use of data and algorithms are also matters that the government must consider to maintain public trust.

Methods

The research method used in the paper titled “Transformation of Government Decision Making with the Utilization of Artificial Intelligence (AI) in the Future” takes the case in Indonesia, using a literature review approach. According to Hasibuan, Zainal A. (2007), a Literature review contains descriptions of theories, findings, and other research materials obtained from reference materials to serve as the basis for research activities. Meanwhile, Snyder (2019: 333) explains that a literature review is a research methodology that aims to collect and take the essence of previous research and analyze several overviews of experts written in the text.

The author uses this method to make it easier to analyze various articles, journals, seminar materials, and literature related to the application of AI, and public decision-making. The author also summarizes the main results that are relevant to the topics discussed. This is to make it easier to synthesize various problems and challenges, which will result in recommendations for the government to transform the decision-making process through the use of AI in the future.

In this case, the author also seeks information from various sources to gain a deeper understanding of the utilization of AI, which can be used to increase effectiveness and efficiency

in the decision-making process, especially in Indonesia. Here are some sources of previous research results that have similarities with the themes discussed, among others:

1. Transforming Indonesia through the Utilization of Artificial Intelligence: Challenges and Impacts by Widya Khoirunisa, and Fatma Ulfatun Najicha, which was published in December 2023.
2. Improving the Efficiency of Public Decision-Making through Artificial Intelligence, by Talitha Hurin Salsabila, Tri Mei Indrawati, Revienda Anita Fitri in the Journal of Internet and Software Engineering Vol: 1, No 2, 2024.

Discussion

The development of Artificial Intelligence in Indonesia has had a major influence that has led the government to transform quickly, one of which is in the decision-making process. The utilization of AI has indirectly changed the way the government works in the process of collecting data and information that is able to display data analysis more carefully. This can be seen from AI utilization systems that are effectively and efficiently able to collect and process data automatically (including emerging patterns and trends) with a high level of accuracy to make a decision.

The understanding of artificial intelligence (AI) is very interesting to understand because it is always closely related to technological advances as a search engine that can help facilitate human tasks. The European Commission's Artificial Intelligence Communication (European Commission, 2018a) defines artificial intelligence as "Artificial Intelligence (AI) refers to systems that display intelligent behavior by analyzing their environment and taking action - with a certain degree of autonomy - to achieve specific goals. AI-based systems are purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, voice, and face recognition systems) or AI can be embedded in hardware (e.g. advanced robots, autonomous cars, drones, or Internet of Things applications)." (Budi Raharjo, 2023). Meanwhile, according to the Minister of Communication and Informatics Circular No. 9 of 2023, Artificial Intelligence is a form of programming on a computer device to perform careful data processing and/or processing.

The Stranas KA document explains that various countries in the world have now prepared themselves to face the development of an increasingly advanced digitalization world. One of them is utilizing AI as a national strategy to understand the direction of their government's national policy in the field of artificial intelligence. As seen in the landscape of Figure 1, which shows that

various countries have implemented national strategies in utilizing AI to answer opportunities and challenges for their national interests.

Figure 1.
**Landscape of the Implementation of National Strategies for Artificial Intelligence (AI)
in Various Countries**



Source: Stranas KA, 2020. Page 14.

As one of the countries utilizing AI, in the Stranas KA document, it is explained that the German Federal Government launched its vision with the slogan “AI Made in Germany”, the Chinese Government with “Deciphering China’s AI Dream”, and the South Korean Government with “Toward AI World Leader beyond IT”. A Konrad Adenauer Stiftung study of six national strategies from six leading countries (the United States, China, the United Kingdom, France, Finland, and South Korea) showed that there were several weaknesses in these countries' national strategies, including (1) vague and inconsistent definitions of artificial intelligence; (2) vague goal-setting that makes it difficult to measure success; (3) emphasizing the strategic aspects of data availability and specialist training over the expansion of domestic computing capacity; and (4) sidelining the solution of creating an ecosystem. (Stranas KA: 15).

In addition, at the Asian level, Singapore is one of the most advanced countries in Asia in the utilization of AI. As published by Oxford Insight in the Government AI Readiness Index 2023, Singapore ranks 2nd in the world and 1st in Asia. In the Stranas KA document, Singapore has released a National AI Strategy (NAIS) that provides a plan for AI as a smart nation in the future. Singapore established the National AI Office (NAIO) as an institution that coordinates all efforts of various artificial intelligence actors and prevents factions from working in silos.

The Stranas KA document, explains that initially, Singapore has established four main artificial intelligence initiatives: (1) Fundamental AI Research which funds scientific research that

will contribute to the other pillars of Singapore's Artificial Intelligence; (2) Grand Challenges which support the work of multi-disciplinary groups that provide innovative solutions to key challenges facing Singapore and the world. Currently, the program focuses on healthcare, urban solutions, and finance; (3) 100 Experiments which funds scalable artificial intelligence solutions to industry-identified problems; and (4) AI Apprenticeship is 9 (nine) month-structured program to grow a new cohort of AI talent in Singapore. Along with the development of the world of digitalization and the use of AI that is increasingly advanced, the Singapore government continues to carry out various strengthening strategies in all areas that are a priority for the country.

