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RESEARCH

How Can Artificial Intelligence (AI) Technologies Enhance Public Policy-making?

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ABSTRACT

PURPOSE: This article seeks to assess the potential of AI technologies in enhancing data-driven policy-making, especially in addressing socio-economic, technological, and environmental challenges in African countries.

DESIGN/METHODOLOGY/APPROACH: The research used a qualitative approach and a comprehensive literature review to understand artificial intelligence (AI) and its potential applications in public policy-making.

FINDINGS: AI can enhance public policy-making processes in multiple ways, but it has not evolved to the point of replacing human intelligence.

RESEARCH LIMITATIONS/IMPLICATIONS: Multidisciplinary empirical research including social scientists, such as policy management experts and AI technology developers, may assist in improving the AI technology weaknesses identified in this paper.

ORIGINALITY/VALUE OF THE PAPER: The article demonstrates that the future of policy-making will depend on a synergy of AI capabilities and human intelligence, with the latter being essential for exercising judgement, and making final policy decisions.

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PRACTICAL IMPLICATIONS: Implementing the findings in this article will enhance the use of AI in policy and improve public policy-making.

KEYWORDS: *Artificial Intelligence (AI); Data; Policy-Making; Public Policy; 4IR, 5IR*

INTRODUCTION AND BACKGROUND

The existing form of data-driven policy-making without AI technology relies on traditional statistical methods and manual analysis to guide decisions. The absence of AI technology in policy-making results in a greater dependence on human expertise for data interpretation, constraining the speed and breadth of analysis. Although data-driven policy-making can still yield results without AI technologies, it may not fully leverage the available data's potential and may not be as efficient or predictive as methods that incorporate AI technologies.

This article commences by examining the current landscape of data-driven policy formulation in the absence of AI technology and underscores the importance of AI in policy analysis. It then delves into the role of AI technology in predictive policy analysis, showcasing case studies and examples where AI has been employed to augment data-driven policy development. Furthermore, it explores the prospective advantages of AI technologies in improving the policy formulation process and the challenges associated with integrating AI into policy-making procedures. Additionally, the article delves into the technical requirements and obstacles in implementing AI technology for data-driven policy formulation. Finally, it discusses the ethical and legal implications of AI-driven policy-making and its potential societal impacts.

CONCEPTUAL AND THEORETICAL BACKGROUND: WHAT IS DATA-DRIVEN POLICY-MAKING?

The necessity for evidence-based decision-making has made data-driven policy-making increasingly indispensable in contemporary policy development. Incorporating scientific research to inform government policies efficiently addresses present and future social, economic, and environmental challenges. The Fourth Industrial Revolution (4IR) of 2000 and the Fifth Industrial Revolution (5IR) of the 2020s have introduced AI technologies and big data analytics in shaping public policies. The 4IR entails robots utilising AI to perform intricate functions, driven by physical, digital, and biological 'megatrends' (Uwizeyimana 2022, p.11). Conversely, the 5IR focuses on augmenting human work with machines and emphasises ethical technology use for societal and

environmental benefit. Unlike the 4IR's emphasis on AI-powered machine replacement, the 5IR adopts a human-centric approach, aiming for personalised and innovative solutions aligned with sustainable development goals (Asaram, 2023, p.1). In conclusion, data-driven policy-making involves integrating AI technology, sensor data, and citizen collaboration to formulate appropriate policies addressing societal issues. AI plays a crucial role in this context, encompassing systems capable of autonomous learning and understanding human speech (Wirjo *et al.*, 2022, p.1).

Data and AI in Policy-making

The utilisation of AI technologies to bolster data-driven policy formulation has garnered significant attention in recent times. In the words of Schneier (2019, p.1), "We must bridge the gap between technology and policymaking" because "our future depends on it".

