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An Evaluationof Factors Impacting the Adoption of ChatGPT forAcademic Support and Enhanced Learning byPostgraduate Students

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Abstract

This research evaluates the factors impactingthe adoption of ChatGPT for academic support and enhanced learning among postgraduate students. The research was guided by two objectives and seven hypotheses. The modified Technology Acceptance Model (m-TAM) was used as the theoretical lens of the research. A quantitative approach was employed and 120 postgraduate students were sampled from172 postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi Statethat formed the population of the research. Crejcie and Morgan's Table of sample size was used in determining the minimum sample size of 118 respondents and were drawn using a simple random sampling technique. Questionnaireswere used as an instrument for data collection. Partial Least Square Structural Equation Modelling and Statistical Package for Social Sciences wereused in analysing the data. Findings revealed that the level of adoption of ChatGPT by the students is partial.Furthermore, out of the seven factors, six are positively significant in impacting the adoption of ChatGPT by postgraduate students with the security and privacy factor recording the highest impact of a P value of 0.000 while the perceived ease of use factor recorded the lowest impact of P values of 0.015. These findings will contribute by guiding the students and ChatGPT providerson what can influence and enhance the utilisation of ChatGPT so that its benefit can be obtained adequately. It is recommended that students and ChatGPT providers should pay serious attention to these factors found influential in the adoption and use of ChatGPT.

Keywords: Postgraduate students, ChatGPT, Factors of Adoption,Academic support,Enhanced learning

Introduction

Large language models such as the Generative Pre-trained Transformer (GPT-3) have recently made major strides in natural language processing (NLP)(Floridi & Chiriatti, 2020). These models can produce text that resembles that of a human, respond to queries, and carry out other language-related activities with great accuracy since they have been trained on vast volumes of text data(Kasneci et al., 2023a).Sallam, (2023a)acknowledged that since more recent Artificial intelligence (AI) algorithms have developed over time and are now capable of processing data in its natural state, it is now possible to mine unstructured data, including unprocessed text and photos.

Large language models have the potential to offer a variety of advantages and chances to professionals and students at all educational levels. Large language models can help university students with their writing and research assignments as well as with the growth of their critical thinking and problem-solving abilities(Panda & Kaur, 2023; Samson & Shannon, 2023). With the use of these models, students can quickly generate summaries and outlines of texts, thereby enabling them to assemble their understandings andessential ideas of the text they are consulting(Kasneci et al., 2023a). Moreover, Large language models can also help students to develop their research expertise by giving them resources and information on a certain subject matter and suggesting unexplored aspects and existing research topics, which can assist them to better understand and analyse the material (Rahman & Watanobe, 2023).

Due to their wide range of applications, large language models have been pointed out as a possible area of study in education. Individuals at all educational levels—primary, secondary, tertiary, and professional development—may be able to improve their teaching and learning experiences by using these approaches(Kasneci et al., 2023a). Furthermore, because every person is different in his/her learning preferences, skills, and requirements, large language models present a special chance to deliver individualised and successful learning experiences(Zhuo et al., 2023). Sallam et al., (2023) stated that as the integration of AI technologies continues to reshape the educational landscape, it is crucial to assess the acceptance and effectiveness of these tools among postgraduate students. One of such tools gaining prominence is ChatGPT, a language model designed for natural language processing and generation.

However, the acceptance of ChatGPT seems to be low among Nigerian postgraduate students, even the few ones that have adopted it in their studies have not been fully utilizing it as

expected(Tan & Charman, 2023). Though it is agreed that the acceptance of ChatGPT by postgraduate students can vary widely based on individual preferences, needs, and experiences(Halaweh, 2023). Despite so, Farrokhnia et al., (2023)strongly argued thatseveral factors have been expected to influence its acceptance.Usefulness, ease of use, reliability, awareness, security and privacy, customization and feedback mechanismare some of the factors that might affect the adoption and use of ChatGPTby students, thus would be examined by this research. Previous research studies focused more on some aspects of ChatGPT such evaluating the evolution and implications of Chat GPT, but failed to evaluate the factors that influence its adoption, thus calls for research in that axis (Yan, 2023). Therefore, it is believed that understanding the factors influencing the acceptance of ChatGPT by postgraduate students is essential for educators, institutions, and developers to optimise its integration into higher educational settings.

