

Algorithmic Governance: Evaluating the Role of Artificial Intelligence in Public Policy Decision-Making

Kamal Singh K. M.

Affiliation: Department of Political Science, Tribhuvan University, Nepal

Corresponding Author : Email: kamalsinghkunwar560@gmail.com

ORCID: <https://0009-0007-5674-6900>

Abstract

This article discusses the use of artificial intelligence in the public policy and challenges associated with it such as the velocity of change and the impact on democracy. Artificial intelligence is really changing how we do policy. That is creating a tension between the speed at which we can do things and the democratic way of doing things with AI.” States really like intelligence. But scholars who study this do not all agree. There is not one idea here that links the use of algorithms to how things are already done and the checks we have in place. The paper reviews the situation and develops a framework that draws on governance theory, public administration and digital governance to explain how technology, institutions and values interact to shape policy. The framework consists of three components: strong institutions, transparency of algorithms and democratic accountability. Will this interaction between these things allow artificial intelligence to improve policy without losing legitimacy or make problems like bias, secrecy and lack of accountability worse? Other models separate technology and politics; the article provides a lens, which it calls the Policy-Algorithm Governance Matrix, for seeing how different combinations of institutions and algorithms can lead to very different outcomes. This is very useful in practice. It can help guide policymakers and scholars in countries in the Global South that are rapidly digitizing but have weak institutions, which is common. Ultimately they have to ensure that artificial intelligence is deployed in a transparent, accountable and ethical way so that we don’t trade democracy for speed. It is part of artificial intelligence and we have to think about how this plays into policy and democracy.

Keywords: Algorithmic Governance, Artificial Intelligence, Democratic Accountability, Digital State, Governance Theory, Policy Analytics, Public Policy

INTRODUCTION

Background and Context

The last decade has seen a remarkable increase of artificial intelligence (AI) in public governance, not only in the administrative work but also in the very rationale of governance practices. From a merely technical tool at the state’s disposal, it has evolved into a powerful influence on the definition, implementation, and evaluation of public policy. Technologies such as machine learning, big data analytics, cloud computing, and digital infrastructure have enabled governments to shift from bureaucratic processes to digitized governance. The 'digital state' (Margetts & Dorobantu,

2019) relies heavily on algorithms for applications such as predictive analysis, autonomous service delivery, surveillance, policy optimization and evidence-based policy-making (Danaher et al., 2017).

Applications of AI in various areas of public policy have led to transformation of public services. For instance, AI is being used to monitor public health events, predict public health threats, and ensure the allocation of resources efficiently in the health sector (Topol, 2019). Similar transformations can be witnessed in public finance and taxation sectors where algorithms are used to detect fraud, compliance monitoring and law enforcement (Yeung, 2018). Even in municipal governance, the concept of "smart cities" using AI to optimize various services such as traffic management, energy, and policing has become a common feature (Kitchin, 2017). It is evident that the use of AI in public administration goes beyond just making administrative processes faster. It is actually reshaping how governments themselves think about authority and public policy.

With the growing applications of algorithmic systems that influence public policy by predicting social trends, identifying patterns, and making policy recommendations, a strong reliance has been placed on data-driven governance, where algorithmic reasoning constitutes justification of public policy choices (Rouvroy & Berns, 2013). Algorithms have been recognized as nascent forms of institutional actors that impact state practices, public policies and citizen state relations.

Furthermore using Artificial Intelligence is a trend around the world. This trend is about using digital tools and modern technology. Governments everywhere are making plans for AI. These plans are meant to make government work more efficient. They also want to save money and do a job of serving people. The United Nations said this in 2023. The Organization for Economic Co-operation and Development and the United Nations also think it's crucial to make rules for AI. These rules should help ideas but also be fair and protect people's rights. In this context, algorithmic governance emerges as a key trait of modern public administration.

Problem Statement

The deployment of AI within public administration systems brings about new political, ethical and institutional challenges. Although it promises gains in terms of speed, accuracy and efficiency, a large number of these AI systems rely on opaque 'black box' mechanisms that prevent public understanding of how their decisions are made (Pasquale, 2015). It is therefore difficult for citizens, public officials, and overseeing institutions to probe algorithmic systems, thus impeding the capacity to hold them accountable for their outcomes and making it more difficult to defend fairness and democratic legitimation in government systems.

Algorithmic systems often reproduce and exacerbate social inequalities where prejudiced assumptions or biased data forms part of their programming (O'Neil, 2016). For instance, training data that carries existing discriminatory biases related to race, gender or economic class can institutionalize forms of digital inequality that are more difficult to identify and rectify than administrative biases they aim to replace.

