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Impact of Technology Adoption on Government Service Delivery Efficiency in Ghana

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Abstract

Purpose: The aim of the study was to assess the impact of technology adoption on government service delivery efficiency in Ghana.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The impact of technology adoption on government service delivery efficiency is profound and multifaceted. Through the integration of digital tools and platforms, governments have streamlined processes, enhanced accessibility, and improved the overall quality of services offered to citizens. Automated systems have reduced bureaucratic hurdles, minimized paperwork, and expedited transactions, leading to faster response times and increased satisfaction among constituents. Additionally, data analytics and predictive modeling have enabled governments to make

more informed decisions, allocate resources effectively, and target interventions where they are most needed. Furthermore, digital communication channels have facilitated greater transparency and engagement, empowering citizens to interact with government agencies more easily and hold them accountable. However, challenges such as ensuring equitable access to technology, safeguarding data privacy, and mitigating digital divides among populations remain pertinent concerns.

Implications to Theory, Practice and Policy: Institutional theory, diffusion of innovation theory and resource dependency theory may be use to anchor future studies on assessing the impact of technology adoption on government service delivery efficiency in Ghana. Prioritize user-centered design principles to ensure that technology solutions are tailored to the needs and preferences of government stakeholders and citizens. Advocate for the development of an enabling regulatory environment that supports innovation and experimentation in government service delivery.

Keywords: *Technology Adoption, Government Service, Delivery Efficiency*

INTRODUCTION

The impact of technology adoption on government service delivery efficiency is profound and multifaceted, revolutionizing how citizens interact with their governing bodies. With the integration of technology into administrative processes, governments can streamline operations, enhance accessibility, and improve overall efficiency. Digital platforms facilitate the automation of routine tasks, reducing bureaucratic hurdles and processing times. Additionally, technologies like data analytics enable policymakers to make more informed decisions by harnessing vast amounts of information. This not only optimizes resource allocation but also enhances the responsiveness of government services to citizens' needs. Moreover, technology-driven solutions often promote transparency and accountability, fostering trust between the government and its constituents. From online portals for submitting applications to e-governance initiatives, the adoption of technology fundamentally transforms the landscape of government service delivery, ushering in an era of increased efficiency and effectiveness.

In developed economies like the United States, Government Service Delivery Efficiency has seen significant improvements over the past decade. For instance, the processing times for various services, such as passport applications and tax filings, have decreased by approximately 15% due to the implementation of digital platforms and streamlined processes (Smith et al., 2017). Moreover, the accuracy of service provision has notably increased, with error rates dropping by 20% as a result of advanced data analytics and automation technologies. Citizen satisfaction with government services has also shown a positive trend, with surveys indicating a 10% increase in overall satisfaction levels over the past five years, attributed to enhanced accessibility and user-centric design of service delivery channels.

Similarly, in countries like Japan, Government Service Delivery Efficiency has been a focal point for improvement efforts. For example, Japan has witnessed a remarkable reduction in processing times for administrative procedures, with a 25% decrease observed in the time taken to register a new business entity, facilitated by the digitization of registration processes and the introduction of online submission options (Tanaka & Nakamura, 2018). Furthermore, the accuracy of service provision has seen considerable enhancement, evidenced by a 30% decline in error rates in tax assessments and welfare benefits disbursement, driven by the integration of artificial intelligence and machine learning algorithms. Citizen satisfaction surveys in Japan have also reflected positively on government services, with a 12% increase in satisfaction levels attributed to improved transparency and responsiveness.

In developing economies, such as those in Sub-Saharan Africa, Government Service Delivery Efficiency has been a critical area of focus to enhance public service accessibility and quality. Despite facing challenges related to limited resources and infrastructure, notable progress has been made. For instance, countries like Rwanda have achieved remarkable improvements in processing times for key services like business registration, with a 40% reduction observed over the past decade, facilitated by streamlined procedures and digitalization initiatives (Munyanshongore et al., 2016). Moreover, efforts to enhance the accuracy of service provision have been underway, leveraging technologies such as biometric identification systems to minimize errors in beneficiary targeting for social welfare programs. Although citizen satisfaction levels vary across countries in Sub-Saharan Africa, there is a growing recognition of the importance of citizen feedback mechanisms and service quality improvements to address public service delivery challenges.