Problem Statement

While ChatGPT shows promise in providing interactive and dynamic conversational experiences, its acceptance among postgraduate students remains largely unexplored(Rahman & Watanobe, 2023). The non-acceptance of ChatGPTby postgraduate students in Nigeria can have several implications, affecting both the students and the broader educational landscape(Cotton et al., 2024; Tan & Charman, 2023). The low level of ChatGPTadoption can affect the effectiveness of the student's performance and their ability to accomplish their targeted objectives(Lo, 2023). Baidoo-Anu and Owusu Ansah, (2023)stated that the non-adoption of educational tools like ChatGPT can result in limited access to advanced learning tools, reduced exposure to emerging technologies, inefficiency in academic support, missed opportunities for collaborative learning, resistance to technological integration, and underutilization of educational resources. Furthermore, in a globalized world, where technology plays a crucial role in various sectors, non-acceptance of ChatGPT by Nigerian students could affect the competitiveness of Nigerian students on an international scale(Tan & Charman, 2023). On the other hand, many other previous studies have not thoroughly investigated the factors that influence postgraduate students' adoption and use of ChatGPT, especially from North Eastern Nigeria. Consequently, the ChatGPTadoption scenario and its factors are not well known by the relevant stakeholders. Therefore, this necessitates the need for this research as assessing the factors that will influence the adoption and use of ChatGPTby Nigerian postgraduate students can lead to its wide adoption

hence helping in mitigating its non-adoption implications and paving the way for its effective integration in the educational landscape of Nigeria.

Objectives of the Research

1. To assess the level of adoption of ChatGPTby postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi State
2. To examine the impactingfactors of adoption of ChatGPTby postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi State

Literature Review

The impact of Chat Generative Pre-trained Transformer (ChatGPT) on student learning can be substantial and multifaceted, influencing various aspects of the educational experience (Geerling et al., 2023). ChatGPT can adapt to individual learning styles and preferences, providing personalized assistance to students. This tailored approach can help address specific learning needs, making the educational experience more effective(Kasneci et al., 2023a) .ChatGPT's availability at any time allows students to access academic support outside traditional working hours. This can be particularly beneficial for students with diverse schedules or those facing time zone differences (Panda & Kaur, 2023).

The adoption of ChatGPT among students is with high speed and hence became one of the latest technologies that recorded high adoption within a short period (Tiwari et al., 2023). Students of various levels adopt ChatGPT to address their information needs by requesting different questions related to their fields of study (Sallam et al., 2023). Atlas (2023) acknowledge that in advanced countries, the adoption and use of ChatGPT among students became a common norm, thus drastically changing their information-seeking behaviour. Moreover Dai et al. (2023) is of the view that the speed at which ChatGPT is adopted by students surprises a lot, thus attributing that to the ability of ChatGPT to provide instant feedback, accurate responses and straightforward answers. However Kasneci et al. (2023b) acknowledged that the ChatGPT technology is associated with some challenges that need to be addressed before fully adopted by the users. Sanmarchi et al. (2023) on their part established that ChatGPT has come to stay as most students across the globe embrace technology in their quest to solve assignments and other academic exercises. Several studies that include that of (Cotton et al., 2024; Dahri et al., 2024; Dai et al., 2023; Omar et al., 2023; Rasul et al., 2023; Yan, 2023) found that ChatGPT adoption among students reached an appreciable stage.

