ISSN 2723-6471

Exploring The Factors Influencing the Adoption of ChatGPT in Educational Institutions: Insights from Innovation Resistance Theory

Salem Alghamdi[1,*], Yaser Alhasawi[2]

[1] *Digital Transformation and Information Department, Institute of Public Administration (IPA), Saudi Arabia*

[2]*Management Information System Department, King Abdulaziz University (KAU), Jeddah, Saudi Arabia*

(Received: March 22, 2024; Revised: April 9, 2024; Accepted: April 20, 2024; Available online: May 18, 2024)

Abstract

The ability of ChatGPT to increase student interaction and personalize learning has the capacity to dramatically change educational institutions. It can help students to ask questions and receive immediate answers from their teachers, provide personalized feedback, as well as provide dynamic experiential learning. This research explores the factors affecting the intention to use ChatGPT for educational purposes, based on Innovation Resistance Theory (IRT). A structural equation modeling was used to analyze data that was gathered from 340 American learners. The results show that usage barrier construct, value barrier, risk barrier, image barrier, traditional barrier, and perceived cost barriers are negatively associated with the intention to use ChatGPT. These findings have important ramifications for ChatGPT developers, educators, and academic institutions. Educators can leverage ChatGPT's capabilities to enhance student learning experiences, facilitate personalized learning paths, and foster collaborative learning environments.

Keywords: Innovation resistance theory, Usage barrier, knowledge barrier, Risk barrier, Intention to use ChatGPT

1. Introduction

It is projected that artificial intelligence (AI) will revolutionize education by bringing about an unprecedented shift in the methods of teaching and learning [1]. The term AI refers to the system that correctively interpret and gain knowledge from the data, and use it to achieve the goals with flexible adjustments [2]. In recent years, AI has been widely used and rapidly transformed [3]. The goal of this technology is to develop systems that can think and act like humans, so they can accomplish their goals [4]. The relevance of AI is seen in its ability to completely transform a wide range of sectors and businesses, including healthcare, finance, education, and entertainment. AI-powered systems in the healthcare industry are able to evaluate enormous volumes of medical data to help with medication development, diagnosis, and treatment planning, resulting in more effective and individualized healthcare delivery [5]. AI algorithms in finance may improve risk management and decision-making processes by analyzing market patterns, spotting fraud, and optimizing investment strategies. In education, AI-driven tools like intelligent tutoring systems and adaptive learning platforms can provide personalized learning experiences, identify student strengths and weaknesses, and offer targeted interventions, ultimately improving learning outcomes.

AI-driven instruments, such as language models and chatbots, like ChatGPT, are essential for improving the process of learning [6]. Chatbots use machine learning algorithms and natural language processing that simulate interaction in a human-like manner [7], [8]. AI Chatbots are easily accessible tools that offer quick responses to students' questions anytime [9]. ChatGPT, a generative pretrained transformer, is the advanced and better version of earlier generative forms which is capable of making forecast and generating response to any almost any query [10], [11]. According to [12], these automated solutions are adept at expediting administrative duties, enabling individualized learning experiences, and encouraging increased student participation. In particular, ChatGPT is unique as an AI-powered chatbot that may serve as a virtual assistant by responding to inquiries, providing clarifications, and creating instructional content [13]. The public ChatGPT makes use of the generative pre-trained transformer (GPT) 3.5.

***Corresponding author: Salem Alghamdi (ghamdiSA@ipa.edu.sa)**
DOI: https://doi.org/10.47738/jads.v5i2.198
This is an open access article under the CC-BY license (https://creativecommons.org/licenses/by/4.0/).
© Authors retain all copyrights

 ISSN 2723-6471

Recently, OpenAI revealed GPT4, its most current language modelling system, which was recently gradually included to ChatGPT Plus. GPT4 is capable of handling text and picture inputs, generating text outputs that are desired and exhibiting human-like performance on a range of educational and professional standards. ChatGPT 4 is superior in terms of conciseness and reasoning than its previous version [14]. It is also capable of handling the photos and videos in the context making it easy for the learner to use it for legitimate purpose [15]. The latest ChatGPT version enhance students' experience through adaptive learning system and personalized content creation. In addition, instead replacing teachers' role, it is empowering them to play their effective role by applying novel pedagogical techniques that encourages students' involvement with textbook [9], [16]. However, some researchers argued that the introduction of ChatGPT in the education setting might reduce teachers and student's interaction [17]. This could lead fewer meaning discussion, receiving emotional support and guidance which are essential for the personal development and learning experiences [18]. In addition, ethical consideration is another significant challenge. These concerns include ChatGPT-generated content for and assignments which pose a threat to academic integrity [19]. There are also some drawbacks to using ChatGPT for teachers. One of the main concerns is teachers' overly dependence on ChatGPT, which hinders their critical thinking, problem-solving capabilities, and diminishes the learning curve [18], [20], [21].

The growing worldwide need of ChatGPT has led to a deeper look at potential barriers to its further acceptance, particularly in the US, due to its large user base and importance to cutting-edge technology [5]. This research uses all five of the Innovation Resistance Theory's factors to better understand the barriers preventing the adoption of ChatGPT. Furthermore, an important aspect to investigate is the perceived cost barrier, which is seen in earlier studies as a significant barrier to the general adoption of novel technology [22]. Innovation Resistance Theory offers a thorough framework for comprehending user resistance to new technology adoption (e.g., ChatGPT) [23]. Using this theoretical framework, the research looks for distinct resistance points that user could show when thinking about incorporating ChatGPT into regular conversations [24]. Despite the abundance of literature on AI technology now in prior literature, there is still very little research on the adoption of ChatGPT in education through the lens of innovation resistance theory model. This study fills the gap in literature by investigating the factors contributing to resistance, seeking insights into the underlying causes of the limited adoption of ChatGPT among students in the United States. The primary goal is to establish connections between usage barrier, value barrier, risk barrier, tradition barrier, image barrier, perceived cost barrier and intention to adopt ChatGPT among U.S students. Additionally, the study aims to analyze statistical variances in ChatGPT adoption intention between users and non-users. To explore these barriers, Innovation Resistance Theory (IRT) and a negative valance factor are employed as analytical frameworks.

The following research questions may be inferred from the preceding assertions: (1) How much technology adoption resistance contributes to ChatGPT adoption intention?

