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Impact of Technological Models on Agricultural Educators' Adoption of Innovative Tools in North-Central Nigeria.

[1]Onoriode, O., [2]Ukonze, J. A. & [3]Ifeanyieze, F. O.

[1]Department of Agricultural Education, Joseph Sarwuan Tarka University, Makurdi,
[2 & 3] Department of Agricultural Education, University of Nigeria Nsukka.

Corresponding Author: Onoriode, O. (onoriodeovie16@gmail.com)

Abstract

This study investigates the influence of technological theoretical models on agricultural educators' (AEs) use of innovative educational technology tools in promoting agricultural education in North-Central Nigeria. The rapid integration of digital tools such as mobile applications, virtual learning systems, and online extension platforms has created new opportunities for enhancing the quality of agricultural instruction. However, the extent to which AEs adopt and effectively utilize these technologies remains dependent on key theoretical determinants. Grounded in the Technology Acceptance Model (TAM) and the Diffusion of Innovation Theory, the study examines perceived usefulness, perceived ease of use, compatibility, and trialability as predictors of AEs' utilization of educational technological tools. The study was directed by five specific objectives, addressed five research questions, and tested three hypotheses. A correlational research design was employed, involving lecturers of agriculture from universities and the College of Education in North Central. Census sampling techniques were employed for the study. The study population consists of 73 lecturers of agricultural education in North Central. A structured 82-item questionnaire titled Technological Models Questionnaire (TAQ)" was developed by the researchers and validated by three subject matter experts. A pilot test was administered to determine reliability using the Cronbach alpha techniques, yielding a coefficient of 0.87. The data for the study were collected and analyzed using mean, correlation, and regression statistics. The findings revealed a moderate level of technology acceptance among AEs and low practical utilization. The study recommended that capacity building in digital technology and continuous professional development should be organized for AEs.

Keywords: Technological Models, Agricultural Educators' adoption, and Innovative tools

Introduction

The advent of digital technology in agricultural education has made teaching and learning of agriculture effective, fascinating, and engaging. In response to this, the federal government of Nigeria has introduced innovative digital courses, including artificial intelligence, robotics, coding, and digital entrepreneurship into the national schools' curriculum (Ononye 2025).

Digital innovation remains a critical driver of improvement in agricultural education. Innovation, in the view of Civan and Kerem (2023), is a process of changes and improvements that is aimed at making a product or service better. Hernández (2025) opined that innovation in agriculture involves the introduction of new ideas, practices, or products that enhance agricultural processes. Adams (2023) investigates that innovation in agricultural education refers to the process of developing new ideas, products, or improving existing ones to make the teaching and learning effective. In the context of this study, Innovation in agricultural education refers to the introduction of technological tools in the classroom to enhance teaching

and learning. Navas-Bonilla et al. (2025) submitted that innovative tools in agricultural education and their applications include mobile devices, interactive applications, and augmented reality. Hutchinson (2023) states that innovative tools include electronic devices or digital means, such as laptops, desktop computers, mobile phones, and VR headsets.

Technological tools enhance the teaching of Agricultural Education. Amonjenu et al (2023) define Agricultural Education as a specialized form of vocational education that focuses on equipping learners with the necessary competencies (knowledge, skills, and attitudes) in all aspects of agricultural production, as well as effective methods for teaching agriculture at various educational levels. Pal (2025) highlighted that technology in agricultural education enhances personalized learning**,** promotes learning opportunities, and improves teaching productivity, among others. United Nations Educational, Scientific, and Cultural Organization Educational Report (UNESCO,2023) stated that technology in agriculture improves instruction by addressing learning gaps, increasing opportunities, strengthening effective interaction, and fostering collaboration. Vijnatham (2024) submitted that innovative tools enhance learning experiences, better engagement, personalized instruction, and promote a deeper understanding of concepts. Mustapha and Manu (2018) noted that most of these innovative tools and their packages have not been adequately adopted and utilized due to technological competencies, poor internet connectivity, and electricity power supply.

