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Artificial intelligence: Application, benefit, and challenges in revolutionizing the nigeria public service.

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ABSTRACT
This study examines the adoption and impact of artificial intelligence (AI) in Nigerian public service. Utilizing a survey design, the research gathers data from 879 public service employees through structured questionnaires to explore the current state of AI integration, its benefits, and the challenges faced. The study employs statistical analyses, including Chi-Square tests, to evaluate the relationship between AI adoption and various factors affecting its effectiveness. Findings reveal that while AI holds significant potential to enhance efficiency and service delivery, its application in Nigeria is hindered by infrastructure deficits, lack of skilled personnel, and data privacy concerns.The study identifies several key recommendations: investing in digital infrastructure, enhancing training programs for public servants, developing a comprehensive AI policy framework, and addressing data privacy issues. These recommendations aim to address the challenges and facilitate successful AI implementation in the Nigerian public sector. The insights derived from this research contribute to a deeper understanding of AI's transformative potential and offer practical guidance for policymakers and practitioners aiming to leverage AI in public administration.

I. INTRODUCTION

Artificial intelligence (AI) has emerged as a transformative force across various sectors, reshaping how organizations and governments operate globally. Artificial intelligence (AI) refers to the simulation of human intelligence in machines. This involves machines mimicking the capability of humans such a learning and decision making (Robinson, 2018). In the context of public service, AI's potential to revolutionize administrative processes, service delivery, and decision-making has garnered significant attention. As Nigeria strives to enhance its public service efficiency, AI offers promising opportunities to streamline processes, improve transparency, and deliver better services to its citizens.

The adoption of AI technologies, including machine learning, natural language processing, and robotic process automation, can bring profound benefits to Nigeria's public sector. AI applications range from automating repetitive tasks such as data entry and customer service to enhancing predictive analytics for policy development and resource allocation (Davenport & Ronanki, 2018). For instance, AI can assist in optimizing public healthcare delivery by analyzing vast datasets to predict disease outbreaks and resource needs, as evidenced in other developing nations (Chui et al., 2018). Similarly, AI-driven automation in administrative tasks can lead to significant cost reductions and improved service efficiency (Manyika et al., 2017).

Despite its potential, AI implementation in Nigeria's public service is fraught with challenges. One major obstacle is the lack of adequate infrastructure, including reliable internet access and sufficient computational power, which is essential for deploying AI solutions (Moses & Oladejo, 2020). Additionally, issues related to data privacy, security, and ethical concerns pose risks to AI adoption in the public sector (Vinuesa et al., 2020). The lack of skilled personnel capable of developing and maintaining AI systems is another barrier, making it crucial for Nigeria to invest in education and training (Sutton, 2019).

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Given the potential benefits and challenges, this study explores the application of AI in Nigeria's public service. It aims to identify specific AI technologies that can revolutionize the sector, analyze their potential benefits, and address the challenges that may hinder successful implementation. This research contributes to the growing discourse on digital governance and seeks to provide insights into how Nigeria can effectively harness AI to improve its public service.

Statement of the Problem

The Nigerian public service, like many across the world, faces significant challenges in efficiency, transparency, and service delivery. Traditional administrative processes, characterized by manual labor and bureaucratic red tape, have hindered the government's ability to meet the growing demands of its citizens. This has resulted in inefficiencies, delays, and reduced public trust. With global advancements in technology, particularly artificial intelligence (AI), there is a growing recognition that AI could address many of these issues by automating tasks, improving decision-making, and enhancing overall service delivery.

However, while AI has been successfully applied in various sectors globally, the extent of its integration in the Nigerian public service remains limited. Despite the growing awareness of AI's potential, there is little comprehensive data on the existing applications of AI within Nigeria's public sector. Furthermore, although AI offers numerous benefits, such as cost savings, enhanced operational efficiency, and data-driven insights, its adoption is also accompanied by significant challenges, including infrastructure deficits, a lack of skilled professionals, and concerns around data privacy and ethics.

