Transforming Governance: A Systematic Review of AI Applications in Policymaking

Amirah 'Aisha Badrul Hisham[*], Nor Ashikin Mohamed Yusof, Siti Hasliah Salleh and Hafiza Abas
Faculty of Artificial Intelligence, Universiti Teknologi Malaysia, Jalan Sultan Yahya Petra, 54100 Kuala Lumpur, Malaysia

*Corresponding author: a.aisha@utm.my

Abstract

This systematic literature review examines the transformative applications of artificial intelligence (AI) in policymaking, exploring its potential to enhance decision-making, public engagement, and governance effectiveness. Employing a rigorous research methodology, this review analyzed scholarly articles from Scopus, Web of Science, and PubMed databases using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, ensuring methodological transparency and reproducibility. The final dataset of 22 articles was synthesized into four key themes: (i) AI in policy development and implementation, which focuses on data-driven decision support in policy formulation; (ii) AI in public administration and governance, highlighting AI's role in improving public sector efficiency and resilience; (iii) ethical and regulatory aspects of AI in policymaking, which addresses critical issues like transparency, privacy, and bias; and (iv) applications of AI in specific policy domains, encompassing areas such as public health, environmental sustainability, and education. Findings indicate that AI can support evidence-based policymaking by facilitating real-time data analysis, scenario modeling, and enhanced public participation. However, challenges persist, particularly concerning ethical considerations, algorithmic accountability, and regulatory frameworks that ensure AI is implemented responsibly and equitably. This review underscores the need for interdisciplinary collaboration, ethical standards, and robust governance frameworks to address these challenges and maximize AI's benefits in policy development and implementation. The synthesis of insights from diverse policy contexts provides a foundation for future research, encouraging exploration of responsible AI integration in policymaking to advance public trust, accountability, and policy effectiveness).

Keywords: Artificial intelligence, governance, policy innovation, PRISMA

■ 1.0 INTRODUCTION

Artificial Intelligence (AI) has rapidly emerged as a transformative force across various sectors, including healthcare, finance, and education (Criado *et al*., 2024). In policymaking, AI presents unparalleled opportunities to improve decision-making, streamline complex processes, and address intricate societal challenges (Wirtz *et al*., 2019). However, integrating AI into policymaking brings forth considerations around transparency, ethics, and accountability, necessitating a careful examination of its role and impact. This systematic review explores the applications, potential benefits, and limitations of AI in policy formulation and implementation, aiming to illuminate prevailing research trends and suggest directions for future study.

The application of AI in policymaking is no longer a futuristic concept but an advancing reality that is increasingly relevant to contemporary governance challenges (Sun & Medaglia, 2019). Policymakers often confront complex, multifaceted issues that demand in-depth analysis and timely interventions (Meijer & Bolívar, 2016). While traditional decision-making processes are robust, they are sometimes hindered by inherent human cognitive limitations and biases. AI technologies, including advanced algorithms, natural language processing, and predictive analytics, provide powerful tools for analyzing large datasets, identifying patterns, and generating insights that significantly improve policy design and execution (Eggers *et al*., 2017; Susha *et al*., 2019).

One critical area where AI demonstrates notable promise is predictive analytics for social and economic policies. By leveraging past datasets and advanced learning models, AI tools can project economic trends, predict social dynamics, and assess the potential impacts of various policy measures. (Janssen *et al*., 2015; Meijer & Bolívar, 2016). For example, AI can aid in predicting the impacts of fiscal policies on economic growth or assessing the effectiveness of social welfare programs. These predictive capabilities empower policymakers to develop more targeted and effective policies, optimize resource allocation, and achieve desired outcomes (Mittelstadt *et al*., 2016). Additionally, AI plays a significant role in public health policy. AI-driven models can analyze epidemiological data to predict disease outbreaks, assess the spread of infectious diseases, and evaluate the effectiveness of public health interventions (Esteva

et al., 2019). During the COVID-19 pandemic, AI tools were instrumental in tracking virus transmission, modeling infection rates, and supporting vaccine distribution efforts (Whitelaw *et al.*, 2020). These applications highlight AI's potential to enhance the precision and responsiveness of public health policies (Esteva *et al.*, 2019).

Moreover, AI fosters more inclusive and participatory policymaking processes. Through advanced algorithms, processing, and sentiment analysis, AI systems can assess public opinion and feedback from social media and other digital platforms, equipping policymakers with timely understanding of public sentiments and concerns (Susha *et al.*, 2019). This capability supports more transparent and democratic decision-making, aligning policies with the needs and preferences of the populace (Mittelstadt *et al.*, 2016; Susha *et al.*, 2019). Despite its promising applications, integrating AI in policymaking presents several challenges. Ensuring data privacy, algorithmic transparency, and ethical adherence are crucial to maintaining fair, accountable, and trustworthy AI-driven policymaking (Mittelstadt *et al.*, 2016). Effective AI implementation in policymaking also requires interdisciplinary collaboration among technologists, policymakers, and social scientists (Janssen *et al.*, 2015).