Reliance on technology vendors and private companies to manage systems can threaten a state's control over its own systems and its ability to be accountable to its people. This is a problem

especially when companies use algorithms that are hard to understand. This situation raises questions about what is right and wrong and also about politics. These issues need to be considered.

These changes have not been fully covered in the literature of traditional governance and public administration where the focus has been mainly on the expansion of e-governance. The study seeks to fill the gap of a coherent theoretical link between algorithmic decision-making, democratic accountability and institutional resilience (Bovens & Zouridis, 2002). I argue that it is necessary to theorize AI beyond administrative efficiency and technology modernization to make sense of its impact on political power, state legitimacy and citizen-state relations.

Research Question

The main research question for the current study, within this context, is: What is the impact of algorithmic decision-making on public policy in the modern state?

More generally, this research enquires transparency, accountability, institutional adaptation and democratic governance under the algorithmic state.

Research Objectives

Main research objectives are:

1. To discuss and contextualize a sense of what algorithmic governance is, and how it fits into the study of politics and how the government works.
2. To examine the pros and cons of employing algorithms to make decisions in public policy, in particular, their impact on the efficiency of implementation, transparency of the process, responsibility of the decision-maker, and the perception that the state is truly representative of the people when the use of algorithmic governance and algorithmic decision-making is adopted in public policy.
3. To create a way to understand how algorithms work with political institutions, administrative systems and governance processes in modern countries;
4. To explore what algorithmic governance means for how strong political institutions are how much citizens participate and how much people trust the government.

Contribution and Significance

This study helps us understand governance better by giving us a framework to see how algorithms affect institutions and political processes not just as technology. It helps link what we know about governance to the discussions about algorithms and their use, in the public sector. In this context, technology is conceived as a much more powerful political force than the inanimate object, providing an understanding of political power in a digitally mediated world.

From a practical point of view, the findings can help policymakers, administrators, and regulatory institutions to develop and implement responsible, transparent and ethical AI-governed public policy.

LITERATURE REVIEW

This article systematically categorizes the literature into core themes to understand the development of governance models, the practical applications of AI in policy-making, the core debates around this transition, and the common analytical shortcomings.

The evolution of algorithmic governance

Algorithmic governance did not just appear out of nowhere. Indeed, it is part of a long history of transformation in the public administration, from e-governance (where the focus was on digitalization of government services and access), to digital governance (involving participatory platforms, horizontal communication networks between government agencies, and linked decision-making) (Janowski, 2015; Mergel et al., 2019).

Now we are firmly in the age of algorithmic governance in which machine learning and advanced analytics are used not only to support existing government functions, but to shape the very process of public policy-making (Janssen et al., 2020; Wirtz, Weyerer, & Geyer, 2019). “Rather than just helping with the administrative process, these systems are creating forecasts and recommendations that impact the outcome. This is a major change in the way governments work, from a system where officials make all the decisions to one where computer programs and data analysis make the decisions. It is more on the data and risk assessment and probabilities. Experts such as Kitchin (2020) and Yeung (2018) have highlighted this perspective.

But the adoption of such practices has not been uniform among governments. Existing studies have demonstrated significant variation across countries and the role of institutions, infrastructure, regulation and data capabilities for both the promise and perils of AI adoption in governance (Meijer & Grimmelikhuijsen, 2021; Valle-Cruz et al., 2020).

The role of AI in public policy decision-making

The use of Artificial Intelligence has spread to every part of the process that the government uses to make decisions.. The impact of Artificial Intelligence is really big when it comes to the decisions that the government makes. The government can do a job of finding trends and figuring out what might go wrong by using advanced analytical and predictive capabilities. This helps the government make interventions that really work. The government can use Artificial Intelligence analysis in areas. For example Artificial Intelligence can help the government figure out if someone is likely to get sick. Artificial Intelligence can also help the government run social welfare programs and plan what cities should look like.

This can help the government provide services to people and do things more efficiently. If the government uses analysis and predictive capabilities, it can better meet people’s needs. Governments use this to make people’s lives better in areas like health, social welfare programs and city planning. Valle-Cruz et al. (2020) The applications are ranging from health prognosis, administration of social welfare programs, and urban infrastructure planning in order to improve efficiency and responsiveness of public service provision (Engin & Treleaven, 2019; Wirtz et al., 2019).

Automation is a crucial component in the role that algorithms are now playing. By automating complex but mundane tasks, they enable consistency and scalability crucial for large bureaucratic

organizations (Margetts & Dorobantu, 2019). AI-powered analytics also enhance evidence-based decision making. By automating tasks that're complicated but routine artificial intelligence enables large organizations to be consistent and work on a big scale. This is very important for bureaucratic organizations. Artificial intelligence also helps people make decisions based on facts by putting different types of information.

