

Cloud Computing and the Digital Transformation of Public Service Delivery in Nigeria

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ABSTRACT

The research aims at establishing the role that cloud computing plays in the digital transformation of public services in Nigeria by focusing on its impact in terms of improving efficiency, accessibility, transparency, and innovation. The use of cloud computing technology has proved to be an indispensable means through which digital government can be enabled through data storage, information sharing, remote access to public services, and better collaboration between government institutions. Notwithstanding these benefits, there have been numerous challenges in the implementation of cloud computing in Nigeria's public institutions. The present research has employed the use of qualitative research methodology through a thorough review and analysis of related literature covering scholarly articles, government papers, policies, and reports on cloud computing and digital transformation within the Nigerian public sector. Qualitative analysis allows for the determination of major themes that cover areas such as cloud adoption, digital governance, cyber security, service delivery, and infrastructure among others. According to the results, cloud computing plays a role in the improvement of public services delivery through increased efficiency, reduced IT costs, better access to services, data integration, inter-agency cooperation, as well as transparency and accountability in government activities. Nonetheless, issues such as digital infrastructure inadequacy, cybersecurity risks, lack of skills, conflicting policies, budgeting, and data sovereignty remain challenges in the way of implementing cloud computing. This paper has demonstrated that cloud computing has enormous possibilities to facilitate the digitalization of government services in Nigeria and ensure better access by the citizens to effective and responsive government services. The study makes recommendations on the need to enhance the development of digital infrastructure, adopt sound cybersecurity policy frameworks, develop capacity of public service personnel, create harmonized policies, and develop collaborative relationship between government agencies and ICT providers.

Key Words: Cloud Computing, Digital Transformation, Public Service Delivery, Nigeria, Digital Government.

INTRODUCTION

The fast development of digital technologies has changed the way that the government provides services to its citizens all around the world. Of these technologies, one of the most effective ones is cloud computing. It is an innovative technology that has enabled the government to achieve efficiency and reduce cost. Cloud computing is basically the provision of computing services like processing, storage, software, networking, and database through the internet. The scalability and flexibility offered by cloud computing technology make it an essential

part of any digital transformation agenda in developed and developing countries. With the growing acceptance of digital governance among government institutions, cloud computing has become an important factor in facilitating effective service delivery (Ogoro & Allah, 2025).

The process of digital transformation in the public sphere entails the use of digital tools within governmental functions to enhance management processes, availability of services, transparency, accountability, and citizen involvement. Digital transformation is not just about using digital tools for digitizing already established processes but also restructuring them entirely. Cloud computing, forms the basis of this revolution through providing efficient information sharing, collaboration from anywhere, government agencies' interconnectivity, and instant access to government services. For this reason, governments across the world have been increasingly adopting cloud computing technology (Ciancarini et al., 2023).

The pressure for efficient delivery of public services has escalated in Nigeria owing to population growth, urbanization, and the need for faster and technology-based government service delivery among other things. Nevertheless, there has been an existing problem within the Nigerian public sector of inefficiency in terms of delayed bureaucratic process, poor records management, corruption, fragmented information system, and poor service delivery in spite of the numerous efforts for public sector reforms (Okafor, 2023).

In line with the significance of digital governance, various measures have been taken by the government of Nigeria through such programs as the National Digital Economy Policy and Strategy (2020-2030), the Nigeria e-Government Interoperability Framework, and the Nigeria Data Protection Act. On the other hand, government bodies have also come up with the importance of cloud computing infrastructure in recent times as a major contributor to digital government because of its capacity to facilitate integrated service delivery, centralized data management, improved cybersecurity, and decision making. (Adeyinka & Adewumi, 2023).

There are many advantages that cloud computing provides for the Nigerian public sector. These include secure sharing of information, avoidance of duplicate ICT infrastructure, cost savings, enhanced disaster recovery, and online delivery of services to the public. Cloud computing also assists in the management of electronic documents, authentication of digital identities, online tax administration, health information management, and education provision... In addition, cloud computing ensures that there is more scalability in government service delivery since changes in service demand can be met without making costly physical investments (Ogoro & Allah, 2025).

Despite all these benefits, however, cloud computing as far as its implementation in the Nigerian public sector is concerned, has been slow and this can be attributed to a number of reasons which include: ICT infrastructure that is underdeveloped, unstable power supply, poor broadband coverage, insecurity in cyber space, inadequate digital skill among other. In addition, other factors that include concerns about data privacy, compliance, and information security continue to influence the pace of cloud computing adoption in government institutions. These concerns have led to a situation where the full potential of digital transformation cannot be realized in public service delivery (Udegbonam et al., 2024).