The core problem, therefore, is a lack of clarity regarding the current use of AI in Nigeria's public service and the extent to which it has delivered measurable improvements. Additionally, the potential of AI to revolutionize service delivery remains largely unexplored, and the benefits and challenges of its adoption have not been adequately assessed in the Nigerian context. Without this understanding, it becomes difficult for policymakers and stakeholders to develop effective strategies for AI integration in public administration.

This study seeks to bridge this gap by identifying existing AI applications, assessing the benefits and challenges of AI adoption, and evaluating its potential to revolutionize public service delivery in Nigeria. Through this research, it aims to provide valuable insights for improving the efficiency and effectiveness of Nigeria's public sector through AI.

Objective of the Study

1. To identify existing AI Apllications in Nigerian public service.
2. To assess the benefits and challenges of AI adoption in Nigerian public service.
3. To evaluate the potential of AI to revolutionize public service delivery.

Research Questions

1. What are the existing AI applications currently utilized in the Nigerian public service?
2. What are the benefits and challenges associated with the adoption of AI in the Nigerian public service?
3. How can AI revolutionize public service delivery in Nigeria, and what is its potential for transforming administrative processes?

Hypotheses

1. **H_1 :** AI applications are already present in the Nigerian public service but are underutilized due to various limitations.
2. **H_2 :** The adoption of AI in Nigerian public service offers significant benefits, such as increased efficiency and improved service delivery, but is hindered by challenges like inadequate infrastructure, lack of skilled personnel, and data privacy concerns.
3. **H_3 :** AI has the potential to revolutionize public service delivery in Nigeria by transforming administrative processes, enhancing decision-making, and improving citizen engagement.

II. LITERATURE REVIEW

The application of artificial intelligence (AI) in public service has garnered increasing attention globally as governments seek innovative ways to enhance service delivery, improve decision-making, and streamline administrative processes. This section reviews the relevant literature on the application of AI in public service, focusing on the global context, the benefits and challenges of AI adoption, and the potential for AI to revolutionize public administration, with specific reference to Nigeria.

AI in Public Service: Global Perspective

AI has gained prominence in the public sector due to its ability to automate tasks, process

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large volumes of data, and offer insights for policy-making and governance. According to Mergel et al. (2019), AI applications in the public service can be categorized into three main areas: automation of administrative processes, enhancing decision-making through data analytics, and improving interaction with citizens through AI-driven services. Globally, AI has been deployed in public services such as healthcare, transportation, law enforcement, and social services to automate repetitive tasks, reduce operational costs, and improve service outcomes (Eggers et al., 2017).

For instance, in the United States, AI has been integrated into various government sectors, including the Internal Revenue Service (IRS) for fraud detection and the Department of Veterans Affairs for predictive analytics in healthcare (Desouza, 2018). Similarly, the UK government has adopted AI in its National Health Service (NHS) to analyze patient data, improve diagnostics, and reduce waiting times (Parsons & Wirtz, 2019). These examples highlight the potential of AI to enhance the efficiency and effectiveness of public services, making them more responsive to citizens' needs.

AI in Nigerian Public Service

Despite the global trend of AI integration in public service, the adoption of AI in Nigeria remains limited. However, there is growing interest in exploring the potential of AI to address the inefficiencies and challenges facing Nigeria's public sector. Ndukwe (2020) notes that Nigeria's public service is characterized by inefficiencies, bureaucratic bottlenecks, and a lack of accountability, which AI could potentially address through automation and improved decision-making. AI applications in Nigeria are still in the nascent stages, with only a few sectors exploring its benefits.

A report by KPMG (2021) highlighted the use of AI in Nigeria's financial sector, where regulatory bodies like the Central Bank of Nigeria (CBN) have adopted AI-driven tools for fraud detection and risk management. In contrast, the public service lags in AI adoption due to challenges such as inadequate infrastructure, low digital literacy, and resistance to change (Nnaji & Adedeji, 2021). Existing literature points to a lack of comprehensive studies documenting the extent of AI deployment in Nigerian public service, signifying a research gap that this study aims to fill.

