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Information literacy and intention to adopt e-pharmacy: a study based on trust and the theory of reasoned action

Mingyue Fan¹ and Oscar Chidiebere Ukaegbu^{1*}

Abstract

Background E-pharmacy has gained popularity as an increasingly utilized platform for accessing healthcare services online. However, its adoption exhibits regional variations and necessitates improvement in certain aspects. Guided by the Theory of Reasoned Action (TRA) and Trust theory, this research explores the pivotal role of information literacy in influencing attitudes, perceived control, word of mouth, and trust. The overarching aim is to understand how these factors collectively impact the adoption of E-pharmacy services.

Methods The study employed Structural Equation Modeling to assess data collected from 473 participants in Nigeria. This methodology allowed for a comprehensive evaluation of the intricate relationships between information literacy, attitudes, perceived control, word of mouth, trust, and E-pharmacy adoption. By utilizing statistical tests within this framework, the research sought to provide a robust analysis of the data and derive meaningful insights.

Results The findings of the research underscore the significance of information literacy in shaping individuals' attitudes towards E-pharmacy. Higher information literacy levels were associated with more positive attitudes, an enhanced sense of perceived control, and increased positive word-of-mouth regarding the use of E-pharmacy services. Additionally, the study revealed that trust plays a crucial intermediary role between word-of-mouth communication and the actual adoption of E-pharmacy.

Conclusions In summary, this research offers a novel and comprehensive explanation of the relationship between information literacy and the adoption of E-pharmacy services. The study's outcomes contribute valuable insights to the ongoing discourse on E-pharmacy adoption, emphasizing its potential to enhance healthcare accessibility and efficiency within the evolving landscape of digital healthcare. The implications of the findings extend to policymakers, healthcare providers, and other stakeholders interested in optimizing the adoption and integration of E-pharmacy services.

Keywords Information literacy, E-pharmacy adoption, TRA, Trust

Introduction

E-pharmacies have revolutionized the healthcare industry, offering greater convenience and accessibility to medication and healthcare services through online platforms. In the past, medicine was primarily distributed through handwritten prescriptions. However, with the growth of e-commerce, the medicine distribution market is shifting towards online forms. This shift is achieved through electronic prescription, commonly referred to as

*Correspondence:

Oscar Chidiebere Ukaegbu
ouchidi@gmail.com

¹ Management School, Jiangsu University, Zhenjiang 212013, China



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e-pharmacy as well as terms like online, Internet, cyber, and telepharmacies [74]. The term “e-pharmacy” in this research encompasses retail pharmacies that also have online services and app-only mobile pharmacies.

The evolving landscape of online healthcare and commerce has driven corporate adjustments. Virtual meetings have become the norm, even within healthcare provider-patient interactions, transforming the way care is delivered. This shift has accelerated existing trends like enhancing digital capabilities for virtual interactions. The internet’s role in health education has surged, with over 70% of adults relying on it for medication-related information [10]. A review article highlighted that during the COVID-19 pandemic, South Africa utilized digital technologies to deliver healthcare services. These included chatbots, artificial intelligence, SMS-based solutions, mobile health applications, telemedicine and telehealth. These innovative tools were employed for detecting and screening infectious and non-infectious diseases, disease surveillance and monitoring, medication and treatment adherence [56]. The research also indicated that amidst COVID-19 in South Africa, digital health technologies were leveraged to offer virtual healthcare services like teleconsultation, e-prescription, and E-Pharmacy.

Moreover, e-pharmacies have capitalized on technological advancements making services more accessible and user friendly through smartphones and mobile apps [68, 78]. However, while e-pharmacies have gained significant popularity, their adoption varies across regions, prompting the need for research to understand the factors influencing the behavioral intention to adopt this service.

