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TENTION TO USE IoT TECHNOLOGY ON AGRICULTURAL PROCESSES IN NIGERIA BASED ON MODIFIED UTAUT MODEL: PERPECTIVES OF NIGERIANS' FARMERS

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ABSTRACT

Users' acceptability is one of the fundamental concepts for development and success of any technology. This research explores the level of acceptability and factors influencing the acceptance of IoT technology in agricultural processes in Nigeria. We modified and used the UTAUT$_2$, as a theoretical basis to conduct empirical research to test the factors that influence farmers' intention to use the IoT technology being the most current computing technology in their agricultural processes, to make farming processes easier and at their convenient which in turn will boost their produce. To empirically test our model, a survey was administered to eight hundred and thirty respondents consisting of petty farmers, agricultural technology/engineers, agricultural scientists, mechanized farmers, and agricultural academics in six States in Nigeria, drawn from 5 Geopolitical zone, to include: Akwa Ibom State, Kano State, Jigawa State, Imo State, and Ogun State. We found out that the level of acceptability was moderate. However, factors like social influence, attitude, awareness, financial strength, affect the general acceptability of IoT technology in Agriculture in Nigeria.

Keywords: Agriculture, IoT, UTAUT, technology awareness, Farmers etc.

INTRODUCTION

The term agriculture in the wider sense involves crop production and its protection, livestock and animal husbandry, diary fisheries and related activities such as soil and water management, irrigation, and drainage systems, agricultural engineering and post-harvest technology, agricultural extension, credit and co-operation, agricultural marketing, forests, and many other related areas. Agriculture is however, one of the fastest means of growing the economy of any nation. This is the reason most of the developed countries of the world embark seriously on agricultural development, so as to improve their economy. Computer in other hand, is a technology that emerges as an emerging tiger to enhance operation in diverse areas including agriculture. Technology advancement have an important role in transforming and facilitating people's lives in various areas including communication, education, health, expertise as well as economy[18].Internet of things (IoT) is a recent technology that is gaining wide acceptability in several fields due to its practical relevance in everyday life improvement[19].

This research project used the Unified Theory of Acceptance and Use of Technology (UTAUT), a prominent technology acceptance and use model, as a theoretical basis to conduct empirical research testing the factors that influence farmers' acceptance and use of technology in their farm environment. Although several studies applied UTAUT in various organizational and cultural contexts, very few implement the full model and examine all of its constructs. By focusing on farmers at all levels and IoT technology that is new to them, and by using the full UTAUT model with no changes or elimination of constructs, this study places itself in the area where there are no exhaustive studies. Also, this research addressed the question of whether UTAUT is applicable in any farming environment for agricultural technologies introduced to the farmers.

One of the most prominent models is the Unified Theory of Acceptance and Use of Technology. Farmers' acceptance and use of technologies introduced in their academic environments is an important factor in determining the success of these technologies *(Welch et al. 2020).*

RELATED LITERATURE

The term "Internet of Things" (IoT) was first used in 1999 by British technology pioneer Kevin Ashton to describe a system in which objects in the physical world could be connected to the Internet by sensors. Ashton coined the term to illustrate the power of connecting Radio-Frequency Identification (RFID) tags used in corporate supply chains to the Internet in order to count and track goods without the need for human intervention Abdul-Qawy et al (2015). According to Abdul-Qawy et al (2015), the Internet of Things has become a popular term for describing scenarios in which Internet connectivity and computing capability extend to a variety of objects, devices, sensors, and everyday items.

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction (Apcar, 2014) . Apcar (2014) said IoT is the connection of physical things to the internet which makes it possible to access remote sensor data and control the physical world from a distance (Azlina et al, 2013). Its function is to overcome the gap between objects in the physical world and their representation in information systems (Azlina et al, 2013). According to Weber (2010), a thing, in the Internet of Things, can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low -- or any other natural or man-made object that can be assigned an IP address and provided with the ability to transfer data over a network. It is the concept that the Internet is no longer just a global network for people to communicate with one another using computers (Xu et al, 2014). It is also a platform for devices to communicate electronically with the world around them. A combination of technologies, including low-cost sensors, low-power processors, scalable cloud computing, and ubiquitous wireless connectivity, has enabled this revolution. However, any object which is capable of identifying, connecting and communicating with other objects is an example of Internet of things (Ajzen, 1991), Sahin, 2006), Taylor & Todd. 1995a).

Why the Internet of Things is important?