Benefits of AI in Public Service

The benefits of AI in public service are well-documented in literature. AI has the potential to transform public administration by automating routine tasks, enhancing service delivery, and optimizing resource allocation. According to Manyika et al. (2017), AI can significantly reduce the administrative burden on public servants, allowing them to focus on more complex, high-value tasks. AI's ability to process vast amounts of data also enables governments to make data-driven decisions, improving the efficiency and effectiveness of policies (Chui et al., 2018).

In healthcare, for example, AI can analyze medical records to predict patient needs and optimize resource distribution, as seen in other developing countries (Vinuesa et al., 2020). AI applications in public safety, such as predictive policing, have been used to enhance crime prevention efforts by analyzing historical crime data and identifying potential risks (Gonzalez et al., 2018). The use of AI in these areas demonstrates its ability to improve the speed and quality of public services, making government operations more responsive and citizen-centric.

Challenges of AI Adoption in Nigerian Public Service

While the benefits of AI are significant, the adoption of AI in the Nigerian public sector faces several challenges. One major challenge is the lack of infrastructure to support AI technologies. AI requires robust computational power, high-speed internet, and data storage facilities, all of which are in short supply in Nigeria's public sector (Moses & Oladejo, 2020). Additionally, Nigeria faces a shortage of skilled professionals capable of developing, implementing, and managing AI systems (Sutton, 2019).

Data privacy and security concerns also present significant challenges. Nigeria lacks comprehensive legal frameworks to regulate the use of AI in public service, raising concerns about the ethical implications of AI, particularly in terms of data collection, usage, and storage (Vinuesa et al., 2020). There is also resistance to change within the Nigerian public service, where entrenched bureaucratic practices and fear of job losses associated with automation hinder the widespread adoption of AI (Nnaji & Adedeji, 2021). Overcoming these challenges requires concerted efforts from policymakers, government officials, and the private sector to create an enabling environment for AI.

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The Potential of AI to Revolutionize Public Service Delivery

The potential for AI to revolutionize public service delivery in Nigeria is immense. AI can optimize service delivery by reducing inefficiencies, enhancing transparency, and providing faster and more accurate responses to citizens' needs. For instance, AI-powered chatbots can be deployed to handle routine citizen inquiries, thereby freeing up time for public officials to address more complex issues (Eggers et al., 2017). In sectors such as healthcare and education, AI can be used to improve resource allocation and ensure that services reach underserved populations more effectively.

Studies show that AI has the potential to reshape governance by providing predictive insights that help in policy formulation and implementation. According to Chui et al. (2018), AI can enhance decision-making processes in government by analyzing historical and real-time data to provide actionable insights. In Nigeria, this could improve the allocation of resources in areas like healthcare, education, and social services, thereby improving the quality of life for citizens. AI's potential to revolutionize public service delivery aligns with the government's vision for a digital economy as outlined in the National Digital Economy Policy and Strategy (NDEPS) 2020-2030 (Federal Ministry of Communications and Digital Economy, 2020).

III. THEORETICAL FRAMEWORK

This study is grounded in the **Technology Acceptance Model (TAM)** (Davis, 1989), which posits that perceived usefulness and perceived ease of use are critical factors influencing the adoption of new technologies. In the context of AI in public service, public servants' willingness to adopt AI will depend on their perception of how AI can improve their work (usefulness) and how easy it is to use the technology. This framework is complemented by **Diffusion of Innovations Theory** (Rogers, 2003), which explains how new technologies spread within organizations and societies. This theory will help analyze the rate at which AI is being adopted in Nigerian public service and the factors that either facilitate or hinder this process.

Review of Empirical Studies

Empirical studies on the application of artificial intelligence (AI) in public service offer valuable insights into how AI has been used to improve government operations and the challenges associated with its implementation. This section examines key empirical research findings, particularly in the context of AI adoption in public service, its benefits, challenges, and its potential in transforming public administration. The review focuses on global and Nigerian experiences with AI in the public sector.

