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E-governance Adoption and Service Delivery in Selected Tertiary Institutions in Adamawa State, Nigeria 2010–2024

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Abstract: In recent times, E-governance has emerged as a veritable tool for improving service delivery in public institutions, including the education sector. Despite its significance and apparent potential to transform the quality of the educational system in Nigeria, its use seems not to be appreciated in tertiary institutions in Adamawa State. This study examines the impact of e-

governance adoption on effective service delivery in selected tertiary institutions in Adamawa State, Nigeria. The study also examines the factors affecting the adoption of e-governance and its implications on effective service delivery in selected tertiary institutions. The theoretical underpinning is the Technology Acceptance Model (TAM). This study is significant considering the global trend toward the digitisation of service delivery in both the public and private sectors of the economy. The research is survey research, and the survey research design was adopted in this study. Both primary and secondary data were collected. The primary data were collected through questionnaires, interviews, and observations from a sample of 400 individuals selected from the study population. The stratified and random sampling technique was adopted to ensure equal representation of the sample among the population parameters. The two universities selected for the study were recognised as strata, and samples were taken using random sampling from each of them. The secondary data were collected from various sources, including documents such as journals, books, magazines, and government reports. The statistical techniques employed in presenting the qualitative data collected are simple percentages, frequency counts, and analysis using the regression analysis test at a 0.05 level of significance. The content analysis was also used to analyse quantitative data. The findings revealed that e-governance has significantly enhanced administrative efficiency and service delivery; however, challenges such as inadequate infrastructure, low digital literacy, technology infrastructure deficits, insufficient funding, resistance to change, cybersecurity concerns, high internet costs, and limited internet access persist. The study recommended potential strategies for improving e-governance implementation, including increasing funding, enhancing training programs, and investing in robust technology infrastructure, among others.

Keywords: E-governance, service delivery, technology adoption, tertiary institutions.

Introduction

Globally, governments have sought effective and efficient ways to fulfil their core responsibility of serving their citizens. In light of this, the Nigerian federal government announced initiatives to digitise its operations in the early 2000s, with concerted efforts geared towards their realisation. According to Abdulkareem and Ishola (2016), these initiatives aim to enhance governmental operations in delivering public goods and services transparently, effectively, and efficiently. Consequently, significant progress and achievements have led to rapid development over the years. Recently, government information and services have become available online and provided electronically. This underscores the crucial role of e-governance in delivering services to citizens effectively.

E-governance encompasses three primary models of delivery: Government-to-Citizens (G2C), Government-to-Businesses (G2B), and Government-to-Government (G2G) (Efthymiou, 2025). G2C refers to the interaction between the government and citizens, where information about government programs and policies is readily accessible. Conversely, G2B describes the relationship between the government and businesses, enabling corporate entities to interact with the government in a

transparent and efficient manner, often through tax remittance and policy review. Simultaneously, G2G involves a symbiotic relationship characterised by both open and confidential interactions among government agencies, levels, and arms (Abdulkareem & Ishola, 2016).

The education policy is included in the concurrent list, indicating that both the federal and state governments must provide educational services to citizens. Tertiary institutions in Adamawa State implement government policies regarding education. Therefore, to serve the masses transparently, effectively, and efficiently, the adoption of electronic means has become essential. Carrying out functions electronically, especially in areas such as fee payment, hostel accommodation, result checking and uploading, and saving and transferring information, simplifies access. This approach will help alleviate issues tied to bureaucratic bottlenecks often associated with government operations.

Considering this, Asaju and Ogar (2022) argue that the adoption of e-governance in tertiary institutions, particularly in the context of teaching and learning, enhances academic excellence. This is why developed nations, such as the United States and the United Kingdom, enhance their educational sectors by modernising practices in student training, ultimately producing better graduates and fostering economic, social, and political development (Markus & Zainul, 2024). The principal activities within the educational sector can be significantly enhanced through electronic means.

At the tertiary level, particularly in universities, the primary functions of teaching, learning, and research have undergone progressive transformation due to the adoption of ICT (Asaju & Ogar, 2022). Electronic learning (E-learning) encompasses the use of the Internet for purposes such as student registration, assessment, and result processing, significantly boosting academic excellence in the educational sector, particularly in tertiary institutions (Asaju & Ogar, 2022; Alam, 2021).

This scenario likely mirrors the situation in tertiary institutions in Adamawa State, where efforts have been made to digitise various aspects of operations within the state public service, especially in universities and other tertiary institutions.

Research Problem

In recent times, concerted efforts have been made to digitalise (fully or partially) government services in Adamawa State. These efforts have culminated in the creation of government portals and numerous agency websites, all designed to accelerate service delivery. However, the selected tertiary institutions in Adamawa State seem not to be proactive in using technology as a catalyst for service delivery. In some tertiary institutions where e-government systems have been deployed, these systems are not linked to the intended users, resulting in limited benefits from such investments.

Introducing new technology to an established organisation is often met with a degree of trepidation and uncertainty by the intended users. Perceptions of the usefulness, complexity, and other concerns are typically associated with e-government projects in these selected institutions. Most tertiary institutions in Adamawa State, for instance, have adopted the online admission process

for enrolling prospective candidates, but the exercise seems not to be as seamless as expected. Most of the new entrants appear to be novices in ICT education and sometimes become frustrated while trying to process their admission online. The above challenges could have far-reaching implications for effective service delivery service delivery in these institutions. It is against this backdrop that the study examined the level of adoption of e-governance for better service delivery in the selected tertiary institutions in Adamawa State.

Research Aim and Questions

The following research questions guided the study.

1. What are the various e-governance platforms adopted by the selected tertiary institutions in Adamawa State to enhance service delivery?
2. How effective are the e-governance platforms in enrolling students for admission, processing school fees, managing academic records, and facilitating communication among staff and students, etc., in the selected tertiary institutions in Adamawa State?
3. What factors hinder the effectiveness of the adopted e-governance platforms in the selected tertiary institutions?

Research Focus

The focus of this study is to examine the adoption of technology in the teaching and learning process, as well as in other administrative activities, at selected tertiary institutions in Adamawa State. The institutions include Modibbo Adamawa University, Yola, and Adamawa State University, Mubi. The study will identify the form of technological tools available and their usage and effectiveness in enhancing service delivery in the selected institutions.

Objectives of the Study

The main objective of this study is to assess the impact of E-governance adoption on service delivery in selected Tertiary Institutions in Adamawa State. However, the specific objectives are to:

i. Identify the various e-governance platforms adopted by selected tertiary institutions in Adamawa State to enhance service delivery.

ii. Examine the effectiveness of these adopted e-governance platforms in various aspects, including enrollment for admission, payment of school fees, academic record processing, and communication among staff and students in the selected tertiary institutions in Adamawa State.

iii. Examine the factors militating against the effectiveness of the adopted e-governance platforms in the selected tertiary institutions.