This systematic review aims to comprehensively analyze the significance of AI in policymaking by examining its integration into policy development, implementation, ethical and regulatory frameworks, and specific policy domains. By identifying current trends, benefits, challenges, and future directions, this review contributes to the evolving discourse on leveraging AI for effective and equitable policymaking. The application of AI in policymaking holds substantial potential to transform governance and public administration. Through synthesizing existing knowledge, this review seeks to provide meaningful perspectives on the prudent and impactful incorporation of AI in policy processes, thereby supporting data-driven, transparent, and inclusive practices (OECD, 2020).

■ 2.0 LITERATURE REVIEW

The use of artificial intelligence (AI) in policymaking has garnered significant attention in recent years, fueled by its potential to transform data analysis and improve policy decision-making processes. AI techniques, especially machine learning and natural language processing, provide robust tools for examining large datasets and uncovering patterns that can guide policy development (Ali *et al.*, 2023; Reis *et al.*, 2019). These capabilities allow AI to support policymakers by generating evidence-based recommendations derived from rigorous data analysis and simulations, enhancing the precision and efficacy of decisions made (Reis *et al.*, 2019). Moreover, AI facilitates greater citizen engagement in the policymaking process by gathering feedback and analyzing public opinion on various issues, thereby making policy more responsive to public needs and sentiments (Reis *et al.*, 2019).

However, implementing AI in policymaking also brings forth critical ethical and regulatory concerns, including issues around bias, transparency, and accountability (Atkinson, 2024; Badrul Hisham *et al.*, 2024; Reis *et al.*, 2019). Effectively managing these risks calls for AI systems to be designed and implemented in an ethically responsible and transparent manner, underpinned with clear guidelines and oversight mechanisms (Atkinson, 2024; Mohamed Yusof *et al.*, 2024; Reis *et al.*, 2019). Cultivating trust in AI-driven policymaking processes is essential to ensure they remain fair, impartial, and accountable to the public. Conducting a systematic literature review is an important step for researchers to comprehensively summarize existing knowledge on AI's role in policymaking, ensuring an objective and well-rounded understanding of current applications, benefits, and challenges (Ali *et al.*, 2023).

A systematic approach to the literature review involves several key steps, starting with defining the scope and requirements, performing an exhaustive search across relevant databases, and screening articles for relevance and methodological quality (Ali *et al.*, 2023; Atkinson, 2024). The findings are then synthesized and analyzed to extract prominent themes, highlight challenges, and identify directions for future research (Atkinson, 2024; Saheb & Saheb, 2023). A thorough review should also address any limitations or potential biases within the methodologies employed, thus promoting a critical understanding of the research landscape (Atkinson, 2024). AI presents significant potential to advance data-driven policymaking, enhance decision-making accuracy, and strengthen citizen engagement. Nonetheless, substantial challenges related to ethics, regulatory frameworks, and public trust remain and must be carefully addressed to ensure the responsible use of AI within policy contexts (Reis *et al.*, 2019; Saheb & Saheb, 2023). Future research should concentrate on developing comprehensive frameworks for the ethical deployment of AI in policymaking and assessing the tangible impact of AI on policy outcomes (Saheb & Saheb, 2023).

■ 3.0 MATERIAL AND METHODS

This study conducted a comprehensive and systematic review of AI applications in policymaking, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to maintain methodological rigor [12]. Recognized for its robustness, PRISMA provides a structured approach for identifying, screening, and analyzing relevant literature, enabling this review to deliver a transparent, reproducible, and comprehensive synthesis of current research, thus offering meaningful insights into the role of AI in policymaking.

3.1 Identification

The search strategy was developed to be both comprehensive and precise, ensuring the inclusion of pertinent studies across a range of reputable sources. The selected databases, which are Emerald Insight, IEEE, Scopus, Web of Science, and PubMed. These databases are known for their extensive coverage of academic and industry publications in artificial intelligence, public policy, and governance. These databases are valued for their depth and breadth, providing access to high-quality, peer-reviewed articles essential for the systematic review process.

A structured approach was employed in crafting search strings. In the initial stage, keywords were identified by consulting dictionaries, encyclopedias, thesauri, and previous research studies, allowing for the development of search terms directly relevant to AI's application in policymaking, such as policy assessment, formulation, implementation, agenda-setting, and evaluation. Following preliminary scoping exercises, these terms were refined to ensure a comprehensive capture of studies addressing AI implementation within policymaking, as shown in Table 1.

Each database search was customized to align with its unique search syntax, enabling tailored and accurate retrieval of literature. Filters were applied to limit results to articles published between 2020 and 2024, written in English, and focused on journal articles, which are typically the most relevant and rigorously peer-reviewed information sources. This strategy retrieved 72 articles during the initial search phase, covering diverse perspectives on AI in policymaking. This systematic approach ensured that the literature review was exhaustive while minimizing irrelevant studies. By using databases encompassing a broad spectrum of scholarly works, the review is grounded in the most relevant and current research, providing a solid foundation for systematic analysis. All databases were assessed in September 2024.