Not only Singapore, but China is now in the process of developing a more comprehensive AI regulation. China is currently one of the leading countries in AI regulation. A series of specialized regulations have also been issued, focusing on Generative AI, Algorithm Recommendation, and AI Innovation and Development enforced in China. What is interesting about the development of AI regulations in China is that various regulations have now been issued and enforced at the national, regional, and local levels. An example at the local level is the Shanghai AI Regulations. This regulatory approach at the local level aims to strike a balance between the importance of regulation and innovation in AI development. It provides certain flexibility to encourage AI development at the local level.

Taking into account the development of AI utilization in several countries, the Indonesian government needs to prepare and anticipate the increasingly advanced utilization of AI. Also, as soon as possible, prepare to transform the decision-making process by utilizing AI. As in China, special regulations have been issued and enforced at the national, regional, and local levels. This is done by seeing the great potential in the presence of AI, which is considered to be able to provide more effective and efficient predictive solutions, especially in collecting data and evidence needed for decision-makers.

As argued by Bostrom (2014), AI can generate high-level thinking that can support the decision-making process. Taddeo and Floridi (2018) have also argued that for AI to be a positive force in society, it requires interdisciplinary cooperation involving computer science, philosophy, ethics, law, sociology, and psychology. This multidisciplinary approach is key to the utilization of AI that has high quality but is also accountable, trustworthy, transparent, and resilient in the face of challenges. For this, a strong governance and policy design is needed, which can serve as a guideline in the future. Floridi and Cowls (2019) emphasize the need for a holistic framework based on ethical principles in the development and application of AI.

Issue 1. Government preparation in utilizing AI for transformation

Various countries have now prepared themselves for the development of an increasingly advanced digitalization world, through the use of AI as a national government strategy. This condition is a trigger for the Indonesian government to immediately prepare various preparations which are also urgent to do. One of them is the utilization of AI in the decision-making process.

Observing from the existing conditions, until now it can be said that the government is still faced with the condition of not maximizing the use of AI directly in the strategic decision-making process. Quoting from the opinion of Teguh Arifiadi, Director of Informatics Application Control (Kemenkominfo RI), that the Indonesian government has not implemented AI in the decision-making process directly due to two main things, namely the unfinished construction of the National Data Center, and the application of AI which is still silo (not connected to the organization as a whole). This means that the utilization of AI data does not only require massive data, but the government must also build cross-sectoral synergies so that the strategic decisions produced are more comprehensive, measurable, and accountable. (Washington Simanjuntak, et al: 2024).

The condition of AI utilization by the government, which has not yet reached the stage of AI implementation in the decision-making process, suggests that the use of AI is only limited to analyzing data and profiling sentiment data. In this stage, the government tends to be based on various ideas/opinions and policy literature or regulations that are still simple but do not consider the benefits of using AI. This condition is a problem in itself, so concrete steps are needed to further maximize the use of AI in the decision-making process.

Concrete steps are needed, to form a new strategy in the transforming power that has a major influence on the decision-making process in the future. One of them will affect the landscape of governance that has been carried out so far. Changes in the landscape in the use of AI will make it easier to integrate conventional ways of making decisions to become public policies that can be seen from various contexts so that they can provide many benefits in helping the government's decision-making process.

Transformation in the decision-making process for the government using AI will provide several benefits, namely:

- a. Data analysis will be faster and more accurate

The use of AI can process and analyze big data quickly and accurately, allowing the government to gain better insights for decision-making.

- b. Optimization of public policies

AI can be used to analyze data and provide recommendations to support the decision-making process. This can improve efficiency and effectiveness in developing more proactive policies.

c. Service improvement

The use of AI can be used to respond to questions from the public, which can present and provide information related to government services quickly. This can certainly improve the quality of services provided by the government to the public.

d. Social media sentiment analysis

The use of AI can be used to analyze negative and positive sentiments, one of which can come from social media. This is one way to make it easier for the government to understand public preferences regarding existing government policies or programs.

e. Operational cost savings

The use of AI can help automate routine tasks such as document processing, data processing, and policy analysis that have been done conventionally. This can certainly save operational costs

f. Data-driven decision making

The use of AI can help the government in collecting and analyzing data to make better decisions. This increases efficiency and effectiveness in decision-making to become a more accurate policy.

g. Risk prediction and contingency planning

AI can be used by the government to analyze risks, predict potential disasters or crises, and develop contingency plans more quickly and precisely.