Although people are happy about these benefits, the way artificial intelligence works in public policy decisions can be affected by things besides the technology itself. These things include how institutions are set up how they are overseen and the quality of the data. Whether or not algorithms work well depends on the situation and how they fit into the bigger system. Artificial intelligence and algorithms are used in context and have to be part of a larger system to be successful, as noted by researchers such as Meijer, Grimmelikhuijsen, and Kitchin. The decisions that are made with the help of intelligence and algorithms do not happen in isolation they happen within the bigger picture of politics and society and this affects how artificial intelligence is used in public policy decision-making.

Key theoretical debates

Artificial Intelligence (AI) in government is reigniting old debates and generating new ones in politics and public administration. One big problem such people see with AI is that it can improve government decision-making, removing mistakes and making it more rational and fair. Algorithms can be really helpful in making decisions and getting rid of biases that people may have. This idea comes from authors like Brynjolfsson and McAfee (2017). They think algorithms can make the government work efficiently. Some people are worried that if we rely much on Artificial Intelligence it might stop important conversations from happening and give too much power to people who are not elected. This is what Amore (2020) and Zuboff (2019) explained. The main thing is, Artificial Intelligence uses data to make decisions. So Artificial Intelligence has to consider the policies and the values and ethics and what the community wants. If we depend much on data we might forget about important things like fairness.

There are researchers like Kitchin, Ananny and Crawford and Benjamin who are trying to find a balance between using Artificial Intelligence and being accountable. They are trying to figure out how to control Artificial Intelligence in the government sector. Meijer and Grimmelikhuijsen recently suggested some ways to make Artificial Intelligence decisions more accountable to the people. They want to combine the things about Artificial Intelligence with the good things about democracy.

The values of being fair and honest are important. Artificial Intelligence decisions should follow these values. Meijer and Grimmelikhuijsen say that Artificial Intelligence can help democracy. It should not replace it. Artificial Intelligence should supplement democracy, not substitute, for it.

These new methods try to find a middle way between AI and democracy.

Risks and critiques

Algorithms making decisions are one thing, but it also has some serious issues. One of the fears is that algorithms can be biased. This means that when machine learning algorithms are trained

on data, they can make things worse and even create new problems with discrimination. This could be in areas such as police work, money, and social services. These are issues that have been talked about before by people like O'Neil and Benjamin, and algorithmic governance is a deal. Algorithmic governance may be the answer. Algorithmic bias is a real danger, and algorithmic governance needs to be careful about that. A closely related problem is opacity. In many cases, the inner workings of AI algorithms are a 'black box' making it impossible to hold the technology accountable (Pasquale, 2015; Ananny & Crawford, 2018). Lack of transparency breeds mistrust when people cannot be shown how decisions were made and be held accountable when necessary. Power structures also seem to be reconfigured in the context of the introduction of algorithms into public administration. Today, technical expertise often lies with a small elite of public officials, or is out-sourced to private technology companies, which may undermine the checks and balances already in place in traditional public bureaucracy, and weaken democratic control over the decision-making process (Veale & Brass, 2019; Zuboff, 2019). A further risk is automation bias, in which people trust automated decisions unquestioningly, even when they are wrong (Logg, Minson, & Moore, 2019). The existing debates on algorithmic governance are, in general, about questions of technical and institutional risk.

Research gap

There is much research on governance, but it is not well organized. Researchers concentrate on one or two problems, like how algorithms operate, what's right and wrong, or how institutions shape them. They do not usually consider all these factors as part of governance. Governance studies should be more comprehensive. To understand governance better researchers must look at it as a whole. Specifically there is a shortage of theories that explain how institutions, transparent algorithms and democratic accountability work together. This shortage is worsened by a lack of understanding of how these factors interact in settings like the Global South. In this region AI is being integrated into governance quickly. It faces unique institutional challenges.

Current governance frameworks are often based on models from developed countries. May not reflect the local realities. What is needed is an approach that combines political theory public administration and digital governance. This study aims to fill this gap by providing a theoretical framework. It seeks to explain how AI and public policy interact. The goal is to offer an understanding of governance in the context of AI. The study focuses on governance and its relationship with AI. Governance is an issue that requires a comprehensive approach. AI is changing the way governments work and researchers need to understand its impact on governance. Governance studies must consider the interaction, between AI and public policy. This will help to create effective governance systems.

METHODS

Research design

The research employs a conceptual analysis design to build a solid framework for understanding algorithmic governance. Conceptual studies offer a great way to advance theories by clarifying concepts, identifying relationships between variables and presenting holistic models that expand and build upon existing theories (Jaakkola, 2020). Specifically, the research combines knowledge and theories from governance theory, public administration and digital governance literature in order to build a powerful framework of AI-driven policymaking. The design of the study is not

descriptive or merely empirical but original, comprehensive and coherent, according to recent calls for integrating a whole range of theoretical perspectives and for understanding technology and institutional phenomena as being intrinsically intertwined (Meijer & Grimmelikhuijsen, 2021).