Studies used many factors in testing their impact on the adoption of ChatGPT by students. However, their findings revealed mixed results of significant and insignificant impact. For instance, Tiwari et al. (2023) revealed that perceived enjoyment and motivation, perceived social presence, perceived credibility as well as perceived usefulness are some of the factors that significantly influence students' attitudes toward the adoption of ChatGPT in Oman. Moreover, Abdaljaleel et al. (2023) found that among the factors that significantly influence the adoption of ChatGPT are perceived ease of use, perceived usefulness, social influence, and perceived anxiety. Additionally Raman et al. (2023) pointed out that reliability, compatibility, relative advantage and perceived ease of use are some factors that significantly influence the adoption of ChatGPT among students. Correspondingly, factors such as performance expectancy, effort expectancy, social influence, hedonic motivation and habit are found to be significant factors that influence the adoption of ChatGPT Polish State UniversityHoland (Strzelecki, 2023). However, some factors when tested were found to be insignificant in impacting the adoption of ChatGPT. For instance, Tiwari et al. (2023) found that the perceived ease of use factor has an insignificant impact on the adoption of ChatGPT by students in Oman. Likewise, findings of (Strzelecki, 2023) revealed that the facilitating condition factor is not influencing the adoption of ChatGPT by students of the Polish State University Holand. Based on the foregoing, it is believed that there are variations among the factors that influence the adoption of ChatGPT among students, hence the need to employ other factors, test them and find their impact on the adoption of ChatGPT by postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi State.

Theoretical Background and Model Development

The Technology Acceptance Model (TAM) is a widely used theoretical framework for understanding and predicting user adoption and use of new technologies(Davis, 1986; Lai, 2017). Originally developed by Fred Davis in the late 1980s, TAM has since been extended and refined by various researchers(Szajna, 1996). TAM posits that the primary determinants of technology adoption are perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness (PU) refers to the user's subjective assessment of how much a particular technology would enhance their job performance or make their tasks easier(Davis, 1986). If users perceive technology as useful, they are more likely to adopt it. In the same vein, perceived ease of use (PEOU) refers to the degree to which users believe that using a particular technology would be

effortless or require minimal mental or physical effort(Davis, 1986). Technologies that are perceived as easy to use are more likely to be adopted.

TAM suggests that both PU and PEOU directly influence users' attitudes toward using a technology, which in turn influences their intention to use it. Furthermore, users' intention to use technology is seen as the strongest predictor of actual technology adoption(Venkatesh & Davis, 2000). Extensions and modifications to the original TAM have been made over the years. Researchers have developed variations of TAM tailored to specific contexts, such as mobile technology adoption (m-TAM), e-commerce adoption (e-TAM), cloud technology adoption and many more. Therefore, this research will also extend the TAM by including other factors to determine the adoption of ChatGPT by postgraduate students in Nigeria.

Other factors included in this research are reported by previous studies as very relevant in impacting the adoption of novel technology. For instance, the training factor is included because Onwuka et al., (2023) asserted that once adequate training will be provided, the adoption of the technology will be easier and improved by the potential adopters. Similarly, the reliability of technology also influences the adoption of that technology. Ogunleye, (2024) revealed that technologies that are tested and found reliable are liable to be easily accepted by the potential adopters of that technology. Moreover, awareness playsvital roles in the adoption of technology (Onwuka et al., 2023). Users who are awareof certain technology accept and use the technology far better than those who are not aware. Additionally, the security and privacy of technology attract and give confidence to potential users, thus enticing them to adopt the technology and use it for simplifying their activities. Continuously, the feedback mechanism is also included in this research model because of its importance in informing the users about the functionality of the technology. Onwuka et al., (2023)affirmed that technology that provides instant feedback makes users accept it as they have an instant function or otherwise of that technology. To this extent, this research planned to extend the TAM by including training, reliability, awareness, security &privacy and feedback mechanism factors. Based on the foregoing, this research formulated the following hypotheses which needs to be tested:

H1: There isa positive relationship between perceived ease of use and the adoption of ChatGPT

H2: There isa positive relationship between perceived usefulness and the adoption of ChatGPT

H3: There isa positive relationship between training and the adoption of ChatGPT

H4: There isa positive relationship between reliability and the adoption of ChatGPT

H5: There isa positive relationship between awareness and the adoption of ChatGPT

H6: There isa positive relationship between security and privacy and the adoption of ChatGPT

H7: There isa positive relationship between feedback mechanism and the adoption of ChatGPT