The creation of the Internet of Things will entail the connection of everyday objects and devices to all kinds of networks, for example, company intranets, peer-to-peer networks and even the global internet (Ma, 2011). For this reason, its development is of great significance

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to the telecommunication industry. It will challenge existing structures within established companies and form the basis for entirely new opportunities and business models (Ma, 2011). The Internet of Things builds upon the revolutionary success of mobile and internet networks by expanding the world's network of networks even further. It does so through the application of key technological enablers (Conti, 2006).

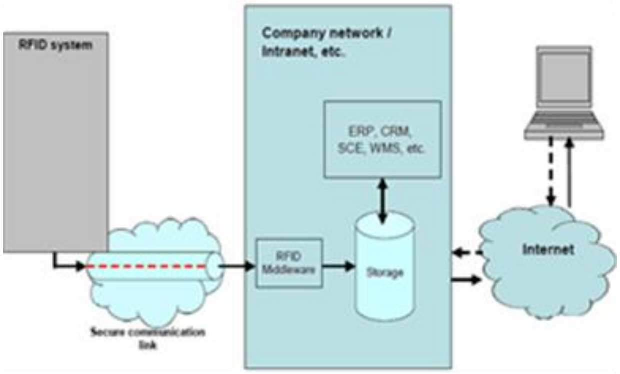

Figure 1: Tagging the internet *(Source:* Ma (2011))

An RFID system in network architecture

Note:

ERP – Enterprise Resource Planning; CRM – Customer relationship Management; SCE – Supply Chain Execution;WMS – Warehouse Management System.

Unified theory of acceptance and use of technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) is a technology acceptance model formulated by Venkatesh and others in "User acceptance of information technology: Toward a unified view" (Agarwal and Prasad (1997)). The UTAUT aims to explain user intentions to use an information system and subsequent usage behaviour. The theory holds that there are four key constructs:

(1) Performance Expectancy,

(2) Effort Expectancy,

(3) Social Influence, and

(4) Facilitating Conditions.

Table 1: Definitions of the constructs

CONSTRUCT	DEFINITION
Performance Expectancy (PE)	The degree to which an individual believes that using the system will help him or her to attain gains in job performance.
Effort Expectancy (EE)	The degree of ease associated with the use of the system.
Social Influence (SI)	The degree to which an individual perceives that important others believe he or she should use the new system.
Facilitating Conditions (FC)	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.
Computer self-efficacy (SE)	Judgment of one's ability to use a technology to accomplish a particular job or task. (adapted from the Social Cognitive Theory)
Computer anxiety (ANX)	Evoking anxious or emotional reactions when it comes to performing a behavior (i.e. using the technology) (Adapted from the Social Cognitive Theory)
Attitude towards using technology (ATUT)	An individual's overall affective reaction to using a system.

The first three are direct determinants of usage intention and behaviour, and the fourth is a direct determinant of use behaviour. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behaviour

In their review of the eight prominent IT acceptance and motivation models, the authors of UTAUT found seven constructs to be significant direct determinants of acceptance and use of technology in one or more of the individual models (Venkatesh, 2003). However, they found that three of these constructs (self-efficacy, anxiety, and attitude) do not have any direct effect on intention to use the technology, therefore, these constructs were dropped from UTAUT while the other four (performance expectancy, effort expectancy, social influence, and facilitating conditions) were kept. This study measures the seven original constructs to compare their influence on acceptance with the findings of UTAUT. Table 1 shows the definition of each of the aforementioned constructs as reported in the originating UTAUT study (Venkatesh, 2003).

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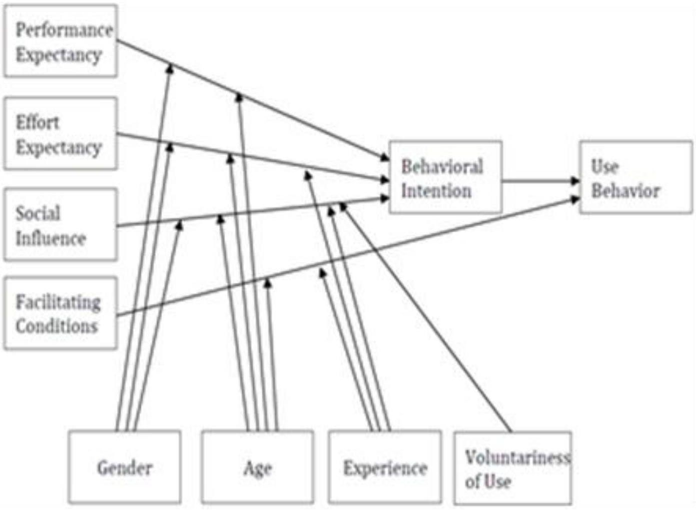