The theoretical contribution of this research lies in its comprehensive investigation of factors contributing to resistance in the adoption of ChatGPT among students in the United States. By employing IRT and a negative valence factor as analytical frameworks, the study delves into the usage barrier, value barrier, risk barrier, tradition barrier, image barrier, perceived cost barrier, and their impact on intention to adopt ChatGPT. In past, many researchers used technology adoption theories to understand ChatGPT adoption in education. For example, [25] used Technology-Organization-Environment (TOE) framework to understand university students ChatGPT adoption. [26] integrated AI device use acceptance (AIDUA) model and cognitive appraisal theory (CAT) to assess the acceptance of ChatGPT4. [27] used an extended Unified Theory of Acceptance and Use of Technology (UTAUT) with perceived interactivity and privacy concern to assess the factors influencing users' acceptance of ChatGPT. [28] employed an extended technology acceptance model (TAM) with intrinsic motivation to examine ChatGPT adoption among undergraduate students in Hong Kong. [29] used and extended UTAUT with anxiety to predict the adoption of ChatGPT among higher education students in UK and Nepal. [30] used Technology Readiness theoretical lens to identify the factors affecting Jordanian students' acceptance of ChatGPT. However, past studies have not paid much attention to the barriers of ChatGPT adoption, particularly using the theoretical lens of IRT. This research not only fills a gap in the literature by applying the IRT model to the context of ChatGPT adoption but also offers insights into the dynamics of resistance points that user may exhibit when considering the integration of ChatGPT into their regular interactions. The research questions posed in this study serve as a guide for future academics exploring technology adoption in the ever-evolving landscape of conversational AI, emphasizing the importance of understanding and addressing resistance factors to maximize the

 ISSN 2723-6471

societal benefits of innovative technologies like ChatGPT. The results of this study have consequences that go beyond its immediate scope since they may be used as a guide by future academics who want to look into related topics in the always changing field of technology adoption. In light of the ongoing progress in conversational AI, it is critical to comprehend and understand the resistance factors or barriers factors in order to optimize the societal advantages that can be derived from innovative technologies such as ChatGPT. IRT factors are technology-specific and focus on underlying causes of students' resistance to using ChatGPT. Understanding the specific barriers to ChatGPT adoption will help academicians to design specific training sessions for the teachers to address students' concerns and accelerate the rate of adoption among the students.

The next section is the literature review, which will discuss the significance of IRT as theoretical lens for the current study. Furthermore, literature review discusses hypotheses development by explaining different barriers affecting the adoption of ChatGPT. The methodology section will discuss the development of measurement scales which is based on past studies established scales, data collection and sampling procedure. Fourth section explains the data analysis and results. This section will elaborate the statistical technique used in this study, validation of measurement and structural models and report the findings based on hypothesized research model. Next section provides a detail discussion on current study findings and compare it previous studies. Furthermore, the study will discuss the theoretical implication by emphasizing the role of IRT factors and its contribution in literature. Practical implications propose strategies that will help to increase ChatGPT adoption among students. Finally, the study proposes future research directions that will help researchers to explore new avenues of research and expand literature on ChatGPT adoption in education.

2. Literature Review

2.1. Innovation Resistance Theoretical Perspective

The innovation resistance theory provides a theoretical framework in understanding the resistance-oriented behavior of the students [1], [13]. IRT helps to explain why customers are apprehensive of new developments. They further argued that innovation resistance is a behavior that arises from users' logical assessment and evaluation of a new innovation that has the potential to disrupt the current paradigm and diverge from their preexisting beliefs [1]. In addition, there are two kinds of consumer opposition: aggressive and passive [8]. The functional barriers outlined in the IRT can be utilized to explore active resistance, which arises from the attributes or characteristics of innovations [12]. The behavioral contradictions caused by the use, value, and the hazard of the invention creates hurdles to its acceptance and usage. Conversely, passive resistance arises from disagreements with previous concepts and may be examined using the psychological barriers that innovation resistance theory presented. The two categories of psychological barriers are tradition and image. The inclusiveness of the IRT renders it a suitable framework for investigating users' reluctance towards innovations [12]. Additionally, prevalent theoretical frameworks like the diffusion of innovation and technology acceptance model do not specifically address the examination of resistance towards user innovations [3]. The IRT focuses on understanding customers' reactions to any product in terms of barriers, such as usage, risk, value, tradition, and image, provides researchers with a theoretical foundation for understanding resistance to innovations. This is particularly significant as innovations will continuously permeate the market.

In past, the literature on IRT presents mixed results regarding the influence of barriers affecting technology adoption. [32] findings revealed that all factors of IRT negatively influence purchase of eco-friendly cosmetics. Similarly, the findings of [33] indicate the negative influence of the IRT variable on the use of mobile ticketing systems. [79] employed IRT to evaluate tourists' adoption of mobile payment systems (MPS) and found that traditional and value barriers do not affect the adoption of MPS among the tourists. [34] used IRT to assess consumers' adoption of internet banking and found the insignificant effect of traditional barriers on adoption. Recently, [35] found the insignificant impact of value barriers on the adopting food delivery applications. However, the literature is limited on the barriers of adopting ChatGPT, particularly the barriers affecting students' intention to use ChatGPT through the lens of IRT. Therefore, this study uses IRT framework and evaluates the barriers affecting the adoption of ChatGPT among the university students.

2.2. Usage Barrier and Intention to Use Chatgpt

The concept of usage barriers pertains to the hindrances that arise from potential modifications, particularly when it comes to utilizing novel technology [4]. For instance, the cognitive effort of learning how to use and integrate new technologies, such as ChatGPT, could be a major barrier. Additionally, in order to prepare for the new technology, it is also necessary to adjust established routines and habits, which contributes to the complexity of the process [5]. It is possible that these barriers will hinder future usage and adoption even after the first learning period is over.

Research has indicated a negative connection between usage barriers and users' intentions to adopt newer digital innovations, including smartphone banking [22], online shopping [3], and mobile commerce [23]. The use of conversational AI models, like ChatGPT, may also be justified by this logic. Usage barriers, which include factors like sophistication, inexperience, and interface challenges, may seriously restrict users' ability to effortlessly integrate ChatGPT into their everyday lives [24], [36]. A key contention posits that the conversational interface of ChatGPT might present difficulties for users to navigate and interact with, potentially resulting in feelings of frustration and a hesitancy to integrate it into their daily routines [31]. Therefore, based on the argument above we postulate the following hypothesis.

H1: Usage barrier will have a negative influence on the intention to use ChatGPT

2.3. Value Barrier and Intention to Use Chatgpt

The concept of value barriers is used for dealing with criticisms, particularly when weighing the advantages of an innovation against the costs associated with its implementation and learning [37]. To ensure minimal value barriers, ChatGPT should provide users with more value in exchange for both time and energy they invested in education and adapting to these systems.

Research has shown that there is a connection between value barriers and user behavior concerning acceptance, resistance, and use of various technologies. Most previous literature indicates that value barriers negatively affect user intentions in a number of contexts, including online shopping [38] and artificial intelligence [39]. Value barriers, such as factors like perceived utility, value, and compatibility with user values, may significantly reduce users' intentions to use ChatGPT. A fundamental dispute revolves around the possible discrepancy between user projections and the perceived value of ChatGPT. If users don't think ChatGPT will significantly improve their lives or think the capabilities aren't necessary for them, they can be reluctant to use it. Furthermore, as the research on AI has shown, worries about the ethical ramifications and biases in AI might serve as significant value barriers [31]. Therefore, based on the discussion ahead we postulate the following hypothesis.

H2: Value barrier will have a negative influence on the intention to use ChatGPT

2.4. Risk Barrier and Intention to Use Chatgpt

Risk barriers pertain to the reluctance stemming from uncertainties inherent in any innovation technology. According to [40] acceptance of innovation is contingent upon the degree of uncertainties introduced by the innovation itself. For example, innovation acceptance tends to decrease when the innovation involves heighten levels of uncertainty. [41] identified four distinct categories of risks linked to innovation: physical, economic, functional, and social.

It is possible that users of ChatGPT will face a number of risks, making it more difficult for them to use and adopt the platform [41]. These risks include the possibility of misinformation or unintended generation of content that may lead to misunderstandings or misinterpretations. Users may be worried about the lack of control over the generated answers, as well as possible ethical difficulties resulting from biased or incorrect outputs. In addition, users of ChatGPT may share information that they feel private or sensitive, raising concerns about data security and privacy [42]. Furthermore, as the model's answers are based on patterns discovered from data and could not always represent correct or current information, there is a chance that using ChatGPT excessively for important decision-making or information distribution might provide difficulties. To build user trust and encourage the responsible and advantageous use of ChatGPT in a variety of applications, these potential risks must be addressed. Therefore, according to the argument, we postulate the underlying hypothesis.

