AI in Digital Government: A Literature Review and Avenues for Future Research

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Abstract

While AI has expanded across society, some sectors have been and need to be developed more than others. The literature on AI in digital government needs to be more robust and comprehensive. Therefore, a systematic literature review was done on 22 peer-reviewed articles. The review discusses AI in digital government from five perspectives: AI governance, decision and policy, citizen, ethical, and capabilities. Digital ambidexterity was used as a lens for analysis. The findings indicated that the literature on AI in digital government needs to be more balanced. Scholars also face obstacles, as prior research may not have identified all the opportunities and challenges of AI in digital government. This literature review reveals that there is a need to explore the balancing of AI risks and opportunities for digital government. The future calls for research into strategizing AI in digital government and going beyond using AI for automating existing activities.

Keywords: Artificial Intelligence, digital government, ambidexterity, exploration, exploitation.

1. Introduction

Society is facing a fast and radical change due to the maturing of Artificial Intelligence (AI) and its ubiquitous penetration of all sectors (Collins et al., 2021). AI in digital government is gaining increasing attention and is seen as a game changer due to the potential benefits it can provide to improving governmental public services (Zuiderwijk et al., 2021; Maragno et al., 2023). Susar and Aquaro (2019) argued that *"AI" is not one thing, it refers to a range of different technologies and applications used in many ways and highlights that we are at different places in our collective empirical and normative understanding of these technologies, their impact on humans and society"* (p. 419). At the same time, AI provides numerous opportunities and risks for digital government. For example, while transparency in AI can enhance citizens' trust, it may also reduce trust in digital government (Dwivedi et al., 2021; Harrison and Luna-Reyes, 2022). The unclear responsibility and accountability of AI is another challenge facing digital governments when it comes to everyday activities and tasks such as decision-making (Ranerup and Henriksen, 2019; de Bruijn et al., 2022; Guenduez and Mettler, 2023). Successful AI implementation in digital government requires government organizations to develop a wide range of capabilities, which will vary in importance depending on the context and the specific government organization's needs (Sun and Medaglia, 2019). AI is, however, not a new research area; in recent years it has received notable attention regarding digital government. Despite this attention, current research on AI lacks a common definition or approach to what is or is not AI in digital government. This creates more difficulties than expected (Schiff et al., 2022; van Noordt and Tangi, 2023; Sienkiewicz-Małyjurek, 2023; Collins et al., 2021). Further, different knowledge gaps still exist. On one hand, the pace of AI adoption in digital government doesn't catch up with AI adoption in the private sector and society in general (Wang and Siau, 2018; Desouza et al., 2020; Zuiderwijk et al., 2021). On the other hand, it remains unclear how AI could be governed in digital government (Alshahrani et al., 2022). However, e-government, built on automation i.e., modernizing paper-based working processes in government agencies through IT solutions, has been the focus of research for a long time (Silcock, 2001; Roehl, 2023). According to Khisro (2022), the challenge in utilizing new digital technology in government agencies is the pre-existing mechanisms of funding models, digital infrastructure, and IT governance. Digital technologies tend to enable and constrain development in government agencies based on human behavior (Khisro, 2021; Khisro, 2022). As the vast amounts of data generated by government agencies are now made available to AI, there is a need to move on to digital government that could meet the requirements for transparency, inclusiveness, development, and

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participation. This is needed to proactively assist in balancing tensions in digital government decision-making, such as tensions between issues of privacy and transparency (Mergel et al., 2019; Khisro, 2022, Isagah and Ben Dhaou, 2023).