Despite these advancements, challenges persist within the e-health domain. These challenges stem from rapid technological changes and a tendency to prioritize trends over quality. Factors such as rapid developments in computer technology, changing customer expectations, and the external environment contribute to these issues [48]. With all these advancements, there is a great need to stay knowledgeable in this aspect. To create successful e-pharmacy systems, a deep understanding of the healthcare environment is crucial, emphasizing the need to address technology-related barriers for widespread adoption and improved outcomes. A lack of understanding of the technology surrounding e-pharmacy remains a substantial barrier to its adoption [62]. Understanding the function of information in e-pharmacy use is critical to tackling this issue and enhancing e-pharmacy outcomes. Previous studies in healthcare with reference to adopting e-pharmacy has been limited. It needs to explain better the relationship among different constructs like information literacy while impacting the consumer intention to adopt e-pharmacy [75]. The study by [29] highlighted the moderation effect of technological literacy, a subset of

information literacy on the relationship between intention to use and behavior to use E-Pharmacy platforms.

Information Literacy (IL) comprises the skills to identify the necessity for information, understand the methods of obtaining, assessing, merging, and disseminating information, and critically analyze various formats [34]. Understanding information is crucial to the lives of citizens and has been emphasized by many authors as highly important in our current era. However, there has been struggles to recognize the specific requirements for critical thinking and responsible action, especially when discussing the effective utilization of the Internet and technology [23]. In light of these complexities, this study delves into the processes influencing consumer behaviors toward the adoption of e-pharmacy, guided by the Theory of Reasoned Action (TRA). TRA provides valuable insights into expected behavioral outcomes, allowing researchers and practitioners to understand behavior change processes better and develop effective interventions. The TRA offers critical information about the desired results of a particular behavior. By understanding these cognitive factors, researchers and practitioners can gain valuable insights into behavior change processes and develop effective interventions. Trust is also a key factor in this aspect as it plays a fundamental role as a social asset and forms the foundation for interaction among individuals who are unfamiliar with each other. Particularly in transactions characterized by a high degree of uncertainty, trust assumes paramount importance, as it instills optimistic anticipations and mitigates the perceived risk for consumers [19]. In e-commerce, trust plays a pivotal role in fostering an environment where customers feel secure enough to divulge personal information, engage in purchasing activities, and heed the guidance provided by vendors [32].

The classical TRA model forms the cornerstone of our theoretical framework, it offers a robust foundation for understanding human behavior across various domains. Its adaptability has been rigorously validated and corroborated through extensive studies on human behavior. Our research leverages and enriches this well-established TRA model by seamlessly integrating perceived control (PC) from the theory of planned behavior (an extension of the TRA model) and word of mouth (WOM) to represent a specific type of subjective norm to replace the generalized variable. This amalgamation of crucial theories and factors is not arbitrary but meticulously selected to address critical gaps and areas influencing the adoption of e-pharmacy. By synthesizing this theory and their associated factors, we aim to explain of the intricate relationship between IL and consumers’ behavioral intention to adopt e-pharmacy. The study by [3] pointed out the role of social influence on e-pharmacy adoption, our

study aims to specify an actionable form of this influence, hence the use of WOM.

This study aims to address research gaps by exploring the relationship between IL and adoption of e-pharmacy. Theoretically, this study provides insight into the role of IL in e-pharmacy adoption and addresses gaps in existing research regarding this field. Practically, the results of this study could help e-pharmacy providers and healthcare professionals improve the use of these platforms by increasing individuals' IL.

Literature review

Definitions

E-pharmacy

E-pharmacy as defined by [21] pertains to a legally recognized pharmacy offering medication distribution (or other pharmaceutical wares) and/or specialized services via the internet or through online means. This technology facilitates remote access to vital medicines and vaccines, potentially eradicating the need for physical visits to healthcare facilities. This is a game-changer, particularly in regions where healthcare access remains a pressing challenge, notably rural areas [39]. However, despite its transformative potential, a significant obstacle to E-pharmacy adoption is the pervasive lack of understanding of the technology. Bridging this knowledge gap and comprehending the role of information in E-pharmacy adoption becomes paramount, given the critical importance of accurate information in navigating the digital healthcare landscape [18].

This study aims to examine the association between IL and consumer intention in using/adopting E-pharmacy (AEP). The debate centers on the need for more information regarding the benefits of E-pharmacy, a void that this research seeks to fill. By exploring the interplay between IL and E-pharmacy adoption, the study aspires to enhance individuals' understanding and empower E-pharmacy providers and healthcare professionals to optimize these platforms effectively.