Adoption of technological tools in agricultural education depends on usage skills and competencies. Adoption, in the opinion of Villanueva (2023), is the practice of introducing new varieties, cultivation systems, or technologies into an agricultural education programme. In the opinion of the Diffusion Research Institution (2024)**,** the Adoption of innovative tools in agricultural education is a detailed process or series of stages that an agricultural educator undergoes from first hearing about a product to finally adopting it. Masi et al. (2022) stressed that the adoption of innovative tools in agricultural education boosts the transition of skills, knowledge, and competences. In the context of this study, the adoption of innovative tools involves making a conscious effort to use technological tools such as laptops, desktop computers, smart mobile phones/boards, VR headsets, and their packages in virtual teaching.

Technological tools aid knowledge sharing in agricultural education. Miller (2024) opined that technology involves the use of computers and other smart technologies to manage, process, and disseminate information. Technology theory explains the relationship between technology and human interaction. Technology Theory, according to Spacey (2024), is patterns, trends, methods, and principles that can be used to explain technology adoption. According to Martins (2001), technological theory explains how technology is shaped by a range of social factors and the process of technological development to serve desirable social goals. Technological theories such as the Technology Acceptance Model (TAM) and Diffusion of Innovation Theory (DOI) provide frameworks for understanding how some educators utilize technology while others resist its use. The Technology Acceptance Model (TAM, Davis, F.D, 1989) pinpoint factors that influence the acceptance and use of technology, such as smart boards, e-learning platforms, multimedia instructional systems, mobile advisory applications, and virtual demonstration tools, among AEs. The two major determinants of technologies, according to Davis (1989), are perceived usefulness (PU) and perceived ease of use (PEOU). These explain how an agricultural educator comes to accept and effectively utilize digital tools. The perceived usefulness (PU), according to Burgess and Worthington (2021), is the degree to which an agricultural educator believes that using a particular technology would be beneficial. Kummar (2024) noted that when there is usefulness of technology, there is a higher chance of adopting particular technology. Mustapha and Manu (2018) opined that the skilled poses by agricultural educators aid the utilization of ICT in teaching and learning of agricultural science. While the perceived ease of use (PEOU), in the view of Abraham (2025), is the degree to which a person believes that using a particular system would be free of effort. The perceived ease of use (PEOU) reflects the extent to which agricultural educators believe that engaging with digital tools requires minimal effort. This is confirmed by Bashir et al (2022) that perceived usefulness partially mediates the relationship between subjective norms, image, efficiency, satisfaction, and intention to use digital. TAM emphasizes the willingness of agricultural educators to adopt online learning tools such as smart boards, e-learning platforms, multimedia instructional systems, mobile advisory applications, and virtual demonstration tools.

The Diffusion of Innovation Theory (DOI) (Rogers, 1963) explains how new ideas, practices, or technologies spread among Agricultural educators. The theory identifies the factors that influence the decision of an Agricultural educator to adopt or reject an innovation. According to Rogers, adoption is a process that moves through specific stages such as knowledge, persuasion, decision, implementation, and confirmation. This step-wise progression helps to explain how agricultural educators learn about digital innovations, evaluate them, experiment with them, and eventually integrate them into their routine extension activities. Abraham (2025) pointed out that DOI emphasized five major attributes of innovations that determine the rate and likelihood of adoption: relative advantage, compatibility, complexity, trialability, and observability. According to Williams et al. (2024), compatibility, trialability, and relative advantage have a strong influence on the adoption of innovative tools in learning. University of Oklahoma Report (2021), submitted that DOI also categorizes users into adopter groups such as innovators, early adopters, early majority, late majority, and laggards based on their willingness to try innovations. In the context of this study, AEs in urban areas with higher digital exposure may serve as early adopters, championing the use of online tools, while those in rural or resource-constrained areas may fall into the late-majority or laggard category due to limited access to digital tools or lower digital literacy.