Table 1 Search strings for database

Database	Strings
Emerald Insight	((title:"Artificial intelligence") OR (title:"AI")) AND ((title:"polic* cycl*") OR (title:"policy assess") OR (title:"policy formula*") OR (title:"policy implement*") OR (title:"agenda set*") OR (title:"policymak* cycl*") OR (title:"policymak*") OR (title:"policy evaluat*")) Year From 2020 until 2024 Content type Article
IEEE	(("Document Title":Artificial intelligence) OR ("Document Title":AI)) AND (("Document Title":polic* cycl*) OR ("Document Title":policy assess*) OR ("Document Title":policy formula*) OR ("Document Title":policy implement*) OR ("Document Title":agenda set*) OR ("Document Title":policymak* cycl*) OR ("Document Title":policymak*) OR ("Document Title":policy evaluat*)) Filters Applied: Journals, 2020 - 2024
Scopus	TITLE ((("artificial intelligence") OR (ai)) AND (("polic* cycl*") OR ("policy assess*") OR ("policy formula*") OR ("policy implement*"))) AND (LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023) OR LIMIT-TO (PUBYEAR , 2024)) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))
Web of Science	((Artificial intelligence) OR (AI)) AND ((polic* cycl*) OR (policy assess*) OR (policy formula*) OR (policy implement*) OR (agenda set*) OR (policymak* cycl*) OR (policymak*) OR (policy evaluat*)) (Title) and 2024 or 2023 or 2022 or 2021 or 2020 (Publication Years) and Article (Document Types) and English (Languages) and 2024 or 2023 or 2022 or 2021 or 2020 (Publication Years) and Article (Document Types)
PubMed	("Artificial intelligence"[Title] OR "AI"[Title]) AND ("polic* cycl*"[Title] OR "policy assess*"[Title] OR "policy formula*"[Title] OR "policy implement*"[Title] OR "agenda set*"[Title] OR "policymak* cycl*"[Title] OR "policymak*"[Title] OR "policy evaluat*"[Title]) Filters: from 2020 – 2024

3.2 Screening

The search strategy was developed to be both comprehensive and precise, ensuring the inclusion of pertinent studies across a range of reputable sources. The selected databases, which are Emerald Insight, IEEE, Scopus, Web of Science, and PubMed. These databases are known for their extensive coverage of academic and industry publications in artificial intelligence, public policy, and governance. These databases are valued for their depth and breadth, providing access to high-quality, peer-reviewed articles essential for the systematic review process.

After collecting a broad range of potentially relevant studies on AI applications in policymaking during the identification phase, the focus shifted to the screening phase. Here, the selected articles underwent rigorous evaluation against predefined research questions and specific inclusion and exclusion criteria (refer to Table 2). The initial round of screening eliminated 38 publications that did not align with the study's focus, leaving 34 articles for more detailed analysis. During this stage, duplicate publications were identified and removed, as shown in Figure 1.

Figure 2 illustrates the occurrence of duplicates across databases. The figure illustrates the distribution of selected articles across several academic databases; IEEE, Web of Science, Scopus, PubMed, and Emerald Insight highlighting the relative contributions of each to this systematic review on AI applications in policymaking. Notably, Web of Science emerged as the primary source, with 13 articles retrieved, suggesting that this database provides the most extensive coverage for this research area. In contrast, the other databases; IEEE, Scopus, PubMed, and Emerald Insight contributed fewer articles, with only one to three articles each. This pattern indicates that while these databases include

relevant studies, their collections on AI in policymaking may be less comprehensive than that of Web of Science.

The minimal overlap between databases underscores the uniqueness of content offered by each source. For instance, Scopus and Web of Science share two articles, while Scopus and PubMed share only one, reflecting limited redundancy across databases. This suggests that each repository contributes unique insights and reinforces the value of a multi-database search strategy. The inclusion of several databases thus enhances the breadth and diversity of the literature, ensuring that the review captures a more comprehensive perspective on the topic. This figure highlights the importance of utilizing multiple academic databases in conducting a systematic literature review on AI in policymaking. The Web of Science provides the most substantial resource, yet other databases contribute essential studies that broaden the scope, affirming that a diverse database selection is crucial for a thorough and representative literature review.

The inclusion criteria prioritized research papers offering practical recommendations, excluding other types of publications, such as books, book chapters, conference proceedings, newsletters, and review articles. The reviewed was limited to publications in English and focused on recent research conducted between 2020 and 2024. This systematic, multi-layered screening ensured the inclusion of only the most relevant, high-quality studies for final analysis, refining the dataset for a thorough and focused review.