Information literacy

Information literacy (IL) is the ability to locate, evaluate, and effectively use information from various sources [49]. In the case of e-pharmacy, the comprehension of IL (IL) holds significant importance as it comprises a variety of specific literacies crucial for the effective adoption and utilization of e-pharmacy services. IL is characterized by the capacity to identify the necessity for information, determine its nature, and efficiently locate, assess, and utilize the required information. It comprises a range of literacies, like health literacy, digital literacy, and technological literacy, which are subsets of IL necessary in effectively making use of

e-pharmacy services as each provides unique benefits to the overall proficiency in information management and usage.

There are many researches on the definition of health literacy. A review article done in 2020, which comprised 34 studies gave a standard definition of health literacy as being competent in the area surrounding modern health society [50]. Health literacy refers to the skill to acquire, interpret, and grasp essential health information and services vital for making wise health-related decisions. Particularly pertinent in e-pharmacy, users must navigate digital health data, comprehend medication guidelines, and make informed decisions regarding their healthcare. Proficiency in health literacy allows individuals to critically evaluate the reliability of online health information, grasp prescription specifics, and adhere to medical guidance obtained through e-pharmacy platforms. Digital literacy, on the other hand, refers to the adept utilization of digital tools and platforms, encompassing skills like internet navigation, e-commerce system operation, and engagement with digital communication tools [64]. In the e-pharmacy sphere, digital literacy guarantees users access to online pharmacy services, secure transaction completion, and interaction with digital interfaces to address their healthcare requirements. Competence in digital literacy empowers users to maximize the benefits of e-pharmacy services by ensuring efficient and safe utilization of digital resources. Lastly, technological literacy involves the proficient understanding and utilization of diverse technologies. In the context of e-pharmacy adoption, technological literacy is significant for operating devices such as computers, smartphones, and tablets to access e-pharmacy services. It also encompasses comprehension of the technology underpinning secure online transactions, along with the ability to troubleshoot common technical challenges that may arise during service utilization. Technological literacy guarantees that users are adept and at ease with the tools essential for engaging with e-pharmacy platforms [29].

Beyond the individual level, the impact of digital technologies on information access and utilization extends to developing countries. In these regions, digital technologies offer access to valuable information across diverse domains, from markets and jobs to health and education. However, realizing the full potential of these technologies hinges on complementary investments such as infrastructure and skills, underscoring the multifaceted nature of IL's impact [26, 57, 83].

Theoretical background and research hypotheses

The conceptual framework is illustrated in Fig. 1.

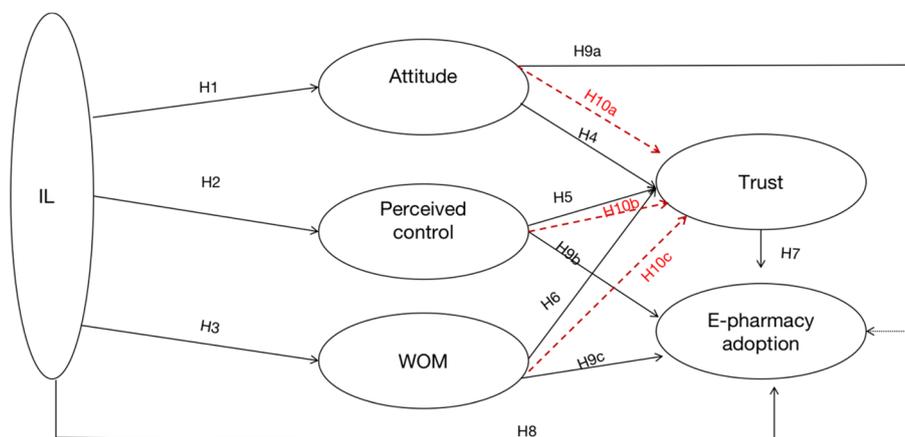


Fig. 1 The proposed research model

Theory of reasoned action

The Theory of reasoned action, TRA [31] proposed a theory, and according to the Theory, a person’s intention to engage in specific conduct determines their behavior. That intention is shaped by two key factors: attitudes (AT) and subjective norms. Attitude represents a person’s overall assessment of a specific behavior, encompassing their favorable or unfavorable assessment. In a study, AT is defined as the collection of beliefs held by an individual regarding a given endeavor [5]. On the other hand, subjective norms relate to the perceived social constraints that encourages or discourages an individual from engaging in a specific behavior [35].