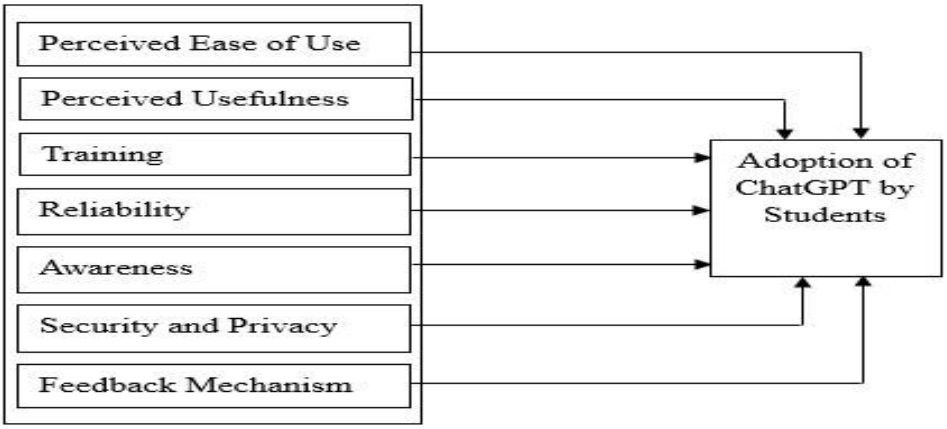

Figure 1: Research Model

Methodology

This explains the approach used in conducting the research, in which the research design, population, sample size, instrument for collecting data, questionnaire administration, and methods for data analysis were described. A quantitative approach using a descriptive survey strategy is employed in this research. Postgraduate students from the Faculty of Social Sciences Sa'adu Zungur University Gadau, Bauchi State served as targeted respondents of the research. 172 respondents formed the population of the research, 118 minimum sample size is considered as revealed by Krejci and Morgan's Table of sampling size determination; consequently, a simple random sampling technique was used in drawing the earmarked sample size of the research.

Previously used scales based on the research variables were adapted and developed into a well-structured questionnaire using a 5-point Likert scale ranging from 1-strongly disagree to 5 strongly agree. Thereafter, content and face validities were examined by subjecting the questionnaire to further verification by experts, which eventually were distributed to the targeted respondents to obtain data that will address the research objectives. Questionnaire distribution and collection were conducted within 1 month. Out of 118 distributed questionnaires, only 106were successfully retrieved. However, 8 of them were rejected due to high-level of missing values and outliers; thereafter, the remaining 98 were therefore subjected to further analysis. Data for the research was analysed using Statistical Package for Social Science (SPSS) software

version 20 and Partial Least Square- Structural Equation Modelling (PLS-SEM) software. SPSS was used in screening the data and analysing the descriptive statistics of the research, while Smart PLS – SEM version 3.0 was used in analysing the measurement and structural models of the research, which eventually provided the results that answered the objectives andhypotheses

Results

Sample Characteristics

The sample characteristics results revealed that 75 (76.6%) males and 23 (33.5%) females participated in answering the questionnaire appropriately. This signified that the male took part in this research more than their female counterpart. It is believed that males undergo postgraduate studies more than females due to several factors (Yılmaz et al., 2019). Moreover, the results further revealed that 12 (12.2%) respondents are PhD students, 31 (31.6%) are MSc/Masters students and 55 (56.1%) are PGD students. It is deduced that PGD students participated more than any other postgraduate candidates considered in this research. In the same vein, information regarding the student's years of study revealed that 24 (24.5%) are in their year 1, 55 (56.1%) are in their year 2, and 19 (19.4%) are in their year 3. No students from year 4 and above participated in this research. This signified that the students in year 2 participated more than any other category of years of study. Table 1 depicts the characteristics information of sampled respondents.