These benefits also do not escape the various challenges that must be observed by the government to transform the decision-making process with the use of AI. Here are some challenges that need to be observed in the decision-making process with the use of AI, namely:

a. Privacy and data security concerns

The utilization of AI in the decision-making process by the government raises concerns about data privacy vulnerabilities and data security risks. Although the government has issued Law No. 27 of 2022 on Personal Data Protection, Minister of Communication and Information Regulation No.20 of 2016 on Personal Data Protection in Electronic Systems, and BSSN Regulation No.10 of 2020 on Cyber Incident Response Team, it does not rule out the possibility of data security being hacked. As happened some time ago

b. Data quality and reliability.

In utilizing AI, the government will indirectly depend on the quality of data that has a high level of accuracy to help make decisions. This is a challenge because the government will be

faced with the possibility of incomplete, inaccurate, or biased data, which can lead to inaccurate insights and decisions. For this reason, the government must also prepare devices with sophisticated technological quality to balance the development of advanced digitalization.

c. Limited human skills

In addition to the poor quality of the data presented, AI also has limitations in understanding the social or ethical context that may need to be an important consideration in the decision-making process. Therefore, there is still a need for more human involvement in the decision-making process to consider becoming an insightful policy, so as not to rely entirely on AI.

d. Ethical issues

The use of AI in the decision-making process often lacks ethical concerns, especially regarding issues such as privacy, fairness, transparency, and accountability. Such as the case that occurred in the hacking of the National Data Center data which caused around 600 million personal data to leak. (voaindonesia.com).

e. Over-reliance and decision bias.

Relying excessively on AI utilization systems in the decision-making process without utilizing qualified human logic can cause excessive dependence and potential bias in understanding. In this case, the government must still prioritize the right balance between the logic of human judgment and the use of AI, to avoid excessive dependence on the use of AI in decision-making.

f. The need for clear regulations and adequate privacy policies.

In collecting and processing data, the government must ensure that privacy and data used have a high level of accuracy, are safe, and can be ethically utilized. The condition of AI utilization in Indonesia, which is still partial and not optimal, requires clear regulations so that the utilization of AI in the future will be better. This can be learned from the good practices of the Chinese and Singaporean governments.

g. Developing unfounded trust.

The downside of over-utilizing AI can lead to unfounded trust (or the wrong level of trust). Utilization of AI may occur when we mistakenly believe that a decision made in a complex situation is the result of the utilization of AI and its intended purpose.

Some of these challenges need to be considered by the government. The government has anticipated this by issuing Circular Letter of the Minister of Communication and Information Technology No. 9 of 2023 which has regulated several ethical principles, including inclusiveness, humanity, security, accessibility, transparency, credibility and accountability, protection of

personal data, sustainable development and environment, and intellectual property. However, given the enormous impact of AI utilization, the Indonesian government should begin to develop strategies and create stronger (legally binding) AI governance policies, rather than relying solely on ethics.

For this reason, as an initial step to establish a strategy for transforming decision-making by utilizing AI, several things need to be prepared by the government, namely:

1. Identification of goals and objectives

In this step, the government needs to identify the goals and objectives that are the basis for utilizing AI in the decision-making process to become a policy. The identification of goals and objectives is related to the problems faced, as well as the decision-making process that will be carried out to become a policy. If the goals and objectives have been adequately determined, it will be easier to measure the results that must be achieved to realize these goals and objectives.

2. Establish criteria

The need for criteria in the use of AI is to identify problems faced in the decision-making process by the government. The identification results can be made into a priority scale, which will facilitate the decision-making process.

3. Creating alternatives

After identifying problems and prioritizing existing problem criteria, the government can make several alternative ways of making decisions on the subject of the problem raised. The decision-making method can be expressed in several alternative AI utilization tools. In this case, tools that can be used include the Analytical Hierarchy Process (AHP), machine learning, data mining, and so on. The creation of this alternative aims to assist in solving problems to achieve the goals and objectives that have been set previously.

4. Testing and determining alternatives

This stage is a process to represent the system tools model used in the decision-making process, based on predetermined assumptions. In this stage, a model of a problem will be tested and validated using predetermined tools. Utilization of AI using these tools, will be tested and select the best decision based on predetermined criteria. The selection of decision-making must involve all stakeholders so that the resulting decision becomes a modified decision of AI utilization that can meet the objectives of all stakeholders.

5. Modifying alternative evaluation

After the decision is made, the next step is to measure the impact of the decision that has been made. The impacts can be both positive and negative, requiring an evaluation of the alternative

decisions that have been generated before they are decided into policy. This method will indirectly cause debate, especially in the use of logic and presentation of existing data, but accuracy will be more guaranteed.

Issue 2. Decision-making transformation strategy in AI utilization

The development of AI utilization in assisting the decision-making process by the government requires a regulation that can regulate and control the utilization of AI as a preparation that must be made by the government. Not only that, the utilization of AI that can assist the government in making decisions also needs to be determined, especially regarding what tools can be utilized about the advantages and disadvantages they have.