Tangi et al., (2021) provided definitions for understanding AI within the broader view of digital government transformation as *"second-order organizational changes enabled by digital technologies transforming the way organizations are structured and organized and resulting in a new state, from the point of view of processes, culture, roles, relationships, and possibly all aspects of the organization"* (Tangi et al., 2021, p. 2). Digital government transformation emphasizes the organizational changes enabled by digital technologies rather than the specific governance and application of AI in digital government. The effectiveness of AI in digital government depends on how well the technology fits the specific tasks required by government organizations, i.e. task-technology fit (Goodhue and Thompson, 1995). Therefore, understanding the task-technology fit is crucial for identifying which areas of digital government can benefit most from AI technologies, enabling public organizations to maximize their potential benefits while minimizing risks. Decades of stored and newly generated data made usable, searchable, and actionable by AI systems can accelerate the move toward digital government. In that sense, AI has a transformational impact on government practitioners. However, the development of AI and its fast integration in key areas of society such as communities, businesses, and organizations, have affected issues of accountability, inclusiveness, and trust in AI systems development (Pencheva et al., 2020; Harrison and Luna-Reyes, 2022; Liva et al., 2020). According to Dwivedi et al. (2021), AI systems tend to reduce the ability of non-experts to audit the mechanisms that lead to decisions. Government policymakers' responsibility is, however, not limited to systems design and implementation. There is a need to better understand the dynamics and processes of AI enacted by the digital government when facing AI systems. Further, the issue of how trust in AI systems can be enhanced must be actively addressed to support digital government. With the extensive adoption of AI, the digital government is experiencing a rapid transformation (Androutsopoulou et al., 2019; Alshahrani et al., 2022; Criado and de Zarate-Alcarazo, 2022). Since AI-based solutions in government agencies have become the current research focus, they need to be comprehended.

In this regard, this systematic literature review aims to contribute to the research agenda on AI in the digital government by answering the calls from Madan and Ashok (2023) and van Noordt and Tangi (2023) who argued that current literature lacks understanding and further research on understanding AI in digital government is needed. This study therefore reviews current literature on the concept of AI in digital government to identify gaps in the current research agenda and suggest avenues for future research. To this end, the next section describes the review approach followed by the literature review. The paper ends with a discussion, conclusion, and avenues for future research.

2. Review Approach

The systematic literature review process was done in three steps (Kitchenham, 2004). The first step was planning for the review, then the articles were chosen, and finally, an in-depth reading of the selected articles was done. Planning for the literature review included choosing databases and scientific journals and delimiting the research to AI in digital government. In choosing databases and scientific journals, the open-access criteria were essential. Therefore, the ScienceDirect database was chosen together with the top ABCD-ranked journals Government Information Quarterly (GIQ) and International Journal of Information Management (IJIM) in the time frame 2019-2023. Including only open-access articles from GIQ and the IJIM in this literature review promotes transparency and equity by removing financial barriers to accessing scholarly literature. It also aligns with the principles of open science, fostering a culture of collaboration, public trust, and innovation in knowledge dissemination (Albornoz et al., 2018; Ross-Hellauer, 2022). This makes this literature review reputable and ensures that academics, practitioners, policymakers, and the general public can benefit from the insights and findings presented in this literature review. The second step was choosing AI in digital government articles by thoroughly going through the title, keyword, abstract, and conclusion for all articles yielded. In this second step, the utilized keywords are as follows; AI for Public Administration, AI in public policy, digital transformation in government, E-government and AI, AI for public decision-making, government innovation, and AI, AI policy in government, smart government, AI-driven public services, machine learning in government, digital government, and AI ethics in government. Sixty articles were yielded in total: forty articles in GIQ and twenty articles in IJIM. To avoid misinterpretations in the review process, the articles had to be written in English. Next, the search was narrowed to include articles that contained keywords related to AI in digital government, public organizations, open government, and public administration. This resulted in twenty-two articles that have been reviewed in this

study. The third step began by carefully reading the twenty-two articles yielded from the second step. Through this in-depth reading, themes of AI governance, decision and policymaking, citizen, ethical, and capabilities perspectives inductively emerged.