However, the following hypotheses were tested to determine the extent to which the adoption of e-governance in selected tertiary institutions in Adamawa State enhances service delivery.

H_{01}: The adoption of e-governance platforms by Staff and students does not influence service delivery in selected tertiary institutions in Adamawa State.

H_{02}: The effectiveness of e-governance platforms does not affect service delivery in selected Tertiary institutions in Adamawa State.

H_{03}: Factors affecting e-governance effectiveness do not affect service delivery in selected Tertiary institutions in Adamawa state.

Literature review

E-governance

The concept of e-governance has generated valuable discourse among various scholars. These scholars tend to have a universal approach towards the meaning of the concept. However, it was defined based on usability and depending on its applicability. Considering the above, Akpan-Obong et al. (2023) describe e-governance as the governance of a nation through the use of Information and Communication Technology (ICT) for the delivery of public goods and services. In their view, Dahiru et al. (2022) describe e-governance as the ICT-enabled route to achieving good governance. It integrates processing and communication technologies, encompassing people, processes, information, and technology in the service of achieving governance objectives. In the same vein, e

Chukwuemeka et al. (2018), as cited in Ogu and Chukwurah (2023), defined e-governance as the adoption of information technology to enhance government operations. They also noted that e-governance refers to the use of information technologies, such as the Internet, the World Wide Web, and mobile computing, by government agencies to transform their relationships with citizens, businesses, various government departments, and other governments. It refers to the use of electronic devices to facilitate government activities.

Service Delivery

Service delivery, as a concept, seems not to enjoy the luxury of a universally accepted definition. However, several scholars proffer their definitions based on their ideology and perceptions regarding the concept. That is why Chukwuemeka et al. (2024) define service delivery as the direct and indirect services provided by the government to its nationals or residents within a country. They also added that the Government provides public services directly by engaging in production, distribution, or service and indirectly by financing services rendered to the citizenry by third parties. Herein, it implies that service delivery involves the provision of good roads, security, portable water, a sound healthcare system, and quality education. Similarly, Badmus (2017) described service delivery as essential services provided by the government, such as social amenities like hospitals, roads, electricity, water supply, marketplaces, customs services, licensing, sanitary services, physical infrastructure, town planning, housing, and education, among others.

The International Review of Law Computer and Technology (2004), cited by Dahiru et al. (2022), posits public service as the direct and indirect services provided by a government to its nationals or residents within a country. The government provides public services directly by engaging in production, distribution, or service and indirectly by financing services rendered to the citizenry by third parties. According to Oshewolo (2010), public service delivery can be viewed as "the process of meeting the needs of citizens through prompt and efficient procedures." This implies that users of services, such as taxpayers, students, private sector customers, including mobile communication subscribers, bank customers, and other clients, have seamless services, and consequently, their demands are promptly met with the aid of e-services. It would also help to build a strong association with the clientele, leading to improved quality and service climate, which would be enhanced through service orientation (Gronroos, 2006).

Adoption of E-governance in Tertiary Institutions in Nigeria

As a result of the emerging trend in the global education system, which involves the implementation of electronic means of service delivery, the Nigerian educational system has acknowledged the importance of e-governance in realising this goal. The adoption of e-governance in public institutions has been categorised by Hamidu (2025) into five stages: emerging, enhanced, interactive, transactional, and connected. The scholar believed that, at the very least, emerging and enhanced e-governance activities focus on making essential information available to the public through the web. At the intermediate level, the government utilises interactive and transactional websites to facilitate two-way communication, conduct online transactions, and aggregate content and services through a portal.

Furthermore, at the advanced stage, the government utilises the web to integrate services across ministries, provide tools for public feedback and deliberation, and customise the web visit for each user through personalised technologies and push notifications. The adoption of e-governance has been acknowledged by government Ministries, Departments, and Agencies (MDAs) as a means to enhance public service delivery.

Empirical Review

In this subsection, recent empirical studies related to the topic, carried out by various scholars, are reviewed. The essence was to appreciate the significance of the studies under review and also identify gaps in the literature that the present study could fill.

Hartanto et al. (2021) conducted an in-depth study to investigate the perceived effectiveness of e-governance as an underlying mechanism linking good governance and public trust, using Indonesia as a case study. Four research questions guided the study. The adopted survey research design and 28-item questionnaire were administered to citizens of two renowned cities in Indonesia: Medan City, situated in North Sumatra Province, and Banjarmasin City, situated in South Kalimantan Province. The results revealed a positive and significant association between transparency, accountability, and responsiveness and the perceived effectiveness of e-governance.

Furthermore, Umar and Ikechukwu (2022) conducted a robust study on the impact of e-governance on service delivery in the Joint Admissions and Matriculation Board (JAMB). A mixed-methods approach was employed in this study. This approach encompasses both qualitative (questionnaires) and quantitative (interviews and observation). A total of 46 questionnaires were administered to JAMB staff, all of which were recovered and analysed using simple percentages. A face-to-face interview was also conducted with selected Computer-Based Test (CBT) operators, students, and lecturers in two tertiary institutions in Kaduna. A content analysis of related literature on the impact of e-governance on JAMB was also conducted. The study revealed that E-Governance has improved service delivery in JAMB. Findings also indicated that inadequate infrastructure, such as electricity, is a significant impediment to the implementation of e-governance applications in JAMB.

Ajibade et al. (2017) conducted a study evaluating e-governance in Nigerian Universities and its impacts on service delivery. The theoretical framework adopted was the Technology Acceptance Model (TAM). The study employed a mixed-methods approach, combining surveys and interviews. Surveys were distributed to 300 students and 100 administrative staff across five universities, complemented by in-depth interviews with key stakeholders. Descriptive statistics, such as percentages, were likely used to analyse survey responses from students and administrative staff, including the percentage of respondents who reported technical issues and the response time improvements. Thematic analysis of in-depth interviews with key stakeholders to identify recurring themes related to service delivery and technical challenges. The findings revealed an improvement in response times for student inquiries by 40%, but 30% of respondents reported technical issues with the platforms. It was concluded that E-governance has significantly enhanced service delivery, particularly in student services, although persistent technical challenges need to be addressed. The study recommended that institutions should invest in IT infrastructure upgrades and continuous training programs for staff and students.