In addition to regulations, ethical arrangements are also very important because ethics in the use of AI is closely related to the role and human behavior that can be caused. As Budi Raharjo argues, AI ethics includes current concerns about, for example, data privacy and bias in current AI systems; short- and medium-term concerns about, for example, the impact of AI and robotics on jobs and the workplace; and long-term concerns about the possibility of AI systems reaching or surpassing human-like capabilities (so-called superintelligence). (Budi Raharjo: 2023, 3).

Ethics in the use of AI has been formulated by the Minister of Communication and Information Technology through Circular Letter No. 9 of 2023, which has regulated ethical values such as inclusiveness, humanity, security, democracy, transparency, credibility, and accountability, protection of personal data, environmental development and sustainability, and intellectual property rights. The presence of this SE is a weakness for the government, because SE is not part of the category of laws and regulations, so the power they have is not like other regulations. For this reason, a regulation that has legal force at the level of a Presidential Regulation is needed regarding the use of AI and ethics in the use of AI.

With the development of AI utilization, many experts argue that not only ethics are needed, but an ethics commission is an independent institution that can play its role as a supervisory and policy-making institution (ad hoc). This commission is expected to be able to function supportively and provide recommendations to the government regarding policies and regulations related to the use of AI. The legal basis for the establishment of this commission can be based on the mandate of the Presidential Regulation as part of the national artificial intelligence strategy.

The discourse for the establishment of the Ethics Commission has appeared in the Stranas KA document, as part of the mandate from Article 39 of Law No. 11/2019 on the National System of Science and Technology. The commission is expected to serve as an institution capable of

directing national policies in the utilization of AI and ensuring the development of artificial intelligence by national strategies and national interests.

The strategy to immediately establish the ethics commission is one of the steps that can be taken by the government in dealing with the increasingly advanced development of AI so that the public will remain supervised and can minimize violations of ethics and culture in the use of AI. This is also part of the bureaucratic reform in Stranas KA, which is part of the Roadmap in 5 (five) priority areas for 2020-2024, namely: health, bureaucratic reform, education and research, food security, and mobility and smart cities.

For example, in the field of bureaucratic reform. Based on Presidential Regulation No.80 of 2011 concerning the Grand Design of Indonesian Bureaucratic Reform 2010 - 2025, it is one of the efforts to change the condition of the bureaucracy as a result of the ineffectiveness of the administrative change process. The Ministry of Administrative Reform and Bureaucratic Reform, in its evaluation of the implementation of bureaucratic reform in Indonesia so far, that bureaucratic reform activities have not touched the root of the problem to produce something substantial and have not had an impact on changes in organizations and society. For this reason, the implementation of bureaucratic reform now has a new strategy, namely: general bureaucratic reform that focuses on improving the internal system and governance of the institution, and thematic bureaucratic reform as a form of new strategy in the Bureaucratic Reform Road Map 2020 - 2024.

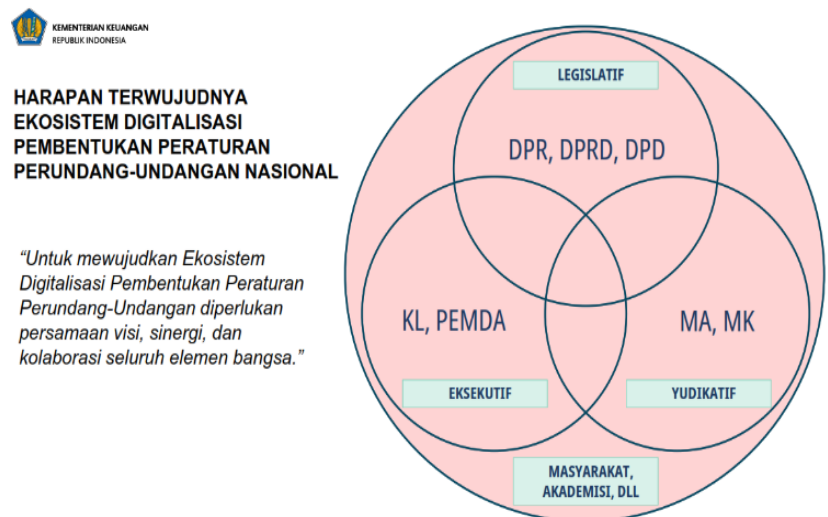
One of these strategies has also actually been included in the Stranas KA document, where the use of AI has become part of the program developed in the KA Innovation Program as a decision or policy-making tool. This program is explained again into more specific sub-programs, namely the development of sentiment analysis systems for government policies, and the development of government big data analysis systems.