Digital ambidexterity (Magnusson et al., 2020) defined as *"the simultaneous handling of established business activities and rapidly changing new digital activities"* (Piccinini et al., 2015, p. 12) was used as a lens to analyze the focus of this study. The digital ambidexterity perspective was applied to create an overview of the papers' outcomes; see Table 1. The rationale behind choosing digital ambidexterity as an analysis framework is that government agencies at different levels i.e., local, regional, and national levels, are constantly facing hurdles to activities related to the exploitation of existing opportunities and the exploration of new opportunities (Smith and Umans, 2015; Mergel, 2018; Cannaerts et al., 2020). The reason for this is that government agencies refer to exploitation as cost reduction, increased effectiveness, and automated processes (Gershon, 2004; Bryson et al., 2008) while they refer to exploration as discovering new services and products to cope with the rapid development of digital transformation in society (Kobarg et al., 2017; Cannaerts et al., 2020).

3. AI in Digital Government Literature Review

The reviewed literature on AI in digital government primarily focuses on several research areas: AI governance, decision and policy making, citizen, ethical, and capabilities perspectives; see Table 1.

Table 1. Reviewed literature.

Author/-s (year)	Perspective/AI focus
Criado and de Zarate-Alcarazo (2022)	AI Governance/ Exploitation
Sun and Medaglia (2019)	AI Governance/ Exploitation
Wilson (2022)	AI Governance/ Exploitation
Zuiderwijk et al. (2021)	AI Governance/ Exploitation
Alshahrani et al. (2022)	Decision/ Exploitation
de Bruijn et al. (2022)	Decision/ Exploitation
Ranerup and Henriksen (2019)	Decision/ Exploitation
Guendue and Mettler (2023)	Policy/ Exploitation
Maragno et al. (2023)	Policy/ Exploration
Wanckel (2022)	Policy/ Exploitation
Androutsopulou et al. (2019)	Citizen/ Exploitation
Cortés-Cediel et al. (2023)	Citizen/ Exploitation
Gesk and Leyer (2022)	Citizen/ Exploitation
Horvath et al. (2023)	Citizen/ Exploitation
König et al. (2023)	Citizen/ Exploitation
Saura et al. (2022)	Citizen/ Exploitation
Kinder et al. (2023)	Ethical/ Exploration
De Sousa et al. (2019)	Ethical/ Exploration
Madan and Ashok (2023)	Ethical/ Exploration
Mikalef et al. (2022)	Capabilities/ Exploitation
Mikalef et al. (2023)	Capabilities/ Exploitation
van Noordt and Tangi (2023)	Capabilities/ Exploration

3.1. AI governance perspective

AI governance, within the realm of government, refers to the responsibilities and accountabilities associated with making decisions regarding the deployment, management, and control of AI technologies. Its purpose is to guide, supervise, and oversee a government's AI initiative (Sun and Medaglia, 2019; Zuiderwijk et al., 2021; Wilson, 2022). The governance perspective is concerned not solely with the policies and frameworks that govern AI but also with the specific contexts in which human decision-makers utilize AI tools. For example, AI is applied in various fields such as public administration (Sun and Medaglia, 2019), law enforcement (Zuiderwijk et al., 2021), and healthcare (Wilson, 2022). The study of AI governance encompasses both process-related and content-related perspectives. From a process point of view, it is crucial to conduct research that explores the implications of AI in government agencies. Furthermore, there is a need for investigations into forms or types of AI rather than treating it as a broad concept. In terms of content-related perspectives, researchers emphasize the development of foundations that draw insights from disciplines when examining the use of AI in governance. Moreover, it is important to examine strategies for implementing and communicating government plans related to adopting AI in government (Zuiderwijk et al., 2021). The application of AI can be seen in automating processes such as identifying and categorizing data portals enhancing its involvement in the public policy cycle by studying user interaction with government services utilizing AI. However, when we talk about AI governance it encompasses governance, service governance, and ethical governance (Zuiderwijk et al., 2021). In a study conducted by Wilson (2022), the focus was on examining 16 strategies related to AI governance