In this study, the conscious decision to omit the general concept of subjective norms and instead concentrate on WOM as a particular and actionable form of subjective norm was made. This choice was motivated by various factors. The context of our research places a notable emphasis on interpersonal communication’s impact, particularly WOM, which is highly pertinent to the behavior under investigation. In numerous modern settings, particularly those related to consumer behavior and decision-making, WOM has been revealed as a potent influencer of intentions and actions [2, 14, 47, 82]. While subjective norms in TRA generally involve the perceived social pressure to engage or refrain from a behavior, this concept can sometimes be overly broad and vague, encompassing a wide array of social influences that may not directly relate to the specific behavior being studied. By honing in on WOM, our objective is to capture a more precise and actionable facet of social influence that directly pertains to the decision-making processes of our participants. Several studies have exhibited the considerable impact of WOM on behavior. For example, marketing and consumer behavior investigations frequently

underscore the significance of WOM as a pivotal determinant affecting behavioral intentions.

Furthermore, an extension variable of the TRA framework, PC is used. PC is a construct within the theory of planned behavior (TPB), and is seen as an extension of TRA [11, 44], it is a widely used theoretical framework in understanding and predicting human behavior. TPB posits that an individual’s behavior is influenced by their ATs, subjective norms, and perceived behavioral control [8]. PC refers to the degree to which an individual feels that they can control their behavior in a given situation, the measures put in place to protect individuals’ personal and health information when using e-pharmacy platforms. The protection of sensitive information is a critical factor in determining individuals’ intention to use e-pharmacy. Previous literature in the health domain has indicated that behavioral intention strongly influences actual behavior. This intention is shaped by the collective impact of AT, social pressure, and PC [16, 17, 40, 63, 85]. PC emerges as a critical psychological factor. It signifies a person’s stand in their capability to influence the parameters within their surroundings [88]. The ability to influence one’s environment (PC) is widely viewed as a key aspect of psychological adaptation or expectation [51, 72]

TRA’s simplicity and informativeness have made it a frequently used paradigm for predicting behavioral intentions, with applications spanning adoption, consumer purchasing, and information sharing [86]. In the context of e-pharmacy, TRA offers a comprehensive framework to explore the psychological, social, and cognitive factors influencing individuals’ decisions.

Word of mouth

Word of mouth (WOM) emerges as a potent force in the intention of E-pharmacy adoption, acting as a vehicle

for sharing experiences and influencing consumer intentions. Positive WOM (PWOM) holds particular sway, as it leads to new client acquisition and carries a higher level of credibility than commercial messages. The trust and satisfaction of consumers with E-pharmacy providers play a pivotal role in shaping PWOM, highlighting the symbiotic relationship between consumer experiences and adoption [25]. Evidence suggests that a satisfied consumer, for example, is more likely to spread favorable WOM than an unhappy consumer, who may take drastic actions like boycotting or lodging complaints against the service provider, or even switching to a rival organization in the online retail industry. [27, 70].

The synergy between these constructs underscores the complexity of human behavior and the multifaceted interplay of factors in E-pharmacy usage.