Figure 2: UTAUT Research Model (Source: Venkatesh et al. ,2003)

Comparison of UTAUT Models

Several technology acceptances models and theories have been applied to different phenomena and varying cultural settings in many studies, yielding varying results. Some of the results from these studies are consistent with the original postulations while others contradict them. Eight technology acceptance models were unified by Venkatesh et al. (2003) to formulate the UTAUT model, including the Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975), the Theory of Planned Behaviour (TPB) (Ajzen 1991), the Technology Acceptance Model (TAM) (Davis 1989), the Combined-TAM-TPB (Taylor and Todd 1995) , Model of PC Utilization (MPCU) (Thompson et al. 1991), Motivational Model (MM) (Davis et al., 1992), Social Cognitive Theory (SCT) (Bandura 1986) and Innovation Diffusion Theory (IDT) (Rogers 1995).

Table 2 provides a summary of the source of each UTAUT construct, with a description and the model from which each construct was derived. Besides the constructs stated in Table 1, four other variables - age, gender, experience, and voluntariness of use - moderate the relationships suggested. These relationships include Effort Expectancy, Performance Expectancy and Social Influence predicting Behavioural Intention (BI) which, together with Facilitating Conditions, influences Use Behaviour (UB). Results from the UTAUT model explained seventy percent (70%) of the variation in user's intention to accept technology (Venkatesh et al., 2003).

Table 2: Description of UTAUT variables and models derived from them

Construct	Description of Perception	Similar Construct and Corresponding Models
Performance Expectancy	The degree to which an individual believes that using the system will help him or her to attain gains in job performance	Perceived usefulness (TAM/TAM2 & C-TAMTPB); - Extrinsic motivation (MM); - Relative advantage (IDT); - Job-fit (MPCU); - Outcome expectations (SCT).
Effort Expectancy	The degree of ease associated with the use of the system.	-Perceived ease of use (TAM/TAM2); - Complexity (MPCU); - Ease of use (IDT).
Social Influence	The degree to which an individual perceives that important others believe he or she should use the new systems.	-Subjective norms (TRA, TAM2, TPB/DTPB and C-TAM-TPB); - Social factors (MPCU); - Image (IDT).
Facilitating Conditions	Refer to consumers' perceptions of the resources and support available to perform a behaviour Venkatesh et al. (2003)	-Perceived behavioural control (TPB/DTPB, C-TAM-TPB); -Facilitating conditions (MPCU); - Compatibility (IDT).

(Source: Table on UTUAT Model; Venkatesh et al., 2003)

Evidence from Table 1 shows that there are similarities among some of the models combined to form the UTAUT model. TPB for example is an improvement of TRA and TAM. These three were combined to form C-TAM-TPB. TAM, authored by Davies et al. (1989), is straightforward and easy to use in different research settings. According to Han (2003), C-TAM-TPB has certain decisions that can influence IT usage similar to TAM but provides additional factors – subjective norm and perceived behaviour control - which are not in TAM (Ajzen and Brown 1991). With the additional construct added to TAM to postulate C-TAM-TPB, the predictive power of behavioural intention to use technology improved (Taylor and Todd 1995b). Nonetheless, prediction of technology usage is better with TAM than C-TAM-TPB.

MATERIALS AND METHODS

Materials

IoT addresses some issues, such as increasing the quality, quantity, sustainability, and cost effectiveness of agricultural production (Danova, 2015). IoT can help in the following agricultural processes:

1. Weather forecasting
2. Temperature Monitoring
3. Health Control for Farm Animals
4. Soil Monitoring
5. Prevention of Stock theft, etc.

The operational data was collected through a questionnaire administered to mechanised farmers, students, and body of knowledge in agricultural sciences and engineering. The questionnaire was made up of two sections to include the personal data section as well as the variable response section. The personal data

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section provides details about the despondence and the variable response section has questions on knowledge expectancy, anxiety, cost, performance expectancy, effort expectancy, attitude towards the technology, the behavioural intensions of farmers as well as actual usage of this technology. A total of 3500 questionnaires were distributed and only 2100 were returned out of which 100 questionnaires where damage and 2000 data was successfully analysed.