in the government context, and the study aims to address governance challenges related to AI such as accountability, transparency, and ethics with a focus on explainability issues. Wilson (2022) differentiates between levels of AI autonomy. In some situations, AI is used in an autonomous capacity, for example, automated processing systems for routine tasks like tax filings. In other situations, AI is used in a non-autonomous way, where human intervention is needed, for instance in decision-support systems that help government practitioners in policy analysis or strategic planning. Thus, the involvement of AI in government ranges from fully autonomous applications to situations where human decision-makers remain heavily included in both governing and debating AI's use. The results indicate that public engagement values and mechanisms are not given priority in these strategies. Although most strategies mention the importance of engagement it is often done in a not thorough enough manner. This lack of emphasis on engagement might be due to perceiving AI as "rhetoric" or something that could potentially hinder efficiency and economic benefits. This finding demonstrates that public administrators are not actively engaging in discussions to address the societal risks associated with AI. The tension between rhetoric and practice in AI governance is evident as even though rhetoric is prevalent in these strategies it does not necessarily reflect a lack of importance given to values or an obstruction to public engagement efforts. This tension poses barriers for AI governance considering the complexity of AI technologies and the difficulties faced by public administrators when trying to anticipate governance outcomes. According to Sun and Medaglia (2019), there are perspectives and contradictions among stakeholder groups regarding the adoption of AI within government contexts. For example, while government officials highlight aspects of AI governance in policy documents, they often overlook challenges related to AI governance. Similar contradictions can be observed in the views expressed by IT managers regarding challenges.

Many of the challenges faced by government practitioners are not related to technical aspects. While concerns about data processing limitations and the opaque nature of AI systems exist, most obstacles revolve around policies and data-related issues. In addition to these concerns, there is a focus on policy matters and hurdles related to data. This indicates that embracing AI involves more than barriers; it also entails considering various factors and regulatory aspects. Sun and Medaglia (2019) emphasize the importance of shifting our attention from "governance by AI " which refers to using AI as a tool for automating policy making to "governance of AI". Unfortunately, this distinction is often overlooked in discussions about implementing AI in this sector. It is therefore crucial to prioritize addressing the challenges posed by AI technology itself rather than simply using it as a means for policy automation.

According to Criado and de Zarate-Alcarazo (2022) in a study focusing on CIOs implementing AI in a local government setting in Spain, regulations are frequently perceived as obstacles when it comes to implementing AI in the government. This suggests that regulatory challenges are seen as barriers hindering the adoption of AI technologies. Similarly, among the factors supporting the implementation of AI, having a governance framework is considered essential. This implies that governance systems might be seen as less helpful when it comes to implementing AI. The study suggests a connection between these perceptions of regulation and governance frameworks and the administrative culture within government organizations. It indicates that preconceived notions about these elements could influence how they are perceived in terms of innovation and technology implementation. Despite these perceptions, having regulations and governance frameworks in place for AI will positively impact achieving AI implementation in public administrations. This shows that even though there may be challenges and perceived obstacles, having a structured regulatory and governance environment is considered beneficial for implementing AI. Moreover, it suggests that national regulations and governance frameworks for AI will also contribute positively to ensuring practices in implementing AI technologies in administrations. This highlights the significance of incorporating considerations into the process of implementing AI. There is a lack of attention given to the human challenges that government agencies face when governing AI and interacting with citizens. However, the uncertainty surrounding AI poses difficulties for public sector managers in assessing the risks and benefits associated with services policy-making processes and decisions based on biased datasets or unethical use of AI. Government entities play a role in safeguarding the data and privacy of individuals. The level of trust and confidence in practices and interactions will ultimately determine the success of AI technology use (Criado and de Zarate-Alcarazo, 2022).

3.2. Decision and policy-making perspective

Understanding AI adoption, identifying the obstacles to its implementation, and fostering collaboration within and outside government organizations are crucial for decision-makers to address its effects and maximize the benefits of AI (Alshahrani et al., 2022). When adopting AI, it's important to

consider its aspects, the specific context in which it will be used, and the government organization's preparedness. In essence, government organizations must continuously find a balance between the impact and technical aspects of AI since both can indirectly influence internal and external stakeholders (Alshahrani et al., 2022). Adopting AI in government encounters challenges such as discrepancies between AI-based decision-making and management decision-making conflicts, with language use and cultural differences establishing effective AI infrastructure ensuring data integrity and sharing as well as addressing ethical and governance concerns (Alshahrani et al., 2022). Ranerup and Henriksen (2019) highlighted the significance of incorporating AI into decision-making processes to create value. According to their findings, the utilization of AI technologies has led to accountability, reduced expenses, and improved efficiency all while prioritizing the needs and preferences of citizens. The authors provided instances that illustrate contrasting factors such as relying on expertise versus automated approaches, cost reduction versus cost-sharing considerations, and building citizen trust versus concerns, around transparency (Ranerup and Henriksen, 2019).