H3: Risk barrier will have a negative influence on the intention to use ChatGPT

 ISSN 2723-6471

2.5. Tradition Barrier and Intention to Use Chatgpt

The success of every good or service is determined by its traditions [43]. According to scholars, traditions are deeply rooted in individuals' relationships and communities, and any challenge to them can lead to boycotts, negative publicity, and adverse word-of-mouth [44]. Tradition barriers are the challenges that arise from any innovation that affects a user's beliefs, or way of behaving [45]. According to research by [46], there is a negative connection between traditional barriers and the intent of adopting new innovations.

Similarly, users may encounter traditional barriers while attempting to embrace ChatGPT, which might negatively affect their intention of incorporating this conversational AI model into their everyday routines [47]. These barriers might include the lack of understanding of and unwillingness to use cutting-edge technology, especially when it comes to artificial intelligence and natural language processing. The interactive interface of ChatGPT may be difficult for users used to more traditional forms of communication to get used to, which might make them reluctant to adopt this cutting-edge technology [48]. In order to break through these conventional barriers, it is necessary to raise user awareness while also making sure that ChatGPT's design is user-friendly, allowing for a smooth and simple interface that will encourage favorable intents for its adoption. Therefore, according to the argument, we postulate the underlying hypothesis.

H4: Traditional barrier will have a negative influence on the intention to use ChatGPT

2.6. Image Barrier and Intention to Use Chatgpt

An image barrier is the unfavorable perception that customers have toward innovation because of a substantial change in its identity or appearance [38]. Customers may develop a bad image of a company if they find that the customer relationship and customer service are unsatisfactory [36], [40]. Additionally, they demonstrated how customer attitudes and behaviours towards various digital technology tasks are influenced negatively by their image.

The image barrier may seriously impede user’s intention to use ChatGPT as they struggle with feelings of unfamiliarity, questions about dependability, and unpleasant experiences from the past [1], [40]. Because, ChatGPT is cutting edge technology, it could seem significantly different from traditional communication channels [49]. This might make users hesitant because they are concerned about the long learning process or find it difficult to get used to a new interface. Furthermore, customers may have issues about ChatGPT dependability if they are uneasy with the technology provider's track record or fear inaccurate or unsuitable results [50]. Users' pre-existing skepticism may be further exacerbated by negative prior experiences with comparable AI-driven tools, leading them to attribute their concerns to ChatGPT. Therefore, based on the argument above, we postulate the following hypothesis (see Figure 1).

H5: Image barrier will have a negative influence on the intention to use ChatGPT

2.7. Cost Barrier and Intention to Use ChatGPT

In the context of ChatGPT, the financial factors that may prevent users from adopting the technology are referred to as “cost barrier”. This barrier frequently appears in the form of use charges or membership fees related to using ChatGPT services [51]. The possibility of incurring charges may discourage users, particularly if they feel that the expenditure is excessive for the advantages, they believe they will get or if they are on the tight budget. In addition, prospective customers may become reluctant or hesitant of there is no clear and value driven price structure in place [50], [52]. Cost factors are important when making decisions, therefore even if ChatGPT has useful features and capabilities, a large or ambiguous financial commitment may make user less likely to utilize it [53]. In order to overcome the cost barrier, supplier must set up fair and clear pricing system. When user believe the value, offer is greater than the associated cost, they will be more likely to adopt and engage with the product. Therefore, based on the argument above, we suggest the following hypothesis. Figure 1 below illustrate the conceptual model used in this research.

H6: Cost barrier will have a negative influence on the intention to use ChatGPT.

 ISSN 2723-6471

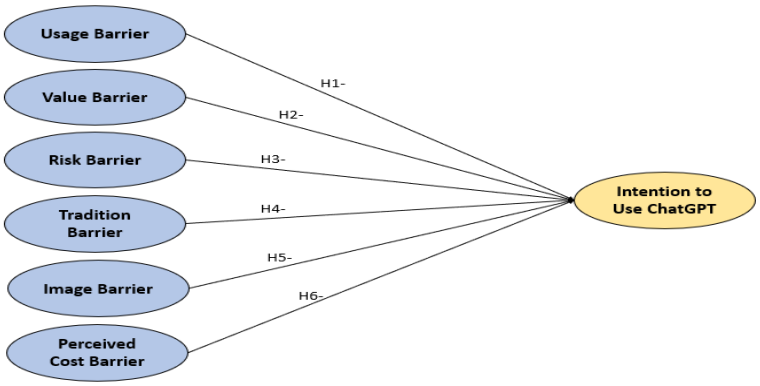

Figure 1. Conceptual Model

3. Methodology

3.1. Data Collection and Sampling

The nature of the study is quantitative, aiming to gather and analyze numerical data to draw statistical conclusions. The population of the study consists of students enrolled in various universities across the United States. University students are extremely tech-savvy [54], and they use ChatGPT for home assignments and paper writing [20]. Therefore, students were selected as the population of study. To ensure target respondents participation in the research and meet the research objective, researchers used a non-probability random sampling approach to purposively distribute the questionnaire to university students across the United States. The students above 18 years old were selected to participate because they can record their independent responses (See Table 1). The responses were gathered using the study relied on an electronic questionnaire distributed randomly to students enrolled in various universities across the United States. A video link has been given to participants in compliance with [55] methodologies. There are a few YouTube tutorials that demonstrate how to use ChatGPT. The participants were asked to answer questions after watching the video. The video aims to clarify the functionality of ChatGPT for its users. The data were gathered from July to September, 2023. [56] proposed 384 sample sizes for the population over two million. The number of questions in the questionnaire may also be used to determine the sample size; responses to each question should range from five to ten [57]. A total of 375 questionnaires were gathered once the study was finished. In the final analysis, 35 surveys were excluded because respondents didn't complete the questionnaires completely. At the end, a final list of 340 questionnaires was finalized.

Table 1. Sample Characteristics

Feature	Classification	Number	Percentage
Gender	Male	110	30.2
	Female	254	69.8
Age	Aged 40 and above	33	9.1
	36–39	65	17.9
	31–35	52	14.3
	26–30	125	34.3
	19-25	89	24.5
Marital Status	Married	125	34.3
	Single	239	65.6
Education	Junior college or below	102	28.0
	Bachelor’s degree	207	56.9
	Master’s degree or above	55	15.1
Job Experience	0–3 years	187	51.4

	4–10 years	112	30.8
	More than 11 years	65	17.9

3.2. Measures

We prepared a survey based on earlier scientific studies in effort to perform this assessment, and we changed some of the questions to better suit the objectives of this investigation. The survey questions were scored on a seven-point Likert scale. A research by [44] provided the basis for usage barrier consisting of four item scale. A sample item is, "In my opinion, ChatGPT is difficult to use. Similarly, value barrier consists of four item scales. A sample item is, "Using ChatGPT is uneconomical". Moreover, risk barrier consists of five items scale. A sample item is "I'm worried that when utilizing ChatGPT, I'll make blunders.". In addition, traditional barrier consists of three items. A sample item is "I feel impatient with my ChatGPT applications. " Similarly, image barrier consists of three items. A sample item is "ChatGPT projected a very negative image". Furthermore, perceived cost barrier consists of five items". A sample item is " I would be charged more to use ChatGPT". In last, adoption intention of ChatGPT consist of six items. A sample item is " I intend to use ChatGPT. The details of constructs' items are provided in Table 2. The researchers took help from the three academic experts to evaluate the overall questionnaire structure. The experts suggested changes related to the sequence of the items and their wordings to match the study context. Additionally, they made minor changes in the layout of the final questionnaire. Before disseminating the questionnaire to the population of study, it was pretested on ten university students to confirm its face and content validity. Students clearly understood the questionnaire items' meaning and didn't report any ambiguity in the content. Then, the researchers distributed the questionnaire to fifty students for the pilot study. The results of the pilot test show that data is consistent as it achieved minimum reliability threshold value 0.70. After establishing the reliability of the questionnaire, it was finally distributed to the target population. Next section will elaborate the data analysis tools and techniques and report the findings of the study.