One of the agencies that has implemented this program is the Ministry of Finance. According to the author, the Ministry of Finance is developing an electronic system for digitizing the formation of laws and regulations. This means that the system being built by the Ministry of Finance is trying to utilize AI in the formation of electronic laws and regulations to become a policy. The process of determining how to build this system is part of the decision-making process which is then synergized with the use of AI to see the number of regulations related to one field and minimize overlap between existing regulations or policies, not repetitive, consistent, or conflicting. With the use of AI such as OpenAI, Google, Anthropic, Microsoft, and so on, AI can analyze and present data in real-time, with a design like an agent to perform specific tasks to facilitate the decision-making process to formulate a policy.

In this case, the Ministry of Finance is quite observant in seeing the potential for utilizing AI in assisting the process of drafting laws and regulations (legislation), such as: assisting the preparation of studies, brainstorming ideas, analyzing the formulation of articles, legal research, increasing the search/access to legal information, interpreting the formulation of articles in regulations, and so on. The system developed by the Ministry of Finance, has been able to improve keyword searches on the website it is developing and developing a law analyzer to help semantic searches for provisions in previous regulations and analyze article formulations. (<https://law-analyzer.kemenkeu.go.id>).

Figure 2.

**Expectations for the Realization of a Digitalization Ecosystem
for the Formation of Laws and Regulations**



Source: Heru Pambudi, 2024.

According to the author, the utilization of AI implemented by the Ministry of Finance is expected to be able to build collaboration and synergy between actors involved in the process of drafting laws and regulations. The utilization of AI in this system has a huge positive impact on the government, namely: 1). Able to reduce costs in the process of drafting a regulation which if done manually will require a high enough cost; 2). Able to shorten the time for completing laws and regulations manually is often inefficient just because of waiting for the wet signature process; and 3). Able to reduce the administrative burden which is quite high, especially in the process of drafting a regulation.

However, the enormous positive impact of the system is inseparable from the challenges and risks that must be faced, such as cyber threats, resistance to changes in work patterns caused by reluctance to change from manual processes, the need for computer technology devices that

must be by existing conditions, and reluctance to be more transparent between units in sharing existing information.

For this reason, some strategies must be carried out by the government to transform the use of AI in decision-making, namely:

1. Policymaking

The government needs to make a policy on AI utilization. This policy will contain several preparations (previously explained), as well as an understanding that regulates, among others: 1) limiting the scope of the decision-making process with AI utilization, which is very broad, to be more consistent; (2) setting goals and objectives that can measure the success of AI utilization in the future; and (3) determining what strategic aspects can be caused by AI utilization in the future. For example, the Ministry of Finance has done good practice in the legal aspect by utilizing AI to assist in the process of drafting laws and regulations (legislation).

2. Establishment of an independent institution

The establishment of an ethics commission as an independent institution can be ad hoc and is expected to be able to play its role as a supervisory and policy-making institution related to AI utilization. As described in the Stranas KA document, this commission is expected to have tasks and functions, namely: 1). Reviewing and determining ethical feasibility; 2). Evaluate and supervise the implementation of the code of ethics for research, development, assessment, and application following the field of science; and 3). Can conduct examinations and impose sanctions in the event of violations of the code of ethics for research, development, assessment, and application. (Stranas KA, 2020: 24).

Issue 3. Transformation of AI utilization affects the policy cycle

The utilization of AI by the Ministry of Finance can be said to be a government breakthrough in the use of AI. The transformation carried out in decision-making to become a policy, can be the first step in the future that the government can utilize AI in the decision-making process. Not always using conventional strategies that use a collection of various ideas/opinions, and simple policy or regulatory literature, to solve problems. However, the government in the future must be able to transform decision-making that will affect the public policy cycle from what has been applied so far.

Pressman and Wildavsky as cited by Budi Winarno (2002: 17) define public policy as a hypothesis that contains initial conditions and predictable consequences. Meanwhile, according to Dunn (in Pasolong, 2007: 39), public policy is a series of interconnected choices made by government agencies or officials in areas concerning government duties. In Dunn's opinion, Price (in Wahab, 2012: 72) also argues that a responsible policy-making process is a process that

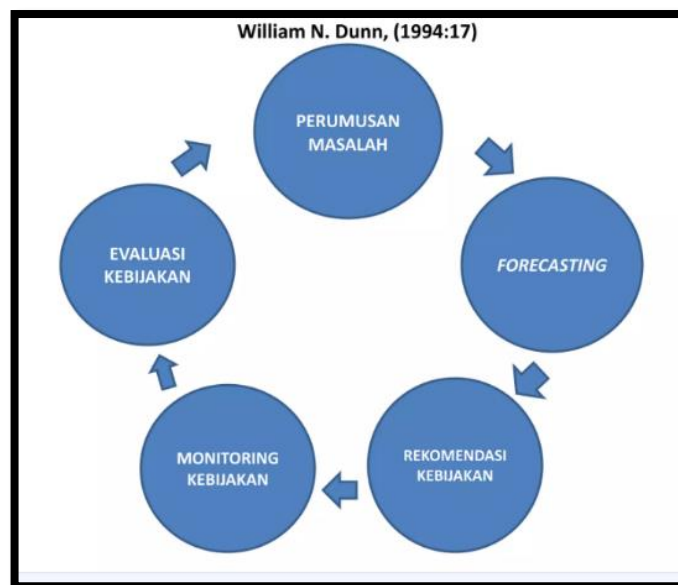
involves interaction between groups of scientists, leaders of professional organizations, administrators, and politicians. This means that in policy making there must be involvement from various actors.