In developing economies, such as those in Sub-Saharan Africa, Government Service Delivery Efficiency remains a pressing concern, with efforts focused on overcoming infrastructure limitations and bureaucratic inefficiencies. For example, in Nigeria, initiatives aimed at improving processing times for essential services like obtaining construction permits have shown promising results, with a 30% reduction observed over the past five years through the implementation of online application systems and simplified approval processes (Oyewole & Olowu, 2019). Additionally, strides have been made to enhance the accuracy of service provision, particularly in areas such as healthcare delivery and social welfare programs, leveraging data-driven approaches and strengthened monitoring mechanisms to minimize errors in beneficiary targeting and resource allocation. Despite these advancements, challenges persist, including limited internet connectivity in remote areas and gaps in digital literacy, impacting the equitable access to government services and overall citizen satisfaction.

Similarly, in countries like Bangladesh, Government Service Delivery Efficiency has been a focal point for reform efforts to address the needs of a rapidly growing population. Significant progress has been made in reducing processing times for administrative procedures, such as land registration and business licensing, with a 25% decrease observed over the past decade through the simplification of procedures and the establishment of one-stop service centers (Ahmed et al., 2018). Moreover, measures to improve the accuracy of service provision have been implemented, including the digitization of public records and the deployment of biometric identification systems to enhance the reliability of beneficiary data for social assistance programs. Despite these advancements, there is a continued emphasis on capacity building and institutional strengthening to ensure sustained improvements in Government Service Delivery Efficiency across diverse sectors and regions.

In many Sub-Saharan African economies, Government Service Delivery Efficiency is further challenged by factors such as limited financial resources, institutional capacity constraints, and political instability. However, strides have been made in various countries to address these challenges and improve service delivery to citizens. For instance, in Kenya, efforts to enhance processing times and accuracy in service provision have been supported by the widespread adoption of mobile technology, with initiatives like the Huduma Centers facilitating faster and more accessible government services across different regions (Chepkemoi et al., 2017). Additionally, the Kenyan government has prioritized citizen feedback mechanisms and transparency measures to ensure accountability and responsiveness in service delivery, contributing to improved citizen satisfaction levels over time.

Similarly, in countries like Ethiopia, Government Service Delivery Efficiency has been a central focus of development agendas, with significant investments made in infrastructure and technology to streamline processes and enhance service accessibility. Initiatives such as the e-Government Strategy have aimed to digitize service delivery channels and improve the efficiency of public administration, leading to notable reductions in processing times for services like business registration and tax filing (Mulatu & Zewde, 2016). Despite these advancements, there remain challenges related to bureaucratic inefficiencies and resource constraints, highlighting the need for sustained efforts to strengthen institutional capacity and governance frameworks to ensure equitable and effective government service delivery for all citizens.

In India, Government Service Delivery Efficiency has been a key priority, particularly with the implementation of digital initiatives like the Aadhaar system, which provides a unique identification number to residents and has facilitated more efficient delivery of various government services (Sharma & Debroy, 2017). Processing times for services like obtaining birth certificates and accessing welfare benefits have significantly reduced due to the Aadhaar-enabled platforms, leading to improved accuracy and transparency in service provision. Moreover, initiatives such as the Digital India program have aimed to bridge the urban-rural divide by expanding internet connectivity and digital literacy programs, thus enhancing access to government services even in remote areas.

In Indonesia, Government Service Delivery Efficiency has seen advancements driven by initiatives like the One-Stop Government Services (PTSP) program, which aims to simplify administrative procedures and reduce bureaucracy (Rahardjo et al., 2018). Through PTSP, processing times for services such as business permits and land registrations have been significantly reduced, contributing to improved ease of doing business and investment attractiveness. Moreover, efforts to digitize public records and enhance online service platforms have not only improved the accuracy of service provision but also increased citizen satisfaction by providing more convenient and transparent channels for interacting with the government.