Analytical logic

The analytical strategy is a combination of deductive and integrative synthesis. The deductive part draws on the combination of established theoretical propositions of, inter alia, state capacity, accountability and digital governance to identify relevant dimensions of analysis with respect to algorithmic decision-making. The integrative synthesis component assists in placing these different dimensions into a wider coherent framework capturing technical and institutional phenomena at once (Snyder, 2019). This strict analytical logic is built on strong theories, and draws on theories from other research areas to deepen the analysis and to construct a framework that truly captures the complexities of algorithmic governance.

Core assumptions

The conceptual framework is based on two basic assumptions. First, AI is to be conceptualized as a sociotechnical system, not a simple technological tool. The approach assumes that algorithms are inherently influenced by human choices, Organizational characteristics and policy goals and cannot be fully explained without a deeper understanding of the organizational and political context in which they are developed and deployed (Kitchin, 2020; Janssen et al., 2020). Second, the framework's research builds upon the assumption that it is institutions that enable algorithmic effects. It asserts that an organization's institutional capacities and structures significantly contribute to the degree to which algorithms enhance (or reduce) state capacities, and also determine whether algorithmic decision-making is fair and legitimate (Meijer & Grimmelikhuijsen, 2021).

Scope and boundary conditions

The research examines AI applications in public policy decision-making within the government sector; it does not focus on AI technology, per se, such as algorithmic design, computational optimizations and software engineering; but rather on the relationships between algorithms and governance structures; that is, the political, institutional and normative factors that frame algorithmic decision-making.

The study's boundary is the interaction between algorithms and governance. Thus it excludes non-governmental actors, purely technological dimensions of AI, as well as ethical or philosophical analyses in order to present a compact yet meaningful theoretical exploration of the phenomena studied.

Validity strategy

To strengthen the study's conceptual validity, it employed a combination of methods: theoretical triangulation, which refers to the combination of multiple theoretical frameworks-governance theory, public administration and digital governance-to support a proposition or argument (Snyder, 2019), and cross-disciplinary synthesis that enhances conceptual coherence by drawing on related fields of study, thereby reducing research bias and providing stronger support for the

derived framework. In addition, the framework's validity was strengthened by an internal check for logical coherence and relevance, grounding the analysis in established theories and recent scholarly studies.

THE DEVELOPMENT OF THE CONCEPTUAL FRAMEWORK

This section builds a framework for understanding the application of AI in public policy decision-making. Three dimensions are taken into account: the effective work of institutions, the openness of AI systems, and the responsibility of decision-makers. Furthermore, these aspects are taken into account to ensure the balanced functioning and trustworthiness of AI in government. Separate consideration of each element will allow us to examine how each influences the other in different circumstances.

Key Areas of AI Governance

Institutional capacity

Institutional capacity is the ability of government institutions to develop, implement and regulate the use of AI policy systems. This capacity is conditional upon such factors as: availability of personnel, adequate regulations and adaptability to current changes. In the context of AI governance, this includes data management, auditing AI systems and inter-agency cooperation.

Research shows that institutions that are able to implement appropriate processes are more likely to benefit from the use of AI in policy decision-making by maintaining data quality, AI models and supervision mechanisms. Instead, institutions with lower levels of capacity depend on external support and lose oversight over the utilization of AI, especially developing countries, whose levels of capacity are generally lower due to resource constraints.

Algorithmic transparency

Algorithmic transparency refers to the accessibility and understandability of AI systems by those interested. The thing about transparency is that it is really important when it comes to making sure that decisions made by intelligence are fair and can be trusted. Artificial intelligence transparency can mean a lot of things, like explaining how an artificial intelligence system works, showing how it makes decisions, or giving out details about what it can do. Even though people are trying to make artificial intelligence easier for everyone to understand, experts think that it is very important for the people in charge to make sure that information is available so that everything is fair and open. Being completely transparent is not always easy because if you share too much information you might give away secrets or private information and if you do not share enough people will not trust the artificial intelligence. So it is very important that the rules and laws find a balance for transparency of artificial intelligence.

Accountability

Accountability problems take on new dimensions with AI because AI decisions may be autonomous, and sometimes inscrutable or contestable, and thus may undermine existing accountability institutions.

To overcome the challenges in AI-driven decision-making, various researchers propose accountability frameworks that include auditing AI systems, regulating them, and involving the public. The underlying idea is that they must comply with the interests and values of society.