Recognizing the challenges that arise when implementing Explainable Artificial Intelligence (XAI) is crucial for governments to make decisions. According to de Bruijn et al. (2022) perceiving AI as a problem and relying on better algorithms to solve it overlooks the complexity of the issues AI addresses. These challenges encompass the lack of expertise in contested explanations, varying or evolving explanations, utilization of data sources and algorithms discrepancies, between behavior and provided explanations, ambiguity in problem-solving, and a strong socio-political context that may breed skepticism. The author suggests taking into account social factors within a socio framework. The primary focus should be on building trust and legitimacy rather than simply overcoming opacity (de Bruijn et al., 2022). Regarding policy design within national government organizations in crisis detection, Wanckel (2022) presents empirical evidence on the use of Big Data Analytics Systems (BDAS). Wanckel highlights the insights obtained from employing analytics in these IT projects especially given their pioneering role in utilizing AI for predictive purposes, at the federal level. The study highlights the significance of frameworks, in developing capacities. It also stresses the need to understand how capacities at different levels influence and contribute to long-lasting achievements, in implementing BDAS. This involves investigating the effects of attitudes, approaches, and systemic structures and how they develop relationships as time progresses (Wanckel, 2022). In their study, Maragno et al. (2023) discovered that successfully implementing AI involves finding a balance between the benefits of data-driven activities and addressing concerns like explainability, data governance, and infrastructure. The authors emphasize the necessity of having frameworks to guide AI in the government. They also stress the significance of avoiding data systems by fostering collaboration among stakeholders in the public sphere. Technology enables opportunities for engagement with citizens, other public organizations, and suppliers underscoring the importance of trust and cooperation in these relationships. However, it's crucial to maintain an exchange between experts and technological agents when using AI systems. While AI has the potential to enhance existing activities its implementation can be hindered by unawareness and lack of trust. Guendue and Mettler (2023) highlight the importance of storytelling in AI policies. These narratives are strategically employed by authorities to communicate policy matters, interpret situations, and advocate for their preferred actions. The changing roles of governments, in the realm of AI policies, the connection between these roles and the underlying policy narratives, and the challenge governments face in balancing their responsibilities are emphasized. Additionally, it is noticed that the government's role as an AI user receives attention in these narratives and certain areas of AI applications are absent from policy documents. The adoption of AI among governments remains a complex and contentious phenomenon (Guendue and Mettler, 2023).

3.3. Citizen perspective

According to a study conducted by Androutsopulou et al. (2019), the use of AI in government has led to improvements in communication between citizens and the government. This is particularly beneficial for services as it helps reduce costs. However, the citizens still need to do the traditional communication for any other complex services. In a study by König et al. (2023), it was found that citizens are supportive of regulations surrounding AI and emphasize the importance of considering its long-term sustainability and societal impact. The study also highlights how AI regulations can affect competitiveness and the global race for AI leadership. While AI is recognized as a technology with the potential to bring advancements in areas and offer new products and services it also carries risks and unintended consequences that can negatively impact society in the long run. The findings from König et al.'s research demonstrate that citizens generally support regulations in two areas: transparency and efficiency. Citizens believe policymakers should govern these aspects even if they may not personally express concerns about their choices. Citizens view AI