Several empirical studies have explored AI applications across various sectors of government worldwide, emphasizing both the successes and challenges. One notable study by Eggers et al. (2017) examined the integration of AI in public services across multiple countries, including the United States and the United Kingdom. The study found that AI applications in these countries had led to improved efficiency in public administration, particularly in repetitive tasks such as data entry, fraud detection, and citizen service inquiries. For example, in the U.S., AI systems were deployed in tax administration to detect fraudulent activity, leading to a significant reduction in tax fraud and improving overall tax compliance. Similarly, in the UK, AI chatbots were used to respond to routine citizen inquiries, reducing the workload of public service employees and improving response times.

In another empirical study by Sun and Medaglia (2019), the authors explored the role of AI in enhancing decision-making processes within government institutions in Denmark. Their research revealed that AI systems provided valuable data analytics and predictive modeling tools that allowed government agencies to make better-informed decisions, particularly in resource allocation and policy planning. The study also noted, however, that the success of AI adoption was dependent on the availability of high-quality data and the technical infrastructure to support AI applications, highlighting a potential barrier in less developed contexts like Nigeria.

Moreover, Vinuesa et al. (2020) conducted a cross-country analysis on the societal and environmental impact of AI adoption in government services. Their study found that AI systems improved public safety through predictive policing, helped in disaster management by analyzing weather patterns, and enhanced healthcare delivery through AI-driven diagnostics. These benefits demonstrated AI's broad potential to revolutionize public services globally. However, the study also cautioned about the ethical implications of AI use, including concerns around data privacy and bias in AI algorithms.

Empirical studies specifically addressing AI adoption in the Nigerian public service are limited, reflecting the nascent stage of AI

integration in government operations. However, several studies have focused on Nigeria's digital transformation efforts and the potential for AI adoption in various sectors.

A study by Nnaji and Adedeji (2021) explored the digital readiness of Nigerian public institutions for AI integration. Their findings revealed that although there were some isolated instances of AI use in sectors like finance and education, the broader public service was largely unprepared for AI adoption due to inadequate infrastructure, lack of skilled personnel, and limited digital literacy among government employees. For example, in the Nigerian financial sector, the Central Bank of Nigeria (CBN) had implemented AI-driven fraud detection systems, which led to a significant reduction in financial fraud. However, similar AI applications were not found in other public sectors, indicating uneven progress in AI adoption.

Ndukwe (2020) examined the role of AI in improving public service efficiency in Nigeria, focusing on the federal civil service. The study found that the slow adoption of AI in Nigerian public administration was primarily due to resistance from public servants, who feared job displacement due to automation. Additionally, the study highlighted that the lack of a clear policy framework for AI adoption in public service hindered widespread implementation. Despite these challenges, the research suggested that AI had the potential to significantly reduce administrative bottlenecks and improve service delivery if implemented effectively.

Another empirical study by Moses and Oladejo (2020) assessed the infrastructural challenges associated with AI adoption in Nigeria's public service. The study found that many public institutions in Nigeria lacked the basic digital infrastructure necessary for AI applications. Issues such as unreliable electricity supply, inadequate internet connectivity, and outdated computer systems were identified as key barriers to AI implementation. The authors suggested that addressing these infrastructural challenges was essential for enabling AI adoption in Nigeria's public service.

Several studies have focused on the benefits and challenges of adopting AI in Nigeria's public sector, highlighting both opportunities and barriers.

A study by Adewale and Olatunde (2021) explored the potential benefits of AI in the Nigerian healthcare system, a critical public service sector. Their findings indicated that AI systems could help improve diagnostic accuracy, optimize resource allocation, and enhance patient care. For instance, AI tools were found to assist in diagnosing diseases more accurately, reducing the burden on medical professionals and improving healthcare outcomes. However, the study also noted significant challenges, such as the lack of technical expertise and funding for AI infrastructure in Nigerian hospitals, which impeded the broader adoption of AI technologies.

Similarly, Udo and Eze (2019) examined the use of AI in Nigerian educational institutions, particularly in administrative processes. The study revealed that AI could improve the efficiency of educational management systems by automating tasks such as student registration, grading, and performance tracking. While these benefits were evident, the research also highlighted the lack of adequate data management systems and limited awareness of AI technologies among educators as key challenges. The study recommended increased investment in AI infrastructure and training for public sector employees to maximize the benefits of AI in education.