Table 1: Sample Characteristics

Demographic variable	**Values**	**frequency**	**Percentage (%)**
Gender	Male	75.0	76.5
	Female	23.0	23.5
	Total	98.0	100
Postgraduate programme type	PhD	12.0	12.2
	MSc/ Masters (Professional)	31.0	31.6
	PGD	55.0	56.1
	Total	98.0	100
Year of Study	1	24.0	24.5

	2	55.0	56.1
	3	19.0	19.4
	4 and Above	00.0	00.0
	Total	98.0	100

PhD= Doctor of Philosophy, MSc=Master of Science, PGD=Postgraduate Diploma

Assessing the Level of Adoption of ChatGPT by Postgraduate Students

The researcher analysed the construct that assessed the students' level of adoption of ChatGPT and the results revealed that the students had partially adopted the ChatGPT as depicted by more than half of them (57.1%), followed by those who never adopted represented by 23.5% and then those who moderately adopted it accounted for theleast which is 19.4%. Furthermore, the results revealed that the overall level of adoption of ChatGPT by the students under consideration is partially as indicated by the Mean and Standard deviation values (Table 2). The construct's descriptive statistical result indicated that the Mean value of the "level of adoption of ChatGPT by postgraduate students construct" is 1.959. This construct is measured on a 4-point Likert scale ranging from 1- Never adopt to 4- fully adopt. Based on the construct Mean value of 1.959, the level of ChatGPT adoption and use by postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi State is partial.

Table 2: The level of adoption of ChatGPT by postgraduate students

Level of Adoption and use	Frequency	Percentage	Minimum	Maximum	Mean	Std. Deviation
Never	23	23.5	1.00	3.00	1.959	0.657
Partially	56	57.1	1.00	3.00		
Moderately	19	19.4	1.00	3.00		
Fully	0.00	0.00	1.00	3.00		
Total	98	100.0	1.00	3.00		

Measurement Model Evaluation

Checking the reliability and validity of questionnaire items/constructs is necessary in order to obtain more accurate results (Hair et al., 2017). Reliability of questionnaire items occurs when it produces consistent outcomes under consistent conditions while validity occurs when the items accurately measure what it intends to measure (Leguina, 2015). The reliability and validity of this research questionnaire items are all examined through Factor loadings (FL), composite reliability (CR), Cronbach alpha (CA), average variance extracted (AVE) and Heterotrait-monotrait (HTMT) criterion. Factor loadings, Cronbach's Alpha and composite reliability values should be equal to or greater than 0.7, while average variance extracted values should be equal to or greater than 0.5 (Hair et al., 2014).

Factor loading which explains the correlation between the items and the factors is expected to have a threshold value of equal to or greater than 0.7 for it to be established (Hair et al., 2013). These research items fulfilled such thresholds as all the items recorded factor loadings above 0.7. Similarly, Cronbach alpha which also testifies to the reliability of the constructs satisfies the minimum threshold of equal to or greater than 0.7 as all the values recorded are above 0.7(Leguina, 2015). Moreover, composite reliability which explains the reliability of the questionnaire item by measuring the internal consistency in scale items is found to be fully established as all the constructs recorded values above 0.7 (Leguina, 2015). Moreover, the average variance extracted which aims at establishing convergent validity also meets the necessary requirement as all the constructs recorded values above 0.05 (Hair et al., 2014). Table 3 depicts value scores of factor loadings, Cronbach alpha, composite reliability and average variance extracted. Accordingly, HTMT which helps in establishing the discriminant validity is achieved as all the values fall within the threshold value of less than 0.90 (Leguina, 2015)as can be seen in Table 4

Therefore, based on the results obtained, it is established that the measurement evaluation model of the research is achieved as all items are reliable and valid based on the minimum threshold propounded by (Hair et al., 2011, 2014; Hair et al., 2012; Leguina, 2015), hence paving the way for the next level of analysis which is structural model evaluation.

Table 3: Measurement Evaluation

Construct	Items	FL	CA	CR	AVE
Perceived ease of use	PEOU1	0.722	0.722	0.799	0.610
	PEOU2	0.877			
	PEOU3	0.877			
	PEOU4	0.727			
	PEOU5	0.733			
Perceived usefulness	PU1	0.709	0.705	0.707	0.540
	PU2	0.713			
	PU3	0.802			
	PU4	0.714			
	PU5	0.811			
Reliability	REL1	0.984	0.873	0.927	0.785
	REL2	0.983			
	REL3	0.984			
	REL4	0.802			
	REL5	0.708			
Awareness	AWA1	0.819	0.805	0.862	0.559
	AWA2	0.853			
	AWA3	0.701			
	AWA4	0.706			
	AWA5	0.732			
Training	TRA1	0.809	0.772	0.733	0.502
	TRA2	0.073			
	TRA3	0.733			
	TRA4	0.789			
	TRA5	0.756			
Feedback mechanism	FBM1	0.816	0.768	0.879	0.700
	FBM2	0.943			
	FBM3	0.952			
	FBM4	0.701			
	FBM5	0.952			
Security and privacy	SAP1	0.924	0.774	0.812	0.505
	SAP2	0.852			