regulation as a means to shape the direction of societies and recognize the risks it poses for humanity. The research underscores the importance of considering citizens' perspectives when formulating AI policies (König et al., 2023). Gesk and Leyer (2022) suggest that higher acceptance of AI is driven primarily by a lack of reasons to oppose it. Factors such as risk and trust significantly influence citizens' willingness to embrace AI. It is crucial to ensure transparency in how AI is used, in public services as concerns about it being an opaque "black box" hinder its acceptance. The fear of failure stands out as the reason against accepting AI given its potential risks. These factors against acceptance have an impact on acceptance as they serve as key triggers for risk considerations in implementation. Saura et al. (2022) stress that governments consider understanding citizens' behavior essential for AI governance. By gaining insights into how citizens behave, governments can make decisions. However, using AI to analyze behavior raises concerns regarding user privacy. Predictions and correlations derived from data analysis can potentially compromise privacy rights. Balancing the need to anticipate and prevent issues while protecting citizens' privacy becomes a challenge. The use of AI in critical surveillance situations can give rise to concerns about citizens' integrity (Saura et al., 2022). This highlights the importance of implementing regulations that prioritize design when it comes to collecting and managing citizen data. It underscores the significance of preventing misuse of data and ensuring the security and privacy of citizens' information. Horvath et al. (2023) highlighted the acceptance of AI in government. Through testing, they examined mechanisms and the complex connections between individual characteristics, such as knowledge about AI and features of AI systems. Another area that raises concerns regarding citizens' acceptance of AI services is data privacy. Cortés-Cediel et al. (2023) shed light on the potential for creating value through chatbots in e-government while addressing aspects like efficiency, accessibility, ethics, and the role of managers in implementing AI. It is necessary to analyze citizens' experiences to design chatbots that can achieve value (Cortés-Cediel et al., 2023).

3.4. Ethical perspective

The legitimacy of AI stems from the leadership and central governments who are actively pursuing digital transformation agendas (Madan and Ashok, 2023). According to Madan and Ashok (2023), it is crucial to adopt a perspective that values concern when dealing with AI ethical paradoxes such as data accessibility versus privacy, predictive accuracy versus potential biases and discrimination as well as safeguarding citizen rights. Madan and Ashok (2023) emphasized the importance of comprehending the underlying mechanisms and dynamics of AI projects. Kinder et al. (2023) highlight the significance of ethical incorporating considerations in AI implementation taking into account the role of citizens and their local context. They conceptualize AI adoption as a learning process that involves cognitions. These individual cognitions are then integrated into organized service models that aim to solve problems faced by citizens within their context and culture. Throughout this learning process, ethical evaluations based on virtues, relationships, and roles play a role. This citizen-centric approach is essential for determining the ethics behind these service innovations. De Sousa et al. (2019) emphasize the importance of studying AI's impact on society and finding solutions for issues. It is crucial to consider policies and ethical aspects associated with the use of AI, across all application domains to ensure that the government can derive value from these solutions. According to a literature review conducted by De Sousa et al. (2019) the field of AI in government primarily focuses on areas such as public service, environmental protection, and economic affairs. However, there seems to be an emphasis on topics like recreation, culture, religion, education, and defense in the existing literature.

3.5. Capabilities perspective

According to Mikalef et al. (2023), the presence of AI has a significant impact on three aspects of outcomes: automating processes, gaining cognitive insights, and fostering cognitive engagement. Additionally, having AI capabilities is crucial for government organizations to effectively utilize their investments in AI. Automating processes and gaining insights have a significant influence on government organizational performance. However, cognitive engagement has an impact on organizational performance. Mikalef et al. (2022) focus on examining municipalities' ability to develop their AI capabilities while considering factors that influence their utilization of AI resources. This goes beyond data, infrastructure, and algorithms. It encompasses the resources that public organizations need for developing and implementing AI applications. The emphasis is on how specific organizational digital capabilities, including AI capabilities, are molded, and established within their context. van Noordt and Tangi (2023) acknowledge the progress made in translating the technological benefits offered by AI into tangible value for public administrations. This limitation is attributed to the lack of AI capabilities within these organizations. The concept of AI capability encompasses not only expertise

but also various technical and non-technical components that are necessary for effectively developing and utilizing AI technologies. This highlights the role played by AI capability in realizing the advantages of AI in government agencies. According to van Noordt and Tangi (2023) within the administration, AI refers to using machines to take over human tasks more efficiently and effectively resulting in tangible outcomes that increase value for the public.