The technologies of the 4th and 5th Industrial Revolutions heavily rely on data. Consequently, both AI technologies and data-driven policy-making are highly data intensive. Data serves as the "cornerstone of modern technology and network communication and is an essential resource for creating digital products and services" (Shubladze, 2023, p.1). The substantial amount of available data has the potential to provide valuable insights and foster innovation across various spheres, including policy development, implementation, and evaluation (Shubladze, 2023, p.1).

According to Data to Policy Navigator (n.d.) report, data-driven policy actions promote evidence-based decision-making, supporting proactive policy decisions rather than reactive decision-making. This approach is crucial due to the dynamic, complex, and chaotic nature of public issues, often referred to as "wicked problems" by experts (Uwizeyimana, 2020, p.1).

AI in the Policy-making Process

The significance of AI in the policy-making process is immense, particularly in data-driven and predictive policy analysis. Predictive Policy Analysis utilises statistical and analytical techniques to model and prognosticate the potential outcomes of various policy decisions before implementation (Lau, 2020). This approach enables policy-makers to employ algorithms to foresee and anticipate the effects of different policy options, allowing for more informed decision-making. By leveraging the power of data, predictive analytics can identify trends, patterns, and likely future developments regarding specific policies, thereby aiding in the development of more effective and efficient public policies. As Patel *et al.* (2021, p.1) pointed out, "The foundations of policymaking—specifically, the ability to sense patterns of need, develop evidence-based programs, forecast outcomes, and analyse effectiveness—fall squarely in AI's sweet spot". AI can aid policy-makers in analysing vast amounts of data to develop more informed, efficient, and anticipatory policies that effectively address the complexities of modern-day challenges.

AI IN THE FIVE STAGES OF THE POLICY-MAKING PROCESS

According to Patel *et al.* (2021, p.3), "Data serves as the raw material, and AI is the tool that can empower policymakers to develop more efficient, targeted, and cost-effective policies that enhance people's lives". AI holds substantial potential in various stages of policy analysis, from agenda setting to policy formulation, decision-making, implementation, and evaluation, as affirmed by Wirjo *et al.* (2022, p.1). Patel *et al.* (2021, p.3) argue that increasing the use of AI technology in policy-making is necessary, as algorithms account for only 10% of a project's success, with the broader technology and engineering environment at 20%. The remaining 70% depends on people and processes, as demonstrated by Patel *et al.* (2021, p.3). It is essential to recognise that the public policy-making process is a multifaceted and multi-stage procedure, encompassing problem identification, policy option formulation, policy adoption, policy implementation (or administration), and policy evaluation. At each stage, AI technologies can empower policy-makers to create greater value and impact, as depicted in Figure 1.

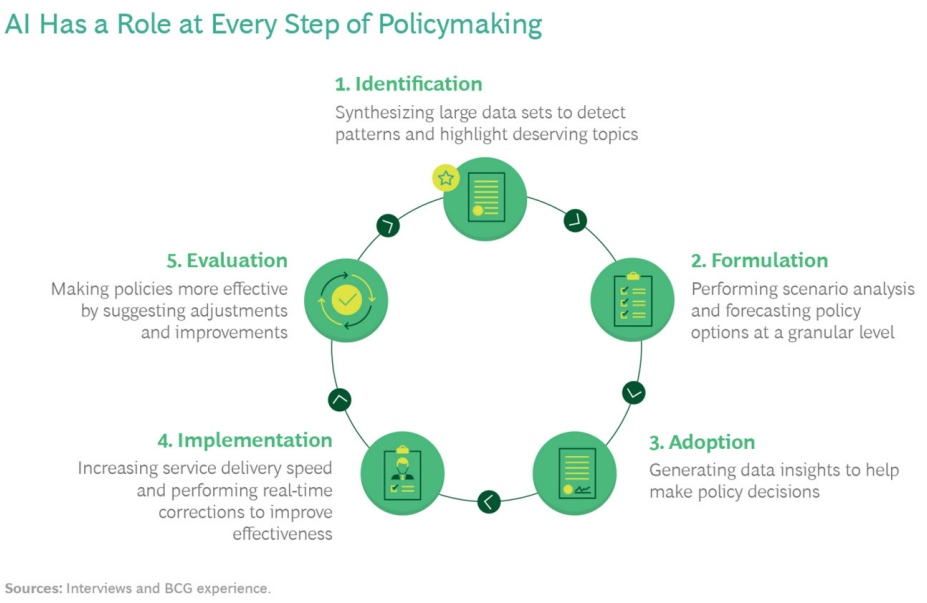

Figure 1: The role AI can play in each of the five stages of public policy-making

