Digital Transformation and AI Adoption in Government: Evaluating the Productivity Gains, Implementation Barriers, and Governance Risks

Kofi Asante Aninakwah

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Kofi Asante Aninakwah

Finance Officer at Accra College of Education

kaninakwah@gmail.com

Abstract

Despite the massive global investment in digital transformation and AI-driven public sector reforms, many governments continue to experience limited productivity improvements, disintegrated implementation, and growing governance risks. While digital platforms and AI tools are expected to enhance efficiency, transparency, and public trust, evidence shows persistent gaps between technological investment and realized performance outcomes, compounded by skills shortages, infrastructural deficits, regulatory weaknesses, and ethical concerns. This study evaluated the productivity gains, implementation barriers, and governance risks associated with digital transformation and artificial intelligence adoption in government institutions. The study adopted a desktop review research design grounded in a positivist research philosophy. An extensive review of peer-reviewed journal articles, policy briefs, institutional reports, and reputable governance and technology publications was conducted. Literature was systematically identified, screened, and analyzed based on relevance to digital transformation, e-governance, artificial intelligence adoption, public sector productivity, implementation barriers, and governance risks. Digital transformation and AI adoption are associated with productivity and efficiency gains in government, especially through automation, workflow optimization, and data-driven decision-making. However, these benefits are constrained by significant implementation barriers, including infrastructure limitations, human capacity deficits, organizational resistance, and fragmented institutional coordination. The study recommends that governments should pursue integrated and context-sensitive digital transformation strategies that align technological deployment with institutional reform, capacity building, and strengthened AI governance frameworks to ensure that productivity gains are sustainable, inclusive, and aligned with public values.

Keywords: *Digital Transformation, Artificial Intelligence, E-Governance, Public Sector Productivity, Governance Risks, Government Institutions.*

1.0 Introduction

Digital transformation and artificial intelligence adoption are redefining how governments deliver services, make decisions, and pursue productivity in an increasingly data-driven public sector (Sharmin & Chowdhury, 2025; Balaji, 2025). Through e-government platforms and AI-enabled systems, public administrations aim to improve efficiency, transparency, and service responsiveness while managing growing societal demands (Alhosani & Alhashmi, 2024; Yigitcanlar et al., 2024). However, the realization of these benefits is challenged by institutional, technical, and human-capacity barriers that complicate implementation (Matlala, 2025; Ahn & Chen, 2022). At the same time, AI adoption introduces governance risks related to accountability, ethics, and public trust (Schiff et al., 2022; Kholov & Mamarasulov, 2024). Examining productivity benefits alongside implementation barriers and governance risks is therefore integral for understanding the real impact of digital transformation in government (Eom & Lee, 2022; Xiaoyan & Segumpan, 2025). Governments across the world are increasingly leveraging digital platforms to modernize service delivery, streamline administrative processes, and improve citizen engagement.

E-government programs have redefined how public institutions interact with citizens by reducing bureaucratic bottlenecks and increasing access to public services through digital channels (Sharmin & Chowdhury, 2025). This change reflects a broader governance paradigm where technology is positioned as a strategic enabler of institutional performance rather than a purely technical tool (Balaji, 2025). Digital transformation in government also aligns with global public sector reforms aimed at strengthening accountability and service quality (Eom & Lee, 2022). However, digitalization outcomes vary significantly across contexts due to differences in institutional capacity, infrastructure readiness, and governance frameworks (Aminah & Saksono, 2021). These variations underscore the need for systematic evaluation of how digital transformation translates into tangible productivity benefits (Chen et al., 2021), while also raising questions about emerging risks within digitally enabled governance systems (Schiff et al., 2022).

Artificial intelligence has become a defining component of contemporary digital transformation strategies in government, offering advanced capabilities for automation, predictive analytics, and decision support. AI applications are increasingly deployed in areas such as tax administration, public safety, healthcare management, and social services, where data-driven insights can improve policy outcomes and operational efficiency (Alhosani & Alhashmi, 2024). The integration of AI into public administration marks a change toward AI-augmented governance, where algorithms complement human judgment in complex administrative tasks (Ahn & Chen, 2022). Governments adopting AI seek to improve productivity by reducing processing time, reducing errors, and improving resource allocation (Yigitcanlar et al., 2024). In several jurisdictions, AI-enabled systems have demonstrated potential for performance optimization, especially in high-volume service environments (Xiaoyan & Segumpan, 2025). Despite these benefits, AI adoption remains uneven across government institutions due to structural, cultural, and regulatory challenges (Kholov & Mamarasulov, 2024). This unevenness highlights the importance of understanding both the opportunities and limitations associated with AI-driven digital transformation (Chibunna et al., 2024).

Productivity benefits are often cited as a primary justification for digital transformation and AI adoption in government. Digital systems enable automation of routine administrative functions, freeing public servants to focus on higher-value tasks such as policy analysis and strategic planning (Balaji, 2025). AI tools further improve productivity by supporting faster decision-making and

improving service accuracy through data analytics and machine learning models (Al-Besher & Kumar, 2022). Evidence from e-government programs suggests that digital platforms reduce transaction costs and improve turnaround times for public services (Sharmin & Chowdhury, 2025). In local government contexts, AI-driven solutions have been associated with improved operational efficiency and service coordination (Yigitcanlar et al., 2024). However, productivity benefits are not automatic and depend on complementary organizational reforms, skills development, and process redesign (Eom & Lee, 2022). Without these enablers, digital investments risk underperformance or redundancy (Schiff et al., 2022). Therefore, assessing productivity outcomes requires a holistic understanding of how technology interacts with institutional structures and human capacity (Ahn & Chen, 2022).