Table 2 The selection criterion in searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Timeline	2020 – 2024	Before 2020 and after 2024
Document type	Journal	Book, book chapter, conference proceedings, newsletter, review
Publication stage	Final	In press
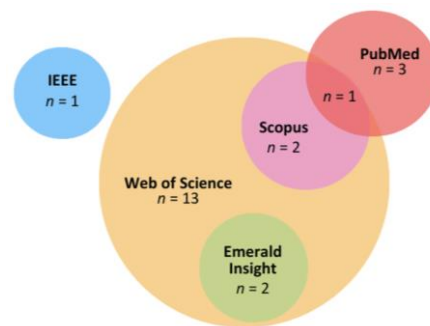
Figure 1 Illustration of database for studied articles ($n = 22$)

3.3 Eligibility

During the eligibility phase, a meticulous selection process was implemented to ensure only the most pertinent studies were included in the final analysis. Initially, 29 articles were selected for detailed consideration, with each title carefully reviewed to verify alignment with the inclusion criteria and overall research objectives. Seven articles were excluded at this stage: three were review papers, which fell outside the scope of primary research required for this review; three were non-journal articles, including a book, a book chapter, and a letter; and one was dismissed due to the lack of full-text accessibility. This stringent vetting process ensured that only the most relevant, accessible, and high-quality studies were retained for further analysis, enhancing the review's focus and reliability.

3.4 Data Abstraction and Analysis

This research employed an extensive analysis to thoroughly assess and integrate findings from various research methodologies, encompassing quantitative, qualitative, and mixed-method investigations. The primary aim of this approach was to extract key themes relevant to the role and significance of AI in policymaking. The analysis began with a rigorous data collection phase, during which 22 selected publications were reviewed in detail to identify content pertinent to the research questions, as illustrated in Figure 2. Following data collection, a systematic evaluation of the studies was conducted, focusing on methodologies used and outcomes reported. The lead author, collaborating with co-authors, developed thematic categories by extracting insights from the synthesized data. A detailed log was maintained throughout the analysis to capture emerging interpretations, reflections, and analytical considerations, ensuring transparency and methodological rigor.

Any discrepancies in thematic interpretation were resolved through collaborative discussions among the authors, reaching consensus on key themes. The refined themes ensured internal consistency across the analysis. Additionally, an expert review involving two field specialists; a law and governance expert (Nor Ashikin Mohamed Yusof) and an AI specialist (Wan Azani Mustafa) was conducted to validate the findings. This dual-review process enhanced the

thematic framework's robustness, confirming its clarity, relevance, and applicability within the broader context of AI-driven policymaking.
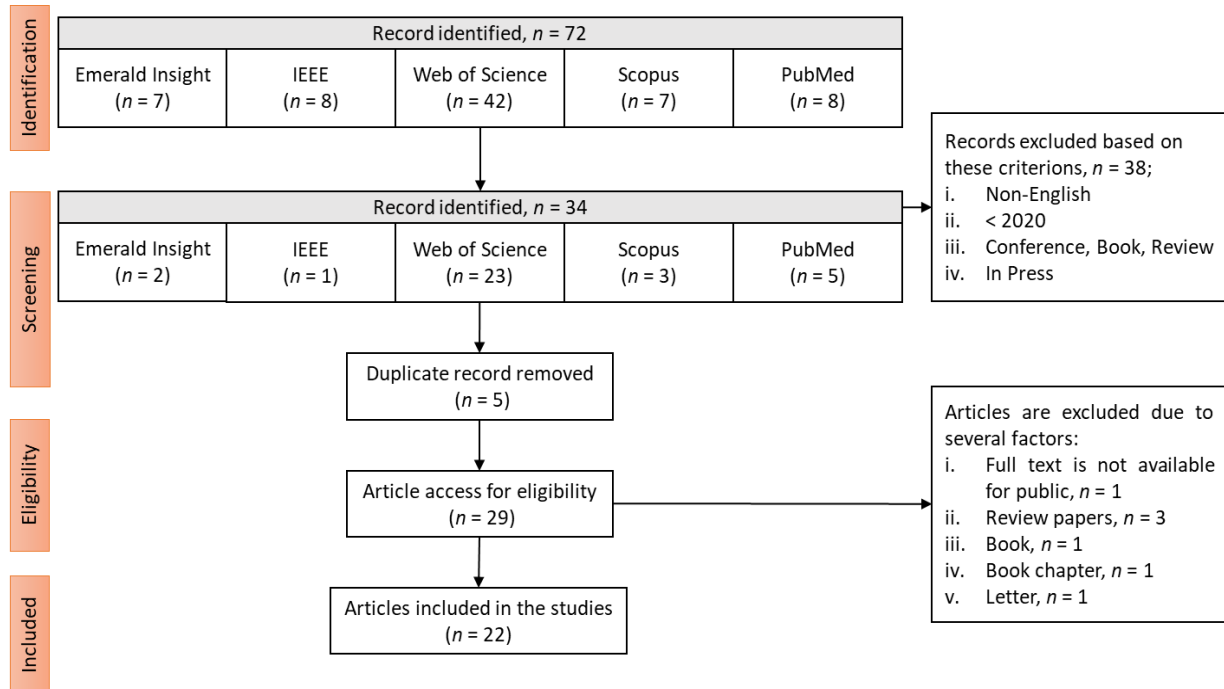
Figure 2 Flow diagram of the proposed search strategy based on the PRISMA framework [12]

■ 4.0 RESULTS AND FINDINGS

Conducting a systematic literature review requires a structured approach that aligns with the steps outlined in the PRISMA framework. This research classifies selected articles into key themes, as shown in Table 3, to create a well-organized analysis of artificial intelligence applications within policymaking. Note that this categorization, based on article titles, will be supplemented with in-depth analysis of the full articles for a more comprehensive review.