Chima and Enoch (2022) examined barriers to e-governance implementation in Nigerian Universities. The theoretical framework adopted was organisational change theory. Interviews were conducted with 50 stakeholders, including faculty, administration, and IT staff. The study identified barriers, including inadequate funding (60% of respondents) and resistance to change among faculty (45%). Overcoming cultural and financial hurdles is crucial for the successful implementation of e-governance. The study recommended that stakeholders engage early in the planning process and secure diverse funding sources, including public-private partnerships.

Research Gap

Despite advancements in e-governance research, several gaps remain, particularly within Nigerian tertiary institutions. The research rarely considers the unique socio-economic, cultural, and technological challenges faced by Nigerian tertiary institutions, particularly in states like Adamawa. Few studies examine the progression of institutions through adoption stages, leaving gaps in understanding their levels of integration. Studies often overlook the experiences and satisfaction levels of end-users, such as students and staff, focusing instead on administrative and technical

aspects. There is a lack of quantitative evidence linking the adoption of e-governance to measurable improvements in service delivery, efficiency, or transparency. While challenges like poor infrastructure, funding deficits, and cybercrime are acknowledged, actionable strategies for addressing them are scarce. Limited exploration exists on leveraging technologies like AI, blockchain, and big data to enhance e-governance systems. The impact of e-governance on academic performance, learning experiences, and faculty productivity remains underexplored. Research seldom addresses how e-governance affects marginalised groups, such as women, students with disabilities, and economically disadvantaged individuals. There is minimal research on establishing mechanisms to improve e-governance systems and measure long-term continuous impacts. This study addresses these gaps by focusing on Adamawa State, providing localised insights into e-governance challenges and opportunities. It will explore the integration of emerging technologies to enhance efficiency and user satisfaction while also investigating inclusivity for marginalised groups. The research will examine broader institutional outcomes, such as academic performance and stakeholder engagement, and propose policy frameworks and infrastructural solutions tailored to Nigerian tertiary institutions. By adopting a dynamic approach, the study seeks to contribute to the application and utilisation of e-governance in Nigeria's higher education sector.

Theoretical Framework

This study is grounded in the Technology Acceptance Model (TAM). The theory was propounded by Fred Davis in 1987. The Technology Acceptance Model (TAM) is a framework developed to explain and predict user acceptance of information technology (IT) systems. TAM argued that perceived ease of use and perceived usefulness significantly influence users' decisions to accept and use technology. This model has gained widespread application across various domains, including education, health care, and public administration, particularly in understanding the adoption of e-governance systems in tertiary institutions.

Fred Davis introduced TAM in his doctoral dissertation at the Massachusetts Institute of Technology (MIT). The model was initially designed to provide insights into user behaviour regarding new technologies. In his seminal paper, "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results," Davis articulated the core components of the model and established its relevance in predicting IT acceptance.

Assumptions of TAM:

TAM is based on the following assumptions:

i. User-Centric Focus: The model emphasises the user's perspective in determining technology acceptance. It assumes that users are rational and will evaluate technology based on its perceived benefits.

ii. Perceived Usefulness (PU): This refers to the degree to which a user believes that using a particular system would enhance their job performance. In the context of e-governance, PU

can be understood as the extent to which the system enhances service delivery and administrative processes in tertiary institutions.

iii. Perceived Ease of Use (PEOU): This reflects the degree to which a user believes that using a system would be effortless. A system perceived as easy to use is more likely to be accepted and utilised by users.

iv. Behavioural Intention to Use: TAM posits that PU and PEOU influence the user's behavioural intention to use technology, which, in turn, affects actual system usage.

Application of theory to the study

E-governance refers to the use of digital technologies, particularly the Internet, to deliver government services and facilitate communication between institutions and their stakeholders. In the context of tertiary institutions in Adamawa State, Nigeria, the adoption of e-governance systems can significantly enhance service delivery, improve transparency, and increase administrative efficiency.

In Adamawa State, the perceived usefulness of e-governance systems in tertiary institutions is pivotal. Staff and Students view these systems as enhancing administrative processes, such as admissions, registration, and communication. For example, if an institution implements an online registration system, students are likely to perceive it as valid if it reduces waiting times and minimises paperwork. Research has shown that when users believe that a technology will improve their performance, they are more inclined to adopt it.

The ease of use of e-governance systems is equally important. If these systems are user-friendly and intuitive, users are more likely to adopt and utilise them. In Adamawa State, institutions need to invest in user training and support to alleviate concerns about the complexity of new systems. For instance, if students find an online portal challenging to navigate, they may be discouraged from using it, regardless of its potential benefits. Ensuring that systems are easy to use can lead to higher acceptance rates.

Behavioural intention to use TAM posits that PU and PEOU directly influence the use of technology. In the case of tertiary institutions in Adamawa State, if students and staff perceive e-governance systems as both valuable and easy to use, they are more likely to intend to use them. This intention is critical for the successful implementation of e-governance initiatives. Institutions must foster a culture that encourages users to provide feedback, enabling continuous improvement of these systems.

Research Methodology

General Background

This study adopted a cross-sectional survey design. This is because research survey design is a fact-finding technique. This study utilises e-governance adoption to examine its impact on service delivery in selected Tertiary Institutions in Adamawa State, Nigeria.

Study Area

Adamawa State, located in the Northeastern region of Nigeria, was selected as the site of investigation, where data were obtained from Adamawa State University, Mubi, and Modibbo Adama University, Yola. The reason for considering Adamawa State tertiary institutions is that, as a state university, it offers a perspective on how e-governance initiatives are implemented at the state level. Additionally, as a federal university, it offers insights into the integration and implementation of federal e-governance. Additionally, the state appears to be lacking in terms of government implementation of e-governance for effective service delivery. Therefore, it is hoped that the research findings will have an impact on the implementations based on this study.

Study Population

The study population comprises Staff and Students of Adamawa State University and Staff and Students of Modibbo Adama University, Yola. The population of Staff and students at Adamawa State University is 1,275, and the population of Staff and students at Modibbo Adama University, Yola, is 1,050, respectively. Therefore, the total population of the study is 28,257 (Adamawa State University, n.d.; Modibbo Adama University, n.d.).

Sample and Sampling Techniques

Since the population of the study is known, the researcher used Taro Yamane's (1973) sample size formula. The formula is denoted as:

$$n = \frac{N}{1 + N(e)^2} \tag{1}$$

Where n is the sample size, N is the population, and e^2 is the degree of freedom $(0.05)^2$.

Therefore, the sample size is 400. The study adopts random and stratified sampling techniques. The universities selected were categorised into strata, and samples were randomly selected based on the population parameters of each stratum. The reason for choosing this method is that the mixed method of stratified and random sampling was used to ensure that different groups or categories of a population are adequately represented in selecting a sample of the population.

