Impact of Technological Factor on Cloud Computing adoption for Electoral Data Management in Nigeria; a mediating effect of Environmental factor

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Abstract. This study was carried out to ascertain the impact of technological factor on the adoption of cloud computing for electoral data management in Nigeria with consideration to the mediating impact of environmental factors. This study adopted inferential research design Three important stakeholders were engaged as target participants which included members of the general public who are of voting age (18 years and above), members of civil society organizations (CSOs) engaged in election monitoring; and INEC personnel. The study's data collection was through questionnaire and then analysed with the Structural equation model (SEM) AMOS of the SPSS. The results revealed that Technological factors significantly and positively affect cloud-based computing adoption in Nigeria electoral system, and that environmental factor partially, positively and significantly mediate in the relationship between Technological factors and cloud-based computing adoption in Nigeria electoral system, it was then concluded, among others, that an increase in the technological factors of cloud computing such as security, privacy, reliability and desirability would result to significant increase in the chances of adoption of the cloud computing technology, it was therefore recommended among others, that cloud computing service provider should ensure the security, reliability and desirability values of their services are maintained and constantly improved as such would increase the chances of government agencies like INEC demanding and adopting their services.

Keywords: Technological, Environmental factors, adoption, cloud computing

1 Introduction

The Independent National Electoral Commission (INEC) of Nigeria has been tasked with the primary responsibility of holding free and fair elections. So, the commission must use internationally known best practices such as the deployment of suitable data collecting, storage and dissemination technology. The commission is allowed to use any technology it deems necessary to carry out its core mandate of organizing free, fair, and credible elections in order to guarantee the long-term stability of Nigeria's democracy [1].

Therefore, it is critically crucial that cloud computing infrastructure be considered if INEC is to play a critical role in re-establishing trust in the Nigeria electoral system and in the Nigeria, government following the events of previous elections, and if elections are to be free, fair, and credible in accordance with globally accepted best practices. Thus, INEC must seek to prioritize the use of a comprehensive, secured, inclusive and transparent technology in the voting, collation, and transmission of election results as well as assertive communication to the general public on the use of this technology for voting, collation and transmission of results. To suggest a solution to this concern, this research study examine possibility of solving this problem by assessing the possible impacts of technological factors on the adoption of the cloud computing system in the Nigeria electoral system and the possible mediating impact of environmental factors.

2 Conceptual Frameworks

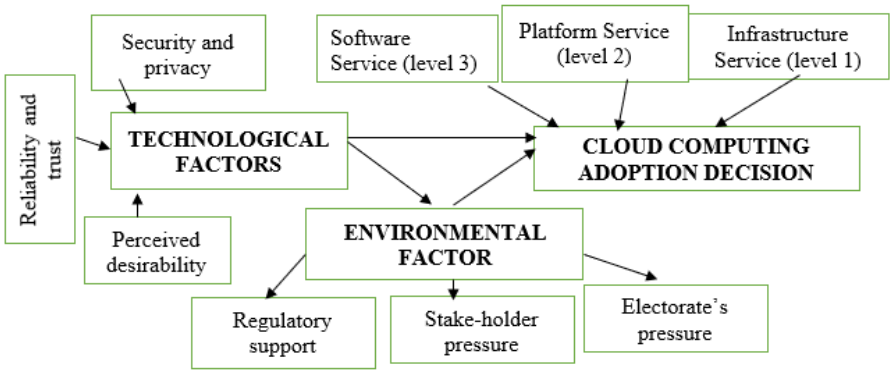

Fig. 1. Conceptual framework of the relationship between technological factor and cloud computing adoption with mediating impact of environmental factor

3 Methodology

This study adopted inferential research design which involves investigating cause-and-effect relationships. This involve determining the relationship between two variables in the case of this study we are concerned with assessing the impact of technological factors on cloud computing adoption and also to determine whether environmental factor mediate between impacts of technological factors on cloud computing adoption.

Three important stakeholders were engaged as target participants. (1) members of the public; the main criterion for selection was nationality (Nigerian) and age (voting age of 18 years and above) (2) members of civil society organizations (CSOs) engaged in election monitoring; and (3) INEC personnel. As a result, the study's data collection was confined to the capital Abuja. The homogeneous sampling method was used to identify individuals with common traits or a collection of shared features. In total, 600 respondents were sampled and used in the survey, and the stakeholder breakdown is as

follows: 300 individuals & households (electorate), 150 INEC employees and 150 CSO.