Source: Patel *et al.*, 2021, p.3

Below is an outline of how AI tools can enhance the different stages of the public policy-making process.

Stage 1: Problem identification and definition: AI tools and technologies can analyse extensive datasets to swiftly recognise underlying patterns of societal issues requiring policy intervention. Machine learning is of critical importance in these situations due to its capacity to process large volumes of data swiftly, providing real-time insights and enabling public-sector leaders and policy-makers to make timely, well-informed decisions (Patel *et al.*, 2021, p.3).

Stage 2: Policy formulation (or policy development): Government policy formulation involves projecting policy options' costs, benefits, and outcomes. Because of AI's ability to scrutinise data from various sources such as the government, private sector, third-party sources (e.g., non-governmental organisations and civil societies), and social media platforms, policy-makers can accelerate the policy/decision-making process and facilitate the localisation and refinement of economic development plans (Patel *et al.*, 2021, p.3).

Stage 3: Policy adoption: During the crucial stage of policy adoption, AI can be a valuable tool. Whether a legislative body is enacting a new law or a regulatory agency is issuing a rule, insights generated using AI in previous stages can better equip regulators and lawmakers to make well-informed decisions. This heightened understanding of the underlying issues enables a more precise forecast of the potential impact of a policy (Patel *et al.*, 2021, p.3).

Stage 4: Policy implementation: Policy implementation is a comprehensive process that encompasses all activities aimed at achieving the policy goals and objectives. Most significantly, AI tools can help enhance policy implementation efficiency through automation and near-real-time field feedback analysis (Patel *et al.*, 2021, p.3).

Stage 5: Policy evaluation: Policy evaluation is a deliberate and systematic process to gauge the level of success or failure in terms of how the input has been processed effectively and efficiently to produce the desired output, outcomes, and impact of the policies (Uwizeyimana, 2021).

Finally, AI can aid in making the policy analysis process more inclusive and participatory by analysing public sentiment and feedback from social media and other digital platforms. This can assist policy-makers in grasping the public's perception and the probable acceptability of policy measures, ensuring that policies are socially aligned and more effectively cater to the needs and concerns of the population.

CHALLENGES TO BE MINDFUL OF WHEN USING AI TOOLS IN THE POLICY-MAKING PROCESS

The significance of AI in policy analysis cannot be overstated. AI tools have the potential to enable more well-informed, efficient, and forward-looking policy-making that can adeptly navigate the complexities of modern challenges. AI has the potential to significantly enhance data-driven policy-making in diverse ways. Research by Božić (2024, p.1) illustrates how AI can enhance the policy development process as discussed below.

Enhancing Data-Driven Policy-making

AI's capacity to process vast datasets stands out as one of its greatest assets. This capability empowers policy-makers to achieve two key objectives: (a) data analysis and presentation, and (b) streamlining policy processes.

Data Analysis and Presentation

Identifying hidden trends and patterns:

AI can unveil concealed connections within intricate datasets that may elude human observers. This can result in a more nuanced comprehension of social and economic issues (Božić, 2024, p.1).

Uncovering hidden insights

AI excels at combing through extensive datasets to pinpoint patterns and trends that humans might overlook. This can aid policy-makers in understanding the underlying causes of social issues, predicting potential consequences of policy decisions, and tailoring interventions to specific demographics.