Research Instruments

A mixed-methods research design was used to conduct this study. Primary and secondary sources were examined to address the research questions and achieve the objectives outlined. This is where both quantitative (questionnaire) and qualitative (interviews and observation) approaches were employed. The quantitative approach involves the use of a survey research design whereby primary data was collected using a structured questionnaire instrument. The questionnaire was designed in both closed-ended and Likert scale questions to gather quantitative data. On the other hand, the qualitative approach involved data generated from policy documents, documented interview transcripts, field notes, textbooks, journal papers, country reports, dailies, and selected

web pages, Among Others. Observation also involved collecting pictures of e-governance tools observed in the study areas. The interview was conducted with key personalities, particularly those within the Registry Department, Vice Chancellor Academic, Director of Academic Planning, selected Deans of Faculties, Chairmen of the Academic Staff Union of Universities, and student unit leaders using structured interviews. The use of these two approaches reinforced each other. Therefore, the depth and quality of data collected and this approach help to paint a complete picture of the phenomenon under study as it covers more ground than either a purely qualitative or quantitative method can achieve

Reliability of the Instruments

The validity of the study is reliant on the careful design and execution of primary data collection tools and the appropriate selection of secondary data sources and was validated through selected internal, external, construct, face, and content validity, which will lead to more reliable and generalisable findings regarding the impact of e-governance on service delivery in tertiary institutions in Adamawa State.

To determine the reliability of the instrument, the initial draft of the questionnaire was pilot-tested on a small sample of the study population. The outcome of the pre-test exercise necessitated modifications to some of the questions. The reliability of the instrument was further determined using Cronbach's Alpha reliability technique, with a total of 73 copies of the questionnaire employed for this purpose. Reliability in document analysis was maintained through systematic coding and triangulation across multiple, verifiable sources, thereby enhancing the credibility of the conclusions. However, both the primary and secondary data collected for this study on e-governance and service delivery in tertiary institutions in Adamawa State were subjected to rigorous reliability checks. The use of standardised data collection instruments, cross-verification with secondary data, and statistical reliability tests ensure that the data is dependable and can support valid and consistent findings. Consequently, the study's results are reliable and can be confidently applied to inform future research and policy decisions in the context of e-governance in education.

Methods of Data Presentation and Analysis

The data analysis for this study employed a systematic approach to processing, organising, and interpreting the collected data, providing meaningful insights into the effect of e-governance on service delivery. The qualitative data were presented in tables, frequency counts and percentages. The data were further analysed using regression analysis with the SPSS package. The study employed regression analysis to determine the extent to which the constructs influence the acceptance of e-Government implementation. The qualitative data were analysed through content analysis.

Results

Research Question 1: *What are the various e-governance platforms adopted by the selected Tertiary Institutions in Adamawa State to enhance service delivery?*

Table 1

Adoption of E-Governance Platforms (Students Only)

S/N	Statement	SA	A	SD	D
1	Students check their results online	90 (30.7%)	178 (60.7%)	15 (5.1%)	10 (3.4%)
2	Payment of school fees is done electronically	90 (30.7%)	171 (58.3%)	15 (5.1%)	17 (5.8%)
3	Computer Based Test is carried out in your institution	64 (21.8%)	137 (46.7%)	48 (16.3%)	44 (15 %)
4	Your institution provides computers to students	00 (00%)	00 (00%)	121 (41.2%)	172 (58.7%)
5	Internet services are available to students on the campus	40 (13.6%)	36 (12.2%)	82 (27.9%)	135 (46 %)
6	Lectures are delivered to students with the aid of a projector	35 (11.9%)	41 (13.9%)	140 (47.7%)	77 (26.3%)

Source: Authors development.

Table 1 represents the responses from the respondents indicating their opinions on the various e-governance platforms being adopted by the selected institutions under study. To achieve the first research objective, which seeks to identify the various e-governance platforms adopted by the selected tertiary institutions to enhance service delivery, respondents were requested to indicate whether students check their results online; 90 respondents representing 30.7% strongly agreed, 178 respondents representing 60.7% agreed, 15 respondents representing 5.1% strongly disagree, and 10 respondents representing 3.4% disagreed. This indicates that most respondents believed students should check their results online. To further support the above, an interviewee from Adsu responded,

> *"I access my academic results through the university portal. The process is simple, but the major challenge we face is when the server goes down during peak periods, like after exam results are released. Sometimes, we encounter delays in seeing the results because the portal can be very slow, especially when a large number of students attempt to access it simultaneously."*

Additionally, a student from Modibbo Adama University, Yola, noted

> *"The system here for checking results is similar to that of other institutions. We log into the university's e-portal to view our grades. One issue is that some lecturers fail to upload their results on time, which can be frustrating. Additionally, when the portal is updated, we often encounter glitches that can take time to resolve."*

Students' opinions were further sought on whether the admission of new entrants and payment of school fees are done electronically. 90 respondents, representing 30.7%, strongly agreed; 171 respondents, representing 58.3%, agreed; 15 respondents, representing 5.1%, strongly disagreed; and 17 respondents, representing 5.8%, disagreed. This implies that there is a high level of agreement among respondents that school fees are paid electronically. A student from Adamawa State University, Mubi, in an interview, said,

> *"The admission of new entrants and payment of fees have been mostly smooth, but there are times when we experience delays in the release of admission and payment confirmation. The bank transfer process sometimes doesn't reflect immediately on the portal, and this has caused anxiety for many students. However, things seem to be improving slowly, especially with the introduction of online payment receipts."*

Regarding this, an interview conducted with MAUTEC students indicated that

> *"We pay fees directly through the university's online payment platform. It has improved compared to previous years, but occasional problems persist, such as network failures during payment processing. Sometimes, payments don't reflect immediately, and we have to visit the finance office to sort things out, which can be inconvenient."*

Furthermore, the table shows respondents' opinions on whether computer-based tests are used in their institution; 64 respondents, representing 21.8%, strongly agreed, 137 respondents, representing 46.7%, agreed, while another 48 respondents, representing 16.3%, strongly disagreed, and 44 respondents, representing 15%, disagreed. It can be concluded that computer-based tests are carried out in these institutions under study. To corroborate this opinion, students from ADSU and MAUTEC shared their thoughts during an interview session:

> *"The CBT system in our university is a step in the right direction, but it's not without issues." Some of the computers are old and slow, and we've had instances where the system crashes during exams. The staffs are usually quick to respond, but it can be frustrating when you're in the middle of a timed test. We use CBT for many exams, and it's pretty efficient. However, sometimes, there are challenges with the servers, which can cause delays in starting exams. There have also been occasional problems with the network, resulting in students being disconnected during the test; however, these issues are generally resolved quickly." MAUTEC.*

It also asked respondents whether their institution provides personal computers to students. A total of 121 respondents, representing 41.2%, strongly disagreed, while 172 respondents, representing 58.7%, disagreed, and 7 respondents agreed with the claim. This indicates that neither Modibbo Adama University nor Adamawa State University provides personal computers for their students. In an interview with some of the students, they assets that access to computers is not as widespread as it should be. The researchers also observed that computer labs are available, but they are often overcrowded, and some of the computers are outdated. This affects their ability to complete assignments or practice for computer-based testing (CBT) exams.