In the policy-making process, in general, the policy cycle consists of several stages, namely problem identification and agenda setting, policy formulation, policy making, policy implementation, monitoring and evaluation, and policy improvement or termination. (P.Sabatier: 1991). However, with the development of AI which is increasingly advanced, in each stage of the existing policy cycle, there will be many changes that can provide new benefits, and provide better policy quality.

Professor Bambang Brodjonegoro, PhD in his presentation on Future Jobs and Skills: Bureaucratic HR Development in the Digital and AI Era, said that AI can identify patterns or abnormalities in data to improve decision-making accuracy, better allocate resources, predict unmet needs, detect fraud or safety risks, and many other things. When properly designed or implemented, these capabilities enable positive contributions in governance activities throughout the policy cycle, from agenda setting and policy formulation to implementation and evaluation. (Bambang Brodjonegoro: 2024).

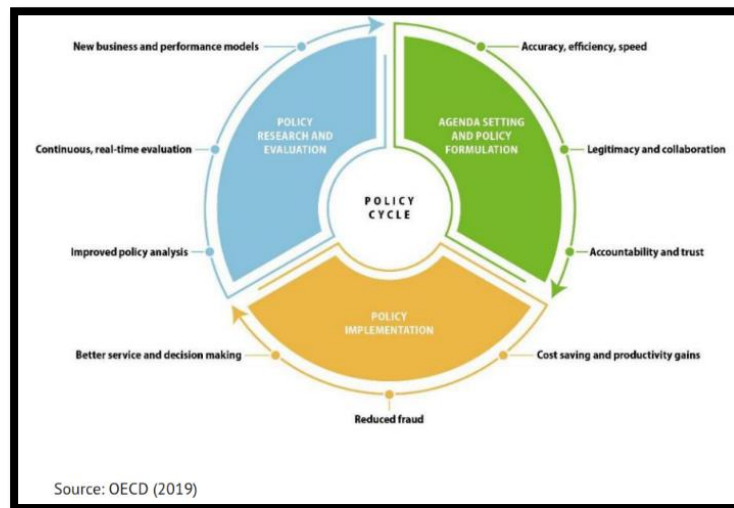
Figure 3.

Stages of the Policy Cycle According to William N. Dunn



Source: <https://www.slideshare.net/slideshow/siklus-lingkungan-kebijakan-publik/125995212>

Figure 4.

AI Provides Benefits at Each Stage of the Policy Cycle

Source: Bambang Brodjonegoro: 2024.

This is a new strategy in the use of AI that can be used by the government to transform the decision-making process in the future, such as the Ministry of Finance. This strategy will be the key to helping every problem that occurs in society. The potential of AI can help collect and analyze data accurately and comprehensively, making it easier to understand highly complex problems. By performing sophisticated data analysis, AI can identify patterns and predictions that conventional analysis cannot.

In addition, taking into account the policy cycle that has been implemented so far, the use of AI has the potential to increase transparency and public participation with the availability of information that is more easily accessible and understood by the public. This makes the decision-making process more inclusive, accurate, and responsive to the real needs of the community so that decisions can better reflect the interests and needs of the community as a whole. Thus, public decision-making can become more effective and responsive to the challenges faced.

Such research has been conducted by Salvatore Rocco (2022) who studied Artificial Intelligence (AI) systems for “algorithmic decision-making” in the public sector. This research focuses on the challenges posed by the use of AI in the areas of governance, law, policy, and technology. It revealed that the challenges related to AI systems lie in 1) ethics, legality, and fundamental rights; 2) welfare; 3) good governance; 4) AI interpretation results; and 5) trust and accountability.

The results of the study prove that the use of AI can indeed provide convenience in automating government tasks in the decision-making process. There is a shift in tasks from what

was previously done manually, now starting to shift towards a more automated direction, for example by using Internet of Things (IoT) devices, or artificial intelligence devices such as Chat-GPT by OpenAI.

The great potential to increase the efficiency of public decision-making with the use of AI can be utilized by the government in processing and analyzing data quickly, and providing more accurate recommendations. AI is also capable of processing large volumes of data and handling the complexity of complicated problems. This is the opinion of Prof. Bambang Brodjonegoro, that the ability of AI to identify patterns or abnormalities in data can help the government to process and analyze data quickly, and improve the accuracy of decision-making in formulating policies that are more effective and have a positive impact.