Predicting policy outcomes

AI models can streamline the policy-making process by simulating the potential consequences of various policy options. This foresight can help policy-makers choose the best course of action, in other words, the policy alternative with the most favourable outcomes (Božić, 2024, p.1).

Simulating real-world scenarios

AI can construct models to simulate the potential impacts of different policy options. This enables policy-makers to test different approaches before implementation, assisting in the selection of the most desirable course of action.

Targeting scarce public resources more effectively

AI's data analysis abilities across various demographics, needs, and resource allocation can assist in accurately targeting public services and programmes to the populations that require them the most (Božić, 2024, p.1).

Optimising resource allocation

With AI's assistance, policy-makers can analyse public spending data to pinpoint areas for enhancement and distribute resources more efficiently. The can also consider utilising AI to identify under-utilised funds in one department and reallocating them to a programme in greater need.

Streamlining Policy Processes

According to Božić (2024, p.1), AI has the potential to significantly enhance the efficiency of policy-making in three key ways:

Automating tasks

AI can automate laborious tasks such as data collection, analysis, and report generation, allowing policy-makers to dedicate more time to critical thinking and public engagement. Among the many benefits of AI technologies are their ability to gather data (often in real-time) from various sources "identify patterns, correlations, anomalies, and trends in the data" (Božić, 2024, p.1), and then visualise the findings in a way that makes it easy to understand.

Faster and more accurate evaluation

Research shows that while many policy implementations succeed, many others fail for various reasons (Mueller, 2020). AI can quickly and accurately analyse data to assess the impact of existing policies. This helps policy-makers identify successful programmes for expansion and make timely adjustments to problematic ones. It is important to recognise that the quality, accuracy, and timeliness of the information inputted into AI tools directly affect the quality and accuracy of the resulting reports. This means that flawed, biased, or low-quality information fed into AI systems will inevitably produce incorrect outputs of similar quality.

Personalising public services

AI technologies can customise government services to meet individual needs. For instance, AI chatbots can offer personalised advice on social programmes or educational opportunities. In his work, Matlala (2024, p.159) mentions that AI chatbots have been utilised for an extended period to address frequently asked questions (FAQs) on social media platforms. This usage can decrease the demand for human interactions and manual responses from public service providers and policy implementers.

Optimising resource allocation

AI can analyse public spending data to identify areas for improvement and optimise resource allocation across different government departments. According to Joloudari *et al.* (2022, p.3), deep learning, based on AI, is the most important method for solving resource allocation problems.

CHALLENGES AND CONSIDERATIONS OF INCORPORATING AI IN THE POLICY-MAKING PROCESS

AI in policy-making offers a powerful set of tools for policy-making, but it also presents several challenges. It is impossible to list all the challenges in this limited space. However, most authors believe the following challenges are integral to AI tools in any situation and environment.

Bias and Fairness

When trained on biased data, AI algorithms can perpetuate social inequalities or reinforce discriminatory practices. For instance, Lau (2020, p.1) provides an example of AI-forecasted crime

reinforcing racial biases in the US criminal justice system. Therefore, it is crucial to address and mitigate bias in AI policy development (Božić, 2024, p.2).

Data Bias

While evidence-based practices are important, intuition and experience are also crucial for making informed decisions. Shubladze (2023, p.1) highlights the importance of combining data with intuition and experience. This is because many social, economic, and environmental issues are complex and require solutions that can be comprehended only by humans, who possess the ability to consider multiple environmental factors simultaneously.

Transparency and Explainability

The lack of transparency in complex AI models can undermine public trust in AI-driven policies for several reasons (Božić, 2024, p.2). If AI systems make decisions that significantly affect individuals or communities, it is essential to know the basis of those decisions, especially in cases where they may need to be contested or corrected. First, when the decision-making processes of AI systems are not clear or understandable to the public, it leads to scepticism and doubts about the fairness and accuracy of those decisions (Silberg and Manyika, 2019).