4. Discussion

This systematic literature review provides an understanding of AI in digital government studies. This was done by reviewing 22 studies focused specifically on AI in digital government and the analysis was done with a digital ambidexterity lens (Magnusson et al., 2020). Based on this literature review it is noticed that AI in digital government is a promising research field that is blooming, nevertheless, there is not yet widely available research that provides unambiguous studies. However, in line with van Noordt and Tangi (2023), Madan and Ashok (2023), Maragno et al. (2023); König et al. (2023) AI is fundamentally reshaping governments, changing their tasks and duties. A clear finding emerging from this systematic literature review is the need to increase the number of studies that focus on using AI for exploration activities within digital government. 18 studies out of 22 focus on how to use AI to reduce costs (Alshahrani et al., 2022), increase efficiency and productivity (van Noordt and Tangi, 2023), automate activities (Androutsopulou et al., 2019), and better services (Wilson, 2022). This leads government agencies to be stuck to e-government that is built on automation with little focus on proactivity, transparency, and innovation (Khisro, 2022). The literature discussed tensions in opposition to each other for example data accessibility versus privacy and predictive accuracy versus discrimination (Madan and Ashok, 2023) while it needs to be studied as an ongoing balance activity to ensure ambidextrous digital government.

The reviewed literature showed AI in digital government was studied from a different perspective. Regarding the AI governance perspective, the literature emphasized that AI governance in digital government focuses on automating processes and enhancing its involvement in public policy (Zuiderwijk et al., 2021; Wilson, 2022). Focusing on enhancing existing activities may slow down the exploration of new opportunities. This means AI governance should support both types of activities i.e., exploitation and exploration alike. AI governance is a bread-and-butter activity in digital government, therefore strict rules governing AI by focusing on enhancing existing activities may also constrain the implementation of AI in digital government and inhibit its ability to produce public value (König et al., 2023). In line with Sun and Medaglia (2019), AI governance should take into consideration the contradictory mindset of exploitation and exploration. The lack of attention given to human challenges that government agencies face when governing AI (Criado and de Zarate-Alcarazo, 2022) constrains governing AI as a human-centered technology. Khisro (2022) emphasized that any new digital technology tends to constrain or enable digital transformation. This is in line with Maragno et al. (2023) that implementing AI could constrain or enable the development of digital government. For instance, transparency can both enable or constrain trust in AI-generated decision-making.

Decisions and policymakers face a challenging task in regulating and governing AI, the balance between fostering sustainable AI and establishing regulatory standards is a critical consideration (Saura et al., 2022; Maragno et al., 2023). Ranerup and Henriksen (2019) argued that incorporating AI into decision-making processes reduced expenses and improved efficiency. This is also an indication that utilizing AI in decision-making is dominated to increase exploitation, while AI could be used for both creating new opportunities and enhancing existing ones, resulting in successfully transforming digital government. According to de Bruijn et al. (2022), a lack of expertise may result in ambiguity in problem-solving and decision-making. This ambiguity may create skepticism about using AI for having an ambidextrous digital government. Moreover, the government's agency structure (Wanckel, 2022) needs to be changed to be adaptable to any new digital technology. Guendue and Mettler (2023) demonstrated the importance of storytelling and interpretations of AI in decision and policymaking. This confirms the importance of explanation and knowledge about AI in decision-making. The pace of change in the outside world means that some decisions may become meaningless.