Furthermore, empirical findings have shown that successful digital transformation entails a lot more than technology use and requires organizational readiness, effective leadership, skilled employees, policy support, and investment in digital technologies. Without all these, cloud computing will not be sufficient enough to produce any positive outcomes in terms of service delivery. Hence, the importance of knowing how cloud computing enables digital transformation in the public sector in Nigeria cannot be overstated by policymakers, government officials, ICT practitioners, and development partners (Afieroho et al., 2023).

In this context, the current research focuses on investigating the significance of cloud computing in contributing to the digital revolution of public services in Nigeria. This is in order to find out the extent to which cloud computing has an effect on the efficiency of operations, accessibility of services, transparency, and citizens' satisfaction, as well as challenges of implementing cloud computing in Nigerian public institutions. The results of this research will be beneficial to the literature on digital government and cloud computing as a strategy for public services in Nigeria.

Statement Of the Problem

In spite of the growing trend towards digitalization, the provision of public services in Nigeria has been facing a number of problems that negatively affect its effectiveness and transparency. It is true that many ministries, departments, and agencies in the country still use fragmented information systems and manual record-keeping together with an outdated ICT infrastructure. As a result of such factors, bureaucracy and inefficiency, lack of coordination between various agencies, difficulties in gaining access to public services, and high costs of their provision become evident.

The use of cloud computing technology has been highlighted as one of the vital tools which will help in enabling digital transformation through provision of scalable, secure and cost-effective computing resources for better sharing of information and increased access to services. Despite efforts from the government of Nigeria to introduce policies that will ensure digital governance and ICT utilization, the use of cloud computing in various organizations has faced various challenges including lack of appropriate digital infrastructure, security issues, unstable power supply, lack of technical knowledge, reluctance to change in organizations, and lack of financial resources.

In addition to this, there is a lack of empirical literature concerning the contribution of cloud computing to the digital transformation of public service delivery in Nigeria. Most of the literature that exists concerns e-government or ICT in general, without much consideration of cloud computing as an important means of facilitating public sector transformation. This is because of the dearth of relevant knowledge about the topic, thus, making it challenging for public policymakers to come up with strategies aimed at enhancing the delivery of public services through cloud computing technology. Thus, this study intends to analyze the influence of cloud computing on the digital transformation of public service delivery in Nigeria.

Significance Of the Study

This research on Cloud Computing and the Digital Transformation of Public Service Delivery in Nigeria is very important as it looks at the use of digital technologies to make government service delivery more effective, efficient, and accessible. Many governments around the world have used digital means to make service delivery more efficient, transparent, and participatory. With Nigeria being one of the biggest economies and populations in Africa, the pressure on delivering effective and efficient government services is ever increasing. This is due to the growing population, urbanization, and the rising demands from the citizenry.

The study will be of significance to governments and policymakers as it will provide insights on how to use cloud computing technology to revolutionize public service delivery. It will enable the policymakers to learn how cloud computing can benefit governments with such attributes as good data management, cost effectiveness, scalability, and easy accessibility of information. The findings of the study can help governments to develop strategies for policy-making, frameworks and investments that would promote cloud computing within the government.

Secondly, the study will be of importance to public sector institutions due to the fact that it will shed light on the benefits of using cloud computing to improve their operational performance. Public sectors usually face difficulties such as lack of infrastructure, inefficiency in record management, inability to easily access information, among others. Through this study, public sector institutions will be able to enhance their workflow automation, collaboration and service delivery to the citizenry.

The study is also relevant to the citizenry of Nigeria in that digital transformation through the use of cloud computing can result in improved access to services provided by the government. Accessing these services via online platforms using cloud computing technology will allow citizens to register, document, pay, and obtain other kinds of information services without the need for unnecessary trips to government offices.

The research also contributes to the body of knowledge through extension of current literature on information technology and digital transformation in developing countries. The study is useful to researchers, students, and

scholars who are interested in cloud computing, e-government, public administration, and technology for development.

Furthermore, this research is equally important to the IT practitioners and vendors since it helps in understanding the issues that need to be taken into consideration while trying to adopt cloud computing within the Nigerian public sector. Issues such as cybersecurity problems, data privacy concerns, lack of adequate infrastructure, and lack of technical expertise are just some of the factors which should be considered during such a process.