Methods

After collection of the data, the data were summarised and analysed using empirical data analysis methods. The responses were clustered and classified based on the UTUAT input variables to ascertain the reactions of farmers to this emerging technology. The sample of this study comprises of 2000 respondents from the classes of mechanised farmers, agricultural undergraduate's students and lecturers. The data collected underwent a screening process consisting of many steps, to ensure that subsequent analysis is based on a complete dataset that is void of any issues such as incomplete answers. Descriptive and reliability statistics were implemented using SPSS. The Cronbach's alpha, Mean ratings, Correlation, Multiple Regression of data analysis were therefore adopted as used by several researchers in this line of study. The results were interpreted with regards to the hypothesis raised.

Research Instruments

The research instruments used for the survey are the questionnaire, tagged UTUAT Questionnaire on IoT Technology on Agricultural processes. The research questionnaire was mainly based the constructs of the UTUAT model developed. The questionnaire is made up of two sections. Part A consists of demographical information whilst part B is made up of the eight subcategories. They are knowledge expectancy, anxiety, cost, performance expectancy, effort expectancy, attitude towards the technology, the behavioural intensions of farmers as well as actual usage of this technology. A five-point Likert scale was adopted to draw responses from the respondents.

THEORY/CALCULATIONS

Evaluations of variables

The variables chosen here are those considered relevant to the farmers' considerations of technology. They are Knowledge expectancy H1, Anxiety H2, Cost H3, Performance Expectancy H4, Efforts expectancy H5 and Attitude towards use of technology H6.

H1: This component evaluates the changing patterns in farmer use of electronic tools over a four-year period, mapping changes in social communications with expectations in formal use of modern farming technology in agricultural processing. However, the technological knowledge strand guides the researchers to develop developmental strides that can support farmers to develop specialist knowledge of what they will need to facilitate and enhances the outcomes of their produce. To evaluate the expected knowledge E(X) of μ of discrete random variables X, simply multiply each value of the random variable by its probability and advancements in operations.

The formula is given as $E(X)=\mu=\sum xP(x)$ … (1)

Here x represents values of the random variable X, $P(x)$ represents the corresponding probability, and symbol $\sum$ represents the sum of all products $xP(x)$. Here the μ symbol was used for the mean because it is a parameter. It represents the mean of a population.

To evaluate the knowledge expectancy we use the model:

$$r(z) = \int_{\infty}^{0} x^{z-1} e^{-z} dz; z > 0 \dots (2)$$

$$r\left(\frac{1}{2}\right) = \sqrt{\pi}$$

$$r(m+1) = m!\, form, anonnegativeinteger$$

$$otherwise: r(a+1) = ar(a)$$

H2: Anxiety is a normal and often healthy emotion. In this context, when a farmer regularly feels disproportionate to use innovative technology, it might become impediments to accepts IoT. Anxiety disorders form a category of mental health diagnoses that lead to excessive nervousness, fear, apprehension, and worry. The anxiety level of the farmer could be evaluated as:

$$X = exp(m) - - - - - - - - (3)$$

$$f(x) = me^{-mx} m > 0, x \geq 0 - - - - - - - - (4)$$

However, the anxiety level of the farmer towards this emerging technology, may be normal in stressful situations such as public speaking or taking a test.

H3: Cost is the expenditure required to create and acquire the IT facilities as well as the installation cost and labour. Especially in this case when it involves utility, cost is charged to expense. In the case of an asset, the charge to expense could be significantly deferred. Most farmers may accepts or reject the technology because of cost implication

H4: Performance Expectancy refers to the belief that the use of a particular technology or method will, to some extent, be advantageous or performance enhancing to the individual. Performance expectancy as a variable in UTAUT model refers to the degree to which individual perceives that using a system will help in attaining a gain in job performance (Venkatesh et al, 2003). The term performance expectancy (PE) is similar to TAM's perceived usefulness (PU).

H5: Effort Expectancy according, Venkatesh et al., (2003) define effort expectancy as the level of easiness related while using any system. This means that effort expectancy refers to the effort needed to use the system, whether it is simple.

H6: Attitude towards use of technology is a feeling or way of thinking that affects the farmers' behaviour towards the use of IoT in their agricultural processing.

Research Model

IUIOTAP-UTUAT Model

The purpose of this study was to determine the strength of the predictors (EE, PE, SI, and FC) on farmers' intention to accept and use IoT for farming processes. The factors that may influence IoT acceptance by Nigerian farmers are illustrated in Figure 3. The study is based on the model of Venkatesh et al. (2003), which has four exogenous variables and two endogenous variables; however, the moderating variables have been included in this study.