The Framework of AI Governance

The framework I am suggesting is based on how institutional capacity, algorithmic transparency, and democratic accountability work. These three areas support each other. For example, having institutional capacity helps make transparency a reality. Transparency in turn helps ensure accountability. A strong democratic accountability framework makes institutional processes more legitimate. Institutional capacity, algorithmic transparency and democratic accountability are all important, on their own. They also make each other stronger. When we have capacity, we can make transparency happen. With transparency, we can hold people accountable. With democratic accountability, we can trust the institutional processes.

Figure 1. Interrelationship between institutional capacity, algorithmic transparency, and democratic accountability in AI-enabled governance systems.

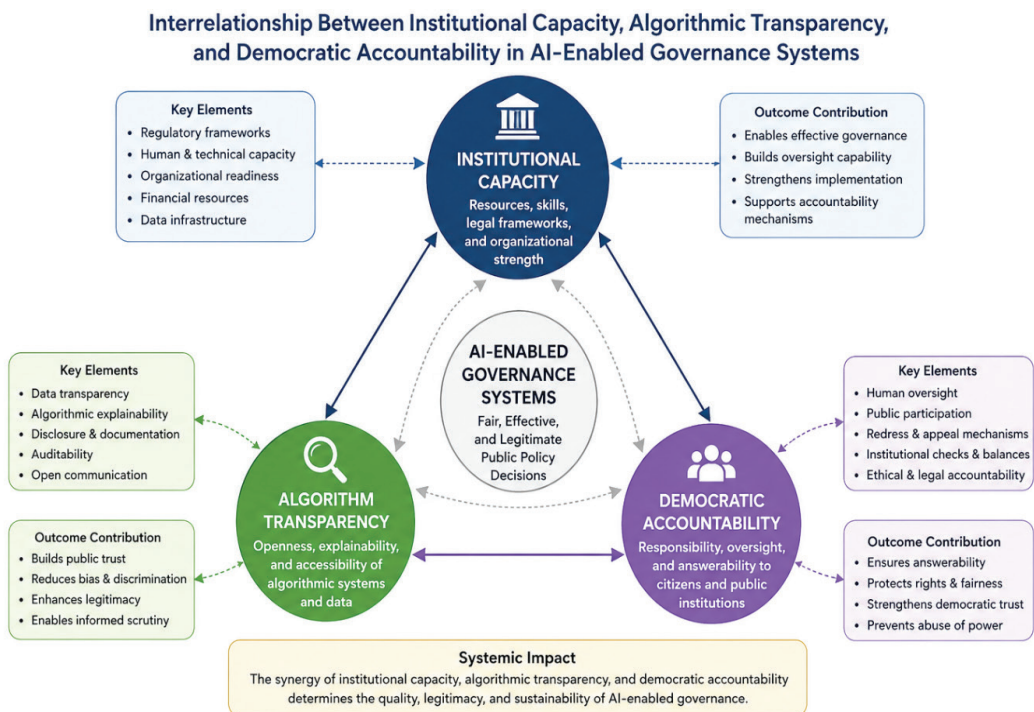


Figure 1. Interrelationship between institutional capacity, algorithmic transparency, and democratic accountability in AI-enabled governance systems.

Note. Developed by the author based on conceptual synthesis of recent literature on algorithmic governance (Janssen et al., 2020; Meijer & Grimmelihijsen, 2021; Kitchin, 2020).

Policy–Algorithm Governance Matrix

To operationalize the conceptual model, this study introduces the **Policy–Algorithm Governance Matrix**, which maps governance outcomes across varying levels of institutional capacity and algorithmic transparency.

Table 1: Policy-Algorithm Governance Matrix illustrating governance outcomes across institutional and algorithmic conditions.

Dimension	High Capacity	Low Capacity
High Transparency	Optimal governance	Symbolic compliance
Low Transparency	Technocratic dominance	Governance failure

Note. Author's conceptualization informed by governance and AI accountability literature (Ananny & Crawford, 2018; Veale & Brass, 2019; Floridi et al., 2018).

Good Governance- Transparent AI is governed by strong institutions. We can have efficiency and accountability and legitimate policy results.

Symbolic Compliance: Some transparency measures may exist but are not institutionalized or substantive enough. The creation of the appearance of accountability with no actual governance quality.

Technocratic Dominance: Strong institutions and low transparency may lead to high efficiency, but also to the concentration of power in the hands of experts, at the expense of democratic oversight.

Governance Failure: This kind of configuration is the worst kind of weak institutions and opaque systems, producing policy outcomes that are neither effective nor legitimate.