i. AI in policy development and implementation

Recent advances in data-driven tools have substantially boosted policymaker engagement. Research reveals that combining expert knowledge with structured narratives significantly enhances engagement, especially in areas where policymakers are less familiar with data-centric approaches. For example, a study observed a 28% and 34% increase in engagement based on professionalism levels and prior data experience (Schiff & Schiff, 2023). The drivers, pressures, state, impact, and response (DPSIR) model in Gran Canaria exemplifies AI's capability to support sustainable policy strategies by providing structured, data-informed insights, which help policymakers base decisions on evidence (Penate-Sanchez *et al*., 2023). This model has shown effectiveness in addressing local environmental issues, demonstrating AI's potential to strengthen the sustainability and impact of policy decisions. Additionally, AI analysis of social media and digital sources has enabled emerging entrepreneurial ecosystems to craft policies that drive economic growth (Hannigan *et al*., 2022).

New frameworks have also been established to improve transparency and accountability in policymaking, particularly within local governments. Based on real-life case studies, these frameworks address operational challenges, ensuring that decision-making remains both compliant and explainable (Papadakis *et al*., 2024). In the health sector, participatory modeling has proven effective in tackling public health issues, such as obesity, by integrating diverse perspectives into the policy development process, thereby fostering holistic solutions (Giabbanelli & MacEwan, 2024). Moreover, critical evaluations of United States national policy strategies underscore the challenge of translating ethical principles into concrete, actionable solutions (Schiff, 2023).

The competitive dynamics between the United States and China highlight the importance of structured, data-informed strategies to improve policy effectiveness and feasibility, with dual-scoring metrics applied to assess each country's policies (Sabau & Lee, 2023). Additionally, data-driven models have been deployed to evaluate pandemic response strategies, employing advanced modeling techniques to balance trade-offs and optimize policy responses during crises (Song *et al*., 2022). Collectively, these examples highlight how data and analytical methods are reshaping policy development to be more responsive, transparent, and evidence based.

ii. AI in public administration and governance

AI technologies play a pivotal role in improving decision-making and governance within public administration. Case studies from various countries illustrate the transformative effect of AI on public sector practices. During

Greece's economic crisis, data-driven methodologies provided insights that helped policymakers manage the crisis more effectively, identifying resilience factors within local businesses (Loukis *et al*., 2020). Similarly, urban energy management has benefited from big data and technology integration. A taxonomy of energy efficiency models revealed the importance of technological standards in addressing increasing energy demands resulting from blockchain and smart city infrastructure development (Anthopoulos & Kazantzi, 2022).

The importance of trustworthiness is obvious; for instance, a study in Singapore identified four dimensions, which are ability, recognition, relational, and principle-based factors that influence public perception of technologies, underscoring the necessity of collaboration and transparency between policymakers and stakeholders (Goh & Ho, 2024). In cities transitioning to low-carbon economies, advanced systems have been instrumental in assessing economic resilience, showing improvement from 2011 to 2021 due to increased public participation and policy interventions (Deng *et al*., 2023). Additionally, analyses of water conservation policies demonstrate how AI and related technologies can reduce carbon emissions by optimizing resource management (Xiang *et al*., 2024). These cases illustrate the impact of modern tools on public administration, enhancing governments' ability to manage resources effectively, increase transparency, and promote sustainable governance.

iii. Ethical and regulatory aspects of AI in policymaking

As advanced technologies become more integral to policymaking, ethical considerations are critical to ensuring that AI serves public interests responsibly. In healthcare, the use of AI decision-support systems raises ethical concerns regarding privacy, data use, and equity. These systems must align with established ethical frameworks, particularly in healthcare sectors that view services either as rights or commodities (Kluge, 2024). The European Union's data discrimination protections provide a valuable model for ensuring fairness in AI-driven decisions, underscoring the need for ethical frameworks in AI governance (Niklas & Dencik, 2024). Such regulations are essential for mitigating bias, safeguarding privacy, and promoting transparency in AI-influenced policy decisions.

The rise of AI also impacts intellectual property rights, introducing questions around authorship and copyright in AI-generated work. Without a clear international framework, uncertainty persists about legal protections for such content, highlighting the need for new legal categories to ensure fair protection (JavieraCáceres & Felipe Muñoz, 2020). Meanwhile, public discourse on ethical AI use, especially in the United States, reveals that while the public can influence policy, engagement in ethical considerations is limited. Economic priorities often overshadow ethical concerns, suggesting a need for greater emphasis on responsible AI governance (Schiff, 2024). By integrating frameworks such as the GDPR, policymakers can adopt regulatory measures that balance innovation with public interest, fostering ethically guided AI governance.

iv. Applications of AI in specific policy domains

Technological advancements significantly impact various policy domains. For instance, in privacy regulation, systems such as PermPress assess application for privacy policies, identifying compliance gaps and highlighting the need for stronger oversight (Rahman *et al*., 2022). In education, a Delphi study pinpointed trends such as equity, fairness, and privacy, stressing the ethical challenges that arise with increased technology integration. This study provided policy recommendations and flagged areas where further research is necessary (Ifenthaler *et al*., 2024).