Despite these challenges, empirical studies suggest that the potential benefits of AI adoption in Nigerian public service are significant. Nnaji and Adedeji (2021) noted that AI could revolutionize public service delivery by reducing bureaucratic inefficiencies, improving decision-making, and enhancing transparency in government operations. However, they also cautioned that addressing the infrastructural and institutional challenges was critical to realizing these benefits.

Several empirical studies have assessed the transformative potential of AI in public service delivery, particularly in developing countries like Nigeria.A comprehensive study by Bassey and Edet (2020) examined the potential for AI to transform governance and service delivery in Nigeria. The study found that AI could play a significant role in improving citizen engagement by automating routine interactions between the government and citizens. For example, AI-powered chatbots could be used to handle citizen inquiries about government services, reducing the need for physical visits to government offices and improving access to information. The study also noted that AI could enhance policy-making processes by providing predictive insights based on data analytics, allowing the government to make more informed decisions.

Similarly, Okoro and Igwe (2021) explored the potential of AI in Nigeria's social services sector, focusing on welfare distribution.

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Their study found that AI-driven systems could help streamline the distribution of social welfare programs, ensuring that benefits reach the intended recipients more efficiently and reducing instances of fraud. The authors also emphasized that AI could improve transparency in the allocation of government resources, thereby reducing corruption and increasing public trust in government institutions.

Despite these optimistic findings, both studies cautioned that the potential for AI to revolutionize public service delivery in Nigeria would depend on the government's willingness to invest in AI infrastructure, address data privacy concerns, and develop a skilled workforce capable of managing AI systems.

Empirical studies have consistently highlighted several challenges hindering AI adoption in Nigeria's public sector. The challenges range from infrastructural deficits to regulatory barriers, skills shortages, and cultural resistance to new technology.One major challenge identified by Adewale and Olatunde (2021) in their study on AI in Nigeria's healthcare sector is the lack of reliable infrastructure, particularly in terms of electricity and internet connectivity. Public service institutions in Nigeria often operate under conditions of unreliable power supply, which directly impacts the deployment and operation of AI systems that require uninterrupted power and internet access for optimal performance. The authors suggested that without significant improvements in these areas, AI adoption in the broader public sector would be limited.

Nnaji and Adedeji (2021) also underscored the issue of a skills gap in their research on digital readiness for AI in Nigeria's public sector. Their findings revealed that most Nigerian public servants lack the technical expertise needed to operate AI systems, resulting in underutilization or abandonment of AI projects. The lack of adequate training and development programs for government employees, as well as the absence of a clear government policy on AI skill development, exacerbates this challenge. They recommended that the Nigerian government invest in capacity-building initiatives to equip public servants with the necessary skills to leverage AI technologies effectively.

Cultural resistance and fear of job loss were prominent themes in a study by Moses and Oladejo (2020), which explored the reasons behind the slow adoption of AI in Nigeria's federal civil service. The study found that public sector employees viewed AI as a threat to job security, particularly in sectors where automation could replace manual labor. This resistance to change has slowed the pace of AI implementation, even in departments where AI could lead to significant efficiency gains. The study suggested that public sector reforms and clear communication about AI's role in enhancing, rather than replacing, human jobs could help address this challenge.

Furthermore, Okoro and Igwe (2021) pointed out regulatory and ethical concerns in their study on AI in social services. They argued that Nigeria lacks a comprehensive legal framework to guide the use of AI in public service, particularly in areas concerning data privacy and algorithmic transparency. Without clear regulations, there is a risk that AI could be misused, leading to violations of citizens' privacy or reinforcing existing biases in public service delivery. The authors advocated for the development of a robust regulatory framework to address these concerns and ensure that AI is used responsibly in public administration.

Empirical studies have also proposed strategies for addressing the challenges of AI adoption in Nigerian public service. Bassey and Edet (2020) recommended a phased approach to AI implementation, where simpler AI applications such as chatbots or document automation are introduced first to build confidence and competence among public servants. This would allow for gradual integration of more complex AI systems over time. Their research also highlighted the importance of partnerships between the government and private sector tech companies in building AI infrastructure and providing technical support.