Questionnaire was used as research instrument and it contain two different section, section one contains questions on social demographical variables of the respondents while section two contain questions on technological factors, environmental factors and adoption of cloud computing. The questionnaire is self-administered and was completed by the respondents independently. The questionnaire has a variety of questions that were evaluated using 5 points Likert scale. The questionnaire is intended to gather data from three stakeholders sampled which included general population, civil society organizations, and INEC personnel.

The Structural equation model (SEM) AMOS of the SPSS was used for data analysis. Explanatory factor analysis was used to ascertain the number of latent variables. Confirmatory factor analysis was conducted to confirm the measurement model which involves the reliability and validity test while structural model was used to test the relationship between the model variables.

4 Results

CMIN/df	GFI	AGF	CFI	TLI	RMSEA	RMR
3.16	0.941	0.912	0.962	0.951	0.063	0.033
Good	Good	Good	Good	Good	Good	Good

Table 1. Model Fit Parameters

Group (levels)	*Construct*	*Path Coefficient*	*P value*	*Effect Size*	*Conclusion*
Level1: (IAAS)	TF	0.133	0.002	0.0016	Positive, Weak and Significant Impact
Level2: (PAAS)	TF	0.377	0.000	0.375	Positive, Strong and Significant Impact
Level3: (SAAS)	TF	0.391	0.000	0.215	Positive, Moderate and Significant Impact

$P < 0.05$ is significant and $p>0.05$ is insignificant.

Table 2. SEM, AMOS output after bootstrapping considering different cloud computing adoption level and the technological factor constructs

- H1: Technological factors significantly and positively affect the decision to adopt cloud-based computing in Nigeria electoral system:

This hypothesis is segregated into three sub-sections to capture the three level of cloud computing adoption and they are stated as follow:

- H1a: Technological factors significantly and positively affect cloud-based computing adoption level 1 in Nigeria electoral system

- H1b: Technological factors significantly and positively affect cloud-based computing adoption level 2 in Nigeria electoral system
- H1c: Technological factors significantly and positively affect cloud-based computing adoption level 3 in Nigeria electoral system

From Table 4 it is observed that at level one, the relationship between technological factor and cloud computing adoption is positive, with path coefficient of 0.133, weak with effect size 0.0016 (less than 0.15) and significant with p-value of 0.002 less than 0.05, thus the alternate hypothesis is accepted which stated that technological factors positively and significantly affect the adoption of first level cloud computing system into Nigeria electoral system. At level 2, it was observed from Table 4 that the relationship between technological factor and adoption of second level cloud computing is positive, with path coefficient of 0.377, strong, with effect size 0.375 (greater than 0.55) and significant with p-value of 0.000 less than 0.05, thus the alternate hypothesis is accepted which stated that technological factors positively and significantly affect the adoption of second level cloud computing system into Nigeria electoral system. At level 3, it was observed from Table 4 that the relationship between technological factor and adoption of third level cloud computing is positive, with path coefficient of 0.391, moderate, with effect size of 0.215 (less than 0.35 but greater than 0.15) and significant, with p-value of 0.000 less than 0.05, thus the alternate hypothesis is accepted which stated that technological factors positively and significantly affect the adoption of third level cloud computing system into Nigeria electoral system.

Hypothesis	*Relation*	*Path weight*	*p-value*	*Conclusion*
H2	TF → CCADecision	0.384	0.000	Positive and significant
	TF → EF → CCADecision	0.065	0.000	Partial mediation effect

$P < 0.05$ is significant and $p>0.05$ is insignificant.

Table 3. path weights and significance levels for the mediating effect

- H2: Environmental factor significantly mediate in the relationship between technological factor and cloud computing adoption in Nigeria electoral data maangement

The second hypothesis as shown in Table 5 revealed that the direct relationship between technological factor and cloud computing adoption is positive with path weight estimate of 0.384 and significant with p-value of 0.000 (less than 0.05) and the indirect relationship between technological factor and cloud computing adoption with mediating effect of environmental factor is also positive and significant with path weight estimate value of 0.065 and p-value of 0.000. Thus, this result implies that the environmental factor played a partial mediating role in the relationship between technological factor and cloud computing adoption, therefore alternate hypothesis is accepted which states that environmental factor has a significant but partial mediating impact on the relationship between technological factor and cloud computing adoption in Nigerian electoral system

5 Conclusion and recommendation

Based on the results and finding of this study, the following conclusion were drowned; one, It was concluded that the INEC official, CSOs and electorate agree that cloud computing technology is secured, reliable and suitable for INEC adoption for data management because they believe it is the solution to the problem of election data manipulation and rigging common experience in Nigeria elections. It was recommended that cloud computing service provider should ensure that the security; reliability and desirability values of their services are maintained and constantly improved as such would increase the chances of government agencies like INEC to demand and adopt their services.

References.

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