In Brazil, Government Service Delivery Efficiency has been a focal point for improvement, particularly in sectors like healthcare and social services. Initiatives such as the "Rede Simples" program have aimed to simplify administrative procedures for starting businesses, resulting in significant reductions in processing times for business registration (World Bank, 2019). Moreover, the implementation of digital platforms for accessing government services, such as the "Gov.br" portal, has enhanced convenience and transparency for citizens, contributing to improved satisfaction levels with government services.

In South Africa, Government Service Delivery Efficiency has been a critical area of focus, given the country's diverse population and socio-economic challenges. Efforts such as the "e-Cabinet" initiative have aimed to digitize government processes and improve decision-making efficiency at various levels of governance (Ndou, 2018). Additionally, initiatives to strengthen service delivery at the local level, such as the "Back to Basics" program, have focused on improving basic service provision in areas like water, sanitation, and electricity, thereby enhancing citizen satisfaction and trust in government institutions.

Technology adoption in government service delivery plays a pivotal role in enhancing efficiency and effectiveness. Digital platforms, such as online portals and mobile applications, facilitate convenient access to government services, reducing processing times and administrative burdens for citizens (Linders, 2012). Automation of services through technologies like robotic process automation (RPA) streamlines repetitive tasks, leading to faster service delivery and minimizing human errors, thereby improving the accuracy of service provision (Bartolacci et al., 2015). Furthermore, the integration of data analytics enables governments to analyze large datasets to identify trends, optimize resource allocation, and tailor services to meet citizens' needs more effectively, ultimately enhancing citizen satisfaction with government services (Moon, 2002).

Among the most likely technology adoptions in government service delivery, the implementation of artificial intelligence (AI) holds significant promise. AI-powered chatbots and virtual assistants

can provide personalized support to citizens, addressing queries and guiding them through service processes in real-time, thereby reducing processing times and enhancing citizen satisfaction (Brynjolfsson & McAfee, 2017). Additionally, blockchain technology offers opportunities for secure and transparent transactions, enhancing the accuracy of service provision and fostering trust between governments and citizens (Yli-Huumo et al., 2016). Moreover, the adoption of cloud computing enables governments to scale their infrastructure dynamically, improving the scalability and reliability of digital platforms for delivering services efficiently (Janssen & Joha, 2018). Overall, these technology adoptions have the potential to revolutionize government service delivery, leading to more responsive, transparent, and citizen-centric governance.

Problem Statement

As governments worldwide increasingly embrace technology adoption to improve service delivery, there is a growing need to understand the impact of these technological advancements on Government Service Delivery Efficiency (GSD). While numerous studies have explored the benefits of technology adoption in enhancing efficiency and effectiveness in government operations (Linders, 2012; Bartolacci et al., 2015), there remains a gap in research regarding the specific mechanisms through which various technologies, such as digital platforms, automation, and data analytics, influence GSD. Furthermore, with the rapid pace of technological innovation, there is a need for up-to-date research that reflects the current landscape of government service delivery and technology utilization.

Existing literature often focuses on case studies or theoretical frameworks, providing valuable insights into the potential benefits of technology adoption for GSD (Moon, 2002; Brynjolfsson & McAfee, 2017). However, there is a lack of comprehensive empirical studies that systematically analyze the impact of technology adoption on GSD across different government sectors and jurisdictions. Additionally, while some research acknowledges the potential challenges and limitations associated with technology adoption in government contexts (Janssen & Joha, 2018), there is a need for deeper analysis to understand how these challenges may hinder or facilitate the achievement of GSD goals. Therefore, this study aims to address these gaps by conducting a rigorous empirical analysis to assess the impact of technology adoption on GSD, considering factors such as processing times, accuracy of service provision, and citizen satisfaction, in order to provide actionable insights for policymakers and practitioners in improving government service delivery efficiency.

Theoretical Framework

Institutional Theory

Originated by Meyer and Rowan (1977), Institutional Theory focuses on how institutions shape organizational behavior and practices. Within the context of technology adoption in government service delivery, this theory emphasizes the influence of institutional pressures, norms, and legitimacy on decision-making processes regarding technology adoption (Wang & Meister, 2018). Governments often face pressure to adopt certain technologies to align with global trends or meet citizen expectations, which can impact the efficiency of service delivery. Understanding the institutional context can help analyze the factors driving or hindering technology adoption and its subsequent impact on government service delivery efficiency.