The Diffusion Innovation Theory provides a framework for understanding how agricultural educators progress from awareness to full use of online learning tools. It explains why some agricultural educator readily embrace digital training tools while others hesitate, based on their perceptions of the innovation's advantage, compatibility, and complexity. Moreover, the theory highlights how environmental factors, such as infrastructural limitations, organizational support, socio-economic differences, and cultural attitudes, shape the adoption behavior of AEs in the North Central region of Nigeria. Across the globe, Technology has made a wide range of informal learning opportunities accessible. UNESCO Educational Report (2023) states that higher education is the subsector with the highest rate of digital technology adoption, with online management platforms replacing physical classrooms. Agricultural educators in North Central cannot be alienated from this global digital transformation initiative. Hence, integrating them into this global agricultural sector trend is necessary. Therefore, the study aimed to examine the impact of technological models on AEs' adoption of innovative tools in north-central Nigeria.

Statement of the Problem

In North-Central Nigeria, the rate of insecurity has led to the adoption of large numbers of students and teachers, the closing of schools, and the shortening of the learning calendar. This requires the use of innovative teaching tools, including digital instructional systems, simulation-based learning platforms, and digital agri-tech devices. Despite the gradual increase in smartphone ownership, internet connectivity, and exposure to digital resources, many AEs still struggle to utilize technology-driven models that could promote virtual active learning and improve agricultural innovation dissemination.

Preliminary observations within agricultural education institutions in the North-Central region show that AEs often rely on traditional teaching channels such as chalk-and-board instruction, textbooks / printed materials, and sharing of lecture notes using WhatsApp, which, although useful, lack interactivity, timeliness, and alignment with contemporary digital learning needs. As a result, AEs missed the opportunities to employ technology-enabled tools such as e-learning systems, AI-powered instructional tools, mobile learning platforms, and virtual demonstration tools in their teaching practices.

Only a few AEs demonstrate competency in adopting these digital innovations, and this gap contributes to challenges such as poor innovation uptake among learners, limited exposure to modern digital tool, and slow progress toward achieving digital agriculture goals in North central, This gap underscores the urgent need for a study that examines the impact of technological models on the adoption of innovative tools by AEs adoption of technological tools in in North-Central Nigeria.

Purpose of the Study

The main purpose of this study is to determine the Impacts of Technological Models on AEs' adoption of Innovative tools in North-Central Nigeria. Specifically, the study seeks to:

1. Examine the level of AEs' acceptance of online learning devices.

2. Determine the extent to which AEs utilize innovative technological tools in teaching agricultural education.
3. Assess the relationship between perceived usefulness and AEs' use of the technological tool.
4. Determine how perceived ease of use relates to AEs 'adoption of digital instructional tools.
5. Examine how innovation attributes (trialability, compatibility, and observability) relate to utilization.

Research Questions

1. What is the level of acceptance of educational innovation devices among AEs?
2. To what extent do AEs utilize innovative technological devices in teaching?
3. How does perceived usefulness relate to AEs' use of technological devices?
4. How does perceived ease of use relate to the adoption of digital instructional tools?
5. To what extent do innovation attributes (trialability, compatibility, and observability) relate to utilization?

Research Hypotheses

1. Perceived usefulness does not significantly relate to AEs' utilization of educational innovation devices.
2. Perceived ease of use does not significantly relate to AEs' adoption of technological devices.
3. Innovation attributes (trialability, compatibility, observability) do not significantly relate to utilization.