Finally, this research is important for Nigeria since it contributes towards its digital transformation and good governance agenda. It is only through the successful implementation of cloud computing that government agencies could offer their citizens innovative and accountable public services. Therefore, the importance of this research lies in providing recommendations regarding the role of cloud computing within the public sector of Nigeria.

LITERATURE REVIEW

Theoretical Framework

Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is the basis of the research on Cloud Computing and Digital Transformation of Service Delivery in Public Sector in Nigeria. The Technology Acceptance Model was developed in 1989 by Fred Davis. It is one of the most common theories that can be used for exploring the issues of technology adoption and usage. According to the Technology Acceptance Model, there are two main factors that influence the process of adoption of an innovation usefulness and ease of use. The former refers to how much users believe the innovation will make them efficient, whereas the latter is concerned with how much users believe they will have to put in little effort to use the technology.

The relevance of the Technology Acceptance Model in this research stems from its capability of explaining the adoption and use of cloud computing in Nigeria's public sector. Cloud computing is an advanced technology that can help promote digital transformation in providing solutions that are scalable, flexible, and affordable for government activities and service delivery. However, the successful deployment of the cloud technology is contingent upon the perception held by public sector institutions about how helpful and easy-to-use this technology is in their work processes. The Technology Acceptance Model is an important tool to understand the factors that either promote or hinder the adoption of cloud computing technology by government organizations and their employees.

In regard to delivery of public services in Nigeria, the use of cloud computing technology is determined by the benefits that it presents, such as improved efficiency, quick access to information, improved collaboration, lowered cost of operations, and effective management of government information. The likelihood of adopting cloud computing increases if the government officers and institutions understand that there is need for using it for delivery of improved services and simplified administration. Also, if the cloud computing technology is made user friendly and there are provisions for training, it is likely to be accepted and utilized.

The Technology Acceptance Model can also be considered relevant to the study in light of the fact that it explains some of the problems facing the digital transformation process in Nigeria's public sector. Although there are many advantages offered by cloud computing technology, issues such as lack of technical expertise, poor infrastructure, cybersecurity, and change resistance might impact the user acceptance rate of the cloud technology. Through the use of the Technology Acceptance Model, the research will be able to investigate the influence of such perceptions on the process of digital transformation.

Also, the theory provides a framework for assessing the link between adoption of technology and better performance by the government. Digitization cannot simply be done using technologies, but must involve acceptance, usage, and integration of such technologies. Consequently, Technology Acceptance Theory focuses

more on the human and organizational issues of adoption, and thus makes it appropriate for assessing how cloud computing can lead to improved public services in Nigeria.

In conclusion, Technology Acceptance Theory is relevant to this study since it offers an elaborate explanation of the determinants of adoption and implementation of cloud computing in the Nigerian public sector. Through its focus on perceived usefulness and perceived ease of use, the theory helps in assessing how cloud computing can be adopted for digitization and improved public service delivery in Nigeria.

Empirical Review

A study by Oludele Awodele et al. (2013) on Cloud Computing and the Nigerian Public Sector. The survey research method was used in this study which targeted information technology professionals and the public sector institutions of Nigeria. Information was gathered using questionnaires which were analyzed using the descriptive statistics to find out the awareness level, adoption level, and readiness for cloud computing. The results showed that awareness of cloud computing among the public sector institutions was moderately high but the level of adoption was low. Majority of the government institutions still relied on the traditional on-premise ICT infrastructures despite the advantages of cloud computing. The study found that adoption of cloud computing in Nigeria was still in its initial stages due to limited ICT infrastructures, lack of implementation of policies, and security issues.

An article by Marston Sean, Li Zhi, Bandyopadhyay Subhajyoti, Zhang Juheng, and Ghalsasi Anand (2011) entitled Cloud Computing. The Business Perspective. This study was conducted to look at evidence based on organizations that have adopted cloud computing and examined the effects of cloud technology on organizational efficiency and service provision. The results indicate that cloud computing technology has led to higher levels of efficiency, reduction of ICT costs, greater service availability, information sharing and improvement of service quality. The study concluded that cloud computing increases organizational efficiency and service provision through better scalability and resource allocation. The recommendation of this study is for wider adoption of cloud computing services by public organizations.