Beyond efficiency, digital transformation in government has been promoted as a mechanism for improving transparency and accountability. Digital platforms allow governments to publish information in real time, improve traceability of administrative actions, and reduce opportunities for corruption (Sharmin & Chowdhury, 2025). AI systems can also support fraud detection, audit functions, and compliance monitoring across public sector operations (Alhosani & Alhashmi, 2024). These developments contribute to improved governance performance by strengthening oversight mechanisms and public trust (Balaji, 2025). In smart city programs, digital governance tools have enabled data-driven management of urban services, contributing to improved social and economic outcomes (Kutkov et al., 2025). However, transparency benefits depend on data quality, system integrity, and institutional willingness to disclose information (Schiff et al., 2022). In contexts where governance structures are weak, digital tools may reinforce existing power asymmetries rather than promote openness (Eom & Lee, 2022). As such, the governance impact of digital transformation requires careful scrutiny beyond technical implementation (Djatmiko et al., 2025).

Despite the promise of digital transformation and AI, governments face substantial implementation barriers that limit realization of expected benefits. Infrastructure deficits, especially in developing contexts, constrain the deployment and scalability of digital systems (Matlala, 2025). Limited financial resources and competing public priorities further restrict sustained investment in advanced technologies (Kholov & Mamarasulov, 2024). Organizational resistance to change also presents a major barrier, as public sector cultures are often risk-averse and hierarchical (Ahn & Chen, 2022). Skills gaps among government employees hinder effective use of digital and AI tools, reducing system utilization and performance (Chibunna et al., 2024). Regulatory uncertainty surrounding AI adoption creates hesitation among public managers due to concerns over compliance and accountability (Xiaoyan & Segumpan, 2025). Additionally, fragmented governance structures impede cross-agency data integration and interoperability (Balaji, 2025). These barriers highlight the importance of institutional readiness as a determinant of digital transformation success (Eom & Lee, 2022).

Social inclusion remains an integral aspect of digital transformation in government, especially in relation to AI adoption. While digital platforms can expand access to public services, they may also exclude marginalized populations lacking digital literacy or connectivity (Djatmiko et al., 2025). AI systems trained on biased data risk reinforcing existing social inequalities in service provision and decision-making (Schiff et al., 2022). Inclusive digital governance requires deliberate strategies to ensure equitable access and representation in technology design and deployment (Kutkov et al., 2025). Studies of e-government adoption indicate that without targeted interventions, digital transformation may widen service gaps rather than close them (Matlala,

2025). Governments must therefore balance efficiency objectives with social equity considerations (Sharmin & Chowdhury, 2025). Policy frameworks that integrate inclusion principles into digital strategies are essential for sustainable governance outcomes (Balaji, 2025). This dimension underscores the ethical responsibilities embedded in AI-enabled public administration (Alhosani & Alhashmi, 2024).

Governance risks associated with AI adoption have become increasingly evident in public sector discourse. Algorithmic opacity poses challenges for accountability, especially when automated decisions affect citizen rights and entitlements (Schiff et al., 2022). Data privacy and security risks intensify as governments collect and process large volumes of personal information through digital platforms (Al-Besher & Kumar, 2022). Weak regulatory frameworks exacerbate concerns about misuse of AI systems in surveillance and decision-making (Kholov & Mamarasulov, 2024). In some cases, reliance on proprietary AI solutions creates vendor lock-in, limiting institutional autonomy and oversight (Yigitcanlar et al., 2024). Governance failures in AI adoption can undermine public trust and legitimacy of government institutions (Eom & Lee, 2022). Addressing these risks requires robust ethical guidelines, transparency mechanisms, and regulatory oversight (Alhosani & Alhashmi, 2024). Consequently, governance considerations must be central to any evaluation of AI-driven digital transformation (Balaji, 2025).

Human factors play a decisive role in influencing the outcomes of digital transformation and AI adoption in government. Public servants' perceptions, attitudes, and competencies influence technology acceptance and effective use (Ahn & Chen, 2022). Resistance often stems from fear of job displacement, loss of discretion, or increased surveillance (Schiff et al., 2022). Training and change management programs are therefore essential to align workforce capabilities with digital objectives (Chibunna et al., 2024). Empirical evidence suggests that employee engagement significantly improves productivity benefits from digital systems (Sharmin & Chowdhury, 2025). Leadership commitment further determines the pace and depth of digital transformation (Balaji, 2025). In environments where leadership is fragmented, digital programs frequently stall or fail (Eom & Lee, 2022). Understanding human dynamics is thus critical to evaluating the effectiveness of AI adoption in public administration (Matlala, 2025).

Institutional context also defines the trajectory of digital transformation in government. Differences in political systems, administrative traditions, and legal frameworks influence technology governance arrangements (Kutkov et al., 2025). Centralized systems may facilitate uniform digital standards, while decentralized systems offer flexibility but risk fragmentation (Yigitcanlar et al., 2024). In emerging economies, digital transformation often occurs alongside broader governance reforms, creating both opportunities and challenges (Djatmiko et al., 2025). Comparative evidence shows that policy coherence and institutional coordination improve digital outcomes (Balaji, 2025). Conversely, misalignment between digital strategies and existing administrative processes reduces effectiveness (Eom & Lee, 2022). Institutional learning and adaptation are therefore necessary to sustain productivity benefits over time (Sharmin & Chowdhury, 2025). These contextual factors underscore the complexity of digital governance transformation (Kholov & Mamarasulov, 2024).

Smart governance and smart city programs illustrate advanced stages of digital transformation and AI adoption in government. These programs integrate AI, IoT, and data analytics to optimize urban service delivery and resource management (Kutkov et al., 2025). Local governments leveraging AI have reported improvements in traffic management, waste collection, and public safety (Yigitcanlar et al., 2024). However, smart governance programs face challenges related to data

governance, interoperability, and citizen participation (Schiff et al., 2022). Ensuring that productivity benefits translate into public value requires inclusive planning and transparent governance structures (Sharmin & Chowdhury, 2025). The smart city experience demonstrates that technology alone cannot resolve governance challenges without institutional alignment (Balaji, 2025). Lessons from these programs inform broader public sector digital transformation strategies (Alhosani & Alhashmi, 2024). As such, smart governance provides a valuable lens for examining AI-driven productivity and risk dynamics (Eom & Lee, 2022).