4. Result and Discussion

4.1. Analytical tool

The purpose of the study is to assess students the adoption of ChatGPT through the lens of IRT. In this study, IRT proposed framework contained seven latent constructs. The study employed Covariance-based structural equation modeling (CB-SEM) to assess the proposed framework. CB-SEM is appropriate statistical technique for theory testing and confirmation [58]. This technique is also suitable for the analysis of normal data containing large sample size [59]. Additionally, CB-SEM uses several model fit indices such as CFI, NFI, AGFI, GFI, and RMSEA to determine whether model accurately represents the data. Before testing the proposed research framework, a two-stage process was employed which include the validation of measurement model and structural model [60].

4.2. Measurement Model Validation

To examine the link among each factor, we performed a correlational inquiry. Table 2 displays the findings, which indicate a substantial association between the variables. Every component has a standard regression score of higher than 0.75 in Table 3 and Figure 2, suggesting that the estimations are more reliable [61]. The Cronbach-alpha method was employed to evaluate each factor's reliability. Table 3 shows that all factors' Cronbach values were higher than the recommended cutoff value of 0.70 [62], indicating that the data is reliable. Using a composite reliability (CR) calculation, the uniformity of all the indicators was examined. According to [59], the study's findings indicate that the CR values are higher than the 0.70 threshold value. We used the square measure of average variance extracted (AVE) to study discriminant validity. Since AVE has a greater square root value than its connection with other variables, the findings provide proof of discriminant validity [63]. The MSV value can be used as an alternative method of evaluating discriminant validity by comparing the AVE value with each of the factors. If AVE exceeds MSV, discriminant validity can be achieved [64]. The factors with AVE values higher than MSV values are confirmed by the findings. The possible relationship among these items was then examined using a convergent validity analysis utilizing item loadings and AVE [55]. The AVE values for each variable are significantly higher than 0.5, according to the results, indicating that these factors meet the standard and have 50% greater variation. It was determined that the values at 0.917 were greater than 0.6 using the Kaiser Meyer Olkin test (see Table 5). Thus, all factorial analyses were able to be conducted using this sample. Thus, all factorial analyses were able to be conducted using this sample. Further, BTS generated an

 ISSN 2723-6471

impressive value of 9,299.87, which meets the requirement for EFA. In Table 6, communalities statistics show that all indicators are above the suggested threshold value 0.4.

Table 2. Results of factor loadings and reliability of latent constructs

Constructs	SFL	VIF	α
Usage Barrier			0.892
In my opinion, ChatGPT is difficult to use.	0.783		
In my opinion, ChatGPT is inconvenient to use	0.758	2.866	
In my opinion, ChatGPT is slow to use.	0.967	2.571	
In my opinion, progress in ChatGPT is unclear.	0.709	2.201	
Value Barrier			0.881
Using ChatGPT is economically nonviable.	0.884	2.589	
Using ChatGPT is not any more advantageous than other tools.	0.848	1.275	
Using ChatGPT does not increase the ability to search for information	0.775	2.230	
Using ChatGPT is not a suitable replacement for a PC for doing searches.	0.824	2.533	
Risk Barrier			0.905
I am afraid of making mistakes in the process of using ChatGPT.	0.765	1.169	
I am afraid of entering the wrong information in the ChatGPT process.	0.733	2.315	
I am afraid of faultiness in the function of ChatGPT	0.886	2.281	
I am afraid of exposure to privacy if using ChatGPT.	0.847	2.738	
I am afraid that ChatGPT's responses to my questions are wrong	0.771	1.849	
Tradition Barrier			0.878
I become annoyed with my ChatGPT applications.	0.962		
I would rather communicate face-to-face instead of using ChatGPT.	0.708	2.095	
I prefer to get any information through search engines or phone calls.	0.702	1.907	
Image Barrier			0.967
ChatGPT presented a rather unfavorable perspective.	0.734		
Many times, technological innovation is too difficult to utilize.	0.831	2.454	
ChatGPT is thought to be challenging to operate.	0.848	1.671	
Perceived Cost Barrier			0.868
It would cost me extra to utilize ChatGPT	0.771		
Subscription fees for ChatGPT are expensive.	0.879	2.064	
Extra charges for ChatGPT are expensive.	0.740	1.962	
I would have to pay extra to utilize ChatGPT.	0.823	2.679	
Session expenses are higher when using ChatGPT than when using alternative methods.	0.734	2.146	
Adoption Intention			0.868
My plan involves utilizing ChatGPT.	0.882	1.851	
I plan to utilize ChatGPT in the coming times.	0.710	2.421	
My intention is to employ ChatGPT to enhance convenience.	0.783	1.194	
I am determined to acquire the skills to operate ChatGPT.	0.773	2.182	
I have a desire to increase my usage of ChatGPT.	0.767		
I plan to suggest ChatGPT to my friends.	0.882	1.556	

 ISSN 2723-6471

Table 3. Discriminant Validity

Constructs	CR	AVE	UB	VB	RB	TB	IB	PCB	ITU
UB	0.905	0.657	0.810						
VB	0.910	0.716	0.600	0.846					
RB	0.925	0.755	0.517	0.473	0.869				
TB	0.910	0.716	0.550	0.679	0.389	0.846			
IB	0.912	0.674	0.525	0.831	0.557	0.418	0.821		
PCB	0.926	0.716	0.328	0.558	0.674	0.423	0.557	0.846	
ITU	0.918	0.737	0.435	0.626	0.748	0.526	0.601	0.774	0.858

Note: N= 364; CR = composite reliability; AVE = average variance extract; UB = usage barrier; VB = value barrier; RB = risk barrier; TB = traditional barrier; IB = image barrier; PCB = perceived cost barrier; ITU = intention to use.

4.3. Multicollinearity

To determine the coefficients of the variance inflation factor (VIF) and fairness, a regression test is carried out to look for multicollinearity problems. The scores of the VIF shouldn't be higher than 0.1 [56]. The findings indicate that there are no multicollinearity problems in this framework as the weights of VIF and Tolerance are in accordance with and lie within the overall recommended range [65]. Table 4 and figure 2 presents the findings.