Alternative strategies in the decision-making process can be utilized by the government using tools, such as machine learning and data mining techniques. The potential of machine learning systems is to identify patterns in complex data and make predictions or decisions that can be utilized for specific purposes, such as classification, regression, clustering, or revealing previously unknown relationships (Kotsiantis et al., 2007). In the context of public decision-making, machine learning applications can help support the decision-making process with more accurate information. This becomes an important source of information to make better, objective, and fair policies (Gandomi & Haider, 2015).

In addition, data mining methods are also an important component in the implementation of artificial intelligence for decision-making that can be done by the government. Data mining includes many techniques for extracting useful patterns or knowledge from large amounts of data (Witten et al., 2016). In the context of public decision-making, data mining can be used to identify relationships between complex variables, discover trends or anomalies, and support the decision-making process with deeper insights.

For this reason, utilizing AI in assisting the decision-making process to become a policy is one of the best strategic steps that the government can take in the future. Utilizing AI can have a major impact on every stage of the policy cycle, as it can help automate administrative tasks, improve the accuracy and speed of decision-making, and help the government make more data-driven policies. AI can also help make it easier to find correlations and patterns that are undetectable by human analysis, especially in understanding problems better, and helping formulate more insightful and effective policies.

Conclusions and Recommendations

The utilization of AI in the process of transforming decision-making by the Indonesian government is not impossible. Based on data published by Oxford Insight in the Government AI Readiness Index 2023, Indonesia's global ranking index is 42nd out of 193 countries in the world. This means that Indonesia can transform decision-making.

The development of AI utilization, which is increasingly advanced, has provided many benefits and challenges that must be faced by the government, especially in Indonesia. As a form of preparation, several things need to be prepared by the government in transforming decision-making with the use of AI, namely: 1). Identifying goals and objectives, 2). Creating criteria, 3). Creating alternatives, 4). Testing and determining alternatives, and 5). Modifying the evaluation of alternatives.

These preparations are the first steps that must be taken by the government to transform the use of AI. This step becomes a strategy that must be carried out by the government, namely: 1. Policymaking in the utilization of AI, and 2. Establishment of an independent institution as a supervisory and policy-making institution related to the utilization of AI.

These preparations and strategies will indirectly affect the policy cycle that has been implemented so far. The utilization of AI will affect each stage in the policy cycle such as problem identification and agenda setting, policy formulation, policy making, policy implementation, monitoring and evaluation, and policy improvement or termination. The amount of potential generated by AI (for example, machine learning and data mining techniques) can improve the efficiency of decision-making, especially in processing and analyzing data quickly, and providing more accurate recommendations.

Therefore, based on the results of the analysis and discussion, the author recommends that the government's steps to transform the decision-making process require a short-term strategy, namely the making of AI utilization policies in the form of a Presidential Regulation so that the decision-making transformation process has a stronger legal basis. The Presidential Regulation should contain strategic steps that must be prepared by the government (as done by China and Singapore), which can be used as guidelines for the use of AI in the future. As for the long-term strategy, the government can establish an Ethics Commission as an ad hoc supervisory institution, which can oversee the use of AI by ethics.

References

- H. Snyder. (2019). 'Literature review as a research methodology: An overview and guidelines'. *Journal of Business Research*, 104, pp. 333–339, <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Widya Khoirunisa, and Fatma Ulfatun Najicha. (2023). "Transforming Indonesia through the Utilization of Artificial Intelligence: Challenges and Impacts". 23 December 2023. <https://www.researchgate.net/publication/376782693>
- Fachry Hasani Habib. (2024). "Assessing the Prospects of Artificial Intelligence Regulation in Indonesia, Lecturer in Law and Digital Technology, School of Law and International Studies, Prasetiya Mulya University". <https://www.hukumonline.com/berita/a/menakar-prospects-of-artificial-intelligence-setting-in-indonesia-lt6613c94285e9b/?page=2>
- Thalita Salsabila, Tri Mei Indrawati, & Revienda Anita Fitri. (2024). "Improving the Efficiency of Public Decision Making through Artificial Intelligence". *Journal of Internet and Software Engineering* Vol: 1, No 2, 2024, Page: 1-21. DOI: <https://doi.org/10.47134/pjise.v1i2.2401>
- P. Sabatier. (1991). "Toward Better Theories of the Policy Process," *Political Science and Politics*, 1991, doi: 10.2307/419923.
- Budi Raharjo. (2023). "Ethical Theory in Artificial Intelligence (AI). STEKOM University, Semarang, 2023.
- Washington Simanjuntak, Agus Subagyo, & Dadang Sufianto. (2024). "The Role of Government in the Implementation of Artificial Intelligence (AI) in the Ministry of Communication and Information of the Republic of Indonesia (Kemenkominfo RI)", *Journal of Social and Economics Research*; Volume 6, Issue 1, June 2024 P-ISSN 2715-6117; E-ISSN 2715-6966. <https://idm.or.id/JSER/index.php/JSER>.
- Heru Pambudi. (2024). "Digitalization of the Formation of Legislation". Webinar on Optimizing the Role of Academic Manuscripts, August 22, 2024.
- Prof. Bambang Brodjonegoro, PhD. (2024). *Future Jobs and Skills: Bureaucratic Human Resources Development in the Digital and AI Era*.
- Martino. (2023). *Utilization of Artificial Intelligence in the Public Policy Cycle: Between Opportunities and Challenges*. Amikom Surakarta National Seminar (Semnasa) 2023.
- Sali Ian Yo, et al. (2023). *Implementation of Intelligent Decision Support System in Player Decision Making in Video Games*. *Journal of Computer Science Kharisma Tech*.
- Rohyan Zaki Ramadhana, and Muhammad Irwan Padli Nasution. (2024). "Analysis of the Impact of AI Technology Implementation on Strategic Decision Making in Management