Diffusion of Innovation Theory

Introduced by Rogers (1962), the Diffusion of Innovation Theory examines how new technologies spread and are adopted within a society or organization. In the context of government service delivery, this theory highlights the importance of understanding the characteristics of both the innovation itself and the adopters (i.e., government agencies) in determining the rate and extent of technology adoption (Kamal & Ahmadi, 2019). By examining factors such as the perceived relative advantage, compatibility, complexity, trialability, and observability of technology adoption, researchers can assess its impact on government service delivery efficiency.

Resource Dependency Theory

Originated by Pfeffer and Salancik (1978), Resource Dependency Theory focuses on how organizations seek resources from their external environment to survive and thrive. In the context of technology adoption in government service delivery, this theory emphasizes the role of external stakeholders, such as technology vendors, in providing resources (e.g., expertise, funding) necessary for successful adoption and implementation (Hobbs & Schneegans, 2020). By understanding the dynamics of resource dependencies, researchers can analyze how these relationships influence technology adoption decisions and subsequent impacts on government service delivery efficiency.

Empirical Review

Smith et al. (2017) conducted a comprehensive study aimed at investigating the impact of e-government adoption on service delivery efficiency in a developing country context. The purpose of the study was to assess how the integration of electronic systems within government operations affected the timeliness and quality of services provided to citizens. To achieve this, the researchers employed a mixed-methods approach, combining surveys administered to government officials and citizens with in-depth interviews. The quantitative data collected allowed for the analysis of service delivery metrics before and after the implementation of e-government initiatives, while qualitative insights provided nuanced understanding and contextual factors influencing the observed outcomes. The findings of the study revealed significant improvements in service delivery efficiency following e-government adoption, including reduced bureaucratic delays and increased citizen satisfaction. These improvements were attributed to factors such as streamlined processes, enhanced accessibility to government services, and improved information management. Based on their findings, the researchers recommended further investment in digital infrastructure and comprehensive training programs for government employees to maximize the benefits of technology adoption and sustain long-term improvements in service delivery efficiency.

Jones et al. (2018) embarked on a longitudinal study aimed at analyzing the implementation and impact of a digital service platform within a municipal government setting. The primary objective was to assess the extent to which the adoption of digital technologies influenced service delivery efficiency and citizen engagement over time. The researchers utilized a combination of quantitative metrics, such as service response times and citizen feedback data, alongside qualitative methods such as interviews with government staff and stakeholders. This mixed-methods approach enabled a comprehensive evaluation of both objective performance indicators and subjective perceptions of service quality. The findings of the study demonstrated a gradual but steady increase in service delivery efficiency following the adoption of the digital service platform,

accompanied by improvements in transparency, accessibility, and citizen satisfaction. Key recommendations arising from the study emphasized the importance of ongoing evaluation and iterative refinement of digital service offerings based on user feedback, as well as the need for organizational capacity-building to support successful technology adoption and integration within government operations.

Garcia et al. (2019) undertook a comparative study to analyze the impact of cloud computing adoption on government service delivery efficiency across multiple countries. The study aimed to examine variations in the level of efficiency gains associated with the migration to cloud-based services and identify factors influencing successful implementation outcomes. Employing a cross-sectional analysis, the researchers evaluated government agencies at different stages of cloud adoption, using a combination of qualitative case studies and quantitative performance metrics. This approach allowed for the identification of best practices and challenges associated with cloud adoption in diverse institutional contexts. The findings of the study revealed a positive correlation between cloud computing adoption and service delivery efficiency, with varying degrees of improvement observed across different countries and sectors. Factors such as organizational readiness, regulatory environment, and data security concerns were identified as critical determinants of successful cloud implementation. Based on these findings, the researchers recommended the development of tailored strategies for cloud adoption, taking into account contextual factors and addressing potential barriers to implementation, such as data privacy and security concerns.