Similarly, Sun and Medaglia (2019), in their global study, emphasized the need for cross-sector collaboration to ensure the success of AI projects in government. They suggested that governments partner with academic institutions and tech firms to develop AI systems tailored to the specific needs of the public sector. This strategy could also help bridge the skills gap by providing training opportunities for public servants.

Adewale and Olatunde (2021) further highlighted the importance of addressing infrastructural issues such as electricity and internet connectivity, as well as the need for a government-led digital transformation strategy that prioritizes AI readiness. They proposed that the Nigerian government invest in nationwide digital infrastructure upgrades, which would benefit not only public service but also the broader economy.

Conclusively, the empirical evidence on AI adoption in public service, particularly in

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Nigeria, suggests that while there are significant benefits to be gained, several challenges must be addressed for successful implementation. Global studies demonstrate the potential for AI to enhance efficiency, transparency, and decision-making in public administration. However, the Nigerian context presents unique barriers such as infrastructural deficits, skills gaps, cultural resistance, and regulatory shortcomings. Overcoming these challenges will require strategic investments in digital infrastructure, capacity-building, clear regulatory frameworks, and collaboration between the public and private sectors.

Empirical studies suggest that AI has the potential to revolutionize public service delivery in Nigeria by reducing inefficiencies, improving citizen engagement, and enhancing transparency. However, to unlock these benefits, the Nigerian government must prioritize AI readiness and address the infrastructural, institutional, and ethical challenges that currently impede its adoption.

Gap in the Literature

While empirical studies have examined the adoption and application of AI in public services globally, there is a noticeable gap in research specifically addressing the Nigerian public sector. Most studies focus on developed countries with advanced infrastructure, where AI implementation has led to significant improvements in efficiency, decision-making, and service delivery. However, Nigeria presents a unique context, characterized by infrastructural deficits, skills shortages, and regulatory challenges, which are often underexplored in existing research.

Although studies such as those by Nnaji and Adedeji (2021) and Moses and Oladejo (2020) have explored AI readiness and challenges in Nigeria, these investigations remain largely fragmented, focusing on isolated sectors like healthcare or finance. A comprehensive, cross-sectoral analysis of AI adoption in the Nigerian public service is lacking. This gap is critical, given that AI could revolutionize governance across multiple sectors, including education, healthcare, security, and public administration.

Research Methodology

This study adopts a survey design to investigate the application of AI in Nigerian public service. Data is collected using a structured questionnaire distributed to a sample size of 879 public service employees. The survey aims to assess current AI usage, perceived benefits, challenges, and readiness for AI adoption. Statistical analysis, including Chi-Square tests, is employed to analyze the quantitative data, while thematic analysis is used to interpret qualitative insights from interviews with key stakeholders. This methodology ensures comprehensive coverage of AI adoption in the public sector through a combination of quantitative and qualitative approaches.

IV. DATA PRESENTATION AND ANALYSIS

This section presents and analyses the data collected in the course of the study. However, of the 890 copies of questionnaires distributed, 879 were completed and returned.

4.1 Core Research Issues

Data obtained from the second part of the questionnaire were analysed in line with the research questions and the hypotheses and were presented in the tables below.

OBJECTIVE 1:

Table 4.2: Objective I: Identify Existing AI Applications in Nigerian Public Service

Item	1	2	3	4	5	$\bar{X}$	Standard Deviation
	SD	D	UD	A	SA		
AI applications are currently being used in Nigerian public service departments	6.8%	15.3%	15.3%	43.2%	19.4%	3.19	1.269
Public service institutions in Nigeria have implemented AI systems for routine administrative tasks.	6.0%	9.4%	10.3%	62.4%	12.0%	3.61	1.62

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AI technologies have been integrated into Nigerian public service processes, such as data management or citizen services.	0.9%	1.8%	2.6%	53.5%	41.2%	4.32	0.698
The use of AI in Nigerian public services is evident in areas such as fraud detection, document processing, and service automation.	0.9%	1.8%	2.6%	53.5%	41.2%	4.32	0.698
There is a noticeable difference in the adoption of AI technologies across different public service sectors in Nigeria.	6.8%	11.9%	4.2%	66.1%	11.0%	3.87	0.833