Table 4. Collinearity diagnostics

Variables	Collinearity Statistics	
	Tolerance	VIF
Usage Barrier	0.745	1.458
Value Barrier	0.865	1.654
Risk Barrier	0.745	1.845
Traditional Barrier	0.922	1.665
Image Barrier	0.710	1.466
Perceived Cost Barrier	0.890	1.525

Notes: Dependent variable: Intention to Use ChatGPT

 ISSN 2723-6471

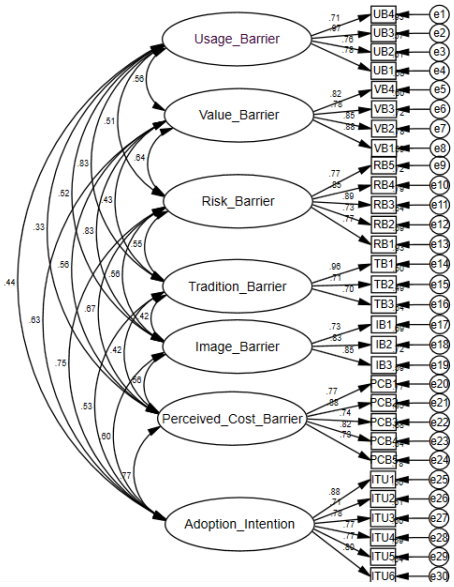

Figure 2. Measurement Model

4.4. Common method variance

A range of analytical and scientific techniques were employed to calculate the common method variance (CMV). First, in order to maintain the items' clarity, precision, and succinctness, a pilot research trial was conducted to confirm the instruments' applicability [66]. Second, if one component accounts for at least 50% of the total variation, Harman's model [66], [67] indicates that CMV effects. According to the study's results, the single factor component described 26.89% of the data, which is less than the 50% criterion and confirms that there was no CMV in the dataset. Thirdly, in order to examine the CMV, [68] looked into the association between latent variables. Every variable has a coefficient of less than 0.90. Based on our data analysis, there appears to be no CMV.

Table 5. Kaiser Meyer Olkin (KMO) and Bartlett's test.

KMO and Bartlett's test		
Kaiser Meyer Olkin Measure of Sampling Adequacy		**0.917**
Bartlett's Test of Sphericity	**Approx. Chi-Square**	9,299.87
	Df	**426**
	Sig.	**0.000**

Notes: df: Degree of freedom, Sig: Significance.

4.5. Goodness-of-Fit

Additionally, we evaluated goodness-of-fit indices using the classificatory method described by [69]. The framework showed excellent fitness with X2= 1142.22, Df = 672, RMSEA = 0.055, GFI = 0.865, and AGFI = 0.806, according to the IBM Amos 24.0 output. The absolute fit indices were compared to predetermined criteria, taking into account RMSEA below 0.08 and CMIN/DF below 3.0 [70]. The [571 proposed 0.90 level was exceeded by the GFI and AGFI. With NFI = 0.901, RFI = 0.922, TLI = 0.912, and CFI = 0.926, the incremental fit indices satisfied the requirement of being larger than 0.90 [70]. Finally, parsimonious fit indices (PCFI = 0.861, PNFI = 0.801, and PGFI = 0.706) that show model fit above the 0.50 barrier [70]. In conclusion, the outcomes confirm the established model's effectiveness.

4.6. Hypothesis Testing

In Table 6, our findings revealed a significant negative impact of usage barrier on intention to use ChatGPT (H1–β = -0.217, $p < 0.001$). Similarly, value barrier ethics is also significantly and negatively related to intention to use ChatGPT (H2–β = -0.686, $p < 0.001$). Hence, hypotheses 1 and 2 are supported. Furthermore, risk barrier has a negative and significant association with intention to use ChatGPT (H3–β = -0.139, $p < 0.01$); therefore, the third hypothesis is

 ISSN 2723-6471

supported. Further, findings indicated that tradition barrier had a positive and significant relationship with intention to use ChatGPT (H4–β = -0.473, p < 0.001). According to our results, the findings of the study indicate that image barrier is negatively related to intention to use ChatGPT (H5–β= -0.410, p < 0.001). In last, perceived cost barrier is also negatively and significantly related to intention to use ChatGPT (H6–β = -0.368, p < 0.01).

Table 6. Results of direct paths.

Hypothetical paths		β	S.E.	t-value	p-value	Confidence interval 95%	Results
						LLCI ULCI	
H1	UB→ITU	-0.217	0.053	-4.056	0.000	[-0.331, -0.124]	Supported
H2	VB→ITU	-0.686	0.067	-10.354	0.000	[-0.597, -0.243]	Supported
H3	RB→ITU	-0.139	0.052	-2.649	0.008	[-0.246, -0.036]	Supported
H4	TB→ITU	-0.473	0.077	-6.138	0.000	[-0.613, -0.304]	Supported
H5	IB→ITU	-0.410	0.116	-3.529	0.000	[-0.605, -0.135]	Supported
H6	PCB→ITU	-0.368	0.107	-3.439	0.000	[-0.666, -0.249]	Supported

Note: N= 364; UB = usage barrier; VB = value barrier; RB = risk barrier; TB = traditional barrier; IB = image barrier; PCB = perceived cost barrier; ITU = intention to use.

5. Conclusion

The present study aims to verify the applicability of the innovation resistance theory for evaluating the drivers of intention to use ChatGPT. The original model was modified and extended by incorporating usage barrier, value barrier, traditional barrier, image barrier, perceived cost barrier and risk barrier.

Firstly, the findings indicate that usage barrier, usage barrier negatively correlates with intention to use ChatGPT. The outcomes are consistent with the prior study of [41] who suggest that the concept of usage barriers pertains to the hindrances that arise from potential modifications, particularly when it comes to utilizing novel technology. For instance, the cognitive effort of learning how to use and integrate new technologies, such as ChatGPT, could be a major barrier. Additionally, in order to prepare for the new technology, it is also necessary to adjust established routines and habits, which contributes to the complexity of the process [42]. It is possible that these barriers will hinder future usage and adoption even after the first learning period is over.

Secondly, our findings indicate that value barrier is negatively associated with intention to use ChatGPT. A correlation has been found between value barriers and the acceptance, resistance, and use of various technologies by users. Past literature indicates that value barriers negatively affect user intentions in a number of contexts, including online shopping [47] and artificial intelligence [48]. Value barriers, such as factors like perceived utility, value, and compatibility with user values, may significantly reduce users' intentions to use ChatGPT. A fundamental dispute revolves around the possible discrepancy between user projections and the perceived value of ChatGPT.

Thirdly, our study indicates that risk barrier is negatively associated with intention to use ChatGPT. According to [40], the acceptance of innovation is contingent upon the degree of uncertainties introduced by the innovation itself. It is possible that users of ChatGPT will face a number of risks, making it more difficult for them to use and adopt the platform [49]. These risks include the possibility of misinformation or unintended generation of content that may lead to misunderstandings or misinterpretations. Users may be worried about the lack of control over the generated answers, as well as possible ethical difficulties resulting from biased or incorrect outputs.

Fourthly, the study findings indicate that tradition barrier negatively connected with intention to use ChatGPT. Users may encounter traditional barriers while attempting to embrace ChatGPT, which might negatively affect their intention of incorporating this conversational AI model into their everyday routines [72]. These barriers might include the lack of understanding of and unwillingness to use cutting-edge technology, especially when it comes to artificial intelligence and natural language processing. The interactive interface of ChatGPT may be difficult for users used to more

traditional forms of communication to get used to, which might make them reluctant to adopt this cutting-edge technology [57].