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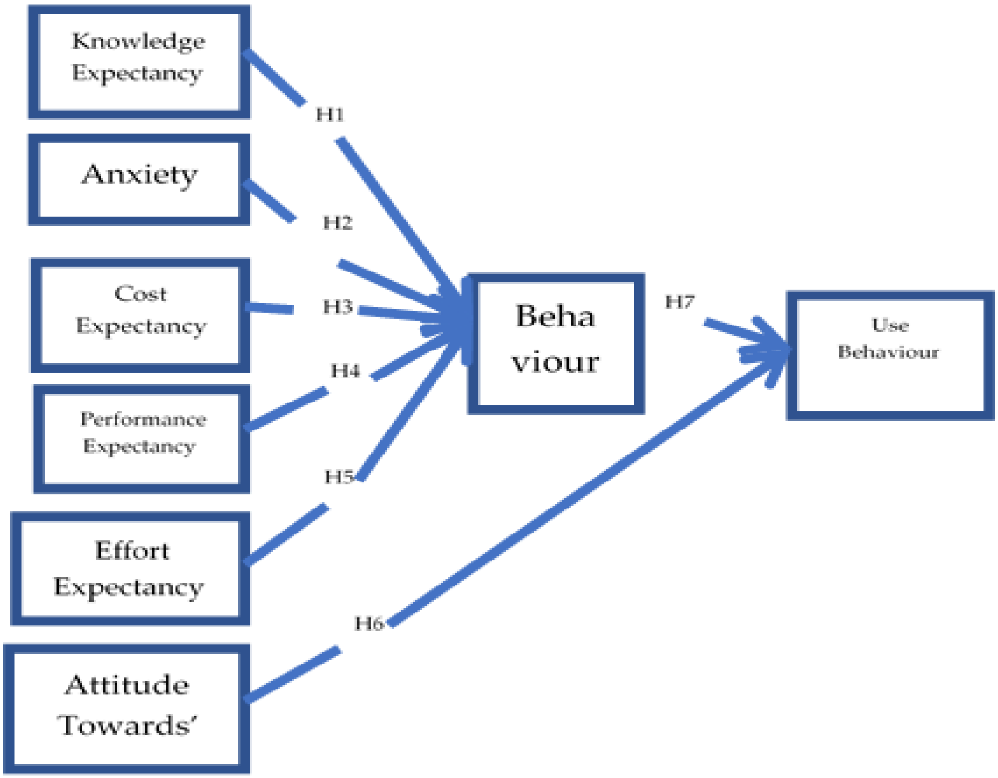

Fig. 3: Modified Theoretical Framework of Hypothesis. (Source: UTAUT Model (Venkatesh et al, 2003)

The proposed work

This study modified the UTUAT$_2$ model by adding Knowledge expectancy, Anxiety, Cost expectancy, Effort expectancy and Attitude towards the use of technology in agricultural processing in Nigeria. The Attitude was adopted from Theory of Reasoned Action (TRA) (Welch et al., 2020). Price was modified by the use of cost since cost mean more than price.