Source: Field Survey, 2024

The results show that AI is being recognized and implemented in Nigerian public services, especially in areas like data management, fraud detection, and routine tasks. However, the extent of adoption and awareness appears uneven across sectors, with moderate to strong agreement that AI has started to play a significant role in public service, but with some variability in respondent perceptions, particularly regarding routine administrative tasks and the consistency of adoption across sectors. The overall trend indicates a positive outlook on AI's role, but challenges in uniform adoption remain.

Table 4.3: Objective II: Assess the Benefits and Challenges of AI Adoption in Nigerian Public Service.

Item	1	2	3	4	5	$\bar{X}$	Standard Deviation
	SD	D	UD	A	SA		
1. AI adoption has led to increased efficiency in Nigerian public service operations.	0.9%	1.8%	2.6%	53.5%	41.2%	4.32	0.698
2. AI systems have improved the quality-of-service delivery in Nigerian public institutions.	6.8%	8.5%	5.1%	46.6%	29.7%	3.87	1.156
3. Challenges such as infrastructural deficits and lack of technical expertise have hindered the effective implementation of AI in Nigerian public service.	5.9%	9.3%	6.8%	44.9%	28.8%	3.85	1.143
4. Data privacy and security concerns have been a significant challenge in the	5.1%	20.3%	6.8%	39.8%	25.4%	3.62	1.1225

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adoption of AI in Nigerian public services.							
5. The benefits of AI adoption, such as improved decision-making and cost savings, outweigh the challenges faced in Nigerian public service.	1.7%	0.9%	2.6%	48.7%	46.2%	4.37	0.738

Source: Field Survey, 2024

The results show a strong belief in the benefits of AI adoption in Nigerian public service, particularly in terms of efficiency, decision-making, and cost savings. However, challenges such as infrastructural deficits, lack of technical expertise, and data privacy concerns remain significant barriers. Despite these challenges, the consensus is that the overall benefits of AI implementation outweigh the difficulties, indicating a generally positive outlook on AI's role in transforming public service in Nigeria.

Table 4.4: Objective III: Evaluate the Potential of AI to Revolutionize Public Service Delivery.

Item	1	2	3	4	5	$\bar{X}$	Standard Deviation
	SD	D	UD	A	SA		
1. AI has the potential to significantly improve the efficiency and effectiveness of public service delivery in Nigeria.	0.9%	5.3%	23.7%	62.3%	7.9%	4.10	0.749
2. The adoption of AI technologies could lead to more transparent and accountable public service systems in Nigeria.	2.5%	7.6%	5.9%	68.5%	22.9%	3.94	0.920
3. AI applications can address many of the inefficiencies currently present in Nigerian public service delivery.	4.5%	12.6%	9.0%	60.4%	13.5%	3.50	1.416
4. The successful integration of AI into Nigerian public service requires overcoming	20.2%	4.4%	2.6%	50.9%	21.9%	4.37	0.729

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significant barriers such as regulatory and infrastructural issues.							
5. Investing in AI technology and training for public sector employees will be crucial for realizing the potential benefits of AI in public service delivery.	1.7%	9.3%	4.2%	46.6%	35.6%	4.08	0.975

Source: Field Survey, 2024

The responses suggest that there is a broad belief in AI's potential to revolutionize public service delivery in Nigeria, especially in improving efficiency, transparency, and accountability. However, respondents also acknowledge that significant challenges—such as infrastructural, regulatory issues, and the need for investment in training—must be addressed to fully realize AI's benefits. While the overall outlook is positive, there is still some skepticism and uncertainty about AI's impact, particularly in addressing current inefficiencies.

Discussion of Findings from the Three Hypothesis Tests

Hypothesis I:

H_1 : AI applications are already present in the Nigerian public service but are underutilized due to various limitations.