Figure 1

Showing Sick/Disabled Students Sitting for CBT Exams

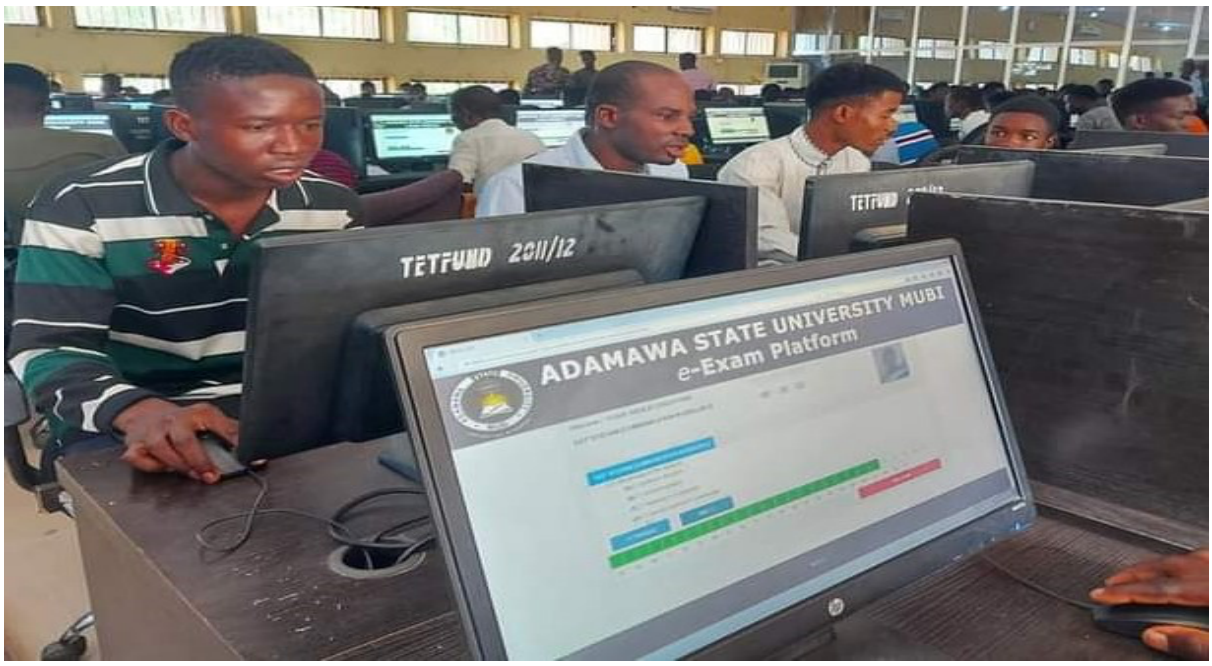

Figure 1 illustrates a sick/disabled student who was sitting for CBT exams and was connected to the internet outside the venue to write his paper. This indicates the level of compliance with the e-exam platform, as there is no alternative for students to use pen and paper for the course.

The respondents were further probed about whether internet services are available to students on campus; 40 respondents, representing 13.6%, strongly subscribed to the view, 36 (12.2%) also supported the claim, another 82 (27.9%) strongly opposed it, and 135 (46%) refuted the claim. This implies that the bulk of the respondents disagreed that internet services are not available at the institutions. In an interview, it was noted that there was no internet service available on either campus, making it difficult to access online resources or check emails.

Respondents were asked to indicate whether lectures were delivered to students with the aid of a projector. The results showed that 35 respondents, representing 11.9%, strongly agreed, 41 respondents, representing 13.9%, agreed, 140 respondents, representing 47.7%, strongly disagreed, and 77 respondents, representing 26.3%, disagreed. This indicates that most respondents disagreed that lectures are not delivered to them with the aid of a projector. This was corroborated by an interview with ADSU staff regarding the use of the projector. His response was, "I have never used a projector during lectures. Sometimes, it was used during postgraduate defences only at the postgraduate school, but the availability of these tools can be inconsistent. Sometimes, the equipment is faulty, or there aren't enough projectors for the lecture hall. When they are made available, they can significantly enhance teaching, especially for large classes, as they facilitate the visual illustration of concepts and encourage student engagement.

Figure 2

Depicting Students Accessing ICT Facility

Figure 2 illustrates students attending practicals in a computer laboratory.

Table 2

Adoption of E-Governance Platform (Staff of the Institutions)

S/N	Statement	SA	A	SD	D
1	Management provides personal computers to staff in this institution	6 (5.5%)	11 (10.5%)	62 (57.5%)	28 (26.5%)
2	Academic staff uses a projector for lecturing	14 (13.0%)	16 (14.9%)	27 (25.2%)	50 (46.6%)
3	Staff have access to free internet service within the campus	0 (0%)	0 (0%)	88 (82.1%)	19 (17.9%)
4	Staff computes students' results electronically	43 (40%)	64 (60%)	0 (0%)	0 (0%)
5	Student results are uploaded on the portal	57 (53.3%)	50 (46.7%)	0 (0%)	0 (0%)
6	Student records and other official documents are stored electronically	47 (43.9)	41 (38.3)	10 (9.3)	9 (8.4)

Source: Authors development.