Fifthly, the study findings describe that image barrier negatively linked with intention to use ChatGPT. The image barrier may seriously impede user's intention to use ChatGPT as they struggle with feelings of unfamiliarity, questions about dependability, and unpleasant experiences from the past [36], [61]. Because, ChatGPT is cutting edge technology, it could seem significantly different from traditional communication channels [62]. This might make users hesitant because they are concerned about the long learning process or find it difficult to get used to a new interface. Furthermore, customers may have issues about ChatGPT dependability if they are uneasy with the technology provider's track record or fear inaccurate or unsuitable results [13].

Lastly, the outcomes suggest that perceived cost barrier adversely associated with intention to use ChatGPT. This barrier frequently appears in the form of use charges or membership fees related to using ChatGPT services [73]. The possibility of incurring charges may discourage users, particularly if they feel that the expenditure is excessive for the advantages, they believe they will get or if they are on the tight budget. In addition, prospective customers may become reluctant or hesitant of there is no clear and value driven price structure in place [13], [63].

5.1. Theoretical Implication

The research makes the significant theoretical contribution by conducting a comprehensive investigation into the factors that contribute to resistance in the adoption of ChatGPT among students in the United States. By leveraging IRT and incorporating a negative valence factor as analytical frameworks, the study delves deeply into various barriers such as usage, value, risk, tradition, image, and perceived cost barriers. These barriers are examined in relation to their impact in the intention to adopt ChatGPT. This research not only fills a critical gap in the literature by applying the IRT model specifically to the context of ChatGPT adoption but also provides valuable insights into the dynamics of resistance points those users may encounter when considering the integration of ChatGPT into their regular interaction. Furthermore, the study's exploration of the research question serves as a guiding framework for future academics interested in investigating technology adoption, particularly within the dynamic landscape of conventional AI. This emphasizes the importance of understanding and addressing resistance factors to fully realize the societal benefits of innovative technologies like ChatGPT.

5.2. Practical Implication

Firstly, the successful implementation of ChatGPT in higher education necessitates careful strategizing and evaluation of numerous elements. This section explores a number of crucial components that employers should consider when introducing ChatGPT into higher education [74], [51]. In order for instructors and learners to utilize ChatGPT effectively, academic institutions should provide the necessary training and support. The ability and confidence of participants may be increased via these training and support systems, which can assist in overcoming barriers. Users are better prepared to handle barriers with thorough training, which promotes more effective and smooth incorporation of ChatGPT into their teaching methods.

Secondly, it is crucial to provide quality assurance while integrating ChatGPT into higher education. To guarantee the accuracy and reliability of ChatGPT recommendations, institutions need to set up procedures. They should also come up with strategies to deal with any possible biases or errors that could occur. Prior to implementing ChatGPT on a large scale, academic institutions should conduct a pilot study that includes a restricted sample of instructors and students. This first stage is crucial for locating and fixing any problems or difficulties, as well as offering an opportunity to enhance the program. Companies are obligated to closely monitor assessments in order to ascertain the influence of ChatGPT on student learning results, teacher workload, and other crucial factors.

Lastly, it is imperative that organizations take into consideration the long-term viability and scalability of using ChatGPT. It is of the utmost importance to ensure that sufficient funds are available to provide network support and maintenance over the long term and that it can effectively handle growing demand as the user base expands. To efficiently deploy ChatGPT in higher learning, several things must be properly considered. We can unleash ChatGPT's potential to revolutionize higher education by resolving these challenges, which will allow institutions to properly use ChatGPT.

5.3. Limitations and Future Research

In spite of ChatGPT's revolutionary potential in higher education, there are still plenty of aspects that need further investigation and improvement. We go over several recommendations and policies for using ChatGPT in higher education in this part. Firstly, a questionnaire survey was used to gather information in this study owing to its low cost. Nevertheless, there are a few limitations to this approach, such as the time-consuming nature of retrieving surveys and the possibility of having trouble obtaining precise distribution quantities. In order to guarantee higher accuracy and dependability, in-person interviews should be carried out instead. This technique is distinguished by its synchronous communication in both time and location. Secondly, cross-sectional research focused on impediments to ChatGPT adoption among U.S. students over a certain time. However, this technique, restricted to a certain time period, may make conclusions meaningless in the future since the gathered information represents just that precise moment in United States. To bypass this constraint, a longitudinal strategy is advocated, allowing researchers to track trends over an extended term and get more precise information on individuals' changes. Thirdly, in the future, personalization and customization may be potential advancements. It is worth looking at how universities are using ChatGPT to provide personalized recommendations based on the needs and preferences of individual students. This may include entering student data, such as their preferred methods of learning and track record of academic achievement, into ChatGPT's suggestions. Lastly, it is also important that future development prioritizes help from international organizations. As higher education grows more internationally focused, institutions need to consider how they might use ChatGPT to empower students who do not understand English. This may include translating ChatGPT models into other languages or using computerized translation to provide recommendations in many languages.

6. Declarations

6.1. Author Contributions

Conceptualization: S.A. and Y.A.; Methodology: Y.A.; Software: S.A.; Validation: S.A., Y.A.; Formal Analysis: S.A., Y.A.; Investigation: S.A.; Resources: Y.A.; Data Curation: Y.A.; Writing Original Draft Preparation: S.A. and Y.A.; Writing Review and Editing: Y.A. and S.A.; Visualization: S.A.; All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6.3. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

6.4. Institutional Review Board Statement

Not applicable.

6.5. Informed Consent Statement

Not applicable.

6.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] D. Ifenthaler and C. Schumacher, "Reciprocal issues of artificial and human intelligence in education," *Journal of Research on Technology in Education*, vol. 55, no. 1, pp. 1–6, 2023.

[2] M. Haenlein, A. Kaplan, C. W. Tan, and P. Zhang, "Artificial intelligence (AI) and management analytics," *Journal of Management Analytics*, vol. 6, no. 4, pp. 341-343, 2019.

[3] M. Halaweh, "ChatGPT in education: Strategies for responsible implementation," 2023.

[4] S. Akgun and C. Greenhow, "Artificial intelligence in education: Addressing ethical challenges in K-12 settings," *AI Ethics*, vol. 2, no. 3, pp. 431–440, 2022.

[5] X. Zhai et al., "A Review of Artificial Intelligence (AI) in Education from 2010 to 2020," *Complexity*, vol. 2021, no. 1, pp. 1–18, 2021.

[6] M. A. Kuhail, N. Alturki, S. Alramlawi, and K. Alhejori, "Interacting with educational chatbots: A systematic review," *Educ. Inf. Technol.*, vol. 28, no. 1, pp. 973–1018, 2023.

[7] C. Kooli, "Chatbots in education and research: A critical examination of ethical implications and solutions," *Sustainability*, vol. 15, no. 7, p. 5614, 2023.

[8] R. Pillai, B. Sivathanu, B. Metri, and N. Kaushik, "Students' adoption of AI-based teacher-bots (T-bots) for learning in higher education," *Inf. Technol. People*, vol. 1, no. 1, pp. 1-12, 2023.

[9] R. H. Mogavi et al., "ChatGPT in education: A blessing or a curse? A qualitative study exploring early adopters' utilization and perceptions," *Computers in Human Behavior: Artificial Humans*, vol. 2, no. 1, p. 100027, 2024.