Trust

Trust (T), emerges as another pivotal aspect in understanding e-pharmacy adoption. There has been many definitions of trust, one of its various definitions relevant to this study is that of [55], trust is described as a person's readiness to be subject to the acts of another person, anticipating that the other party will fulfill an activity crucial to the trustor. Trust indicates a positive belief about the perceived reliability, dependability, and confidence in a person, an object, or a process. A study has demonstrated that the confidence of customers significantly influences the process of embracing an E-Pharmacy platform, as individuals display a greater inclination towards engaging with the platform when they have a sense of assurance regarding its reliability [80]. Trust is not solely confined to interpersonal relationships but extends to interactions involving technology as well. The relationship between trust in technology and the acceptance of technological tools by users, as well as their behaviors, is well-known. Hence, the rapid establishment of trust in technology emerges as a crucial concept in current discussions [65]. Trust inherently reduces perceived risks and fosters readiness [73]. Trust assumes a critical role in the digital realm and is divided into two categories: entity trust and virtual trust. Virtual trust pertains to trust within the online environment and is characterized by the complex nature of the internet [22]. In the virtual world, building trust is vital to reduce transaction costs, enhance consumer purchase rates, and alleviate uncertainties and risks faced by online shoppers. In developing countries, trust plays a significant role in influencing consumer behavior [90]. In a research article by [92], it was mentioned that trust is an essential psychological characteristic to check prior and during the initial phases of adoption, particularly in urban regions where a great

deal of the population have not yet been accustomed to chronic encounters with the given behavior.

A more specific type of trust relevant to this study is institutional trust. In e-pharmacy, institutional trust denotes the confidence individuals have in formal establishments, such as governmental entities, regulatory bodies, and legal frameworks, to operate in the best interest of the public and ensure the dependability and security of offerings. Within the e-pharmacy environment, institutional trust encompasses reliance on regulatory protocols, laws safeguarding data, and the comprehensive oversight of digital pharmaceutical services. The existence of rigorous regulatory structures that oversee and uphold standards for e-pharmacies is of utmost importance. Research has demonstrated that unambiguous and enforced regulations bolster public confidence in online healthcare services. Essential to this is the trust placed in institutions' capability to safeguard personal and medical data. Trust theories underscore the significance of perceived security in the acceptance of online services. Trust is cultivated through transparency in operations and mechanisms of accountability. Institutions witness an elevation in trust levels when they provide transparent information about their operations and allow for public scrutiny. Efficient dissemination of information by institutions concerning the safety, advantages, and guidelines of e-pharmacies can heighten trust levels. Public education initiatives and informative materials play a crucial role. Institutional trust nurtures a perception of e-pharmacies as dependable and secure. Studies indicate that individuals are more inclined to view these services as credible when they trust the entities overseeing e-pharmacies.

Trust in establishments diminishes the perceived risks linked with online transactions. The Technology Acceptance Model (TAM) and associated research indicate that reduced perceived risk augments the probability of embracing e-commerce services, including e-pharmacies. Institutional trust directly impacts the behavioral intentions of individuals towards utilizing e-pharmacy services [12]. Studies focusing on e-health services have revealed that institutional trust substantially influences users' intentions to interact with these services. In essence, trust for E-pharmacy is built if the perceived rewards surpass the disadvantages of using E-pharmacy [89].

Research hypotheses

The concept of IL initially pertains to the skill of acknowledging one's information requirements and being able to determine, assess, and utilize information in an efficient manner [87]. Finding, assessing, and using the proper information has become more challenging due to how

quickly accessible and plentiful information is [6]. People are more likely to comprehend how e-pharmacy might enhance their health outcomes and simplify their lives if they are literate and have access to trustworthy information sources. Hence, the following hypothesis is proposed.

H1: IL has a positive association with individuals' ATs.

PC is when a person believes he has the capacity or means to influence the parameters of his surroundings, in this example, the e-pharmacy platform [88]. The ability to influence one's environment (PC) is seen as a key aspect of psychological adaptation or expectation [51, 72]. Individuals with greater levels of IL will have greater confidence in the control of e-pharmacy platforms.

H2: IL has a positive association with individuals' PC.

WOM continues to be an essential technique for spreading information about a product or service and influencing customers' intentions. WOM occurs when customers share their experiences with others. In the virtual context, a study stated that if consumers are satisfied with their experience, they will spread the Word among their friends and families, attracting new potential customers of the service [81].

H3: IL has a positive association with individuals' WOM.

AT is the personal assessment or evaluation of a behavior based on a specific criterion, such as positive/negative, harmful/beneficial, or pleasant/unpleasant. People are more inclined to trust and accept e-pharmacy, for instance, if they believe it to be convenient and affordable. Personal and normative influences affect an individual's behavior [13]. In simpler terms, when a person's AT towards e-pharmacy is positive, there is a concurrent increase in the individual's level of trust in e-pharmacy.