Table 2 represents the staff's opinions on the adoption of various e-governance platforms for service delivery in the selected institutions under study; their responses on whether management provides personal computers to staff in the institutions, six respondents representing 5.5% strongly agreed, 11 respondents representing 10.5% agreed, 62 respondents representing 57.5% strongly opposed the view, and 28 respondents representing 26.5% refuted the claim. This implies that most of the respondents did not subscribe to the view that management provides personal computers to

staff in their institutions. Interviews with staff from both institutions corroborated this. A staff from Adamawa State University affirmed the position by responding to the question,

> *"No, the institution doesn't provide personal computers to all staff members. A few departments may have computers available for shared use, but most of us rely on our laptops to complete our work. This situation can slow down workflow, especially when we have technical issues with our devices or need software that isn't available to us."*

Another staff member from MAUTECH responded,

> *"At Modibbo Adama University, some senior staff members are provided with personal computers, but many of us still have to use our own devices." This affects efficiency, particularly in office work. Access to computers is a major factor in timely submission of grades, preparing lecture notes, and managing student records."*

Respondents were asked to indicate whether academic staff use projectors for lecturing. Fourteen respondents, representing 13.0%, strongly affirmed the position; 16 respondents, representing 14.9%, agreed; 27 respondents, representing 25.2%, strongly disagreed; and 50 respondents, representing 46.7%, disagreed. This indicated that most staff members declined to use the projector for teaching. This was affirmed by the key informant interviews conducted with staff from both institutions. A staff from ADSU confirmed that "I have never used a projector during lectures. Sometimes, it was used during postgraduate defences only at the postgraduate school, but the availability of these tools can be inconsistent. Sometimes, the equipment is faulty, or there aren't enough projectors for the lecture hall. When they are made available, they can significantly enhance teaching, especially for large classes, as they facilitate the visual illustration of concepts and encourage student engagement. There was an opposing view from the staff at MAUTECH when he posited,

> *"We frequently use projectors and other ICT tools in our lectures, especially in computer science classes." It has been beneficial in helping students understand the material better through visuals and slides. However, technical glitches, such as power outages or equipment failure, can sometimes disrupt lessons."*

In the same vein, respondents were requested to indicate whether staff has access to free internet service within the campus. 88 respondents, representing 82.2%, strongly disagreed, and 19 respondents, representing 17.8%, disagreed; this implies that there is no free internet service within the campus. Furthermore, respondents were asked to indicate whether student results were computed electronically. Of the 43 respondents, 40% strongly agreed, and 60% agreed. This indicates that all staff members from both institutions agreed that students' results are being computed electronically.

Table 2 shows that all staff members agreed that students' results are uploaded to the portal. This is because 57 respondents, representing 53.3%, strongly agreed with the claim, and 50 respondents, representing 46.7%, agreed with it. Again, the bulk of the respondents indicated that student records and other official documents are stored electronically. Expressly, 47 respondents,

representing 43.9%, strongly agreed with this view, 41 respondents, representing 38.3%, agreed, while 10 respondents, representing 9.3%, strongly disagreed, and nine respondents, representing 8.4%, disagreed.

Research Question 2: *How effective were these e-governance platforms in enrolling students for admission, processing school fees, managing academic records, and facilitating communication among staff and students, among other functions, in the selected tertiary institutions in Adamawa State?*

Table 3

E-governance Effectiveness

S/N	Statement	SA	A	SD	D
1	ICT tools have improved the accuracy of service delivery in this institution	181 (45.2%)	138 (34.6)	49 (12.2%)	32 (8%)
2	Data privacy and security of the portal are guaranteed from unauthorised access	55 (13.7%)	109 (27.2%)	158 (39.5%)	78 (19.5%)
3	Online admissions and payment of school fees are carried out hitch-free	90 (22.6%)	70 (17.4%)	149 (37.3%)	91 (22.7%)
4	Online course registrations are carried without hitches	91 (22.7%)	149 (37.4%)	105 (26.3%)	54 (13.6%)
5	CBT Exams are conducted successfully in this institution	180 (45%)	76 (19%)	84 (21%)	60 (15%)
6	The use of projector aids in teaching and learning	212 (53.1%)	136 (31.4%)	22 (5.6%)	41 (10.2%)
7	Staff and Students are experienced in operating the ICT tools effectively	138 (34.5%)	93 (23.3%)	90 (22.5%)	79 (19.7%)
8	There is a feedback mechanism for any complaint	107 (26.7%)	225 (56.3%)	27 (6.8%)	41 (10.2%)

Source: Field survey (2024).

Table 3 presents the effectiveness of e-governance platforms adopted by staff and students of the selected institutions under study. Their opinion indicated that ICT tools have improved the accuracy of service delivery, which is shown in their responses. A total of 181 respondents, representing 45.2%, strongly agreed; 138 respondents, representing 34.6%, agreed; 49 respondents, representing 12.2%, strongly disagreed; and 32 respondents, representing 8%, disagreed. Respondents were asked to indicate whether the data privacy and security of the portal are guaranteed against unauthorised access. The results showed that 55 respondents, representing 13.7%, strongly agreed, 107 respondents, representing 27.2%, agreed, 158 respondents, representing 39.5%, strongly disagreed, and 78 respondents, representing 19.5%, disagreed. In an interview with the staff of the ICT department at ADSU, it was noted that the institution has basic security measures in place, including password-protected portals for staff and students. However, I am not sure how advanced the system is in terms of protecting sensitive data from breaches. There is no clear communication on how data privacy is managed, which leaves some of us uncertain about the system's security, as stated by Modibbo Adama University, Yola. There are measures in place,

such as access restrictions for sensitive data and regular updates to our e-governance system. However, I believe the security measures could be strengthened. There hasn't been much communication about cybersecurity or data privacy protocols, so staff often rely on the IT department for guidance when issues arise.

This indicates that most respondents disagree that the data privacy and security of the portal are guaranteed against unauthorised access. Similarly, respondents disagreed that online admission and payment of school fees are carried out without any issues. This is reflected in their responses, where 90 respondents (22.6%) strongly agreed, 107 respondents (27.2%) agreed, 158 respondents (39.5%) strongly disagreed, and 91 respondents (22.7%) disagreed.

Figure 3

Admission Officer Attending to Online Admission for Student

Figure 3 illustrates the admission officer attending to student complaints about online admission. This figure illustrates that online admission is in practice in these institutions, which helps reduce costs and makes the management of staff and student records more effective and efficient.

Further responses from the respondents indicate that online course registrations are carried without hitches. Of the 92 respondents, representing 23%, a substantial majority strongly agreed with the view. A total of 149 respondents, representing 37.4%, agreed with this view. A total of 105 respondents, representing 26.3%, strongly disagreed, and 54 respondents, representing 13.6%, disagreed. This study aligns with the findings of Shamsuzzaman et al. (2023), which reported a 35% increase in student satisfaction rates due to more efficient processes in admissions and registration.

Effective e-governance is positively correlated with improved administrative efficiency and increased student satisfaction. Expanding successful models to other institutions and conducting regular evaluations to assess effectiveness was recommended for necessary action.