[10] V. Giordano, I. Spada, F. Chiarello, and G. Fantoni, "The impact of ChatGPT on human skills: A quantitative study on twitter data," *Technological Forecasting and Social Change*, vol. 203, no.1, p. 123389, 2024.

[11] S. Elbanna and L. Armstrong, "Exploring the integration of ChatGPT in education: adapting for the future," *Management & Sustainability: An Arab Review*, vol. 3, no. 1, pp. 16-29, 2024.

[12] N. Abbas, J. Whitfield, E. Atwell, H. Bowman, T. Pickard, and A. Walker, "Online chat and chatbots to enhance mature student engagement in higher education," *Int. J. Lifelong Educ.*, vol. 41, no. 3, pp. 308–326, 2022.

[13] M. Haleem, M. Javaid, and R. P. Singh, "An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges," *BenchCouncil Trans. Benchmarks, Stand. Eval.*, vol. 2, no. 4, p. 100089, 2022.

[14] T. Rasul et al., "The role of ChatGPT in higher education: Benefits, challenges, and future research directions," *Journal of Applied Learning and Teaching*, vol. 6, no. 1, pp. 1-12, 2023.

[15] S. S. Gill et al., "Transformative effects of ChatGPT on modern education: Emerging Era of AI Chatbots," *Internet of Things and Cyber-Physical Systems*, vol. 4, pp. 19-23, 2024.

[16] H. Khosravi et al., "Explainable artificial intelligence in education," *Computers and Education: Artificial Intelligence*, vol. 3, no. 1, p. 100074, 2022.

[17] M. Neumann, M. Rauschenberger, and E. M. Schön, "'We Need To Talk About ChatGPT': The Future of AI and Higher Education," in *2023 IEEE/ACM 5th International Workshop on Software Engineering Education for the Next Generation (SEENG), IEEE*, pp. 29-32, 2023.

[18] H. Al-Mughairi and P. Bhaskar, "Exploring the factors affecting the adoption AI techniques in higher education: insights from teachers' perspectives on ChatGPT," *Journal of Research in Innovative Teaching & Learning*, vol. 1, no. 1, pp. 1-9, 2024.

[19] D. R. Cotton, P. A. Cotton, and J. R. Shipway, "Chatting and cheating: Ensuring academic integrity in the era of ChatGPT," *Innovations in Education and Teaching International*, vol. 61, no. 2, pp. 228-239, 2024.

[20] H. Yu, "Reflection on whether Chat GPT should be banned by academia from the perspective of education and teaching," *Frontiers in Psychology*, vol. 14, no. 1, p. 1181712, 2023.

[21] N. Iqbal, H. Ahmed, and K. A. Azhar, "Exploring teachers' attitudes towards using chatgpt," *Global Journal for Management and Administrative Sciences*, vol. 3, no. 4, pp. 97-111, 2022.

[22] K. Mouloudj et al., "Adopting Artificial Intelligence in Healthcare: A Narrative Review," *in Use Artif. Intell. Digit. Mark. Compet. Strateg. Tactics*, pp. 1–20, 2024.

[23] P. Kaur, A. Dhir, N. Singh, G. Sahu, and M. Almotairi, "An innovation resistance theory perspective on mobile payment solutions," *J. Retail. Consum. Serv.*, vol. 55, no. 1, p. 102059, 2020.

[24] S. A. Bin-Nashwan, M. Sadallah, and M. Bouteraa, "Use of ChatGPT in academia: Academic integrity hangs in the balance," *Technol. Soc.*, vol. 75, no. 1, p. 102370, 2023.

[25] H. Jo and Y. Bang, "Analyzing ChatGPT adoption drivers with the TOEK framework," *Scientific Reports*, vol. 13, no. 1, p. 22606, 2023.

[26] X. Ma and Y. Huo, "Are users willing to embrace ChatGPT? Exploring the factors on the acceptance of chatbots from the perspective of AIDUA framework," *Technology in Society*, vol. 75, no. 1, p. 102362, 2023.

[27] D. Menon and K. Shilpa, "“Chatting with ChatGPT”: Analyzing the factors influencing users' intention to Use the Open AI's ChatGPT using the UTAUT model," *Heliyon*, vol. 9, no. 11, pp. 1-9, 2023.

[28] C. Y. Lai, K. Y. Cheung, and C. S. Chan, "Exploring the role of intrinsic motivation in ChatGPT adoption to support active learning: An extension of the technology acceptance model," *Computers and Education: Artificial Intelligence*, vol. 5, no. 1, p. 100178, 2023.

[29] T. Budhathoki, A. Zirar, E. T. Njoya, and A. Timsina, "ChatGPT adoption and anxiety: a cross-country analysis utilising the unified theory of acceptance and use of technology (UTAUT)," *Studies in Higher Education*, pp. 1-16, 2024.

[30] M. Habes, A. Alanani, E. Youssef, and H. Sharif, "Why Do Jordanian Students Prefer Using ChatGPT: A Case Study of Higher Education Institutions," *in Artificial Intelligence in Education: The Power and Dangers of ChatGPT in the Classroom, Cham: Springer Nature Switzerland*, pp. 127-141, 2024.

[31] J.-J. Hew, L.-Y. Leong, G. W.-H. Tan, K.-B. Ooi, and V.-H. Lee, "The age of mobile social commerce: An Artificial Neural Network analysis on its resistances," *Technol. Forecast. Soc. Change*, vol. 144, no. 1, pp. 311–324, 2019.

[32] M. Sadiq, M. Adil, and J. Paul, "An innovation resistance theory perspective on purchase of eco-friendly cosmetics," *Journal of Retailing and Consumer Services*, vol. 59, no. 1, p. 102369, 2021.

[33] C. C. Chen, C. H. Chang, and K. L. Hsiao, "Exploring the factors of using mobile ticketing applications: Perspectives from innovation resistance theory," *Journal of Retailing and Consumer Services*, vol. 67, no, 1, p. 102974, 2022.

[34] I. Arif, W. Aslam, and Y. Hwang, "Barriers in adoption of internet banking: A structural equation modeling-Neural network approach," *Technology in Society*, vol. 61, no. 1, p. 101231, 2020.

[35] C. C. Chen, C. H. Chang, and K. L. Hsiao, "Exploring the factors of using mobile ticketing applications: Perspectives from innovation resistance theory," *Journal of Retailing and Consumer Services*, vol. 67, no. 1, p. 102974, 2022.

[36] A. Kumar, A. Shankar, A. K. Tiwari, and H.-J. Hong, "Understanding dark side of online community engagement: an innovation resistance theory perspective," *Inf. Syst. E-bus. Manag.*, vol 1, no. 1, pp. 1–27, 2023.

[37] S. Heidenreich and M. Handrich, "What about passive innovation resistance? Investigating adoption-related behavior from a resistance perspective," *J. Prod. Innov. Manag.*, vol. 32, no. 6, pp. 878–903, 2015.

[38] C.-S. Yu and W. Chantatub, "Consumers’ resistance to using mobile banking: Evidence from Thailand and Taiwan," *Int. J. Electron. Commer. Stud.*, vol. 7, no. 1, pp. 21–38, 2015.

[39] L. Ma and C. S. Lee, "Understanding the barriers to the use of MOOCs in a developing country: An innovation resistance perspective," *J. Educ. Comput. Res.*, vol. 57, no. 3, pp. 571–590, 2019.

[40] S. Dunphy and P. A. Herbig, "Acceptance of innovations: the customer is the key!," *J. High Technol. Manag. Res.*, vol. 6, no. 2, pp. 193–209, 1995.