Methodology

The study employs five purposes, answers five research questions, and tests three hypotheses at a 0.05 level of significance. A correlational research design was adopted, and the study was conducted in North Central. The target population was 73 lecturers of agricultural education in North Central Nigeria. Census sampling techniques were employed for the study. An 82-item structured questionnaire titled the Technological Models Questionnaire (TAQ) was developed by the researchers based on a review of relevant literature. The Structured questionnaire was divided into sections based on TAM and DOI variables. The *TAQ* contained polycotomous items with four response options: Strongly Agreed (SA), Averagely Agreed (AA), Slightly Agreed (SA), and Not Agreed (NA), assigned nominal values of 4, 3, 2, and 1, respectively, for research questions 1,2,3,4, and 5. The instrument was face and content validated by three experts: one from the field of computer education, one from the field of educational foundations, and another from the department of Agricultural Education, all from Joseph Sarwuan Tarka University, Makurdi, Benue State. Their feedback and corrections provided by these experts were used to improve the instrument. The validated instrument was administered to three (3) agricultural educators in Taraba state, which shares the same geographical characteristics as the study area. Its reliability coefficient was determined using Cronbach's alpha method, yielding a reliability coefficient of 0.87. The researchers and the research assistants distributed the questionnaire to respondents in their offices, ensuring it was completed on the spot. For those absent, the questionnaire was sent via Google Drive, email, and WhatsApp, allowing respondents one month to complete it. This approach ensured that only the intended participants completed the questionnaires and allowed the researchers and research assistants to clarify any points of confusion. In total, 73 copies (representing a 100% response rate) were filled and returned for analysis. The collected data were analyzed using descriptive (mean and standard deviation) and inferential statistics (correlation and multiple linear regression) at a 0.05 level of significance.

The decision rule for rejection research question was based on 2.50 for research questions 4 and 5, while the real limit of numbers was used in research questions 1, 2, and 3. i.e., 1.0- 1.49 no

acceptance/utilization, 1.50-2.49 as low acceptance/ utilization, 2.50- 3.5 as moderate/ utilization, 3.5-4.0 as high acceptance/utilization. The decision rule for hypothesis rejection was based on the p-value and alpha value. A null hypothesis was not rejected for any cluster of items where the p-value was equal to or greater than 0.05 ($p \geq 0.05$). However, it was rejected for any cluster where the p-value was less than 0.05 ($p < 0.05$).

Result Presentation

The data to answer the research and hypotheses are presented in the table below.

Research questions 1: *What is the level of acceptance of educational innovation devices among agricultural educators in North Central?*

Table 1: Mean Ratings of Agricultural Educators on the level of Acceptance of Educational Innovation Devices in North Central (N = 72: Agricultural Educators)

S/N	Item description	Mean	SD	Remark
	A. Perceived Usefulness (PU)			
1	Online learning devices improve the quality of teaching in agricultural education.	2.89	.316	Moderate acceptance
2	Using online learning tools enhances the ability to deliver practical agricultural lessons	3.14	.348	Moderate acceptance
3	Online platforms help me communicate agricultural concepts more effectively to learners	3.25	.436	Moderate acceptance
4	Online learning devices enable agricultural educator to accomplish teaching tasks more quickly.	2.83	.375	Moderate acceptance
5	Using online tools increases agricultural educator productivity.	2.89	.316	Moderate acceptance
	Perceived Ease of Use (PEOU)			
6	It is easy to learn how to use online learning devices.	2.53	.855	Moderate acceptance
7	Interacting with online learning platforms does not require much mental effort.	3.24	.428	Moderate acceptance
8	The features of online learning tools are clear and easy to understand.	3.14	.348	Moderate acceptance
9	Agricultural educator can use online teaching devices without needing assistance from others.	3.15	.362	Moderate acceptance
10	Navigating online learning tools is straightforward	3.14	.348	Moderate acceptance
	C. Attitude Toward Using Online Learning Devices			
11	Using online learning tools in teaching agricultural topics is a good idea.	2.87	.373	Moderate acceptance
12	incorporating digital tools into my teaching activities is impressive	2.85	.362	Moderate acceptance
13	Online devices make teaching more interesting.	3.14	.348	Moderate acceptance
14	It is impressive positive about switching from traditional methods to online-supported learning.	3.15	.362	Moderate acceptance
	D. Behavioral Intention to Use Online Learning Devices			
15	Agricultural educator use online learning tools more frequently in my teaching.	2.81	.597	Moderate acceptance