A lack of visibility into AI's inner workings makes it challenging to hold the appropriate entities accountable for mistakes or ethical lapses (Silberg and Manyika, 2019).

Finally, trust is the cornerstone of public acceptance of technology. For AI-driven policies to be embraced and supported, people need to trust that these technologies are being used in a way that aligns with their values and interests (Silberg and Manyika, 2019).

Human Values and Ethics

AI cannot fully comprehend human values, feelings, emotions, and ethical considerations. Therefore, human oversight is essential to ensure that AI serves the public good (Božić, 2024, p.2). Human oversight plays a pivotal role in the iterative improvement of AI systems, helps mitigate risks associated with AI, and enhances its potential to address complex societal challenges. Furthermore, the engagement of diverse stakeholders in the oversight process enhances the many aspects of good governance and democratic principles in AI systems (Peñalver, 2024, p.1). The European Label of Governance Excellence (ELoGE) developed by the Council of Europe (2008, p.1) lists the following 12 principles of good democratic governance:

1. "Participation, Representation, Fair Conduct of Elections
2. Responsiveness
3. Efficiency and Effectiveness

4. Openness and Transparency
5. Rule of Law
6. Ethical Conduct
7. Competence and Capacity
8. Innovation and Openness to Change
9. Sustainability and Long-Term Orientation
10. Sound Financial Management
11. Human Rights, Cultural Diversity and Social Cohesion, and
12. Accountability"

(Council of Europe, 2008, p.1).

Violation of Human Rights

AI tools such as facial recognition can infringe upon privacy protections (Patel *et al.*, 2021, p.2). According to the National Academies (2024, p.2) facial recognition technology has the capacity to significantly influence civil liberties, human rights, and privacy due to its ability to streamline and reduce the cost of gathering extensive data about an individual's actions. According to Patel *et al.* (2021, p.2), the concern about human rights violations is almost inevitable since AI facial recognition technologies often collect an individual's data without the person's consent or knowledge.

Digital Divide

Unequal access to technology may lead to uneven participation in the policy-making process (Božić, 2024, p.2). The digital divide can lead to under-representation of significant segments of society, particularly among the less affluent and rural residents: this issue arises due to unequal access to AI technology platforms. Additionally, even those with access may not always engage in policy-making efforts (Matlala, 2024, p.189).

Cybersecurity Threats

The use of AI in public policy-making raises concerns about data safety. The 4IR offers opportunities for more efficient services, but it also challenges the existing regulatory frameworks of African countries, especially in areas such as data security, cybersecurity, consumer protection, and technology usage laws (Nalubega and Uwizeyimana, 2019, p.3). Robust cybersecurity measures are essential to safeguard sensitive data from cyberattacks (Božić, 2024, p.2).

Technological Literacy

Most technological advancements are driven by IT experts who may not fully comprehend public policies, while policy-makers often lack an understanding of the technological development process (Schneier, 2019). It is essential for AI technologists to engage with the public policy-making process to appreciate the importance of public concerns in technological advancements. Both policy-makers and the public may benefit from receiving training to effectively utilise new technologies for policy-making purposes (Božić, 2024, p.2).

APPLYING THE "RESPONSIBLE AI" PRINCIPLES SOLUTIONS TO CHALLENGES OF USING AI TOOLS IN PUBLIC POLICY-MAKING

In their work, Patel *et al.* (2021, p.2) highlight the potential risks associated with utilising AI in public policy-making. They emphasise that the use of AI systems in governance poses the risk of unintended harm to individuals and society when these systems are not developed and implemented responsibly. The issue lies in AI systems drawing insights and making future predictions based on historical data, which may contain inherent biases. For example, an AI engine fed with data reflecting past discriminatory practices may perpetuate those biases when used to inform housing or criminal justice policies. Patel *et al.* (2021, p.2) argue that rather than completely discarding AI, it is essential to adopt "responsible AI" principles, such as accountability, transparency, and fairness, to harness its potential.