[41] S. Ram and J. N. Sheth, "Consumer resistance to innovations: the marketing problem and its solutions," *J. Consum. Mark.*, vol. 6, no. 2, pp. 5–14, 1989.

[42] F. Ye and Z. Wang, "Effects of information technology alignment and information sharing on supply chain operational performance," *Comput. Ind. Eng.*, vol. 65, no. 3, pp. 370–377, 2013.

[43] J. Borraz-Mora, V. Bordonaba-Juste, and Y. Polo-Redondo, "Functional barriers to the adoption of electronic banking: The moderating effect of gender," *Rev. Econ. Apl.*, vol. 25, no. 75, pp. 87–107, 2017.

[44] K. Moorthy et al., "Barriers of mobile commerce adoption intention: perceptions of generation X in Malaysia," *J. Theor. Appl. Electron. Commer. Res.*, vol. 12, no. 2, pp. 37–53, 2017.

[45] D. Menon and K. Shilpa, "‘Chatting with ChatGPT’: Analyzing the factors influencing users’ intention to Use the Open AI’s ChatGPT using the UTAUT model," *Heliyon*, vol. 9, no. 11, 2023.

[46] M. Antioco and M. Kleijnen, "Consumer adoption of technological innovations: Effects of psychological and functional barriers in a lack of content versus a presence of content situation," *Eur. J. Mark.*, vol. 44, no. 11/12, pp. 1700–1724, 2010.

[47] J.-W. Lian and D. C. Yen, "Online shopping drivers and barriers for older adults: Age and gender differences," *Comput. Human Behav.*, vol. 37, no. 1, pp. 133–143, 2014.

[48] J. Oktavianus, H. Oviedo, W. Gonzalez, A. P. Putri, and T. T. C. Lin, "Why do Taiwanese young adults not jump on the bandwagon of Pokémon Go? Exploring barriers of innovation resistance," 2017.

[49] S. Sok and K. Heng, "ChatGPT for education and research: A review of benefits and risks," Available SSRN 4378735, 2023.

[50] O. Oviedo-Trespalacios et al., "The risks of using chatgpt to obtain common safety-related information and advice," *Saf. Sci.*, vol. 167, no. 1, p. 106244, 2023.

[51] M. Harsono and I. A. P. Suprapti, "The Role of Fintech in Transforming Traditional Financial Services," *Account. Stud. Tax J.*, vol. 1, no. 1, pp. 81–91, 2024.

[52] A. John and J. Klein, "The boycott puzzle: Consumer motivations for purchase sacrifice," *Manage. Sci.*, vol. 49, no. 9, pp. 1196–1209, 2003.

[53] R. El Badrawy, R. Abd El Aziz, and M. Hamza, "Towards an Egyptian mobile banking era," *Comput. Technol. Appl.*, vol. 3, no. 11, 2012.

[54] H. Patil and S. Undale, "Willingness of university students to continue using e-Learning platforms after compelled adoption of technology: Test of an extended UTAUT model," *Education and Information Technologies*, vol. 28, no. 11, pp. 14943-14965, 2023.

[55] N. Han, J. Chen, G. Xiao, H. Zhang, Y. Zeng, and H. Chen, "Fine-grained cross-modal alignment network for text-video retrieval," *in Proceedings of the 29th ACM International Conference on Multimedia*, 2021, pp. 3826–3834.

[56] U. Sekaran, "Research methods for business: A skill-building approach," *J. Multidiscip. Eval.*, vol. 1, no. 20, pp. 1–16, 2005.

[57] X. Deng and Y. Lin, "The benefits and challenges of ChatGPT: An overview," *Front. Comput. Intell. Syst.*, vol. 2, no. 2, pp. 81–83, 2022.

[58] G. Dash and J. Paul, "CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting," *Technological Forecasting and Social Change*, vol. 173, no. 1, p. 121092, 2021.

[59] J. F. Hair Jr, L. M. Matthews, R. L. Matthews, and M. Sarstedt, "PLS-SEM or CB-SEM: updated guidelines on which method to use," *International Journal of Multivariate Data Analysis*, vol. 1, no. 2, pp. 107-123, 2017.

[60] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, Multivariate Data Analysis, 7th ed., Upper Saddle River, NJ: Prentice Hall, 2010.

[61] P. Limna, T. Kraiwanit, K. Jangjarat, P. Klayklung, and P. Chocksathaporn, "The use of ChatGPT in the digital era: Perspectives on chatbot implementation," *J. Appl. Learn. Teach.*, vol. 6, no. 1, pp. 1-12, 2023.

[62] S. R. Shihab, N. Sultana, and A. Samad, "Revisiting the use of ChatGPT in Business and Educational Fields: Possibilities and Challenges," *BULLET J. Multidisiplin Ilmu*, vol. 2, no. 3, pp. 534–545, 2023.

[63] M. von Zahn, S. Feuerriegel, and N. Kuehl, "The cost of fairness in AI: Evidence from e-commerce," *Bus. Inf. Syst. Eng.*, vol. 1, no. 1, pp. 1–14, 2021.

[64] V. Partel, S. C. Kakarla, and Y. Ampatzidis, "Development and evaluation of a low-cost and smart technology for precision weed management utilizing artificial intelligence," *Comput. Electron. Agric.*, vol. 157, no. 1, pp. 339–350, 2019.

[65] P. M. Bentler and P. Chou, "Practical issues in structural modeling," *Sociol. Methods Res.*, vol. 16, no. 1, pp. 78–117, 1987.

[66] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, Multivariate Data Analysis, New Jersey: Prentice-Hall, Inc., 2006.

[67] J. C. Nunnally, Psychometric Theory 3E, New York, NY: Tata McGraw-Hill Education, 1994.

[68] R. P. Bagozzi, Y. Yi, and L. W. Phillips, "Assessing construct validity in organizational research," *Adm. Sci. Q.*, vol. 1, no. 1, pp. 421–458, 1991.

[69] D. Hooper, J. Coughlan, and M. R. Mullen, "Structural equation modelling: Guidelines for determining model fit," *Electron. J. Bus. Res. Methods*, vol. 6, no. 1, pp. 53-60, 2008.

[70] C. Fornell and D. F. Larcker, "Structural equation models with unobservable variables and measurement error: Algebra and statistics," *J. Mark. Res.*, vol. 18, no. 3, pp. 382-388, 1981, doi: 10.2307/3150980.

[71] R. C. MacCallum and S. Hong, "Power analysis in covariance structure modeling using GFI and AGFI," *Multivariate Behav. Res.*, vol. 32, no. 2, pp. 193–210, 1997, doi: 10.1207/s15327906mbr3202_5.

 ISSN 2723-6471

[72] J. Żammit, "Harnessing the Power of ChatGPT for Mastering the Maltese Language: A Journey of Breaking Barriers and Charting New Paths," *in Machine Intelligence for Smart Applications: Opportunities and Risks, Springer,* 2023, vol. 1, no. 1, pp. 161–178.

[73] P. P. Ray, "ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope," *Internet Things Cyber-Physical Syst.*, vol. 1, no. 1, pp. 1-9, 2023.

[74] S. Rawas, "ChatGPT: Empowering lifelong learning in the digital age of higher education," *Educ. Inf. Technol.*, vol. 1, no. 1, pp. 1–14, 2023.