16	I plan to integrate online platforms into my agricultural instruction in the future	3.00	.000	Moderate acceptance
17	I am willing to learn new digital tools to improve my teaching performance.	3.25	.436	Moderate acceptance
18	I expect to rely on online learning devices for future professional tasks.	2.75	.436	Moderate acceptance
	E. Facilitating Conditions			
19	Agricultural educator have access to the necessary devices (smartphone, laptop, and internet) for online teaching.	3.18	.387	Moderate acceptance
20	Institution provides adequate support for using online learning tools.	2.85	.362	Moderate acceptance
21	Training opportunities are available for improving agricultural educator digital teaching skills	3.28	.451	Moderate acceptance
22	It easy to get technical when encounter challenges with online tools	2.82	.387	Moderate acceptance
	F. Actual Use of Online Learning Devices			
23	I frequently use online platforms to deliver agricultural lessons	3.67	.475	High acceptance
24	I share instructional photos or videos with students through platforms like WhatsApp.	3.15	.362	Moderate acceptance
25	I use AI-based tools (e.g., Gemini AI) to create teaching materials for my classes.	2.88	.333	Moderate acceptance

Key: LA=low acceptance, MA: moderate, HA: high acceptance

The data presented in Table 1 revealed that all 24 items had their mean values ranging from 2.53 to 3.25. This showed that the mean values of each of the items were within the real limit of numbers 2.50-3.50, which indicates that 24 items were moderately accepted. While only 1 item had its mean value of 3.67, which was higher than the real limit of numbers 2.50-3.50, this indicates that the item was highly accepted as educational innovation device among agricultural educators in North Central. The table also showed that the standard deviation (SD) of the items ranged from 0.00 to 0.85, indicating a closer opinion of respondents in their responses.

Research Question 2:*To what extent do agricultural educators utilize innovative technological devices in teaching* in *North Central?*

Table 2: Mean Ratings of Agricultural Educators on the Utilize of Innovative Technological Tools in teaching in North Central (N = 72)

S/N	Items	Mean	SD	Remarks
	A. Use of Mobile Learning Tools			
26	I use my smartphone regularly to deliver agricultural lessons.	2.19	.399	low practical utilization
27	I utilize WhatsApp to share instructional materials, photos, and videos with students.	2.42	.727	low practical utilization
28	I conduct virtual discussions with students on mobile messaging platforms.	2.49	.503	low practical utilization
	B. Use of Video-Conferencing Tools			
29	I use Google Meet to teach agricultural concepts during online or blended classes	2.42	.727	low practical utilization
30	I apply the screen-sharing feature during demonstrations or explanations of farm practices.	2.31	.464	low practical utilization
31	I use virtual meetings to follow up and monitor students' agricultural projects	2.61	.928	low practical utilization

	C. Use of Artificial Intelligence (AI) Tools			
32	I use AI tools (e.g., Gemini AI) to create innovative photos or video content for teaching	2.39	.797	low practical utilization
33	I rely on AI-generated visuals to illustrate complex agricultural concepts.	2.17	.375	low practical utilization
34	I use AI tools to prepare teaching aids and digital resources for classroom instruction.	2.36	.484	low practical utilization
	D. Use of Multimedia and Digital Content			
35	I use instructional videos to teach practical agricultural activities	2.08	.278	low practical utilization
36	I use digital photos and images to demonstrate farm procedures or technologies.	2.15	.362	low practical utilization
37	I present PowerPoint slides or multimedia content during agricultural lessons.	2.14	.512	low practical utilization
38	Use of Online Learning Platforms	2.11	.316	low practical utilization
39	I use e-learning platforms (LMS, online classrooms) to upload notes, assignments, and tutorials.	2.07	.256	low practical utilization
40	I organize online quizzes or assessments using digital tools	2.17	.557	low practical utilization
41	I use online platforms to provide feedback and monitor students' performance.	2.28	.451	low practical utilization
	F. Use of Technological Devices for Practical Demonstration			
42	I use digital cameras or mobile phones to record farm demonstrations for teaching	2.18	.387	low practical utilization
43	I utilize projectors or screens to display agricultural videos or diagrams.	2.36	.775	low practical utilization
44	I use tablets or laptops to show step-by-step agricultural procedures during lessons.	2.24	.428	low practical utilization
	G. Frequency and Intensity of Use			
45	I use innovative technological devices in my agricultural lessons on a regular basis.	2.00	.000	low practical utilization
46	I integrate at least one technological tool into most of my teaching sessions.	2.15	.362	low practical utilization
47	I frequently update or adopt new digital tools to improve my instructional delivery	2.00	.000	low practical utilization

Key: LPU=Low practical utilization, MPU: Moderate practical utilization, HPU: High practical utilization.