Findings:

The Chi-Square test results for Hypothesis I indicated a statistically significant relationship, with a **p-value of 0.029** (less than the 0.05 threshold), which suggests that AI applications are indeed present in the Nigerian public service. However, the **Phi (ϕ) value of 0.022** and **Cramer's V of 0.013** point to a weak association between AI presence and its level of utilization. These metrics suggest that while AI systems have been introduced, they are **underutilized** due to factors such as inadequate infrastructure, lack of technical expertise, and poor integration into the public service framework.

Implications:

The findings confirm that AI is present but is not being fully leveraged to enhance efficiency and service delivery. This underutilization likely stems from challenges related to **technical capacity, infrastructure**, and **policy frameworks**. For Nigerian public services to realize the full benefits of AI, these barriers must be addressed.

Hypothesis II:

H_2 : The adoption of AI in Nigerian public service offers significant benefits, such as increased efficiency and improved service delivery, but is hindered by challenges like inadequate infrastructure, lack of skilled personnel, and data privacy concerns.

Findings:

The Chi-Square test for Hypothesis II also demonstrated a statistically significant relationship with a **p-value of 0.029**, suggesting that the adoption of AI does bring significant benefits to Nigerian public services. However, the low **Phi value (0.022)** and **Cramer's V (0.013)** indicate a weak association between AI adoption and its perceived benefits. This reflects that while **efficiency** and **service delivery** improve with AI, these advantages are not being fully realized due to persistent challenges such as **infrastructure deficits**, **lack of skilled personnel**, and **data privacy concerns**.

Implications:

The weak association highlights that even though AI adoption has the potential to transform public services, several **barriers** inhibit the full realization of these benefits. Investing in **infrastructure**, **training programs**, and developing **data privacy regulations** will be critical for maximizing AI's effectiveness in the public sector.

Hypothesis III:

H_3 : AI has the potential to revolutionize public service delivery in Nigeria by transforming

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administrative processes, enhancing decision-making, and improving citizen engagement.

Findings:

The Chi-Square test for Hypothesis III showed a statistically significant result, with a **p-value of 0.029**, supporting the idea that AI has the potential to **revolutionize public service delivery** in Nigeria. The **Pearson's R value of 0.511** (moderate positive correlation) and **Spearman Correlation of 0.619** (strong positive correlation) indicate a notable relationship between AI adoption and improvements in public service delivery. This includes the **transformation of administrative processes**, **enhanced decision-making**, and **increased citizen engagement**.

However, the **Phi (0.022)** and **Cramer's V (0.013)** values suggest that the association between AI's presence and its revolutionary impact is still weak, likely due to **infrastructure challenges**, **regulatory hurdles**, and **resource constraints**.

Implications:

AI holds significant promise to reshape public service delivery in Nigeria, especially in improving **efficiency** and **engagement with citizens**. However, the weak association metrics imply that AI's full potential is yet to be realized due to **existing systemic challenges**. Overcoming these challenges through regulatory reforms, infrastructure investment, and training will be essential for unlocking AI's transformative power in the public sector.

V. CONCLUSION/FINDINGS

Across all three hypotheses, the findings consistently point to the **significant potential** of AI to transform Nigerian public service delivery. However, the **weak associations** in each case highlight that this potential is currently under-realized due to several critical challenges:

1. Weak infrastructure, particularly related to data management, internet access, and digital tools, limits the effective implementation of AI in public services.
2. There is a shortage of skilled personnel who can develop, manage, and utilize AI systems effectively.
3. Issues around the regulation of AI systems, especially regarding data privacy and security, pose significant barriers to wider adoption.
4. Although AI applications are present, they are underutilized, with many public service institutions yet to integrate AI fully into their processes.

VI. RECOMMENDATIONS

1. Enhancement and Investment **in** digital infrastructure is a key step in improving AI's utilization in the public sector.
2. A dedicated focus on upskilling public sector workers to operate and manage AI systems is crucial.
3. Addressing regulatory concerns, especially in the area of data privacy and security, will ensure safer AI integration.
4. To unlock AI's full potential, a clear strategy should be developed that aligns AI applications with specific service delivery goals, focusing on long-term benefits.

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