Analytical Interpretation

The model clearly showed that the governance outcomes are dependent on how the institution works and how the algorithm works, not on the technology itself. An interesting observation is that the effect of an element on governance is conditioned by others. If transparency is high, but capacity to manage transparency is low, the transparent element can be just a performative act. High capacity and low transparency simultaneously. This can place everything in the hands of a few technical elites.

The model also revealed that it is very difficult to be efficient and legitimate at the same time. Artificial Intelligence can boost efficiency by accelerating processes as well as providing better insights. Artificial Intelligence can, however, also raise issues of transparency and legitimacy. AI is efficient according to the model, but that might be a problem for legitimacy. If the public prefers full participatory processes, then decision-making may be slower, less efficient but more participatory.

The framework serves as a core theory for the analysis of Algorithmic Governance, assessing the interaction of institutional capacities, transparency and algorithmic performance to develop governance structures that can meet the demands of contemporary democracy.

DISCUSSION

The results of the study on governance are presented in this section. It talks about the impact of artificial intelligence or AI on decision making by the governments and the accountability of authority for the decisions made and its impact on institutions. The discussion starts with a

presentation of the initial diagrams and then proceeds to their application to real life and the policy implications.

Theoretical Implications

The application of AI to the governmental decision-making processes means that we must fundamentally re-evaluate our notions of how government functions. In the past we understood government as a human system with human agents making decision based on rules and authority. With the inclusion of AI in this decision-making framework, we must now contend with computer based decision making based on algorithms and data. This has direct implications on the definition of authority and power, as we can no longer define government as purely a system which has human agents who hold ultimate authority.

AI, through its role in decision-making, is changing the notion of governance as it now involves computers, in addition to humans and institutions. Authority now rests in the hands of machines and it is difficult to attribute responsibility to anyone, the individual who programmed the algorithm or the AI system itself. There are issues such as accountability and human responsibility, to what extent can we deem an individual responsible for the actions taken by the AI that he programmed. The Policy-Algorithm Governance Matrix that is presented graphically shows that the use of AI within a system goes beyond just the usage of technology and is intimately tied to the functioning of institutions.

Comparative Insight: Global South Contexts

The usage of AI differs across the world and in certain regions, particularly in European countries, a certain structure of governing has developed, wherein systems have been put in place to ensure that the use of AI is transparent and accountable. Conversely, in other nations, and most strikingly, in developing countries within the Global South, there is a lack of the required institutions and rules to control AI. This enables the uninhibited use of AI in a way that can, in most cases, be unaccountable.

These developing nations often lack personnel with the required skill sets for using and developing AI, and insufficient amounts of data to develop its application, and thus have to depend on developed nations and companies for their AI systems, where there can be no real control over the utilization of AI in these nations. This has dire consequences for accountability and ethical usage, and could very well exacerbate already established inequalities through unjust applications of the technology. This can also provide countries in the Global South with an opportunity to create applications of AI which suit their particular institutions and constraints.

Policy Implications

Regulatory Frameworks

Rule-making should be implemented that ensures that the usage of AI is always transparent and accountable, through explaining the results and providing the facility for audits and analysis of the decision-making process. In order to remain democratic and human rights-consistent, the use of AI in governmental bodies must adhere to democratic norms and fundamental human rights.

Without adequate rules, there is always the chance that the misuse of AI by government institutions could make them undemocratic and unaccountable, by increasing the lack of control that people will eventually have over government decisions.

Ethical AI Governance

When making use of AI, there needs to be emphasis on ethics. All AI systems will have certain biases associated with them; however, these need to be addressed, and systems developed so that discrimination does not result. Transparency is really important when making decisions about Artificial Intelligence. We need to know how these decisions are made so that Artificial Intelligence is developed and used in a way that is.

When we create rules for Artificial Intelligence, we have to make sure those rules match the values that are important to people, like being fair and making sure everyone is included and treated with respect. To be fair and to respect people, Artificial Intelligence systems have to be built with these values in mind.

Institutional Reform

We need institutions that are well equipped to face the challenges which AI presents. We have to develop skills and capacities like digital literacy and auditing of AI systems. More importantly institutions must be independent and not overdependent on other states and organizations.

Democratic institutions must be strong enough to adequately oversee the integration and use of AI and the public must be able to express its views on its use. The goal should be to deploy AI as an augmentation tool, not a subversion.

THEORETICAL CONTRIBUTION

This paper makes three theoretical contributions to the area of algorithmic governance in public policy. These contributions can be integrated to extend the current literature on governance by bringing together systems theory and traditional approaches to political science and public administration, while providing a model for analyzing AI decision-making environments within the field of algorithmic governance.