The Universal Declaration of Human Rights (abbreviated, UDHR, 1948): Human rights are rights inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion, or any other status	African Charter on Human and Peoples' Rights (Banjul Charter): Adopted 27 June 1981 Entered into force 21 October 1986
Article 1: Right to Equality Article 2: Freedom from Discrimination Article 3: Right to Life, Liberty, Personal Security Article 4: Freedom from Slavery Article 5: Freedom from Torture and Degrading Treatment Article 6: Right to Recognition as a Person before the Law Article 7: Right to Equality before the Law Article 8: Right to Remedy by Competent Tribunal Article 9: Freedom from Arbitrary Arrest and Exile Article 10: Right to Fair Public Hearing Article 11: Right to be Considered Innocent until Proven Guilty Article 12: Freedom from Interference with Privacy, Family, Home and Correspondence	Chapter I: Human and Peoples' Rights: Article 1: Member States of the OAU shall recognize and adopt measures to give effect to the rights, duties, and freedoms enshrined in this chapter. Article 2: Every individual is entitled to the enjoyment of rights and freedoms without any discrimination. Article 3: Every individual shall be equal before the law and entitled to equal protection. Article 4: Every human being has the right to life and personal integrity. Article 5: Every individual has the right to dignity and protection against exploitation and degradation. Article 6: Every individual has the right to liberty and security of person. Article 7: Every individual has the right to have their cause heard and to a fair trial. Article 8: Freedom of conscience and religion is guaranteed.

Article 13: Right to Free Movement in and Out of the Country Article 14: Right to Asylum in Other Countries from Persecution Article 15: Right to a Nationality and the Freedom to Change It Article 16: Right to Marriage and Family Article 17: Right to Own Property Article 18: Freedom of Belief and Religion Article 19: Freedom of Opinion and Information Article 20: Right of Peaceful Assembly and Association Article 21: Right to Participate in Government and in Free Elections	Article 9: Every individual has the right to receive and express information. Article 10: Every individual has the right to free association. Article 11: Every individual has the right to assemble freely. Article 12: Every individual has the right to freedom of movement and residence. Article 13: Every citizen has the right to participate in the government and access public services. Article 14: The right to property is guaranteed. Article 15: Every individual has the right to work under equitable conditions and receive equal pay.
Article 22: Right to Social Security Article 23: Right to Desirable Work and to Join Trade Unions Article 24: Right to Rest and Leisure Article 25: Right to Adequate Living Standard Article 26: Right to Education Article 27: Right to Participate in the Cultural Life of Community Article 28: Right to a Social Order that Articulates this Document Article 29: Community Duties Essential to Free and Full Development Article 30: Freedom from State or Personal Interference in the above Rights	Article 16: Every individual has the right to the best attainable state of physical and mental health. Article 17: Every individual has the right to education and cultural participation. Article 18: The family is protected, and discrimination against women and children is prohibited. Article 19: All peoples shall be equal, and no domination of one people by another is justified. Article 20: All peoples have the right to self-determination and assistance in their liberation struggle. Article 21: All peoples have the right to their wealth and natural resources. Article 22: All peoples have the right to economic, social, and cultural development. Article 23: All peoples have the right to national and international peace and security. Article 24: All peoples have the right to a favorable environment for their development. Article 25: States have the duty to promote and ensure respect for the rights and freedoms in the Charter. Article 26: States have the duty to guarantee the independence of courts and establish institutions for the protection of rights and freedoms.

Source: University of Minnesota (n.d.); African Union (1986)

Finally, AI Technologists and the Public Need to Regularly Keep Oversight on all AI Lifecycles:

For example, according to (Peñalver, 2024, p.1), during the design phase it is crucial to include mechanisms for human intervention and ensure that people can easily understand and monitor AI systems. Continuous monitoring and evaluation are necessary during the deployment phase to ensure the systems act within their ethical boundaries. Post-deployment involves the capability

to intervene and rectify the system when unforeseen circumstances or ethical concerns arise. This integration ensures that AI systems are technically competent, ethically aligned, and socially beneficial (Peñalver, 2024, p.1).