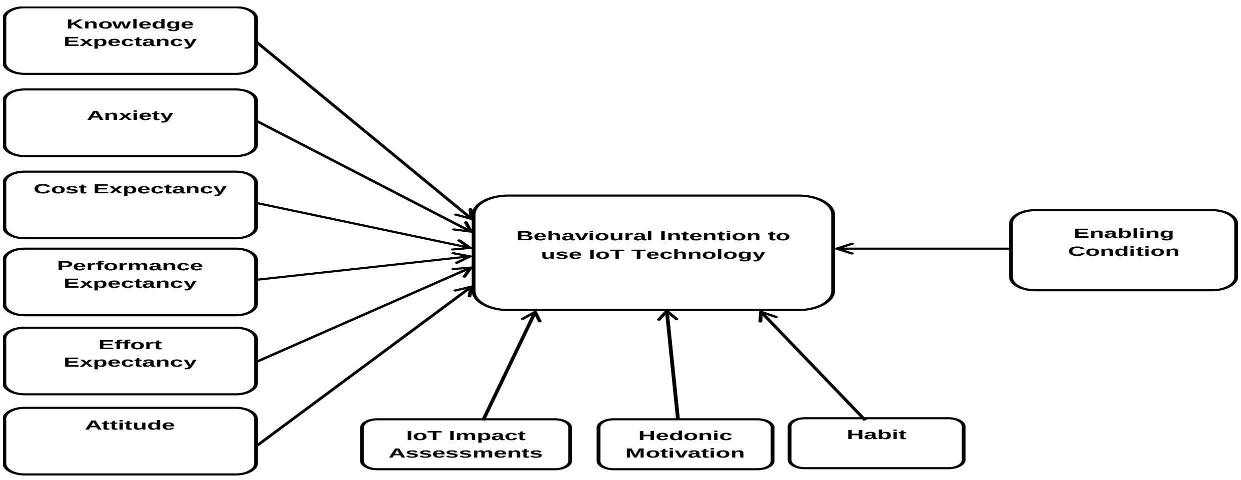

Fig. 3: The Proposed Model

The proposed model focused on identifying the relationship between these variables, Hedonic Motivation and Habit on farmers' intention to use the Internet of Things (IoT) technology in agricultural processes in Nigeria, as provided in figure 2:

However, consideration was not made to the moderating effect of age, gender, literacy level and experience of the farmers in this study because our respondents were all from academic environments and allied institution. Table 4 shows the definition of the aforementioned constructs as reported in the originating UTUAT study (Azjen, 1999).

Table 4: Definition of constructs

Core Construct	Definitions	References
Knowledge Expectancy	"evaluates the changing patterns in farmer use of electronic tools over a four year period, mapping changes"	
Anxiety	"Anxiety is a normal and often healthy emotion. In this context, when a farmer regularly feels disproportionate to use innovative technology"	
Cost Expectancy	"Cost is the expenditure required to create and acquire the IT facilities as well as the installation cost and labour."	
Performance Expectancy	"The degree to which an individual believes that using the system will help him or her attain gains in job performance"	
Effort Expectancy	"The degree of ease associated with the use of the system"	
Attitude	"An individual's positive or negative feelings (evaluative effect) about performing the target behavior"	

RESULT AND DISCUSSION

I. Analysis of demographic data

Table 5: Demographics of Respondents

GENDER	**No.**	Percentage (%)
MALE	1300	65
FEMALE	700	35
MIXSEX	0	0
	2000	100
OCCUPATION		
STUDENTS	980	49
MODENIZED FARMERS	150	7.5
ACADEMICS	870	43.5
	2000	100
HIGHEST QUALIFICATION		
ND/HND/B.Sc.	1390	69.5
PGD	25	1.25
M.Sc	410	20.5
Ph.D	175	8.75
	2000	100

Considering Table 5; most of the respondents in gender were male with a total of 1300 respondents representing 65% while the female respondents were 700 respondents representing 35%. Among the responses in the occupation unit, the students' classes has the highest respondents with a total of 980 respondents representing 49% followed by the academics with a total of 870 respondents representing 43.5% whilst the modernised farmers 150 respondents representing 7.5%. In the last categories of the demographics data collection, the undergraduates has the highest respondents with a total of 1390 respondents representing 69.5%, followed by the master's degree holders with a total of 410 respondents representing 20.5&, followed by the Doctorate degree holders with a total of 175

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respondents representing 8.75% whilst the Post Graduate Diploma holders has a total of 25 respondents representing 1.25%.

II. Evaluation of the modified UTUAT variables using Cronbach's Alpha

The modified UTUAT variables were adequately analysed and constructed using Cronbach's Apha (Venkatesh et al., 2013). Many constructs here were found to be reliable since the evaluated statistics was above 0.65 that presents the arguments related to the IoT acceptability and usability as highly reliable. Table 6 shows the detailed analysis of the results of the evaluation of the modified UTUAT variables using the Cronbach's Alpha as explained above.

Table 6: Reliability Coefficients of Constructs

Constructs	Cronbach's Alpha	Number of Items
Knowledge Expectancy	0.623	5
Anxeity	0.731	5
Cost Expectancy	0.702	5
Performance Expectancy	0.654	5
Effort Expectancy	0.822	5
Attitude to the use of IoT	0.945	5
IoT Impact Accessments	0.657	5
Hedonic Motivation	0.732	5
Farmers' Habit towards IoT	0.755	5
Enabling Condition	0.763	5