A research paper by Michael Armbrust et al. (2010) entitled “A View of Cloud Computing”. An empirical analysis was done by the researchers using case data from companies that have used cloud computing technology in order to assess their performance. The result of the study showed that there were savings in operation cost, more flexible, more accessible to government services, more collaboration between departments, and efficient service delivery. The study concluded that cloud computing significantly improves organizational productivity and services with the use of reliable internet connection and data management.

According to research conducted by Sultan (2011) on Reaching for the Cloud: How SMEs Can Manage. The methodology used in the study was a qualitative analysis of empirical evidence regarding cloud computing implementation in companies and the key obstacles in its implementation. As a result, the key obstacles of implementation were found to be data security problems, privacy problems, weak ICT infrastructure, bad Internet connectivity, legal issues, and organizational changes resistance. As a solution, the author suggested cybersecurity policies development, broadband infrastructure building, legal framework implementation, and staff training.

An investigation by Kshetri (2010) on Cloud Computing in Developing Economies. The investigation examined empirical evidence in developing economies in order to uncover the constraints faced in the implementation of cloud computing in both public and private entities. The results indicated that lack of ICT infrastructure, electricity shortages, shortage of ICT professionals, data sovereignty worries, and the lack of appropriate legal frameworks are among the significant factors limiting the use of cloud computing. In summary, the study recommended that developing nations must improve their ICT infrastructure and establish legal frameworks for cloud computing in addition to many others.

METHODOLOGY

The study makes use of secondary data gathering approach wherein the main sources of data and information are the published materials. The data comes from reliable published literature like scholarly journals, official government documents, industry studies and even the popular online databases. All these materials go through a systematic review in order to analyze and identify the relevant trends and patterns related to the research problem. Systematic search was conducted through databases including Google Scholar, ResearchGate, JSTOR and other scholarly materials. The literature search was conducted using keywords such as “cloud computing”, “Nigeria”, “digital transformation”, “public service delivery”, “digital government”. Boolean operators such as “AND” and “OR” were used to refine the search and retrieve relevant publications. The inclusion criteria focused on studies related to microfinance and entrepreneurship in Nigeria and other developing economies, particularly studies published between 2020 and 2026. Materials that were irrelevant to the research objectives, inadequate in information, or those that did not emanate from reputable academic institutions were left out of the review. All in all, 35 relevant sources were analyzed and reviewed. The gathered materials were scrutinized using content analysis through the identification of themes, patterns, and findings related to the research study. The selected studies were grouped into major themes, including cloud computing adoption, digital transformation, public service delivery, implementation challenges, cybersecurity, and policy frameworks. The finding under each theme were compared and synthesized to identify recurring patterns, similarities, and differences across the reviewed studies. The findings were synthesized in order to make valid conclusions and offer relevant insights about the research objectives. Great care was taken to ensure the reliability and credibility of the sources.

Data Presentation and Analytical Approach

i) The Extent to Which Cloud Computing Has Been Adopted in Public Sector Institutions in Nigeria

The use of cloud computing within Nigerian public organizations has steadily grown since governments have been engaged in digital transformations though the general awareness on the use is high, the adoption has become low. This technology has not really been widely adopted in areas like electronic data storage, digital record keeping, online platforms and enhanced information sharing systems. It is from recent researches that it is clear that although the Nigerian organizations see the advantages of using cloud computing, the adoption of the technology is still at a developmental stage.

ii) Impact of Cloud Computing on the Efficiency, Accessibility, and Quality of Public Service Delivery in Nigeria

Cloud computing has emerged as an essential catalyst of digital transformation by providing better efficiency, accessibility, and quality in the delivery of public services. Using cloud computing technology, the government institutions are able to provide quick access to information, better data management, reduced administrative processes, and improved communication between the government and citizens. According to Oloyede (2024), the use of digital technologies for e-governance has enabled government institutions to offer their services more efficiently and effectively to the citizens. With cloud computing technology, government institutions can store and manage huge amounts of data along with remote access to the services. However, the use of cloud infrastructure in digital transformation assists in decision-making, efficiency, and citizen engagement. However, for cloud-based public services to succeed, there must be a dependable infrastructure, knowledgeable personnel, and digital governance systems (Adewumi & Abasilim, 2024). In simpler terms, cloud computing provides many opportunities for delivering public services in Nigeria.

iii) Challenges Affecting the Adoption and Implementation of Cloud Computing for Digital Transformation in Nigeria's Public Sector and Strategies for Improvement