CONCLUSIONS

AI plays a crucial role in policy analysis, enhancing data-driven policy-making by processing vast datasets. It can identify hidden trends and patterns, predict policy outcomes, simulate real-world scenarios, target scarce public resources more effectively, and optimise resource allocation. AI can automate tasks such as data collection, analysis, and report generation, allowing policy-makers to focus on critical thinking and public engagement. It can also quickly and accurately evaluate the impact of existing policies, identifying successful programmes for expansion and making timely adjustments to problematic ones.

Most importantly, data-driven policy-making relies on AI technology to enhance efficiency and predictability because AI technologies and big data analytics are crucial in addressing social, economic, and environmental challenges. AI holds substantial potential in various stages of policy analysis, including agenda-setting, policy formulation, decision-making, implementation, and evaluation. It can help identify issues, predict future trends, and assess policy effectiveness through simulations and scenario analysis.

However, challenges such as bias, fairness, data bias, transparency, human values, ethics, human rights violations, digital divide, cybersecurity threats, and technological literacy need to be addressed. Responsible AI principles must be applied to ensure the ethical use of AI in policy-making and AI technologists. Finally, AI technologists and the public must consistently monitor all phases of AI development, deployment, and post-development to guarantee that its application contributes to the well-being of people while upholding ethics, human rights, and values.

IMPLICATIONS AND FUTURE DIRECTIONS

The role of AI technologies in the various stages of the policy-making process is unmistakable as we move from the 4th IR to the 5th IR. It is essential to assess the impact of using AI in the different stages of the policy-making process, such as issue identification, policy adoption, implementation, and evaluation. In addition, while conducting research for this paper, it became evident that there is a lack of academic articles discussing the potential of AI technologies to improve public policy-making in developing countries, particularly in Africa. It is imperative to investigate how AI can enhance public policy-making in Africa to avoid a situation in which the African continent and its people lose out on the benefits of AI technologies in public policy-making, implementation, and evaluation.

REFERENCES

African Union (1986): *African Charter on Human and Peoples' Rights (Banjul Charter)*. Available at: http://www.oas.org/en/sla/dil/docs/African_Charter_Human_Peoples_Rights.pdf. Accessed: 11 July 2024. 14pp.

Asaram, L.S. (2023): *The Renowned Fifth Industrial Revolution and Engineering*. Engineering Institute of Technology. Available at: https://www.eit.edu.au/the-renowned-fifth-industrial-revolution-and-engineering/#:~:text=Unlike%20past%20revolutions%2C%205IR%20enhances,more%20personalized%20and%20innovative%20solutions. Accessed: 03 July 2024.

Božić, V. (2024): *The Role of Artificial Intelligence in Enhancing Public Policy*. Available at: https://doi.org/10.13140/RG.2.2.11494.23363 Accessed: 03 July 2024.

Datapolicy.org (2023): *Turn data into policy*. Available at: Turn Data into policy. Accessed 1 July 2024.

Joloudari, J.H., Alizadehsani, R., Nodehi, I., Mojrian, S., Fazl, F., Shirkharkolaie, S.K., Kabir, H.M.D., Tan, R.S. and Acharya, U.R. (2022): Resource Allocation Optimization Using Artificial Intelligence Methods in Various Computing Paradigms: a Review. *arXiv preprint arXiv*: 2203.12315.

Lau, T. (2020): *Predictive Policing Explained*. Brennan Center for Justice. USA. Available at: https://www.brennancenter.org/our-work/research-reports/predictive-policing-explained. Accessed: 27 June 2024.

Matlala, L.S. (2024): *Social media as an effective citizen-based monitoring tool for public service delivery in South Africa*. PhD Thesis: University of Johannesburg.