In developing and transitional governance contexts, digital transformation and AI adoption present both promise and vulnerability. Governments seek to leapfrog traditional administrative challenges through digital platforms, improving service reach and efficiency (Djatmiko et al., 2025). At the same time, limited regulatory capacity increases exposure to governance risks and system failures (Matlala, 2025). External technology dependence raises concerns about sovereignty and long-term sustainability (Kholov & Mamarasulov, 2024). Productivity benefits in these contexts are often uneven, benefiting urban centers more than rural or marginalized populations (Sharmin & Chowdhury, 2025). Capacity-building programs remain critical for sustaining digital reforms (Chibunna et al., 2024). International experiences emphasize the need for context-sensitive digital strategies (Balaji, 2025). Evaluating these dynamics is essential for understanding how digital transformation redefines public sector performance (Eom & Lee, 2022).

Digital transformation and AI adoption represent an important change in how governments organize, deliver, and govern public services. While evidence points to significant productivity benefits, these outcomes are contingent upon institutional readiness, human capacity, and governance safeguards (Alhosani & Alhashmi, 2024). Implementation barriers and governance risks continue to define the effectiveness and legitimacy of digital reforms (Schiff et al., 2022). A balanced evaluation must therefore integrate technological, organizational, and ethical aspects (Ahn & Chen, 2022). Through examining productivity benefits alongside implementation barriers and governance risks, this study responds to growing calls for comprehensive assessment of AI-driven public sector transformation (Balaji, 2025). Such an approach contributes to informed policymaking and sustainable digital governance (Sharmin & Chowdhury, 2025). It also advances scholarly understanding of how digital transformation redefines contemporary government practice (Eom & Lee, 2022).

1.1 Statement of the Problem

Ideally, digital transformation and AI adoption in government are expected to deliver seamless service delivery, high productivity, transparent decision-making, and strong public trust through efficient, data-driven governance systems (Sharmin & Chowdhury, 2025; Balaji, 2025). Thus, it is expected that AI tools are fully integrated across government functions, supported by skilled personnel, interoperable systems, and clear governance frameworks that safeguard accountability and ethics (Yigitcanlar et al., 2024; Alhosani & Alhashmi, 2024). However, the reality is that many governments continue to experience fragmented implementation, limited productivity, skills shortages, and stalled projects that remain at pilot stages (Ahn & Chen, 2022; Eom & Lee, 2022). This gap between expectation and reality is further widened by governance risks, regulatory weaknesses, and declining public trust arising from opaque and poorly managed digital systems (Schiff et al., 2022; Matlala, 2025). The rapid push toward digital transformation and AI adoption in government has exposed a persistent productivity gap between technological investment and realized performance outcomes. Despite global spending on government digital transformation exceeding USD 550 billion annually, studies indicate that over 60% of public-sector digital

projects fail to meet their intended efficiency targets due to weak implementation and poor institutional alignment (Balaji, 2025; Eom & Lee, 2022).

Evidence from e-government reforms shows that while digital platforms reduce transaction times by up to 40%, actual productivity improvements in public agencies average below 15%, largely due to parallel manual processes and limited system integration (Sharmin & Chowdhury, 2025; Chen et al., 2021). In many administrations, AI systems remain confined to pilot stages, with less than 30% of deployed tools scaled across departments (Yigitcanlar et al., 2024; Xiaoyan & Segumpan, 2025). Public sector employees report low confidence in AI-supported decision systems, with adoption willingness rates below 50% in several jurisdictions (Ahn & Chen, 2022; Alhosani & Alhashmi, 2024). These figures suggest a structural productivity paradox where digital transformation expands technological capacity without proportionate performance gains (Schiff et al., 2022). Implementation barriers further compound these productivity challenges, particularly in terms of infrastructure readiness, skills deficits, and organizational resistance. Studies show that nearly 45% of government agencies in developing and transitional economies lack the minimum digital infrastructure required for advanced AI deployment (Matlala, 2025; Kholov & Mamarasulov, 2024). Even in digitally advanced governments, up to 38% of public servants lack formal training in digital or AI-related competencies, limiting effective system utilization (Chibunna et al., 2024; Ahn & Chen, 2022). Fragmented data systems remain a critical bottleneck, with more than half of government departments operating in silos that prevent interoperability and real-time analytics (Balaji, 2025; Eom & Lee, 2022).

Financial challenges also evident, as AI implementation costs consume up to 20% of annual ICT budgets in some public institutions, crowding out maintenance and capacity-building investments (Alhosani & Alhashmi, 2024; Yigitcanlar et al., 2024). These barriers collectively undermine the scalability and sustainability of digital transformation initiatives (Sharmin & Chowdhury, 2025; Chen et al., 2021). Governance risks associated with AI adoption present an equally serious problem, particularly regarding accountability, transparency, and ethical oversight. Research indicates that over 65% of government AI systems operate as "black boxes," offering limited explainability for automated decisions affecting citizens (Schiff et al., 2022; Al-Besher & Kumar, 2022). Data protection audits reveal that nearly 40% of public-sector digital platforms fail to fully comply with established privacy and data governance standards (Kholov & Mamarasulov, 2024; Matlala, 2025). Algorithmic bias has been identified in public service allocation systems, with error rates disproportionately affecting marginalized populations by up to 25% in some cases (Djatmiko et al., 2025; Alhosani & Alhashmi, 2024). Furthermore, regulatory frameworks for AI governance remain underdeveloped, with fewer than one-third of countries having comprehensive AI laws applicable to public administration (Yigitcanlar et al., 2024; Eom & Lee, 2022). These risks threaten public trust, which surveys show has declined by 18–22% in jurisdictions where opaque digital systems dominate service delivery (Sharmin & Chowdhury, 2025; Schiff et al., 2022).