Information Systems". Scientific Journal of Research and Development Student (JIS) Vol.2, No.1 February 2024 e-ISSN: 2988-5922; p-ISSN: 2988-6058, Pages 161-168 DOI: <https://doi.org/10.59024/jis.v2i1.579> .

Christian Guntur Lebang; Gatra Priyandita and Trissia Wijaya. (2023). Indonesia's Digital Transformation Current Conditions and Projections. Indonesian Laboratory 2045. July 2023.

Alvina Dwi Suwandhita, et al. (2023). Human Resources Data Analysis for Decision Making: The Use of Data Analysis and Artificial Intelligence (AI) in Forecasting Human Resources Trends, Talent Management, and Employee Retention. Creative Management Journal (MAKREJU) Vol.1, No. .4 November 2023 E-ISSN: 2963-9654 and P-ISSN: 2963-9638, Pages 97-111 DOI: <https://doi.org/10.55606/makreju.v1i4.2161>

Erwin, et al. (2024). Digital Transformation. PT. Sonpedia Publishing Indonesia. June 2023. ISBN: 978-623-09-3640-1 .

Brilianto Mochamad Prakoso, et al. (2024). "Implementation of Artificial Intelligence (AI) in the Formation of Legislation in Indonesia". Deposition: Journal of Legal Science Publication Vol. 2, No. 1 March 2024 e-ISSN: 2987-4211; p-ISSN: 2987-5188, Pages 224-240 DOI: <https://doi.org/10.59581/deposisi.v2i1.2280>

National Strategy for Indonesian Intelligence 2020 – 2045. (Stranas KA).

Government AI Readiness Index 2023. Oxford Insight. December 2023.

Law Number 11 of 2019 concerning the National Science and Technology System.

Presidential Regulation Number 82 of 2023 concerning the Acceleration of Digital Transformation and Integration of National Digital Services.

Presidential Regulation Number 39 of 2019 concerning One Data Indonesia.

Circular Letter of the Minister of Communication and Information Technology Number 9 of 2023 concerning the Ethics of Artificial Intelligence.

<https://si.ittelkom-pwt.ac.id/2024/05/14/eksplorasi-kecerdasan-buatan-ai-dalam-prodi-sistem-information-meningkatkan-pengempatan-kebangunan-dan-analysis-data/>

<https://www.youtube.com/watch?v=wZPRkarj1ug&t=7s>

<https://journal.pubmedia.id/index.php/pjise/article/view/2401/2469>

<https://journal.widyakarya.ac.id/index.php/Deposition-widyakarya/article/view/2280/2151>

<https://penerbit.stekom.ac.id/index.php/yayasanpat/article/view/463/488>

<https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-Readiness-Index-2.pdf>

[https://www.researchgate.net/profile/Widya-](https://www.researchgate.net/profile/Widya-Khoirunnisa/publication/376782693_Transforming_Indonesia_through_the_Utilization_of_Artificial_Intelligence_Challenges_and_Impacts/links/65870a1c2468df72d3cec07c/Transforming-Indonesia-through-the-Utilization-of-Artificial-Intelligence-Challenges-and-Impacts.pdf)

[Khoirunnisa/publication/376782693_Transforming_Indonesia_through_the_Utilization_of_Artificial_Intelligence_Challenges_and_Impacts/links/65870a1c2468df72d3cec07c/Transforming-Indonesia-through-the-Utilization-of-Artificial-Intelligence-Challenges-and-Impacts.pdf](https://www.researchgate.net/profile/Widya-Khoirunnisa/publication/376782693_Transforming_Indonesia_through_the_Utilization_of_Artificial_Intelligence_Challenges_and_Impacts/links/65870a1c2468df72d3cec07c/Transforming-Indonesia-through-the-Utilization-of-Artificial-Intelligence-Challenges-and-Impacts.pdf)

<https://idm.or.id/JSER/index.php/JSER/article/view/332/276>