Mueller, B. (2020): Why public policies fail: Policymaking under complexity. *EconomiA*, Vol. 21, No. 2, pp.311-323.

Nalubega, T. and Uwizeyimana, D.E. (2019): Public sector monitoring and evaluation in the Fourth Industrial Revolution: Implications for Africa. *Africa's Public Service Delivery and Performance Review*, Vol. 7, No. 1, pp.1-9.

National Academies (2024): *Advances in Facial Recognition Technology Have Outpaced Laws, Regulations; New Report Recommends Federal Government Take Action on Privacy, Equity, and Civil Liberties Concerns*. Available at: https://www.nationalacademies.org/news/2024/01/advances-in-facial-recognition-technology-have-outpaced-laws-regulations-new-report-recommends-federal-government-take-action-on-privacy-equity-and-civil-liberties-concerns. Accessed: 11 July 2024.

Patel, J., Manetti, M., Mendelsohn, M., Mills, S., Felden, F., Littig, L. and Rocha, M. (2021): *AI Brings Science to the Art of Policymaking.* Boston Consulting Group. Available at: https://web-assets-pdf.bcg.com/prod/how-artificial-intelligence-can-shape-policy-making.pdf Accessed: 5 July 2024. 12pp.

Peñalver, M.F. (2024): *Keeping AI in Check: The Critical Role of Human Agency and Oversight*. Nemko. Available at: https://www.nemko.com/blog/keeping-ai-in-check-the-critical-role-of-human-agency-and-oversight#:~:text=Human%20oversight%20plays%20a%20pivotal,beneficial%20to%20all%20of%20society Accessed: 12 July 2024.

Schneier, B. (2019): *We must bridge the gap between technology and policymaking. Our future depends on it.* World Economic Forum. Available at: https://www.weforum.org/agenda/2019/11/we-must-bridge-the-gap-between-technology-and-policy-our-future-depends-on-it/ Accessed: 12 July 2024.

Shubladze, S. (2023): *How To Make Use Of The New Gold: Data*. Forbes Technology Council. Available at: https://www.forbes.com/sites/forbestechcouncil/2023/03/27/how-to-make-use-of-the-new-gold-data/ Accessed: 01 July 2024.

Silberg, J. and Manyika, J. (2019): Notes from the AI frontier: Tackling bias in AI (and in humans). *McKinsey Global Institute*, Vol. 1, No. 6, 8pp. Available at: https://www.mckinsey.com/featured-insights/artificial-intelligence/tackling-bias-in-artificial-intelligence-and-in-humans Accessed: 11 July 2024.

The Council of Europe (2008): *12 Principles of Good Democratic Governance*. Available at: https://rm.coe.int/12-principles-brochure-final/1680741931 Accessed: 12 July 2024.

University of Minnesota (n.d.): *Appendix 5: The Universal Declaration of Human Rights* (abbreviated). Available at: http://hrlibrary.umn.edu/edumat/hreduseries/hereandnow/Part-5/8_udhr-abbr.htm Accessed: 12 July 2024.

Uwizeyimana, D.E. (2020): The logframe as a monitoring and evaluation tool for government interventions in a chaotic and complex environment. *Africa's Public Service Delivery and Performance Review*, Vol. 8, No. 1, p.a328. Available at: https://doi.org/10.4102/apsdpr.v8i1.328

Uwizeyimana, D.E. (2021): A new typology policy monitoring and evaluation indicators. *The European Journal of Economics, Law and Social Sciences*, Special Issue, pp.128-154.

Uwizeyimana, D.E. (2022): Black Africans' Contributions to Global Industrial Revolutions. *The Thinker*, Vol. 90, Special Focus, pp.9-19.

Wirjo, A., Calizo Jr., S., Vasquez, G.N. and San Andres, E.A. (2022): *Artificial Intelligence in Economic Policymaking*. APEC Policy Support Unit Policy Brief No. 52, November 2022

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