Wang et al. (2020) conducted an empirical study to investigate the influence of mobile technology adoption on local government service delivery efficiency. The study aimed to assess the extent to which the integration of mobile technologies within government operations contributed to improvements in service accessibility, responsiveness, and overall efficiency. Methodologically, the researchers employed data envelopment analysis (DEA) to evaluate the relative efficiency of government service delivery units, comparing performance metrics before and after the adoption of mobile technologies. In addition, surveys targeting government officials provided qualitative insights into the perceived benefits and challenges associated with mobile technology implementation. The findings of the study indicated a positive correlation between mobile technology usage and service delivery efficiency, with mobile-enabled government agencies demonstrating higher levels of productivity and responsiveness compared to their non-mobile counterparts. Key recommendations arising from the study included the development of mobile-friendly interfaces for government services, the integration of mobile solutions into existing service delivery processes, and the implementation of training programs to enhance digital literacy among government employees.

Chen and Gupta (2021) conducted an empirical study aimed at examining the impact of blockchain technology adoption on government service delivery efficiency, with a focus on enhancing data security and transparency. The study sought to assess the extent to which the integration of blockchain technology within government operations facilitated improvements in service quality, trust, and accountability. Methodologically, the researchers employed a mixed-methods approach, combining qualitative case studies of blockchain implementations with stakeholder interviews and quantitative analysis of system performance metrics. The findings of the study revealed that blockchain adoption had a positive impact on government service delivery efficiency, leading to

increased trust among citizens and improved accuracy of service delivery data. However, the study also identified challenges associated with blockchain implementation, including scalability limitations, interoperability issues, and regulatory uncertainties. Based on these findings, the researchers recommended the development of interoperability standards and regulatory frameworks to support the widespread adoption of blockchain technology within government operations, as well as ongoing monitoring and evaluation to ensure the integrity and effectiveness of blockchain-enabled services.

Patel and Kim (2022) conducted a meta-analysis aimed at synthesizing findings from multiple empirical studies on the impact of technology adoption on government service delivery efficiency. The purpose of the study was to identify common trends and variations in the relationship between technology adoption and service delivery outcomes across different technologies and contexts. Methodologically, the researchers aggregated data from various sources, including peer-reviewed journals, government reports, and grey literature, to conduct a comprehensive review of existing empirical evidence. The findings of the meta-analysis revealed consistent evidence supporting a positive relationship between technology adoption and service delivery efficiency, with variations observed depending on factors such as governance structure, technological maturity, and implementation strategies. Key recommendations arising from the study emphasized the importance of evidence-based decision-making and knowledge sharing among government agencies to facilitate successful technology adoption and integration within government operations.

Li et al. (2023) conducted an empirical study to investigate the adoption of artificial intelligence (AI) in government service delivery and its impact on efficiency and effectiveness. The study aimed to assess the extent to which AI integration within government operations contributed to improvements in service responsiveness, accuracy, and citizen satisfaction. Methodologically, the researchers employed a quasi-experimental design, comparing AI-assisted service delivery to traditional methods across multiple government agencies. Quantitative performance metrics, such as response times and error rates, were collected and analyzed, alongside qualitative data obtained through interviews with government officials and stakeholders. The findings of the study demonstrated that AI integration led to significant improvements in service delivery efficiency, with AI-enabled systems outperforming traditional methods in terms of speed, accuracy, and reliability. However, the study also highlighted challenges associated with AI implementation, such as ethical considerations, algorithmic biases, and the need for ongoing monitoring and oversight. Based on these findings, the researchers recommended the development of ethical AI governance frameworks, the implementation of bias mitigation strategies, and the establishment of mechanisms for continuous monitoring and evaluation to ensure the responsible and equitable deployment of AI technologies within government service delivery.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Research Gap: Despite the wealth of studies examining the impact of various technologies on government service delivery efficiency, there appears to be a lack of comprehensive research that integrates multiple technological innovations. While individual studies have explored the effects of e-government, cloud computing, mobile technology, blockchain, and artificial intelligence separately, there is a notable absence of research that systematically compares and contrasts the combined impact of these technologies within governmental contexts. Addressing this gap could provide valuable insights into the synergistic effects of technology integration and inform more holistic approaches to digital transformation within government agencies.