In digital identity, new systems offer solutions for preventing identity theft, emphasizing future-proof, sustainable management of identities (Mir *et al*., 2022). Similarly, advanced models in environmental management help mitigate risks associated with landfills, although real-time data monitoring challenges remain (Gautam *et al*., 2024). A critical review of United States national research strategies stressed the importance of frameworks that promote accountability and public trust, positioning the country to address global challenges effectively (Gursoy & Kakadiaris, 2023). These examples highlight the wide-ranging applications of modern technology across sectors, enhancing privacy protections, education, environmental sustainability, and governance.

■ 5.0 DISCUSSION

Modern tools and technologies are progressively integrated into policy development and implementation, offering transformative potential in traditional processes. Advanced analytical methods, such as data mining and modeling, allow policymakers to manage extensive datasets, thereby enhancing evidence-based decision-making. Studies show that blending expert insights with narrative approaches increases engagement, especially in regions with limited exposure to data-driven policy methods. For instance, the drivers, pressures, state, impact, and response (DPSIR) model supports sustainable policy strategies by grounding decisions in environmental data. Furthermore, data-driven policy recommendations have fueled economic growth within emerging ecosystems. Transparent decision-making frameworks address operational and compliance challenges, while participatory modeling in the health sector exemplifies the effectiveness of collaborative approaches in developing comprehensive policies.

In public administration, data-driven methodologies have proven effective in navigating complex challenges, such as resilience assessment during economic downturns. Urban management has benefited from efficiency models driving sustainability, while economies shifting toward low-carbon frameworks show resilience through enhanced public engagement. Research from Singapore identifies key factors influencing public trust in government and technology, highlighting the importance of collaboration. Environmental policies, including water conservation, demonstrate how modern tools can reduce carbon emissions by optimizing resource use.

Ethical and regulatory considerations remain essential as AI tools are integrated into policymaking. In healthcare, decision-support systems provide critical insights but raise privacy and bias concerns. Policymakers must balance technological innovation with ethical standards, especially in areas like healthcare and research. The European Union's approach to data discrimination sets a foundation for fair and transparent decision-making, while intellectual property rights are evolving to address the unique challenges of AI-generated content. In the United States, public engagement primarily emphasizes economic impact over ethical concerns, suggesting the need for frameworks that integrate public perspectives into ethical policymaking.

Across various policy domains, technological solutions have made substantial impacts. Privacy regulation is strengthened through systems evaluating compliance, while education policy addresses issues of equity and data security. Digital identity management offers robust solutions against unauthorized access, and environmental management benefits from tools that mitigate landfill impacts, despite challenges in data accuracy and monitoring. United States research strategies emphasize the importance of public trust and accountability, illustrating the expansive influence of advanced tools on privacy, education, environmental sustainability, and governance.

■ 6.0 CONCLUSIONS

Integrating AI and other advanced tools into policymaking holds remarkable potential to transform governance and public administration. This review underscores AI's multifaceted role in bolstering sustainable policy strategies, strengthening resilience within public administration, and advancing ethical governance frameworks. While AI-driven approaches offer substantial benefits for informed decision-making and tackling complex societal challenges, they also introduce significant concerns around transparency, bias, privacy, and ethical responsibility.

Future research should focus on developing robust frameworks that ensure responsible and equitable AI integration across diverse policy domains. Realizing AI's full potential in policymaking will require interdisciplinary collaboration, adherence to ethical guidelines, and frameworks that build public trust and accountability. Addressing these critical challenges will enable policymakers to leverage AI for creating data-driven, transparent, and inclusive policies that effectively address society's evolving needs. This systematic review establishes a foundation for further research, fostering continued exploration of responsible AI applications within policy processes.

ACKNOWLEDGMENT

REFERENCES

Ali, O., Abdelbaki, W., Shrestha, A., Elbasi, E., Alryalat, M. A. A., & Dwivedi, Y. K. (2023). A systematic literature review of artificial intelligence in the healthcare sector: Benefits, challenges, methodologies, and functionalities. *Journal of Innovation & Knowledge*, *8*(1), 100333. https://doi.org/https://doi.org/10.1016/j.jik.2023.100333

Anthopoulos, L., & Kazantzi, V. (2022). Urban Energy Efficiency Assessment Models from an AI and Big Data Perspective: Tools for Policy Makers. *Sustainable Cities And Society*, *76*, Article 103492. https://doi.org/10.1016/j.scs.2021.103492

Atkinson, C. F. (2024). Cheap, Quick, and Rigorous: Artificial Intelligence and the Systematic Literature Review. *Social Science Computer Review*, *42*(2), 376-393. https://doi.org/10.1177/08944393231196281

Badrul Hisham, A. A., Mohamed Yusof, N. A., Shaari, Z., Abas, H., Mustapa, S., Zahar, S., Salehudin, W. R., Saliman, S., Almusawi, M., Mustafa, W. A., & Mohd Yunus, F. N. (2024, 14-15 Nov. 2023). Unveiling The Digital Realm: A Systematic Review on Regulating Blockchain for Online Breast Milk Services. International Conference for Technological Engineering and its Applications in Sustainable Development (ICTEASD-2023), Islamic University, Al-Najaf, Iraq.