The reviewed literature also emphasizes that citizen acceptance and knowledge, both technical and non-technical (Androutsopulou et al., 2019; van Noordt and Tangi, 2023), are fundamental for their successful participation in the implementation of AI in digital government (Cortés-Cediel et al., 2023). AI has been used in government agencies to reinforce the communication between citizens and the government to reduce service costs and increase efficiency (Androutsopulou et al., 2019; König et al., 2023). In this sense, government agencies are focusing on enhancing existing activities with little attention to exploring new services for citizen benefit. Furthermore, understanding the ideas and prejudices underlying citizen behavior as

they enable and constrain government practitioners' behavior. In line with Gesk and Leyer (2022), one of the main reasons behind constraints using AI in digital government for exploration is the "fear of failure" which often triggers a hiatus of exploration activities. Privacy and transparency (Horvath et al., 2023; König et al., 2023) are widely mentioned in AI in digital government literature. However, it is a challenge to balance these two contradictory kinds of activities. Further AI in digital government involves ethical paradoxes (Madan and Ashok, 2023) which can constrain AI use if it is not given enough consideration. For example, balancing accessibility and security is fundamental for having an ambidextrous digital government. Learning process that involves cognition (Kinder et al., 2023) as an ongoing activity is essential to create awareness among government practitioners about ethical aspects. However, AI in digital government needs to be considered in various areas in the literature such as culture and education (De Sousa et al., 2019).

Regarding the capability's perspective, the literature focused on automating processes and utilizing investments in AI effectively (Mikalef et al., 2023; Mikalef et al., 2022) to increase exploitation activities. However, fostering cognitive engagement (Mikalef et al., 2023) has the potential to enable exploration activities in digital government. Cognitive engagement in the form of, for example, education for government practitioners to enhance their understanding of the need for both exploitation and exploration alike. AI utilization in government agencies to take over human tasks more efficiently and effectively results in tangible outcomes that increase value for the public (Goodhue and Thompson, 1995; van Noordt and Tangi, 2023). The reviewed literature on AI capabilities focused on exploitation in the sense of replacing practitioners' tasks and activities.

5. Conclusion and Avenues for Future Research

This study aimed to contribute to AI in the digital government research agenda. From the presented discussion of this systematic literature review, AI in digital government is utilized to complement or replace current activities and tasks to increase the efficiency of everyday activities and tasks. Less attention was given to creating new opportunities and services to increase innovation within government agencies. AI in digital government is thus dominated by an exploitation perspective at the expense of an exploration perspective. The conclusion is that the perspective of balancing issues of exploitation and exploration is lacking in AI in digital government research. This study therefore suggests further research along the following avenues:

- Ambidextrous government: go beyond exploitation or exploration by conducting research on balancing both exploitation and exploration. For example, how AI in digital government can be ambidextrous.

- Regulation and innovation: balancing stability and flexibility in AI regulation to continue driving innovation. For example, how stability and flexibility are addressed in AI regulation alike.

- Political vision: there is a lack of political vision in the current literature about using AI in digital government. For example, how political vision impacts AI implementation in digital government.

- Decision and policy making: Conduct studies on the speed of the decision and policy-making process. For example, how decision and policy making can be faster regarding AI in digital government i.e., to be able to work in one direction, without all the details being clear.

- Operationalization AI governance: The backbone for successfully operationalizing AI in digital government is data governance and management. This research area was given little attention in the literature thus it needs more studies. For example, balancing privacy and transparency in data collection, storage, and utilization.

- Strategizing AI: conduct research on developing strategies to increase AI knowledge among government practitioners and citizens to foster trust and participation in democratic processes. For example, how AI strategized in digital government initiatives.

This study contributes to the AI digital government research agenda in two ways. First, previous research has primarily focused on the intuitive replacement and complement of the existing services in government. The contribution is that we pinpoint the importance of developing an AI digital government research agenda by focusing on balancing exploitation and exploration as ongoing activities. The second contribution is the strict governance of AI (König et al., 2023) could constrain digital government development.

This study offers three main contributions for government practitioners. First, practitioners can use the proposed avenues for research as a reference for deciding what areas need attention, funding, or collaboration in their business. Second, government practitioners can use the proposed avenues for research as a roadmap for developing AI strategies and AI governance in their policies. Third, government practitioners need to be aware of the importance of both

exploiting existing activities and exploring new opportunities alike.

6. References

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