H4: AT has a positive association with individuals' trust in e-pharmacy.

PC is described as an individual's sense of empowerment in successfully carrying out a behavior. As the magnitude or degree of this empowerment increases, individuals are more likely to trust and engage in the desired behavior. According to a research study, individuals are less likely to participate in a specific behavior if they perceive minimal control [9, 13]. The higher the level of control an individual possesses, the stronger their trust in using e-pharmacy. Hence, the following hypothesis is proposed.

H5: PC has a positive influence on individuals' trust in e-pharmacy.

According to a study, WOM generates favorable consumer responses. Individuals who receive this type of communication are more inclined to seek more information about the discussed topic [14]. Previous research has demonstrated the connection between

WOM, trust, and the intention to engage in a particular behavior [2]. The presence of positive WOM influences the establishment of trust and enhances the acceptance of e-pharmacy. Thus, the subsequent hypothesis is put forth.

H6: WOM has a positive association with individuals' trust in e-pharmacy.

Within this specific setting, the intention of customers to utilize e-pharmacy in coming years might be understood as their adoption of e-pharmacy. Adoption and human-technology interaction are facilitated by trust [4]. Users need to trust e-pharmacy platforms to perform their tasks safely and reliably. Thus, before individuals are ready to embrace e-pharmacy, customers must have a certain level of trust for it. E-pharmacy can potentially lower healthcare delivery costs, making it more affordable and accessible [52]. These benefits will increase users' trust in e-pharmacy. Thus, the subsequent hypothesis is proposed.

H7: Trust has a positive association with individuals' adoption of e-pharmacy.

IL is considered to be the crucial structure that enlightens and brings together other types of literacy. Although the medium and form of information might differ, the essential characteristics of IL (identify, access, assess, integrate, utilize, comprehend) are still universal aspects to be taken into account [87]. Individuals who are more adept at accessing and analyzing health information online will have a better awareness of the benefits and features of e-pharmacies, increasing the chance of adoption. This implies that IL has a direct positive effect on e-pharmacy adoption, indicating that persons with greater levels of IL will be more likely to use e-pharmacy services than those with lower levels of IL. Thus, the subsequent hypothesis is put forth.

H8: IL has a direct positive association with adoption of e-pharmacy.

Positive ATs towards e-pharmacy adoption are linked to the perceived benefits of convenience, cost-effectiveness, and accessibility. Individuals with such positive ATs are more likely to adopt e-pharmacy services. PC over personal health information in e-pharmacy platforms influences adoption, with trust in security measures being a key factor. The only difference between safety and security is the loss incurred by human intention [42, 69]. Individuals' perceptions of their abilities to govern and preserve their personal health information when using e-pharmacy services are referred to as PC.

WOM have a direct positive impact on e-pharmacy usage. Personal endorsements, opinions, and experiences are pivotal in shaping perceptions of e-pharmacy services. Positive WOM enhances trust and confidence in e-pharmacy platforms, increasing adoption [20].

H9a: AT has a direct positive association with adoption of e-pharmacy.

H9b: PC has a direct positive association with adoption of e-pharmacy.

H9c: WOM has a direct positive association with adoption of e-pharmacy.

Previous studies show the mediating role of trust in behavioral acceptance [58]. In the following hypotheses, we propose that trust functions as an intermediary factor (mediator) connecting the variables (AT, PC, WOM) and the dependent variable (e-pharmacy adoption). The indirect effects posit that AT, PC, and WOM impact the adoption of e-pharmacy by influencing individuals' trust in the platforms of e-pharmacy. Consequently, this trust enhances the probability of their adoption of e-pharmacy services.

H10a: Trust mediates the relationship between AT and adoption of e-pharmacy.

H10b: Trust mediates the relationship between PC and the adoption of e-pharmacy.

H10c: Trust mediates the relationship between WOM and adoption of e-pharmacy.