III. *Reliability Coefficients Chart* Evaluation of the modified UTUAT variables using Cronbach's Alpha

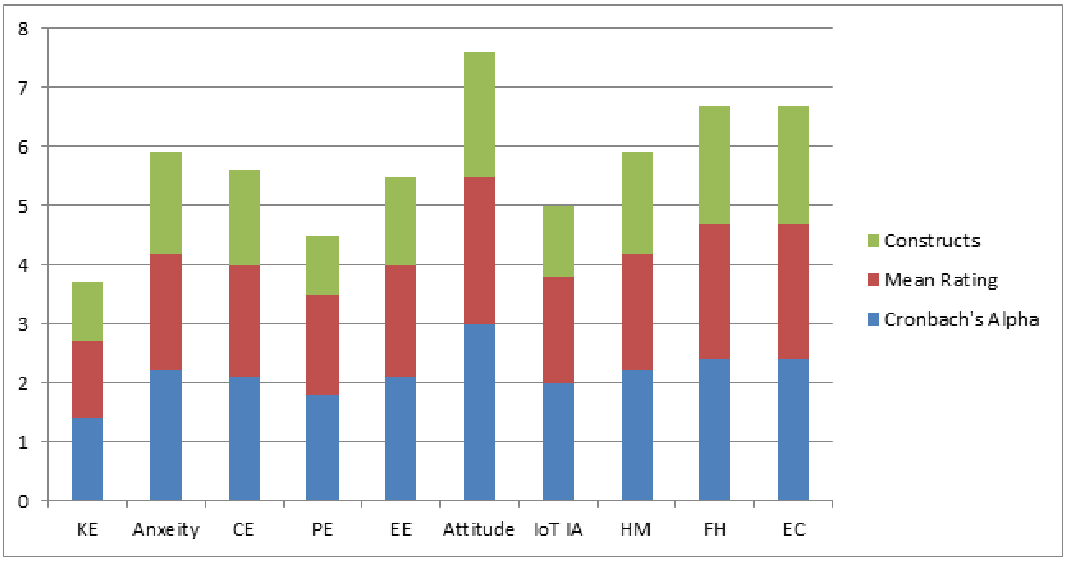

Fig.4: Reliability Coefficients Chart Evaluation of the modified UTUAT variables using Cronbach's Alpha

The chart in figure 4 shows the reliability coefficients level of the Cronbach's Alhpa constructs of the modified UTUAT variables with the following variables represented as:

KE - Knowledge Expectancy

CE – Cost Expectancy

PE – Performance Expectancy

EE – Effort Expectancy

IoT IA – IoT Impact Assessments

HM – Hedonic Motivation

EC – Enabling Conditions

IV. Farmers' Acceptability Level of the Internet of Things Technologies in Agricultural Processing in Nigeria

In other to analyse the level of acceptability of the application of Internet of Things technology in agricultural processes in Nigeria by farmers, mean rating was computed on a scale interval of 1 (very low) to 5 (very high). it was observed that the overall acceptability of this emergence technology by the Nigerian farmers was very low. Moderate scores for construct like Anxeity, Attitude only; low scores for construct like Enabling Conditions and very low scores for constructs like Knowledge Expectancy, Cost Expectancy, Performance Expectancy, Effort Expectancy, IoT Impact Assessments and Hedonic Conditions.

It was observed that Nigerian farmers have not really realized the usefulness of IoT in agricultural processing, as such is not important to them. Table 6 shows the level of acceptance and use of this emerging technology by Nigerian farmers in agricultural processing.

Table 7: Nigerians' Farmers Acceptability Level of the use of Internet of Things Technologies in Agricultural Processes

Validity	Constructs	Mean Rating [a]	Level
Valid	Knowledge Expectancy	1.34	Very Low
	Anxeity	3.20	Moderate
	Cost Expectancy	1.15	Very Low
	Performance Expectancy	1.05	Very Low
	Effort Expectancy	3.10	Moderate
	Attitude to the use of IoT	1.03	Very Low
	IoT Impact Assessments	1.15	Very Low
	Hedonic Motivation	1.31	Very Low
	Farmers' Habit Torwards IoT	1.20	Very Low
	Enabling Condition	2.75	Low

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V. Correlation and Regression Analysis

This is the stage that the degree to which a change in the independent variable that resulted in a correspondents change in the dependent variable are measured. In this paper, the Pearsons' Product-Moment Correlation was used in finding the relationship between the independent's variables (Knowledge Expectancy, Anxiety, Cost Expectancy, Performance Expectancy, Effort Expectancy, Attitude, IoT Impact Assessments, Hedonic Motivation, Enabling Conditions and the dependents variable (Behavioural Intention to use IoT Technology).