The problem is further compounded by growing inequalities in digital access and institutional capacity across and within governments. While high-income countries report e-government usage rates above 70%, adoption in low- and middle-income contexts remains below 40%, limiting the reach of productivity-enhancing technologies (Balaji, 2025; Djatmiko et al., 2025). Local governments, which deliver over 60% of frontline public services, often receive less than 25% of national digital transformation funding, constraining effective AI integration (Yigitcanlar et al., 2024; Kutkov et al., 2025). Social inclusion assessments show that digital exclusion affects up to

one-third of citizens in some regions, reducing the overall public value of digital reforms (Matlala, 2025; Sharmin & Chowdhury, 2025). At the same time, weak coordination between national digital strategies and agency-level implementation leads to duplication and inefficiency, with up to 35% of digital investments yielding limited operational impact (Eom & Lee, 2022; Chibunna et al., 2024). These gaps demonstrate the need for a systematic evaluation of productivity, implementation barriers, and governance risks associated with digital transformation and AI adoption in government.

1.2 Research Objective

To evaluate the productivity gains, implementation barriers, and governance risks associated with digital transformation and artificial intelligence adoption in government institutions.

1.3 Research Question

What are the productivity gains, implementation barriers, and governance risks associated with digital transformation and artificial intelligence adoption in government institutions?

2.1 Theoretical Framework

This study was informed by Sociotechnical Systems Theory and Institutional Theory.

2.1.1 Sociotechnical Systems Theory

Sociotechnical Systems Theory was developed by Eric Trist and Ken Bamforth in 1951. The theory states that technology cannot be treated as an independent driver of productivity because human behavior, work structures, and organizational culture significantly shape outcomes (Trist, 1981). In public sector contexts, this perspective is especially relevant because government institutions are highly people-centric and rule-bound, making technology adoption dependent on social arrangements (Mumford, 2006). Digital transformation and AI adoption therefore require alignment between technological tools and administrative practices to achieve productivity gains (Bostrom & Heinen, 1977). Failure to achieve this alignment often results in underutilized systems and resistance among employees (Pasmore, 1988). The theory thus provides a strong conceptual basis for examining why digital reforms in government frequently fall short of expectations (Cherns, 1976).

Sociotechnical Systems Theory emphasizes that implementation barriers arise when technical systems are imposed without adequate consideration of human roles, skills, and participation (Mumford, 2006). In government institutions, AI systems introduced without staff involvement often disrupt established workflows, leading to inefficiencies rather than productivity improvements (Trist, 1981). The theory stresses participatory design as a mechanism for reducing resistance and enhancing acceptance of new technologies (Cherns, 1976). Public servants' perceptions, competencies, and trust in digital systems are therefore central to successful AI adoption (Pasmore, 1988). When these social elements are neglected, digital transformation initiatives tend to stall or operate in parallel with manual systems (Bostrom & Heinen, 1977). This explains why many governments experience persistent implementation challenges despite substantial digital investment (Mumford, 2006). The theory thus directly informs analysis of implementation barriers in AI-enabled public administration (Trist & Bamforth, 1951).

The theory also sheds light on governance risks associated with AI adoption in government. Sociotechnical Systems Theory cautions that over-automation can erode human judgment, accountability, and ethical oversight if social controls are weakened (Emery & Trist, 1960). In

public administration, this risk is magnified because decisions often affect citizens' rights and access to services (Trist, 1981). The theory advocates for balanced systems in which technology supports, rather than replaces, human decision-making (Pasmore, 1988). Poorly designed sociotechnical systems can create opaque decision processes, reducing transparency and public trust (Cherns, 1976). Governance risks therefore emerge when technical efficiency is prioritized at the expense of institutional accountability (Bostrom & Heinen, 1977). Sociotechnical Systems Theory highlights the need for ethical and governance safeguards embedded within system design (Mumford, 2006). This perspective is crucial for evaluating AI risks in government settings (Trist & Bamforth, 1951).

Sociotechnical Systems Theory provides a comprehensive lens for understanding productivity outcomes, implementation barriers, and governance risks in digital government initiatives. It underscores that successful AI adoption depends on harmonizing technological innovation with organizational structures and human capabilities (Trist, 1981). The theory moves beyond technological determinism by recognizing public institutions as social systems shaped by norms, routines, and power relations (Emery & Trist, 1960). This approach is particularly suited to government environments characterized by bureaucratic complexity and accountability requirements (Mumford, 2006). By emphasizing joint optimization, the theory explains why isolated technology upgrades often fail to deliver sustainable productivity gains (Pasmore, 1988). It also provides guidance for designing AI systems that enhance, rather than undermine, governance quality (Cherns, 1976). Consequently, Sociotechnical Systems Theory strongly informs this study's evaluation of digital transformation and AI adoption in government (Bostrom & Heinen, 1977).

2.1.2 Institutional Theory

Institutional Theory was developed by Meyer and Rowan (1977). Institutional Theory explains organizational behavior as defined by formal rules, norms, and cultural beliefs rather than purely efficiency considerations. The theory was advanced by scholars such as Meyer and Rowan, and later DiMaggio and Powell, who argued that organizations adopt practices to gain legitimacy within their institutional environment (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). In government, digital transformation and AI adoption are often influenced by regulatory mandates, political pressures, and global reform trends rather than internal performance needs (Scott, 2014). This explains why governments frequently adopt digital systems symbolically, without deep operational integration (Tolbert & Zucker, 1996). Institutional Theory therefore provides a framework for understanding the gap between digital policy commitments and actual productivity gains (Oliver, 1991). It emphasizes that compliance and legitimacy often outweigh efficiency in public sector decision-making (Scott, 2008). This perspective is essential for analyzing AI adoption in government institutions (Meyer & Rowan, 1977).

Institutional Theory identifies three mechanisms coercive, normative, and mimetic pressures— that shape organizational behavior (DiMaggio & Powell, 1983). Coercive pressures include laws, regulations, and political directives compelling governments to adopt digital technologies (Scott, 2014). Normative pressures arise from professional standards and expectations among public administrators and ICT professionals (Tolbert & Zucker, 1996). Mimetic pressures lead governments to imitate digital and AI initiatives implemented by peer countries or leading institutions, often without contextual adaptation (Meyer & Rowan, 1977). These pressures help explain why AI systems are rapidly adopted but poorly implemented in many public institutions (Oliver, 1991). Institutional Theory thus clarifies why implementation barriers persist even when

technology is available (Scott, 2008). This makes the theory highly relevant for evaluating digital transformation challenges in government (DiMaggio & Powell, 1983).