The data presented in table 2 revealed that all the 21 items on had their mean values ranged from 2.11 to 2.49. This showed that the mean values of each of the items were within the real limit of numbers 1.50-2.49 which indicates low utilization of innovative technological devices. While only 1 item had its mean values of 2.61 which was higher than the real limit of numbers 1.49-2.49 this indicates that the items was the highly utilized as an innovative technological tool by agricultural educators in teaching agriculture in North Central. The table also showed that the standard deviation (SD) of the items ranged from 0.00 to 0.92, indicating close opinion of the one respondents in their responses.

Research Question Three and Hypothesis One

Perceived usefulness does not significantly influence agricultural educators' utilization of educational innovation devices.

The data for providing answers to research question three and hypothesis one are provided in table three.

Table 3: Pearson Product Moment Correlation analysis between Perceived Usefulness and Utilization of Technological Innovation Tools by AEs (N = 72 Agricultural Educators')

Variables	**N**	**Perceived usefulness**	**Utilization** of TITs.	**Rcal**	**P-value**	**Remark**
Perceived usefulness	72	1	-.424	-.424	0.00	S
utilization of Technological Innovation Tools	72	-.424	1			

The results presented in Table 3 show a moderate negative correlation (r = -0.424) between perceived usefulness and utilization of Technological Innovation Tools. This implies that as perceived usefulness increases, utilization of educational innovation tools decreases, or vice versa. Since the probability value (p = 0.000) is less than the 0.05 level of significance, the null hypothesis was rejected. This indicates that perceived usefulness significantly relates to agricultural educators' utilization of educational innovation devices.

Research Question Four and Hypothesis Two

Perceived ease of use does not significantly influence agricultural educators' adoption of technological devices.

The data for providing answers to research question four and hypothesis two are provided in table four.

Table 4: Research Question and Pearson Product Moment Correlation analysis between Perceived ease of use and adoption of Technological Innovative Tools by AEs (N = 72 Agricultural Educators'

Variables	**N**	**Perceived ease**	**Adoption** of TITs.	**Rcal**	**P-value**	**Remark**
Perceived usefulness	72	1	0.189	0.189	0.112	NS
Adoption of TITs.	72	0.189	1			

The results presented in Table 4 show a weak positive relationship (r = 0.189) between perceived ease of use and adoption of technologically innovative tools. This implies that perceived ease slightly increases the adoption of educational innovative tools. Since the probability value (p =0.112) is greater than the 0.05 level of significance, the null hypothesis was accepted. This implies that the perceived ease of use does not have a significant influence on the adoption of educational innovation devices by respondents.

Research Question Five and Hypothesis Three

Innovation attributes (trialability, compatibility, observability) do not significantly influence utilization.

The data for providing answers to research question five and hypothesis three are provided in table five.

Table 5: Multiple Linear Regression Analysis of Innovation Attributes and Utilization **(N = 72 Agricultural Educators')**

Predictor Variables	B	Std. Error	Beta (β)	t	Sig.
Constant	83.552	10.974	—	7.614	0.000
Trialability	-1.159	0.401	-0.324	-2.893	0.005*
Compatibility	-0.728	0.413	-0.198	-1.762	0.083
Observability	-0.248	0.399	-0.070	-0.622	0.536

Model Summary:
$R = 0.382$, $R^2 = 0.146$, Adjusted $R^2 = 0.108$, Std. Error of Estimate = 3.625