Criado, J. I., Sandoval-Almazán, R., & Gil-Garcia, J. R. (2024). Artificial intelligence and public administration: Understanding actors, governance, and policy from micro, meso, and macro perspectives. *Public Policy and Administration*, *0*(0), 09520767241272921. https://doi.org/10.1177/09520767241272921

Deng, Y., Jiang, W. Y., & Wang, Z. Y. (2023). Economic Resilience Assessment and Policy Interaction of Coal Resource Oriented Cities for The Low Carbon Economy based on AI. *Resources Policy*, *82*, Article 103522. https://doi.org/10.1016/j.resourpol.2023.103522

Eggers, W. D., Schatsky, D., & Viechnicki, P. (2017). *AI-augmented government - Using cognitive technologies to redesign public sector work*. D. U. Press. https://www2.deloitte.com/content/dam/insights/us/articles/3832_AI-augmented-government/DUP_AI-augmented-government.pdf

Esteva, A., Robicquet, A., Ramsundar, B., Kuleshov, V., DePristo, M., Chou, K., Cui, C., Corrado, G., Thrun, S., & Dean, J. (2019). A guide to deep learning in healthcare. *Nature Medicine*, *25*(1), 24-29. https://doi.org/10.1038/s41591-018-0316-z

Gautam, K., Pandey, N., Yadav, D., Parthasarathi, R., Turner, A., Anbumani, S., & Jha, A. N. (2024). Ecotoxicological Impacts of Landfill Sites: Towards Risk Assessment, Mitigation Policies and The Role of Artificial Intelligence. *Science Of The Total Environment*, *927*, Article 171804. https://doi.org/10.1016/j.scitotenv.2024.171804

Giabbanelli, P. J., & MacEwan, G. (2024). Leveraging Artificial Intelligence and Participatory Modeling to Support Paradigm Shifts in Public Health: An Application to Obesity and Evidence-Based Policymaking. *Information*

(Switzerland). https://doi.org/10.3390/info15020115

Goh, T. J., & Ho, S. S. (2024). Trustworthiness of Policymakers, Technology Developers, and Media Organizations Involved in Introducing AI for Autonomous Vehicles: A Public Perspective. *Science Communication*. https://doi.org/10.1177/10755470241248169

Gursoy, F., & Kakadiaris, I. A. (2023). Artificial Intelligence Research Strategy of The United States: Critical Assessment and Policy Recommendations. *Frontiers In Big Data*, *6*, Article 1206139. https://doi.org/10.3389/fdata.2023.1206139

Hannigan, T. R., Briggs, A. R., Valadao, R., Seidel, M. D. L., & Jennings, P. D. (2022). A New Tool for Policymakers: Mapping Cultural Possibilities in An Emerging AI Entrepreneurial Ecosystem [Article]. *Research Policy*, *51*(9), Article 104315. https://doi.org/10.1016/j.respol.2021.104315

Ifenthaler, D., Majumdar, R., Gorissen, P., Judge, M., Mishra, S., Raffaghelli, J., & Shimada, A. (2024). Artificial Intelligence in Education: Implications for Policymakers, Researchers, and Practitioners. *Technology Knowledge and Learning*. https://doi.org/10.1007/s10758-024-09747-0

Janssen, M., Wimmer, M. A., & Deljoo, A. (2015). *Policy Practice and Digital Science: Integrating Complex Systems, Social Simulation and Public Administration in Policy Research*. Springer International Publishing. https://books.google.com.my/books?id=ZvHLCQAAQBAJ

JavieraCáceres, B., & Felipe Muñoz, N. (2020). Artificial Intelligence, A New Frontier for Intellectual Property Policymaking [Article]. *Journal of Intellectual Property Law and Management*, *9*(2), 108-131.

Kluge, E. H. (2024). The Ethics of Artificial Intelligence in Healthcare: From Hands-on Care to Policymaking. *Healthc Manage Forum*, 8404704241253985. https://doi.org/10.1177/08404704241253985

Loukis, E. N., Maragoudakis, M., & Kyriakou, N. (2020). Artificial Intelligence-based Public Sector Data Analytics for Economic Crisis Policymaking [Article]. *Transforming Government: People, Process and Policy*, *14*(4), 639-662. https://doi.org/10.1108/TG-11-2019-0113

Meijer, A., & Bolívar, M. P. R. (2016). Governing the smart city: a review of the literature on smart urban governance. *International Review of Administrative Sciences*, *82*(2), 392-408. https://doi.org/10.1177/0020852314564308

Mir, U., Kar, A. K., & Gupta, M. P. (2022). AI-enabled Digital Identity – Inputs for Stakeholders and Policymakers [Article]. *Journal Of Science And Technology Policy ManagemenT*, *13*(3), 514-541. https://doi.org/10.1108/JSTPM-09-2020-0134

Mittelstadt, B. D., Allo, P., Taddeo, M., Wachter, S., & Floridi, L. (2016). The ethics of algorithms: Mapping the debate. *Big Data & Society*, *3*(2), 2053951716679679. https://doi.org/10.1177/2053951716679679

Mohamed Yusof, N. A., Saimy, I. S., Salleh, S. H., Badrul Hisham, A. A., Mustafa, W. A., & Alkafaji, H. (2024). Artificial Intelligence Law for Malaysia. International Conference for Technological Engineering and its Applications in Sustainable Development (ICTEASD-2023), Islamic University, Al-Najaf, Iraq.