The theory is also central to understanding governance risks associated with AI adoption. Institutional Theory argues that weak regulatory frameworks and unclear accountability structures create institutional voids where risks can flourish (Scott, 2014). In government, AI systems may operate without clear legal responsibility, leading to opacity and accountability gaps (Meyer & Rowan, 1977). Institutional fragmentation further complicates oversight, especially when multiple agencies share responsibility for digital systems (Tolbert & Zucker, 1996). Symbolic compliance with digital governance standards may mask underlying ethical and operational risks (Oliver, 1991). Institutional Theory therefore explains why governance failures occur even in highly regulated public sectors (Scott, 2008). It highlights the importance of strong institutional frameworks to manage AI risks effectively (DiMaggio & Powell, 1983).

Institutional Theory provides a powerful explanation for why digital transformation and AI adoption in government often prioritize legitimacy over performance. It shows that productivity gains are contingent on institutional alignment, not just technological capability (Scott, 2014). The theory explains persistent implementation barriers arising from bureaucratic inertia, regulatory complexity, and symbolic adoption of reforms (Meyer & Rowan, 1977). It also offers insights into governance risks linked to weak institutional accountability and fragmented oversight (Oliver, 1991). Institutional Theory complements Sociotechnical Systems Theory in explaining public sector digital transformation outcomes.

2.2 Empirical Review

Sharmin and Chowdhury (2025) conducted an empirical study examining the impact of digital transformation in governance, with a specific focus on how e-governance influences public administration efficiency and transparency. The study adopted a mixed-methods research design, integrating qualitative content analysis of national digital governance policies with quantitative survey data collected from policymakers and public administrators across selected countries. To strengthen empirical validity, the authors employed a comparative case study approach, focusing on Estonia, India, and South Korea, countries widely recognized for advanced e-governance systems. The analysis assessed how digital tools such as artificial intelligence, blockchain, big data analytics, and cloud computing are embedded within public administration processes to reduce bureaucratic delays, enhance service accessibility, and improve accountability.

Quantitative findings showed that automation of administrative workflows led to significant reductions in processing time and operational costs, while digital service platforms increased citizen engagement and satisfaction with government services. The study further revealed that transparency gains were strongly associated with the adoption of open data initiatives and blockchain-based procurement systems, which reduced discretionary decision-making and opportunities for corruption. Survey results indicated that over two-thirds of respondents perceived e-governance as having a positive effect on institutional transparency and public trust. However, the empirical analysis also identified substantial implementation challenges, including persistent digital divides, cybersecurity vulnerabilities, and bureaucratic resistance to organizational change. These barriers were more pronounced in developing governance contexts, where infrastructural and regulatory limitations constrained full-scale adoption.

Balaji (2025) examined the role of e-Government and e-Governance in driving digital transformation in public administration through review of global e-Government initiatives. The

study synthesized evidence from multiple country experiences to assess how information and communication technologies enhance efficiency, transparency, and accessibility in public service delivery. Findings showed that digitization of government processes reduces administrative costs, shortens service delivery timelines, and improves inter-agency coordination, particularly in areas such as licensing, taxation, and social services. However, the study identified major challenges including the digital divide, cybersecurity risks, regulatory gaps, and limited institutional capacity to adopt advanced technologies such as artificial intelligence and blockchain. The study concluded that while e-Governance delivers clear productivity and transparency benefits, sustainable digital transformation requires strong policy frameworks, capacity building, and governance structures to manage emerging technological risks.

Kiris and Gurul (2025) investigated the drivers and barriers influencing the adoption and diffusion of artificial intelligence applications in public administration, with a focus on how these factors influence effective AI integration in government institutions. The study employed an integrated Interpretive Structural Modeling (ISM) and MICMAC analysis framework to systematically map and analyze the interrelationships among technological, organizational, environmental, and human factors affecting AI adoption. The findings identified key drivers such as data availability, top management support, technological readiness, and perceived efficiency gains as critical enablers of AI diffusion in the public sector. The study found that major barriers included cybersecurity threats, data privacy concerns, budgetary constraints, skills shortages, and infrastructural limitations, which were found to exert strong inhibitory effects on implementation. The ISM-MICMAC results demonstrated that organizational and governance-related barriers possess high driving power, meaning they significantly influence other constraints within the AI adoption ecosystem. The study concluded that unless these foundational barriers are strategically addressed through policy reforms, capacity building, and investment in secure digital infrastructure, governments are unlikely to fully realize the productivity and service delivery benefits of AI-enabled public administration.

A study by Chisika and Yeom (2025) conducted a comparative empirical analysis examining the influence of national artificial intelligence strategies on good governance indicators across 40 African countries over the period 2013–2022. The study adopted a comparative case study design, making use of secondary data from the 2022 World Governance Index alongside national AI policy documents to assess changes in governance outcomes. A structured analytical framework was applied to evaluate key indicators, including government effectiveness, regulatory quality, and control of corruption. The findings revealed that countries with formal AI strategies such as Kenya, South Africa, and Rwanda experienced significant improvements in governance performance, with government effectiveness scores increasing from a mean of -0.3435 in 2013 to -0.3058 in 2022, accompanied by reduced variability (standard deviation of 0.48). In contrast, countries without AI strategies recorded a decline in effectiveness, with mean scores falling from -0.9929 to -1.0847 and higher variability (standard deviation of 0.65). While AI applications in sectors such as agriculture and healthcare showed positive outcomes, the study identified persistent barriers including infrastructure deficits, data privacy concerns, and digital literacy gaps, concluding that policy-driven and inclusive AI strategies are essential for translating technological adoption into sustainable governance improvements in Africa.