Developing the Policy-Algorithm Governance Matrix

The main theoretical contribution is the Policy-Algorithm Governance Matrix which captures the impact of differences in the level of institutional capacity and algorithmic transparency on governance quality. Most studies of the impacts of AI have considered structural and technological variables separately. In this study, we combine structural and technological variables in a single framework to show how different dimensions of algorithmic governance interact.

The matrix is designed to show that the strength of institutions and the conditions offered by the transparency factor are not just add-ons to the sophistication of algorithmic systems, but are fundamental to a quality system of governance. These findings are in line with scholarship that places algorithmic systems within a broader governance ecosystem, rather than as an isolated decision-making mechanism. By disentangling the relationship between these variables, we provide a comprehensive framework for understanding when AI improves the quality of governance and undermines legitimacy.

Integrating political science and AI governance

Second, the study connects to the existing literature on political science and AI governance. Traditionally, political science has focused on authority, legitimacy, and institutional design issues, while AI governance speaks of transparency, performance, and algorithmic fairness. The paper offers a blending of the two perspectives, as algorithmic systems have implications for processes like decision-making authority and policy implementation. The implication for the field of AI governance is that this integration informs the understanding of the changes that the state is going through, positioning AI not simply as an instrumental tool, but as part of an entire structure of governance affecting the distribution of power and the effectiveness of state capacity and legitimacy, given the critical role of digital infrastructures.

A Multi-Dimensional Analytical Model

The third contribution is the development of a multi-dimensional analytical framework that emphasises the relationship between institutional capacity, algorithmic transparency and democratic accountability. Unlike single-dimensional frameworks, this multi-dimensional framework highlights the interdependence between these elements, and implies that gains in one dimension (e.g. algorithmic transparency) may not lead to substantial gains in governance quality without sufficient institutional capacity and accountability frameworks. The formulation draws on prior work on digital transformation and the increasingly complex interrelationship between technologically-mediated systems and established organizational structures.

Limitations

Most of this paper is conceptual. There have been no empirical tests or data that have supported the conclusions. Due to our theorization, we are provided a framework for the examination of a problem but cannot determine causality or how the Policy-Algorithm Governance Matrix may fare when faced with the real world as indicated by Jaakkola (2020) and Snyder (2019).

The context that this theory can be applied to is a further limitation. Even though we provided our theory in a general manner, institutions, politics and technology can vary across contexts and the nature of algorithmic governance may vary accordingly. For example, the outcomes experienced by developed and developing nations will not necessarily reflect the model we developed, according to Meijer and Grimmelikhuijsen (2021).

The rapid advancement of intelligence is another constraint. With changing technologies of artificial intelligence, policies that govern them, and practices of algorithmic governance, our thoughts may only prove relevant in the present. For example, some parts of the proposed framework may need to be modified as new technological advancements and institutional frameworks evolve, as outlined by Kitchin (2020) and Wirtz and colleagues (2019).

However, with these limitations this study provides us a useful platform in further research and comparison in the realm of algorithmic governance, especially in reference to the Policy-Algorithm Governance Matrix and the field of algorithmic governance.

Future Research Agenda

An important factor in the Future Research Agenda for governance is ensuring our notions about governance are indeed true. Using a tool to test our understanding, the Policy-Algorithm Governance Matrix helps us in developing our ideas further. By implementing the tool with real case-studies and various cases from around the world we can investigate our theories further.

How different countries apply governance in general and algorithmic governance in specific must be addressed. In this way we can examine how true our theoretical constructs are in practice. By analyzing cases of how states with both strong financial and old institutions apply algorithmic governance we can develop the application of our theoretical constructs to real cases (Meijer & Grimmelikhuijsen 2021; Janssen et al. 2020).

Another important avenue for future research is exploring how algorithmic governance operates in developing countries. Most of the research has been focused on developed countries, and how algorithmic governance operates in these developing states is far less explored. How governments utilize artificial intelligence, for example, when decision-making and where they utilize it; to increase citizens' ability to take up opportunities or to control the general populace; needs extensive investigation (Amoore, 2020; Taylor & Broeders, 2015).

To make ways to look at algorithmic governance, we need to find researchers who are interested in politics, data, ethics, and public administration. We should work with these experts so we can make tools to help us study governance. By working we can do a better job of looking at algorithmic governance from many different sides. This will help us understand it fully. We can make progress on this issue by working with people who know a lot, about these things like Kitchin said in 2020. That will help us learn more about algorithmic governance.

Lastly, we must strive to ensure algorithmic governance is both just and open. Policies must be created to guarantee that algorithmic governance is utilized in a fashion that is both equitable and beneficial to society as a whole, for as AI becomes a larger force in our lives, it must align with our most important ethical principles (Floridi et al. 2018; Zuboff, 2019).