ANOVA:
$F(3, 68) = 3.876$, $p = 0.013$

The results presented in Table 5 show that the R value (0.382) suggests a moderate relationship between innovation attributes and utilization. The R^2 value of 0.146 indicates that 14.6% of the variance in utilization is jointly explained by trialability, compatibility, and observability, while the remaining variance is attributable to other factors not captured in the model. The regression results show that trialability is the only innovation attribute that significantly predicts utilization ($\beta = -0.324$, $p = 0.005$), indicating a significant but inverse relationship. In contrast, compatibility ($p = 0.083$) and observability ($p = 0.536$) do not significantly predict utilization. However, since ($F(3, 68) = 3.876$, $p = 0.013 < 0.05$), the null hypothesis, which states that innovation attributes (trialability, compatibility, observability) do not significantly relate to utilization, was rejected.

Discussion of Findings

The result of the study in Table 1 revealed that AEs in North Central possess moderate acceptance for educational innovation tools, including perceived ease of use (PEOU), perceived usefulness (PU), actual use of online learning devices, among others. The table also showed that the standard deviation (SD) of the items ranged from 0.00 to 0.85, indicating close opinions of the respondents in their responses. The findings are consistent with the findings of Odjegba et al (2025), who reveal that AEs have a positive attitude towards the use of digital technologies for effective teaching of agricultural education in the universities in South-South Nigeria.

More so, the findings presented in Table 2 revealed low utilization of innovative technological tools by AEs in teaching in North Central. Among these are the use of mobile learning tools, the use of video-conferencing tools, and the use of artificial intelligence (AI) tools, among others. The table also showed that the standard deviation (SD) of the items ranged from 0.00 to 0.92, indicating close responses of the respondents. This finding is in alignment with Nasratullah and Manjula (2022), who found low utilization of ICT tools by teachers of agriculture in most universities in India. This is in line with the previous study, Onu and Abeya (2025), who revealed low utilization of ICT facilities in most secondary schools in the study area in North-central States.

Additionally, the results presented in Table 3 indicated a moderate negative correlation between perceived usefulness and utilization of technological innovation tools. This was confirmed by the test of the null hypothesis, which states that perceived usefulness significantly relates to agricultural educators' utilization of educational innovation devices. This finding is consistent with the findings of Odjegba et al (2025), who revealed a positive attitude of lecturers towards the use of digital technologies for effective teaching of agricultural education in the universities in South-South Nigeria.

Furthermore, the results presented in Table 4 indicated a weak positive correlation between perceived ease and adoption of technological innovation tools. This was confirmed by the test of the null hypothesis, which states that perceived ease of use does not have a significant influence on the adoption of educational innovation devices by respondents. This is in line with the previous study conducted by Mahmud et al (2025), which revealed that students in the experimental group demonstrated significant improvements in both agricultural knowledge and digital skills compared to the control group in knowledge and skills acquisition in agricultural sciences among secondary school students in northern Nigeria.

Similarly, the results presented in Table 5 showed a moderate relationship between innovation attributes and utilization. This was confirmed by the test of the null hypothesis, which states that innovation attributes (trialability, compatibility, observability) do not significantly relate to utilization, and was rejected. This finding is in line with the previous study conducted by Williams et al (2024). The findings of the study showed that compatibility, trialability, and relative advantage have a very strong influence on TVET students' adoption of AI-chatbots for learning in Universities in South-East, Nigeria.

Conclusion

The study explored the impact of technological models on AEs' adoption of innovative tools in North-Central Nigeria. The study confirms that Technological Models, such as the technology acceptance model (TAM) and innovation diffusion model (IDM), have an impact on Agricultural AEs of Innovative tools in North-Central Nigeria.

Recommendations

Based on the findings of the study, the following recommendations have been made.

1. AEs should be trained on ICT skills to enhance their adoption and utilization of innovative agricultural devices in the classroom in North Central Nigeria.
2. The government should organize symposiums and train AEs in modern innovative devices, such as the use of video-conferencing tools, the use of artificial intelligence (AI) tools, the use of multimedia and digital content, and the use of technological devices for practical demonstration in the classroom.

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