Taiwo and Oladele (2025) examined the effect of artificial intelligence innovations on public service delivery in Nigeria, focusing on both the benefits and challenges of AI implementation in a developing-country context. The study adopted a qualitative research design, drawing on an

extensive review of scholarly literature, textbooks, and empirical evidence from prior studies on AI use in Nigerian public administration. The findings indicated that AI technologies such as machine learning, predictive analytics, and automated decision-making systems had the potential to improve service efficiency, transparency, and citizen satisfaction by addressing long-standing challenges including service delays, uneven access, and weak accountability. However, the study identified significant implementation barriers, notably inadequate digital infrastructure, low levels of digital literacy among public servants, and resistance driven by fears of job displacement. The authors concluded that while AI presents strong opportunities for transforming public service delivery in Nigeria, its success depends on the establishment of robust regulatory and ethical frameworks, as well as sustained investment in capacity building and training for public sector employees to support effective and citizen-centered AI adoption.

Kyambade and Namatovu (2025) explored health-care leaders' perspectives on artificial intelligence implementation in Uganda, focusing on barriers, innovation drivers, and strategic considerations for effective AI integration within public health institutions. The study adopted a qualitative exploratory design, using semi-structured interviews with 24 leaders drawn from various public health-care organizations, with data collected between December 2023 and February 2024. Qualitative content analysis using an inductive approach revealed three major categories of challenges affecting AI adoption: external constraints such as regulatory gaps, limited funding, and infrastructure deficits; institutional capacity for change management, including resistance to change, insufficient technical expertise, and weak leadership support; and transformation of health-care practices, encompassing concerns about job displacement, ethical risks, and data security. Despite these challenges, respondents consistently recognized AI's potential to enhance diagnostic accuracy, improve operational efficiency, and optimize clinical workflows. The study concluded that successful AI implementation in Uganda's public health sector requires coordinated regulatory reforms, strategic leadership commitment, targeted capacity building, and ethical safeguards to translate technological innovation into sustainable improvements in service delivery.

A study by Mushinzimana, Faisal, and Teressia (2025) examined the adoption of digital transformation within Rwanda's business community and its potential to increase financial benefits using a SWOT analytical framework. The study employed a qualitative case-based design, collecting primary data through online interviews with senior personnel including a Manager, Credit Officer, and Accountant from Reseau Interdiocesain De Microfinance (RIM) Rwanda, with data collection commencing in April 2024. Findings identified key strengths such as strong internal resources, existing technological infrastructure, digital expertise, and successful prior digital initiatives that enhance competitiveness and financial performance. However, significant weaknesses were observed, including uneven digital infrastructure between urban and rural areas, gaps in digital skills, organizational culture constraints, and limited strategic planning capacity. The analysis further highlighted opportunities arising from strong government commitment, high mobile penetration, infrastructure development, and a growing skilled workforce, which collectively support financial inclusion and public–private partnerships. At the same time, threats such as cybersecurity risks, high technology costs, outdated regulations, and reliance on foreign technology were found to undermine sustainable digital transformation. The study concluded that Rwanda's digital transformation success depends on coordinated government leadership, regulatory reforms, investments in ICT infrastructure and cybersecurity, and large-scale digital literacy and training programs to support long-term financial and institutional resilience.

Kwarkye (2025) examined Ghana's pathway to artificial intelligence governance and its broader implications for Africa through a policy-focused analytical review presented as a governance policy brief. The study analyzed Ghana's evolving AI ecosystem by examining legislative instruments, national digital transformation policies, and the 10-Year National Artificial Intelligence Strategy introduced in 2022, supported by secondary policy documents and institutional reports. Findings showed that Ghana's AI governance framework was strongly anchored in earlier regulatory foundations, particularly the Data Protection Act (2012) and the establishment of the Data Protection Commission, which provide ethical and privacy safeguards critical for responsible AI deployment. The study further highlighted the role of the Digital Ghana Agenda in strengthening digital infrastructure, regulatory reforms, and digital skills development, creating an enabling environment for AI innovation. Ghana's national AI strategy, structured around multiple pillars including AI talent development, sector-specific applications, and sustainable economic growth, positions the country as a continental model for balancing innovation with ethical governance. Nonetheless, the study noted persistent challenges related to global power asymmetries, capacity constraints, and the need for inclusive, forward-looking regulatory frameworks. The paper concluded that Ghana's policy-driven and human-centric approach offers valuable lessons for African countries seeking to harness AI for public service delivery and economic development while mitigating governance and ethical risks.

3.0 Methodology

This study adopted a desktop review research design to examine digital transformation and artificial intelligence adoption in government, with a focus on productivity benefits, implementation barriers, and governance risks. The review was guided by a positivist research philosophy, seeking to synthesize existing empirical and policy-based evidence through an objective and systematic approach. Relevant literature was identified through an extensive search of academic databases, peer-reviewed journals, policy briefs, institutional reports, and reputable governance and technology publications. Key search terms included digital transformation in government, e-governance, artificial intelligence adoption, public sector productivity, implementation barriers, and AI governance risks. Inclusion criteria focused on studies addressing government or public sector contexts, AI and digital governance frameworks, and empirical or policy-oriented analyses. The selected sources were screened for relevance, methodological relevance and contribution to understanding AI-driven public administration. Through systematic analysis and synthesis of the reviewed literature, the study developed a comprehensive overview of prevailing trends, challenges, and governance implications, while also identifying gaps to inform future research and policy development.

4.0 Findings

The reviewed literature establishes that digital transformation and AI adoption brings about significant productivity and efficiency gains in public administration, particularly through automation, workflow optimization, and enhanced service accessibility. Studies by Sharmin and Chowdhury (2025) and Balaji (2025) demonstrate that e-governance platforms significantly reduce administrative processing times, operational costs, and bureaucratic delays while improving inter-agency coordination and citizen engagement. Empirical evidence shows that automation of public sector workflows and deployment of digital service platforms increase service responsiveness and satisfaction, confirming that digital tools can strengthen core administrative functions when effectively implemented. These findings collectively affirm that digital transformation is a critical driver of productivity improvement in government institutions.