Respondents were asked to indicate whether CBT exams (Figure 4) were conducted successfully in their institution. The results showed that 180 respondents, representing 45%, strongly agreed, 76 respondents, representing 19%, agreed, 84 respondents, representing 21%, strongly disagreed, and 60 respondents, representing 15%, disagreed. This indicates that most respondents agreed that CBT exams are conducted successfully in their institutions. The traditional methods of assessment in Nigeria are characterised by various forms of examination malpractices, including bringing unauthorised materials, writing on currency notes and identity cards, spying on other candidates in the examination hall, substituting answer sheets, and altering examination scores or grades. Others include impersonation, body writing or tattoos in which students, especially females, write on hidden parts of their bodies (Kozlowska, 2023).

Again, respondents were asked to indicate whether the use of a projector aids in teaching and learning. Of the 201 respondents, 50.2% strongly agreed, 31.4% agreed, 5.6% strongly disagreed, and 10.2% disagreed. This suggests that most respondents believe the use of projector aids enhances teaching and learning. It was revealed that Staff and Students are experienced in operating ICT tools effectively; this is evidenced by 138 respondents (34.5%) strongly subscribing to the view, 93 respondents (23.3%) agreeing, 90 respondents (22.5%) strongly opposing the claim, and 79 respondents (19.7%) supporting it. It was demonstrated that there are feedback mechanisms in place for addressing any complaints within both institutions. Expressly, 107 respondents, representing 26.7% of the total, strongly agreed, 225 respondents, representing 56.3%, agreed, and 27 respondents, representing 6.8%, strongly disagreed with the claim. Additionally, 41 respondents, representing 10.2%, also disagreed.

In the past, various methods have been employed to assess an individual's ability, ranging from oral to written, from practical to theoretical, and from paper and pencil to electronic assessments. The predominant mode of students' assessment in Nigeria is the traditional method. In this method, students are assessed using a pen and paper to evaluate their cognitive abilities.

Figure 4

Students sitting for CBT Exams

Research Question 3: *What factors hinder the effectiveness of the adopted e-governance platforms in the selected tertiary institutions?*

Table 4

Factors Militating Against the Effective Adoption of the E-Governance Platform

S/N	Statement	SA	A	SD	D
1	Staff and students are resisting the adoption of e-governance service delivery in our institution	87 (21.7%)	68 (16.9%)	163 (40.8%)	82 (20.6%)
2	Inadequate Computers hinder the effective adoption of e-governance	117 (29.3%)	219 (54.7%)	22 (5.5%)	42 (10.6%)
3	Power failure affects the effective adoption of e-governance	161 (40.3%)	168 (42%)	49 (12.3%)	22 (5.4%)
4	Lack of funding hinders the effective adoption of e-governance	104 (25.9%)	164 (40.9%)	66 (16.6%)	66 (16.6%)
5	Lack of available internet service within the campus affects service delivery	114 (28.4%)	130 (32.6%)	95 (23.7%)	61 (15.3%)

6	There is the issue of data privacy and security of ICT users	87 (21.8%)	185 (46.3%)	89 (22.1%)	39 (9.8%)
7	There is a disparity between the ability of the students and staff to use computers for academic and administrative purposes effectively	193 (48.2%)	78 (19.6%)	106 (26.4%)	23 (5.7%)

Source: Field survey (2024).

Table 4 represents an attempt to achieve the third research objective, which seeks to determine the factors that militate against the effective adoption of the e-governance platform by students and staff in the selected institutions under study. Respondents were requested to indicate whether staff and students are resisting the adoption of e-governance service delivery in their institution. The results showed that 87 respondents, representing 21.7%, strongly agreed, 68 respondents, representing 16.9%, agreed, 163 respondents, representing 40.8%, strongly disagreed, and 82 respondents, representing 20.6%, disagreed. This implies that the bulk of the respondents disagreed with the view that staff and students are resisting the adoption of e-governance service delivery in their institution.

The results of this study align with those of Chima and Enoch (2022), who identified barriers such as inadequate funding (60% of respondents) and faculty resistance to change (45%). Overcoming cultural and financial hurdles is crucial for the successful implementation of e-governance.

Table 4 seeks to determine whether inadequate computers hinder (Figure 5) the effective adoption of e-governance. 117 respondents, representing 29.3%, strongly agree; 218 respondents, representing 54.4%, agree; 22 respondents, representing 5.5%, strongly disagree; and 42 respondents, representing 10.6%, disagree. This implies that inadequate computers hinder the effective adoption of e-governance. Similarly, respondents were asked to indicate whether power failures affect the effective adoption of e-governance. 161 (40.3%) respondents strongly agreed with this view, 168 (42%) respondents agreed equally, 49 (12.3%) strongly opposed the claim, and 22 (5.4%) respondents opposed the view.

Figure 5

Showing Insufficient Computers and Maintenance

Similarly, 104 respondents, representing 25.9%, strongly agreed that lack of funding hinders effective adoption of e-governance; another 164 respondents, representing 40.9%, agreed; 66 respondents, representing 16.6%, strongly disagreed, and 66 respondents, representing 16.6%, disagreed. This indicates that most respondents agreed that a lack of funding hinders the effective adoption of e-governance. In the same vein, Udoh's (2024) study results agree with this study, among others, that bureaucratic corruption is visible and rampant in Nigeria, and a significant number of people believe that e-governance can help curb bureaucratic corruption in the country. That the problem of the public bureaucracy in Nigeria is further compounded by corruption and posits that e-governance has the potential role to mitigate bureaucratic corruption in the country

Again, respondents' opinions indicated that 114 respondents, representing 28.4%, strongly agreed that the lack of available internet service within the campus affects service delivery, 130 respondents, representing 32.6%, agreed, 95 respondents, representing 23.7%, strongly disagreed, and 61 respondents, representing 15.3%, disagreed. This indicates that most respondents agreed that the lack of available internet service within the campus negatively impacts service delivery.

Again, respondents' opinions indicated that 87 respondents, representing 21.8%, strongly agreed that there is an issue of data privacy and security of ICT users, 185 respondents, representing 46.3%, agreed, 89 respondents, representing 22.1%, strongly disagreed, and 39 respondents, representing 9.8%, disagreed. This indicates that most respondents agreed that there is an issue with data privacy and security for ICT users. Table 4 presents respondents' opinions on whether there is a disparity between the staff's ability to use computers effectively for both academic and administrative purposes. A total of 193 respondents, representing 48.2%, strongly agreed; 78 respondents, representing 19.6%, agreed; 106 respondents, representing 26.4%, strongly disagreed; and 23 respondents, representing 5.7%, disagreed. This suggests that most respondents

agreed that there is a disparity between the staff's ability to utilise computers for both academic and administrative purposes effectively. The entire table has answered the third research question and has achieved the third objective.

Test of Hypotheses

Decision Rule: If the p-value is less than 0.05 (the level of significance), reject the null hypothesis and affirm a significant relationship; otherwise, do the opposite.