Table 8 shows the correlation of Farmers' adoption factors. According to the correlation analysis, Knowledge Expectancy, Anxiety, Cost Expectancy, Performance Expectancy, Effort Expectancy, Attitude to the use of IoT, IoT Impact Assessments, Hedonic Motivation, and Enabling Condition was positively correlated with Farmers Intension where the correlation coefficient was equal to .512, .730, .456, .566, .822, .715, .728, .555, and .567 respectively. It was observed that Anxiety has significant values since the correlation between independents variables and the dependents variable (Behavioural Intention to use IoT Technology) was near to no relations.

Table 8: Correlation of Nigerians' Farmers Adoption Factors

TA	KE	A	CE	PE	EE	AofIoT	IoTIA	HM	FH	EC
KE	1									
A	.633**	1								
CE	.265**	.472**	1							
PE	.531**	.433**	.421**	1						
EE	.547**	.621**	.303**	.583**	1					
AofIoT	.533**	.623**	.358**	.352**	.587**	1				
IoTIA	.413**	.546**	.343**	.433**	.580**	.712**	1			
HM	.528**	.489**	.321**	.407**	.433**	.521**	.623**	1		
FH	.321**	.720**	.407**	.435**	.645**	.622**	.542**	.655**	1	
EC	.512**	.730**	.456**	.566**	.822**	.715**	.728**	.555**	.567**	1

Note: KE -Knowledge Expectancy, A – Anxiety, CE - Cost Expectancy, PE - Performance Expectancy, EE - Effort Expectancy, AofIoT - Attitude to the use of IoT, IoTIA - IoT Impact Assessments, HM - Hedonic Motivation, EC - Enabling Condition.

** Correlation is significant at the 0.01 level (2-tailed)

The results shows that Knowledge Expectancy has the largest value ($\beta = 0.655$, $t = 0.852$, $p<0.001$) showing that Knowledge Expectancy had the highest impact among the independents variables in deciding the Nigerian farmers' intension to use Internet of Things Technology in agricultural processes. Enabling Conditions has the second largest value ($\beta = 0.421$, $t = 0.609$, $p<0.001$), followed by Attitude ($\beta = 0.410$, $t = 0.599$, $p<0.001$), other independents variables hashave insignificants values since the correlation between the independent variables and dependents variable was very near to no relation.

However, the Better values showed the rate of change in independent variable may cause absolute change in the dependent variable, next, the R^2 value of 0.835 indicating that 83.5% of the variance in behavioural intention could be explained by the model.

Table 9: Regression Analysis of Farmers' Adoption Factors

	B	t-value
Knowledge Expectancy	0.655	0.852***
Anxeity	-0.871	-2.100
Cost Expectancy	0.155	0.321
Performance Expectancy	-0.025	-1.408
Effort Expectancy	0.390	0.298
Attitude to the use of IoT	0.410	0.599**
IoT Impact Assessments	0.062	0.203
Hedonic Motivation	0.033	0.074
Farmers' Habit Torwards IoT	0.090	0.945
Enabling Condition	0.421	0.609***
R^2	0.835	
Adjusted R^2	0.862	

****p<.01, ***p<.001 Dependent Variables: BI**

CONCLUSION

Based on our findings on the level of acceptability and factors influencing the acceptance of IoT technology in agricultural processes using the modified $UTAUT_2$, as a theoretical basis, we found out that there is need to make farming processes easier and more convenient which in turn will boost farm produce; the level of acceptability of IoT technology in agricultural processes in Nigeria must be high. As research found out that Nigerian farmers have not adopted the use of this emergent technology in Agricultural processes. However, The study explore the level of acceptability of IoT in agricultural processes by Nigerian farmers as well as factors that could affects the acceptance level and farmers' intention to use IoT in their agricultural processes in terms of relationships among determinants of the modified $UTUAT_2$ model usage intention by Azjen (2019). The findings indicated that the significant predictors of Nigerians' farmers intentions to use Internet of Things (IoT) in agricultural processes in order to improve the performance expectancy and other factors that have insignificant values since their p-values are greater than 0.05. Hence, Nigerians' farmers usage behaviour depends on the improved level of Knowledge Expectancy, Anxiety, Cost Expectancy, Performance Expectancy, Effort Expectancy, Attitude, IoT Impact Assessments, Hedonic Motivation and Enabling Conditions. It is therefore concluded that the benefits of the application of Internet of Things Technology by Nigerians' farmers in agricultural processes should be promoted to the farmers at all level for them to accept this emergent technology. Further studies can expand this research by including the more

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moderating variables in the UTUAT2 model that were not considered in our study.

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