The literature further highlights that AI technologies amplify productivity gains beyond traditional e-government systems by enabling data-driven decision-making, predictive analytics, and intelligent automation. Kiris and Gurul (2025) established that AI adoption is driven by factors such as data availability, technological readiness, and top management support, which facilitate diffusion and scaling across public institutions. Similarly, Taiwo and Oladele (2025) found that AI applications in public service delivery improve efficiency, transparency, and citizen satisfaction by addressing persistent issues such as service delays and uneven access. Across the studies, AI is consistently positioned as a transformative capability that enhances government performance when embedded within supportive organizational and governance structures.

Despite these benefits, the reviewed studies reveal widespread implementation barriers that limit the realization of digital and AI-driven productivity gains. Infrastructure deficits, particularly in developing and transitional economies, emerge as a dominant constraint, as shown in studies conducted in Nigeria, Uganda, and Rwanda. Kyambade and Namatovu (2025) and Taiwo and Oladele (2025) identified limited digital infrastructure, inadequate funding, and weak institutional capacity as key obstacles to AI implementation. These barriers often result in fragmented adoption, pilot projects that fail to scale, and parallel use of manual systems that dilute efficiency gains. Human and organizational factors are also repeatedly identified as major impediments to successful digital transformation. Several studies highlight resistance to change, skills shortages, and fear of job displacement among public servants as critical barriers to AI adoption. Kiris and Gurul (2025) demonstrated that organizational and governance-related barriers possess high driving power, meaning they significantly influence other constraints within the AI ecosystem. Similarly, Kyambade and Namatovu (2025) found that weak change management capacity and insufficient leadership support slow AI integration in public health institutions. These findings emphasize that technology adoption in government is fundamentally a sociotechnical challenge rather than a purely technical one.

Literature also provides strong evidence on the governance implications of AI adoption, particularly regarding accountability, transparency, and ethical oversight. Sharmin and Chowdhury (2025) and Kwarkye (2025) show that digital transparency initiatives, such as open data platforms and blockchain-based procurement systems, reduce corruption and strengthen public trust. However, several studies caution that without robust governance frameworks, AI systems may introduce new risks related to data privacy, cybersecurity, and opaque decision-making. These risks are especially pronounced in contexts with weak regulatory enforcement and fragmented institutional oversight. Comparative studies offer valuable insights into the role of national strategies and policy frameworks in shaping AI governance outcomes. Chisika and Yeom (2025) demonstrated that African countries with formal AI strategies experienced measurable improvements in governance indicators such as government effectiveness and control of corruption, while countries without such strategies recorded declining performance. Similarly, Kwarkye (2025) showed that Ghana's structured, policy-driven approach to AI governance anchored in data protection laws and a national AI strategy provides a viable model for balancing innovation with ethical safeguards. These findings underscore the importance of deliberate, policy-led AI adoption in achieving sustainable governance outcomes.

The study also established contextual differences in digital transformation outcomes, with stronger results observed in countries possessing advanced digital infrastructure and institutional maturity. Case studies from Estonia, South Korea, Kenya, Rwanda, and Ghana show that productivity and governance benefits are more pronounced where digital reforms are supported by strong legal

frameworks, skilled workforces, and long-term strategic planning. Conversely, studies from Nigeria and Uganda illustrate how limited capacity and regulatory gaps constrain AI's impact despite its potential. This variation reinforces the argument that digital transformation outcomes are highly context-dependent. The reviewed studies converge on the conclusion that digital transformation and AI adoption offer significant productivity and governance benefits, but these gains are neither automatic nor uniform. Successful outcomes depend on addressing implementation barriers related to infrastructure, skills, organizational culture, and regulatory capacity. The literature also emphasizes that governance risks must be proactively managed through ethical frameworks, data protection laws, and institutional accountability mechanisms. Taken together, these findings justify the need for integrated evaluations that simultaneously examine productivity benefits, implementation barriers, and governance risks associated with digital transformation and AI adoption in government institutions.

5.0 Conclusion

Digital transformation and artificial intelligence adoption have become unavoidable channels for modern governments seeking to remain effective, responsive, and credible in an increasingly digital society. The body of literature reviewed leads to the conclusion that technology alone does not transform public administration; rather, transformation occurs when digital tools are embedded within supportive institutional arrangements, capable human systems, and coherent policy frameworks. Governments that approach digital transformation as a strategic governance reform, rather than a technical upgrade, are better positioned to realize sustained improvements in public sector performance and service delivery.

The findings also point to the critical importance of governance readiness in shaping the trajectory of AI adoption in government. Where regulatory clarity, ethical safeguards, leadership commitment, and institutional coordination are present, digital transformation strengthens accountability and public trust. In contrast, weak governance environments amplify risks related to opacity, inequality, and misuse of technology. This suggests that AI governance must evolve in parallel with technological deployment, ensuring that innovation is aligned with public values, legal standards, and citizen rights.

Moreover, there is need for balanced and context-sensitive digital transformation strategies. Governments must reconcile ambition with capacity by investing in skills development, infrastructure, and change management while fostering inclusive and participatory approaches to digital reform. Sustainable AI adoption in the public sector therefore depends on long-term policy coherence, continuous institutional learning, and deliberate efforts to integrate technology with human and organizational systems. Such an approach offers the most viable path toward resilient, ethical, and high-performing digital governance.

6.0 Recommendations

In view of the findings, governments should adopt integrated digital transformation strategies that explicitly link technology deployment with institutional reform, human capacity development, and governance strengthening. Digital and AI initiatives should be embedded within broader public sector reform agendas rather than implemented as isolated ICT projects. This requires clear national and sector-specific digital strategies, strong leadership commitment, and coordination across ministries and agencies to ensure interoperability, scalability, and alignment with public service objectives. In addition, governments should invest in human capital and change management to support sustainable AI adoption in government. Public institutions should

prioritize continuous training and reskilling of public servants to build digital and AI competencies while addressing fears related to job displacement through transparent communication and role redesign. Change management frameworks should be institutionalized to promote acceptance, ownership, and effective use of digital systems across all levels of government.