Niklas, J., & Dencik, L. (2024). Data Justice in The Twin Objective of Market and Risk: How Discrimination is Formulated in EU's AI Policy. *Policy and Internet*. https://doi.org/10.1002/poi3.392

OECD. (2020). *Building Capacity for Evidence-Informed Policy-Making*. https://doi.org/doi:https://doi.org/10.1787/86331250-en

Papadakis, T., Christou, I. T., Ipektsidis, C., Soldatos, J., & Amicone, A. (2024). Explainable and Transparent Artificial Intelligence for Public Policymaking. *Data & Policy*, *6*, Article e10. https://doi.org/10.1017/dap.2024.3

Penate-Sanchez, A., Alonso, C. P., Espino, E. P. C., & Martel, A. F. (2023). A Machine Learning Approach to Design a DPSIR Model: A Real Case Implementation of Evidence-based Policy Creation using AI. *Advanced Engineering Informatics*, *57*, Article 102042. https://doi.org/10.1016/j.aei.2023.102042

Rahman, M. S., Naghavi, P., Kojusner, B., Afroz, S., Williams, B., Rampazzi, S., & Bindschaedler, V. (2022). PermPress: Machine Learning-Based Pipeline to Evaluate Permissions in App Privacy Policies. *IEEE Access*, *10*, 89248-89269. https://doi.org/10.1109/ACCESS.2022.3199882

Reis, J., Santo, P. E., & Melão, N. (2019). Artificial Intelligence in Government Services: A Systematic Literature Review. In Á. Rocha, H. Adeli, L. P. Reis, & S. Costanzo, *New Knowledge in Information Systems and Technologies* Cham.

Sabau, T., & Lee, D. W. (2023). Navigating the AI Ascendancy: Evaluating US Policies in the Sino- American AI Race. *Korean Journal Of Defense Analysis*, *35*(3), 427-454. https://doi.org/10.22883/kjda.2023.35.3.005

Saheb, T., & Saheb, T. (2023). Topical Review of Artificial Intelligence National Policies: A Mixed Method Analysis. *Technology in Society*, *74*, 102316. https://doi.org/https://doi.org/10.1016/j.techsoc.2023.102316

Schiff, D. S. (2023). Looking Through A Policy Window with Tinted Glasses: Setting the Agenda for US AI Policy. *Review Of Policy Research*, *40*(5), 729-756. https://doi.org/10.1111/ropr.12535

Schiff, D. S. (2024). Framing Contestation and Public Influence on Policymakers: Evidence From US Artificial Intelligence Policy Discourse. *Policy and Society*. https://doi.org/10.1093/polsoc/puae007

Schiff, D. S., & Schiff, K. J. (2023). Narratives and Expert Information in Agenda-setting: Experimental Evidence on State Legislator Engagement with Artificial Intelligence Policy. *Policy Studies Journal*, *51*(4), 817-842. https://doi.org/10.1111/psj.12511

Song, S. R., Liu, X., Li, Y., & Yu, Y. (2022). Pandemic Policy Assessment by Artificial Intelligence. *Scientific Reports*, *12*(1), Article 13843. https://doi.org/10.1038/s41598-022-17892-8

Sun, T. Q., & Medaglia, R. (2019). Mapping the Challenges of Artificial Intelligence in The Public Sector: Evidence from Public Healthcare. *Government Information Quarterly*, *36*(2), 368-383. https://doi.org/10.1016/j.giq.2018.09.008

Susha, I., Grönlund, Å., & Van Tulder, R. (2019). Data driven social partnerships: Exploring an emergent trend in search

of research challenges and questions. *Government Information Quarterly*, *36*(1), 112-128. https://doi.org/https://doi.org/10.1016/j.giq.2018.11.002

Whitelaw, S., Mamas, M. A., Topol, E., & Van Spall, H. G. C. (2020). Applications of digital technology in COVID-19 pandemic planning and response. *Lancet Digit Health*, *2*(8), e435-e440. https://doi.org/10.1016/s2589-7500(20)30142-4

Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2019). Artificial Intelligence and the Public Sector—Applications and Challenges. *International Journal Of Public Administration*, *42*(7), 596-615. https://doi.org/10.1080/01900692.2018.1498103

Xiang, J. J., Mao, H. T., & Yang, B. (2024). Impact Assessment and Mechanism of Water Conservancy Policy on Carbon Emission Performance under The Background of Artificial Intelligence. *Expert Systems*, *41*(5). https://doi.org/10.1111/exsy.13190