CONCLUSION

This research investigated how AI has been used by governments in the decision-making process and raised concerns about the way AI has been used and the potential harm it could cause for the democracy, accountability and institutions. As government institutions adopt AI, it has an impact on policy-making and operation processes.

This research found it necessary to develop framework for the analysis of the way how AI operates with the government institution. We designed Policy-Algorithm Governance Matrix that illustrates the extent of government's employment of AI on a scale based on the level of openness and transparency. It helps us assess the effect of AI on government institutions performance.

The research demonstrated that it is inadequate to focus only on the efficiency or advanced state of AI and government performance and institutions. Accountability, transparency and fairness is another dimension for the research on the subject. Governments have to find an optimal level of the technology use so that they maintain their institutional structure for the democracy to survive.

The ultimate finding is that AI, as a decision-making tool in policy-making, should be able to help governments serve their citizens only if its operation adheres to the rules for the democracy and accountability to survive.

Conflict of Interest

The authors declared no conflict of interest.

Funding

None

REFERENCES

- Amoore, L. (2020). *Cloud ethics: Algorithms and the attributes of ourselves and others*. Duke University Press.
- Ananny, M., & Crawford, K. (2018). Seeing without knowing: Limitations of the transparency ideal. *New Media & Society*, 20(3), 973–989. <https://doi.org/10.1177/1461444816676645>
- Benjamin, R. (2019). *Race after technology: Abolitionist tools for the new Jim code*. Polity Press.
- Bovens, M. (2007). Analysing and assessing accountability. *European Law Journal*, 13(4), 447–468. <https://doi.org/10.1111/j.1468-0386.2007.00378.x>
- Cath, C. (2018). Governing artificial intelligence: Ethical, legal and technical opportunities and challenges. *Philosophical Transactions of the Royal Society A*, 376(2133). <https://doi.org/10.1098/rsta.2018.0080>
- Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New public management is dead—Long live digital-era governance. *Journal of Public Administration Research and Theory*, 16(3), 467–494.
- Engin, Z., & Treleaven, P. (2019). Algorithmic government: Automating public services. *The Computer Journal*, 62(3), 448–460. <https://doi.org/10.1093/comjnl/bxy035>
- Floridi, L., Cowls, J., Beltrametti, M., et al. (2018). AI4People—An ethical framework for a good AI society. *Minds and Machines*, 28(4), 689–707. <https://doi.org/10.1007/s11023-018-9482-5>
- Fukuyama, F. (2013). What is governance? *Governance*, 26(3), 347–368. <https://doi.org/10.1111/gove.12035>
- Gilson, L. L., & Goldberg, C. B. (2015). So what is a conceptual paper? *Group & Organization Management*, 40(2), 127–130.
- Janssen, M., Brous, P., Estevez, E., Barbosa, L., & Janowski, T. (2020). Data governance for trustworthy AI. *Government Information Quarterly*, 37(3). <https://doi.org/10.1016/j.giq.2020.101493>
- Kitchin, R. (2020). The data revolution and data-driven governance. *Information, Communication & Society*, 23(1), 1–17. <https://doi.org/10.1080/1369118X.2019.1621833>
- Margetts, H., & Dorobantu, C. (2019). Rethinking state capacity in the digital age. *Government Information Quarterly*, 36(1), 1–8.
- Meijer, A., & Grimmelikhuijsen, S. (2021). Responsible and accountable algorithmization. *Government Information Quarterly*, 38(3). <https://doi.org/10.1016/j.giq.2021.101577>
- Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation. *Government Information Quarterly*, 36(4). <https://doi.org/10.1016/j.giq.2019.03.002>
- O’Neil, C. (2016). *Weapons of math destruction*. Crown.
- OECD. (2021). *Artificial intelligence in society*. OECD Publishing.
- Pasquale, F. (2015). *The black box society*. Harvard University Press.
- Snyder, H. (2019). Literature review methodology. *Journal of Business Research*, 104, 333–339.
- Sun, T. Q., & Medaglia, R. (2019). Mapping AI in public sector. *Government Information Quarterly*, 36(2), 368–383.
- Taylor, L., & Broeders, D. (2015). Development and surveillance. *Information Technology for Development*, 21(4), 514–529.
- Valle-Cruz, D., Criado, J. I., Sandoval-Almazan, R., & Ruvalcaba-Gomez, E. (2020). AI in policy cycle. *Government Information Quarterly*, 37(4).
- Veale, M., & Brass, I. (2019). Administration by algorithm. *Public Money & Management*, 39(6), 425–435.
- Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2019). AI in public administration. *International Journal of Public Administration*, 42(7), 596–615.
- Zuboff, S. (2019). *The age of surveillance capitalism*. PublicAffairs.