Contextual Research Gap: Existing studies predominantly focus on technology adoption within developed or developing country contexts, with limited attention given to specific contextual factors that may influence the outcomes of such initiatives. For instance, factors such as cultural norms, political stability, regulatory environments, and levels of technological infrastructure vary significantly across different regions and may significantly impact the effectiveness of technology adoption strategies. Future research should aim to explore these contextual nuances more deeply to develop tailored approaches that account for the diverse needs and challenges faced by governments in different socio-political contexts.

Geographical Research Gap: While the existing literature includes studies conducted across multiple countries, there is a notable lack of research focusing on specific geographical regions, particularly in regions with underrepresented perspectives such as Africa, Latin America, and Southeast Asia. By neglecting to examine the unique challenges and opportunities present in these regions, current research may fail to provide comprehensive insights into the global landscape of technology-enabled government service delivery. Future studies should strive to address this gap by conducting region-specific analyses that account for local socio-economic dynamics and policy contexts, thereby facilitating more inclusive and contextually relevant conclusions.

CONCLUSION AND RECOMMENDATION

Conclusion

Analyzing the impact of technology adoption on government service delivery efficiency is a multifaceted endeavor crucial for understanding the transformative potential of digital innovations in public administration. Through a comprehensive review of empirical studies spanning various technological domains and geographical contexts, it becomes evident that technology adoption can significantly enhance service delivery efficiency by streamlining processes, improving accessibility, and fostering citizen satisfaction. However, several research gaps persist, including the need for more holistic approaches that integrate multiple technologies, deeper exploration of contextual factors influencing outcomes, and increased attention to underrepresented geographical regions. Moreover, there is a call for more robust integration of qualitative and quantitative methodologies, longitudinal studies to track the sustained effects of technology adoption, and closer collaboration between researchers and policymakers to ensure the translation of research insights into actionable strategies. Addressing these gaps will not only advance scholarly understanding but also support the development of evidence-based policies and practices aimed at

maximizing the benefits of technology adoption for government service delivery efficiency, ultimately contributing to more responsive, transparent, and citizen-centric governance systems.

Recommendation

The following are the recommendations based on theory, practice and policy:

Theory

Researchers should endeavor to integrate existing theoretical frameworks from disciplines such as public administration, information systems, and organizational behavior to provide a comprehensive understanding of the mechanisms underlying the impact of technology adoption on service delivery efficiency. Theoretical integration can facilitate the development of more nuanced research models that account for the complex interactions between technological, organizational, and contextual factors. Embrace multidisciplinary approaches that draw on insights from diverse fields, including sociology, economics, and psychology, to capture the multifaceted nature of technology-enabled transformations in government service delivery. By adopting an interdisciplinary lens, researchers can generate novel theoretical insights that shed light on the social, economic, and psychological implications of technology adoption within governmental contexts.

Practice

Prioritize user-centered design principles to ensure that technology solutions are tailored to the needs and preferences of government stakeholders and citizens. Engage end-users throughout the technology adoption process through participatory design workshops, usability testing, and feedback mechanisms to co-create solutions that align with user expectations and enhance service delivery efficiency. Develop comprehensive capacity-building programs to equip government employees with the skills and knowledge necessary to leverage technology effectively in their daily operations. Training initiatives should cover areas such as digital literacy, data management, and change management to foster a culture of innovation and facilitate the successful integration of technology within government agencies.

Policy

Advocate for the development of an enabling regulatory environment that supports innovation and experimentation in government service delivery. Policymakers should establish clear guidelines and standards for technology adoption while also providing flexibility for agencies to adapt their processes to changing technological landscapes. Additionally, policymakers should prioritize data privacy and security considerations to mitigate potential risks associated with technology adoption. Promote evidence-based policymaking by fostering closer collaboration between researchers and policymakers to translate research insights into actionable policy recommendations. Policymakers should leverage empirical evidence from rigorous research studies to inform the design and implementation of technology adoption initiatives, ensuring that policy interventions are grounded in empirical evidence and aligned with the needs of government stakeholders and citizens.

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