Moreover, governments should scale up AI governance and regulatory frameworks to manage ethical, legal, and accountability risks associated with digital transformation. This includes updating data protection laws, establishing clear accountability mechanisms for AI-assisted decisions, and enforcing cybersecurity standards across public institutions. Ethical guidelines and oversight bodies should be empowered to ensure that AI systems remain transparent, fair, and aligned with public values, particularly in sensitive service delivery areas. Furthermore, policymakers should pursue inclusive and context-sensitive digital transformation approaches that address inequalities in access and institutional capacity. Investments in digital infrastructure should prioritize underserved regions and frontline public service agencies, while partnerships with the private sector, academia, and development partners can support innovation and capacity building. Continuous monitoring, evaluation, and learning should be incorporated within digital governance initiatives to adapt strategies over time and ensure that productivity gains translate into equitable and sustainable public value.

REFERENCES

Ahn, M. J., & Chen, Y. C. (2022). Digital transformation toward AI-augmented public administration: The perception of government employees and the willingness to use AI in government. *Government Information Quarterly*, *39*(2), 101664.

Al-Besher, A., & Kumar, K. (2022). Use of artificial intelligence to enhance e-government services. *Measurement: sensors*, *24*, 100484.

Alhosani, K., & Alhashmi, S. M. (2024). Opportunities, challenges, and benefits of AI innovation in government services: a review. *Discover Artificial Intelligence*, *4*(1), 18.

Aminah, S., & Saksono, H. (2021). Digital transformation of the government: A case study in Indonesia. *Jurnal Komunikasi: Malaysian Journal of Communication*, *37*(2), 272-288.

Balaji, K. (2025). E-Government and E-Governance: Driving Digital Transformation in Public Administration. *Public Governance Practices in the Age of AI*, 23-44.

Chen, C. L., Lin, Y. C., Chen, W. H., Chao, C. F., & Pandia, H. (2021). Role of government to enhance digital transformation in small service business. *Sustainability*, *13*(3), 1028.

Chibunna, U. B., Hamza, O., Collins, A., Onoja, J. P., Eweja, A., & Daraojimba, A. I. (2024). The Intersection of AI and Digital Transformation: A Roadmap for Public and Private Sector Business Innovation.

Chisika, S. N., & Yeom, C. (2025). Comparative Analysis of National Artificial Intelligence Strategies and Their Impact on Good Governance Indicators in Africa. *ASIA-PACIFIC JOURNAL OF CONVERGENT RESEARCH INTERCHANGE Учредители: Future Convergence Technology Research Society*, *11*(3), 75-92.

Djatmiko, G. H., Sinaga, O., & Pawirosumarto, S. (2025). Digital transformation and social inclusion in public services: A qualitative analysis of e-government adoption for marginalized communities in sustainable governance. *Sustainability*, *17*(7), 2908.

Djatmiko, G. H., Sinaga, O., & Pawirosumarto, S. (2025). Digital transformation and social inclusion in public services: A qualitative analysis of e-government adoption for marginalized communities in sustainable governance. *Sustainability*, *17*(7), 2908.

Eom, S. J., & Lee, J. (2022). Digital government transformation in turbulent times: Responses, challenges, and future direction. *Government Information Quarterly*, *39*(2), 101690.

Kholov, A., & Mamarasulov, S. (2024). Problem Of Using Artificial Intelligence and Digital transformation in the System of Public Administration. In *Proceedings of the International Conference* (pp. 46-55).

Kiris, S. B., & Gurul, B. (2025). Drivers and Barriers to Adoption and Diffusion of AI Applications in Public Administration. In *AI Deployment and Adoption in Public Administration and Organizations* (pp. 1-38). IGI Global Scientific Publishing.

Kutkov, O., Zolotov, A., Akimova, L., & Akimov, O. (2025). Digital Transformation of Social Governance: Economic Challenges and Opportunities of Smart Cities. *Economics, Finance and Management Review*, (1 (21)), 17-28.

Kwarkye, T. G. (2025). *Ghana's Pathway to AI Governance and Its Implications for Africa*. Centre for International Governance Innovation.

Kyambade, M., & Namatovu, A. (2025). Health-care leaders' perspectives on AI implementation in Uganda: overcoming barriers, driving innovation and strategic considerations. *Leadership in Health Services*, *38*(3), 442-463.

Matlala, L. S. (2025). E-governance in South Africa: barriers and enablers of virtual evaluation in the public sector. *Insights into Regional Development*, *7*(2), 84-108.

Mushinzimana, L., Faisal, A., & Teressia, A. (2025). Strategy For Evaluating the Strengths, Weaknesses, Opportunities, And Threats of The Business Community in Rwanda in Adopting Digital Transformation to Increase Financial Benefits. *Indiana Journal of Economics and Business Management*, *5*(1), 64-96.

Schiff, D. S., Schiff, K. J., & Pierson, P. (2022). Assessing public value failure in government adoption of artificial intelligence. *Public Administration*, *100*(3), 653-673.

Sharmin, S., & Chowdhury, R. H. (2025). Digital transformation in governance: The impact of e-governance on public administration and transparency. *Journal of Computer Science and Technology Studies*, *7*(1), 362-379.

Sharmin, S., & Chowdhury, R. H. (2025). Digital transformation in governance: The impact of e-governance on public administration and transparency. *Journal of Computer Science and Technology Studies*, *7*(1), 362-379.

Taiwo, F., & Oladele, O. (2025). The Impact Of Artificial Intelligence (Ai) Innovations On Public Service Delivery In Nigeria.

Xiaoyan, L., & Segumpan, R. G. (2025). Navigating AI Adoption Challenges in China's Public Sector: Implications for Efficiency and Performance. *International Journal of Academic Research in Business and Social Sciences*, *15*(3), 1367-1381.

Yigitcanlar, T., David, A., Li, W., Fookes, C., Bibri, S. E., & Ye, X. (2024). Unlocking artificial intelligence adoption in local governments: Best practice lessons from real-world implementations. *Smart Cities*, *7*(4), 1576-1625.