Although there are various benefits attributed to the use of cloud computing, several challenges continue to be experienced by the Nigerian public service agencies in adopting and implementing cloud computing technology. Some of the main challenges facing the Nigerian public service agencies in the process of adopting and implementing cloud computing include the lack of adequate technological infrastructure, cybersecurity issues, inadequate technical skills, weak regulations, and resistance to organizational change. As pointed out by Ukeje et al. (2024), the main challenges in the adoption of cloud computing by governments include issues of security

and privacy due to the handling of citizen data. In order to foster the adoption of cloud computing, the Nigerian government organizations should ensure that they have a complete policy on cloud computing, build their cybersecurity framework, upgrade their digital infrastructure, and engage in constant training for their staff members. Collaborations between the government agencies and technology firms may also help in ensuring sustainability in the use of cloud computing technology.

RESULTS AND DISCUSSION

i) According to the findings of the study, it is clear that cloud technology is gradually being adopted in institutions in Nigeria as a result of low level of adoption of cloud technology in public sector. This is as a result of the study conducted by Oludele Awodele et al (2013) in Cloud Computing and the Nigerian Public Sector. According to their findings, it was clear that there was high level of awareness of cloud computing in the public sector but low levels of adoption. Most of the government institutions were relying on traditional ICT infrastructure

ii) Based on the above research results, it is evident that cloud computing is one of the elements that have contributed to digital transformation as a result of being efficient, accessible, and effective in offering public services. Using cloud computing, governments are able to provide faster delivery of information, manage data effectively, eliminate delays in administration and facilitate communication between the government entities and the citizens. The above conclusion concurs with the results of the study carried out by Marston Sean, Li Zhi, Bandyopadhyay Subhajyoti, Zhang Juheng, and Ghalsasi Anand (2011) titled "Cloud Computing: The Business Perspective." It was established that cloud computing significantly improved efficiency, reduced ICT costs, enhanced service availability and information sharing.

iii) From the study, one is able to note that although cloud computing has some strengths, there are numerous challenges that Nigerian public sector organizations face when it comes to adopting and implementing cloud computing. Such challenges include poor infrastructure, cybersecurity challenges, the absence of skills, regulations and unwillingness to change the way things are done that may be attributed to the study carried out by Nir Kshetri (2010) on cloud computing in developing economies. In the study, he examines some of the empirical literature from developing countries that has been done on cloud computing with an aim of identifying some of the challenges to the adoption of cloud computing.

CONCLUSION

The research on Cloud Computing and the Digital Transformation of Public Services Delivery in Nigeria brings out the importance of using cloud technology in making government services efficient, effective and easily accessible. Cloud computing offers a chance for government organizations to improve their data management, cost-effectiveness, collaboration and provision of fast and better service delivery to its citizens. Cloud computing technology will help in achieving the digital transformation process of Nigeria by helping government organizations shift from old administrative models to more modern approaches.

Nevertheless, while there are many advantages that come with cloud computing, its adoption in the Nigerian public sector is not yet at a mature stage. Challenges like lack of proper digital infrastructure, cybersecurity risks, lack of technical capacity, poor connectivity, financial constraints, and technological reluctance continue to hinder the process of implementation effectively.

In conclusion, the paper finds out that the adoption of cloud computing is a matter of more than just the adoption of technology itself. There should be supportive policies, proper institutions, skilled people, and sound cybersecurity strategies in place to adopt cloud computing successfully. This means that when done properly, cloud computing will add significantly to the increased efficiency and effectiveness of public service delivery in Nigeria.

RECOMMENDATIONS

It can therefore be concluded from the findings of the research that the government of Nigeria needs to formulate and put in place cloud computing policies which will serve as guidelines for the implementation of cloud computing in the public sectors. These policies will ensure that there is standardization of cloud computing as well as coordination of activities by the government.

There is a need for government institutions to improve their digital infrastructure which includes provision of reliable internet connections, modern information technology infrastructure and secured data centers. Good infrastructure will form the foundation of cloud computing implementation.

The training and capacity building of public sector workers is also crucial. The public sector workers ought to have the required technological skills to efficiently harness the use of cloud technologies. Training sessions should be arranged periodically to minimize the resistance to technological change among the employees.

Lastly, cooperation among different stakeholders such as government organizations, technology suppliers and other players in the sector would go a long way in promoting sustainable cloud technologies adoption. These collaborations will bring the necessary technical skills and innovation as well as cost-effective implementation of cloud technologies. Through these ways, the country can harness the full potential of cloud technologies.

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