	SAP3	0.981			
	SAP4	0.702			
	SAP5	0.706			
Adoption of ChatGPT	INT1	0.781	0.702	0.709	0.509
	INT2	0.702			
	INT3	0.704			
	INT4	0.723			
	INT5	0.746			

Note: FL= Factor Loadings, CA= Cronbach Alpha, CA=Composite Reliability, AVE= Average Variance Extracted

Table 4: Heterotrait-monotrait (HTMT) criterion

	Awareness	ChatGPT adoption	Feedback mechanism	Perceived ease of use	Perceived usefulness	Reliability	Security and privacy	Training
Awareness								
ChatGPT adoption	0.265							
Feedback mechanism	0.334	0.208						
Perceived ease of use	0.197	0.600	0.225					
Perceived usefulness	0.126	0.277	0.070	0.351				
Reliability	0.330	0.253	0.182	0.345	0.094			
Security &privacy	0.195	0.556	0.174	0.259	0.149	0.137		
Training	0.205	0.896	0.096	0.297	0.162	0.520	0.890	

Structural Model Evaluation

Structural model evaluation helps in finding the relationship between independent variables and dependent variable, the effect size (F^2) of each independent variable on the dependent variable as well as the coefficient of determination (R^2)(Leguina, 2015). Results revealed that out of the seven relationships hypothesized, six are positively significant in influencing the adoption of ChatGPT by the postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi State. The positive impactingfactors which recorded Pvalues of less than 0.05 (P=< 0.05) are perceived ease of use, perceived usefulness, awareness, reliability,

security and privacy and feedback mechanism. While the one factor that is not significant is the training factor. Moreover,the results of F^2 of each independent variable on the dependent variable as can be seen in Table 5 revealed that there is a small contribution of each independent variables on the dependent variable.Cohen (1988)maintained the F^2 values of >= 0.2 as small, >= 0.15 as medium and >= 0.35 as large. Additionally, the coefficient of determination (R^2) which indicates the collective contributions of all the independent variables on the dependent variable revealed a value of 0.806. implying that the independent variables collectively explain 80.6% variances in the dependent variable which is quite good according to (Hair et al., 2019; Henseler et al., 2009).

Based on the structural model results as shown in Table 5 and Figure 2, the model is good enough to serve as a road map for predicting and influencing the adoption of ChatGPT by the postgraduate students of the Faculty of Social Sciences, Sa'adu Zungur University Gadau, Bauchi State.

Table 5: Path coefficients and the results of the significance tests for P, F^2, R^2, and Q^2 values

hypothesis	Relationships	Beta value	P values	Hypothesis Status	F^2 values	F^2 Status	R^2 value
H1	Perceived ease of use to adoption and useof ChatGPT	0.171	0.015	supported	0.203	small	0.806 (806%)
H2	Perceived usefulness to adoption and useof ChatGPT	0.117	0.010	supported	0.114	small	
H3	Trainingto adoption and useof ChatGPT	0.112	0.152	unsupported	0.144	small	
H4	Reliability to adoption and use of ChatGPT	0.174	0.004	supported	0.143	small	
H5	Awarenessto adoption and useof ChatGPT	0187	0.001	supported	0.195	medium	
H6	Security & privacy to adoption and useof ChatGPT	0.536	0.000	supported	0.223	medium	
H7	Feedback mechanism to adoption and useof ChatGPT	0.195	0.004	supported	0.131	small	