Table 5

Summary of Test of Hypotheses

Hypotheses	T	p-value	Decision
H_{01}: E-Governance Platforms Adoption by Students and staff does not influence Service delivery in institutions in Adamawa state	4.624	.047	Reject
H_{03}: Effectiveness of E-Governance Platforms does not affect Service delivery in institutions in Adamawa state	4.086	.000	Reject
H_{04}: Factors Affecting E-Governance Effectiveness does not affect Service delivery in institutions in Adamawa state	-4.828	.000	Reject

Source: Field survey (2024).

Table 5 presents the test of the hypothesis, achieved by evaluating the t-statistic and its corresponding significance value. From the table, H_{01}, H_{02}, and H_{03} are all rejected. The regression results showed that the adoption of e-governance platforms by staff and students, as well as the effectiveness of e-governance platforms and factors affecting e-governance effectiveness, are significant in influencing service delivery in tertiary institutions in Adamawa State. According to the results presented, the probability/significant values for H01, H02, and H03 are at the 0.05 level of significance; hence, the null hypotheses (H_{01}, H_{02}, and H_{03}) raised in this study are all rejected. The study, therefore, concluded that the independent variables, measured by the adoption of e-governance platforms by students and staff, the effectiveness of e-governance platforms, and factors affecting e-governance effectiveness, are significant in influencing service delivery in tertiary institutions in Adamawa State.

Discussion

Hypothesis one, which states that the adoption of e-governance platforms by students and Staff does not influence Service delivery in selected tertiary institutions in Adamawa state, was rejected. The same is said of hypothesis two, which states that the effectiveness of e-governance platforms does not affect Service delivery in selected tertiary institutions in Adamawa state. This hypothesis was rejected, as was hypothesis three, which posits that factors affecting e-governance effectiveness do not impact service delivery in selected tertiary institutions in Adamawa state. The study's rejection of hypotheses H_{01}, H_{02}, and H_{03} indicates a significant influence of e-governance platforms on service delivery in educational institutions within Adamawa State. This finding aligns with existing literature, which underscores the transformative impact of e-governance on institutional efficiency,

transparency, and user satisfaction. The rejection of H_{01} suggests that the adoption of e-governance platforms by staff and students has a significant influence on service delivery in tertiary institutions. This finding is consistent with those of Nnamani et al. (2023), who noted that e-governance enhances administrative efficiency and student engagement in educational institutions. E-governance platforms offer streamlined processes for administrative tasks, including registration and accessing academic resources, resulting in enhanced service delivery (Gajendra et al., 2012). Ajibade et al. (2017) found that the study conducted to evaluate e-governance in Nigerian universities had an impact on service delivery, which aligns with this study. Specifically, the study reported an improvement in response times for student inquiries by 40%. However, 30% of respondents reported technical issues with the platforms. E-governance has significantly enhanced service delivery, particularly in student services, although persistent technical challenges need to be addressed. The active use of these platforms by staff and students enables institutions to manage and respond to student needs efficiently.

The rejection of H_{02} underscores the crucial role of e-governance platforms in enhancing service delivery. Effective e-governance systems are characterised by user-friendly interfaces, reliability, and robust support systems, which collectively enhance user experience and institutional productivity (Almarabeh & AbuAli, 2010; Shamsuzzaman et al., 2023). When e-governance platforms are effectively implemented, they reduce administrative bottlenecks and improve the overall responsiveness of educational institutions to both student and staff requirements (Heeks, 2001; 2002). Furthermore, the rejection of H_{03} suggests that various factors affecting the effectiveness of e-governance platforms have a significant impact on service delivery. Factors such as technological infrastructure, user training, and institutional support play crucial roles in the success of e-governance initiatives (Gupta & Jana, 2003). Ensuring robust IT infrastructure and comprehensive training programs for users can mitigate common challenges associated with e-governance implementation (Bwalya & Mutula, 2014). Institutional support, including leadership commitment and sufficient funding, is crucial for maintaining effective e-governance systems (Ndou, 2004).

Limitations of the Study

The study focuses exclusively on selected tertiary institutions in Adamawa State, Nigeria. Therefore, the findings may not fully represent the experiences of tertiary institutions in other states or regions within Nigeria. Differences in technological infrastructure, governmental policies, and institutional capacities across regions could limit the generalizability of the results. Technological advancements and policy changes over this extended timeframe could lead to varying adoption levels of e-governance within the institutions studied. Consequently, the findings might reflect historical trends rather than the current state of e-governance. Also, the study only examines selected tertiary institutions, which might introduce selection bias. If the chosen institutions are more technologically advanced or better funded than others, the results could overestimate the effectiveness and adoption rate of e-governance in the state. Additionally, the reliability of the findings depends on the availability and accuracy of the data collected. Challenges such as incomplete records, inconsistent data reporting, or reliance on self-reported information from respondents might affect the validity of the study's conclusions.

Conclusions and Implications

Thus, it is sufficient to conclude that factors affecting e-governance effectiveness, e-governance platform adoption (by students), and the effectiveness of e-governance platforms are significant predictors of tertiary institutions in Adamawa State.

Furthermore, poor internet services and inadequate information infrastructure, combined with the country's low level of technological development, have made accessibility a significant challenge. Additionally, the conduct of examinations via a computer-based testing method, which most tertiary institutions have already adopted, is not without challenges. Inadequate functional computers in institutions, power outages, faulty monitors, integrity issues with examination managers, and a low computer literacy rate are some of the problems that undermine the effectiveness of the CBT programme. Students have leveraged this and continue to engage in all forms of examination malpractice. There are cases where students go into the examination hall and write for themselves and their friends without being caught. Also noteworthy are the issues related to online payment of fees. Unnecessary delays caused by poor network services, excessive charges via remote generation, and other bank fees sadly make e-payment more costly. There are also problems of inadequate capital, a lack of training for staff and students, a high cost of maintaining ICT infrastructure, poor acceptability of the new process, an absence of a policy framework, and vandalism of ICT equipment, which further made the adaptation and integration of e-administration a herculean task. The above challenges have far-reaching implications for almost all aspects of educational administration and, consequently, service delivery.

The study, therefore, recommends a proactive action no part of the management of the institutions to provide more funds to buy the equipment that will enhance the availability and coverage of internet facilities around the university, provide more computers and ICT equipment for staff and students, enhance electricity supply in the campuses and ensure timely and consistent maintenance and safety of the available ICT equipment within the campus.

Suggestions for Future Research

The study only covered two Universities in the state. Other studies can be carried out to examine the situation in other tertiary educational institutions in the state.

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Conflict of Interest

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