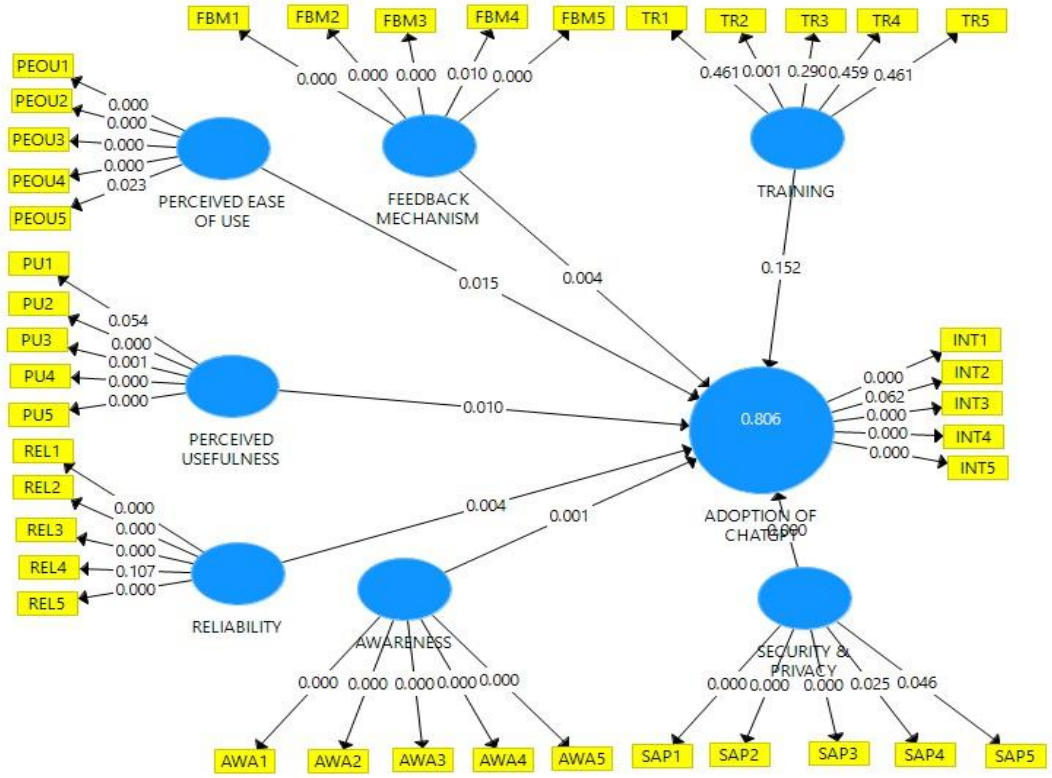

Figure 2: PLS_SEM model output of the research showing Coefficient of determination (R^2) and path coefficient

Discussion

This research affirmed the strong association between "perceived ease of use" and "adoption of ChatGPT" by postgraduate students, implying that the simplicity of using ChatGPT makes its adoption to be increased by postgraduate students. This finding is consistent with previous studies by (Dahri et al., 2024; Goh et al., 2023; Yilmaz et al., 2023), however contradicts other previous findings that (Faruk et al., 2023; Saif et al., 2024; Tiwari et al., 2023). Based on this result, hypothesis 1 is accepted. Moreover, perceived usefulness is also found to have a strong positive connection with the adoption of ChatGPT by postgraduate students, saying that the usefulness and benefits of ChatGPT positively influence the postgraduate students to adopt and use it for their academic pursuits. This finding corroborated other previous findings such as (Dahri et al., 2024; Goh et al., 2023; Tiwari et al., 2023; Yilmaz et al., 2023) but deviate from other ones that include that of (Goyal et al., 2023).

In the same vein, this research results revealed that the reliability factor is a strong influencer of ChatGPT adoption by postgraduate students, suggesting that the reliability of ChatGPT entices its adoption by postgraduate students consequently improving its usability.. Choudhury et al.

(2024) acknowledged the reliability of ChatGPT in providing accurate responses to users. This research finding supported previous findings of Choudhury et al. (2024) who also affirmed the positive impact of ChatGPT reliability. However, this research finding disagrees with other previous findings that established that the reliability of ChatGPT is not certain thus will not influence its adoption by users(Lo, 2023; Rasul et al., 2023). Continuously, awareness factors is found to have a strong positive relationship with the adoption of ChatGPT by postgraduate students, signifying that awareness significantly influences the acceptance and use of ChatGPT.. Once the postgraduate students is aware of the ChatGPT, its adoption by them will be seriously enhanced and broadened. This finding is in line with that of (Aliyu et al., 2023) who found the positive influence of awareness on the adoption of novel technologies. However, the finding contradicts that of (Goyal et al., 2023)who found that awareness does not significantly influences the adoption of novel technology.

In this research, security and privacy factor emerged as another good indicator of ChatGPT adoption by postgraduate students, attesting that security and privacy play a significant role in making postgraduate students to adopt ChatGPT. These findings are consistent with other studies that have demonstrated a notable and affirmative correlation between security and privacy and the adoption of technology in the educational domain. For instance, in areas such as ChatGPT (Choudhury et al., 2024), e-learning platforms (Azizi et al., 2020; Nikolopoulou et al., 2020), and learning management software (Raman & Don, 2013). However, this present finding is not the same as some previous findings that includethat of Wu et al. (2023) which show concerns about the security and privacy of ChatGPT. Additionally, the feedback mechanism factor also indicated a positive significant relationship with the adoption of ChatGPT by postgraduate students, implying that with good feedback from the ChatGPT, postgraduate students will rush to adopt such technology to address their information needs. An effective feedback mechanism indeed influences adoption of ChatGPT by users as it satisfies their information needs quickly (Habibi et al., 2023). This present finding corroborated some other previous ones by (Dai et al., 2023) and (Habibi et al., 2023). However, the finding disagrees with some other previous findings by (Fuchs, 2023).

Training factor is found to have an insignificant impact on the adoption and use of ChatGPT, implying that training does not influence postgraduate students to adopt ChatGPT. This revealed that without undergoing training on how to operate ChatGPT applications, students can still operate the application. Rahman and Watanobe, (2023) acknowledged that ChatGPT is a simple

application that one can operate without rigorous training. This finding is in line with other previous findings that found that training is an insignificant factor influencing the adoption of novel technology (Jibrin et al., 2019; Yakubu et al., 2024). However, the finding contradicts some findings that found a positive significant impact between training and adoption of technologies such as the Internet of thing(Yuvaraj, 2016) and cloud computing (Njenga et al., 2019).

Conclusion

The research aimed to assess the level of adoption of ChatGPTas well as to examine the impactingfactors of ChatGPT adoption by postgraduate students using the TAM framework, which is extensively used in technology adoption research. We utilized the modified TAM scales for the additional variables to assess the adoption and utilization of ChatGPT, with all eight variables satisfying the established standards for reliability and validity. Accordingly, the research confirmed the significant impact of six factors (Perceived ease of use, Perceived usefulness, Reliability, awareness, feedback mechanism, security and privacy) on the adoption and use of ChatGPT by postgraduate students. Therefore, taking these significant factors into consideration can fuel the adoption of ChatGPT among postgraduate students to address their academic-based information needs for enhanced learning and academic support. This research enhances the knowledge about factors impactingthe adoption of ChatGPT by postgraduate students. Even though prevailing literature on this subject is scarce, especially regarding Northern Nigeria and specifically North Eastern Nigeria, this research results hold considerable importance for expanding discussions about the adoption and use of ChatGPT in academic settings and by postgraduate students.

Recommendations

Since ChatGPT adoption and utilization in the higher education domain are not yet extensively explored, there are useful suggestions that this research will offer for future studies.

1. Considering the fact that ChatGPT plays a vital role in enhancing students' pursuance of knowledge and this research results revealed that ChatGPT is partially adopted, it is recommended that more strategies should be devised toward improving its adoption to adequately enhance and support learning.
2. Factors that are positively significant in influencing the adoptionof ChatGPT should be given special consideration when deliberating or deciding to adopt ChatGPT. This can

make the adoption of ChatGPT more widely, hence impacting the students' readiness to acquire knowledge.

3. Other categories of users apart from postgraduate students in the higher education domain such as Librarians, lecturers and technologies should be considered in future studies.

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