Research methodology

The theoretical model data analysis was tested using Structural equation modeling (SEM). There are several reasons for selecting SEM. It is recognized as an established way for calculating complex models of cause-and-effect relationships in the context of management [33]. The smart Partial Least Squares (PLS) utilized in this research has demonstrated its reliability through the execution of various tests aimed at evaluating the robustness of the measurement model [53]. SEM incorporates statistical procedures for testing measurements and functional, predictive, and causal hypotheses [15, 41]. Moreover, it enables examining a model encompassing multiple dependent constructs. These constructs are latent, meaning they are not directly observable and have various dimensions, thus requiring operationalization through multiple measurement items. In this respect, structural equation modeling considers measurement errors, thus enhancing the accuracy of model estimation. The data analysis for this study employed SmartPLS software version 4.0. The choice of the Partial Least Squares Structural Equation Modeling (PLS-SEM) method was made due to its appropriateness for capturing complex interactions within the research framework. PLS-SEM is well-suited for empirical research in various dynamic scenarios, particularly with limited sample sizes. Previous research has demonstrated that PLS-SEM enables the simultaneous assessment of latent variables and their interrelations, which is crucial given the intricate factors influencing behavioral intentions [76, 77]. All variables

identified in the study can be effectively examined using this approach. PLS-SEM serves as a robust analytical instrument capable of unraveling the complexities associated with E-Pharmacy utilization in Nigeria, owing to its flexibility in handling both formative and reflective constructs. Consequently, it presents an optimal choice for comprehensively capturing the intricate and multidimensional aspects of consumer behavior.

Pilot testing

Pilot testing functions as an initial phase and a critical step in verifying the efficacy and viability of the research tool and methodological approach prior to full-scale execution. In this regard, a total of 110 consumers were engaged in this study to respond to the provided research questionnaires. This enabled the researchers to evaluate the pertinence, lucidity, and intelligibility of the survey instrument. The study garnered 80 responses, indicating a response rate of 72.7% from the survey. Following the reception of responses, the researchers enlisted the expertise of four specialists to scrutinize the questionnaires, thus addressing any potential ambiguities and confirming the suitability of the research tool within the Nigerian context. Our team conducted the PLS-SEM analysis on the data derived from our pilot survey utilizing SmartPLS version 4.0. The Cronbach's α coefficients from our pilot examination surpassed 0.7, signifying satisfactory reliability. Moreover, the pilot test provided an opportunity to approximate the duration required to finalize the survey and obtain feedback on any unanticipated challenges or hindrances that participants may face.

Questionnaire design and sampling process

Questionnaire design

To recruit participants for this study, a convenience sample strategy was used. 600 questionnaires were distributed, 548 returned and 473 responses was found valid. The study closely adheres to ethical principles throughout the recruitment and research process, such as informed permission and data privacy. The questionnaires were administered in English in Nigeria, as English serves as the official language for communication in the country. The detailed measurement items and their respective sources are provided in the Appendix section.

Sampling process

After the pilot testing phase, the investigation assembled a diverse and representative sample of survey participants that mirrors the Nigerian consumer demographic. The targeted individuals for the research encompassed a variety of demographic characteristics, including different genders, age brackets, educational attainments,

and socio-economic standings. The research utilized the stratified sampling technique to enlist participants to ensure inclusivity. The rationale behind employing this method lies in Nigeria’s distinct regions, each potentially possessing unique infrastructure, culture, and economic traits. The study aimed to capture the regional nuances that influence consumers’ ATs towards E-Pharmacy by stratifying the sample according to geographical zones. Furthermore, the study enlisted participants with prior exposure or interest in utilizing E-Pharmacy platforms and their ATs toward technological adoption. The sample pool comprised 600 respondents from three states, representing the major ethnic groups in the nation (Lagos, Enugu, Kaduna). Alongside the stratified sampling method, convenience sampling techniques were also employed to select individuals with prior exposure to or interest in E-Pharmacy. This involved the distribution of Microsoft Forms via different means such as online platforms, social media outlets (Facebook, X (Twitter), Telegram, WhatsApp), and health-related forums to engage with potential participants. The self-administered process required participants to independently complete the survey questionnaire without external assistance. This method gave respondents the chance to complete the survey at their convenience, in a comfortable environment, and free from external influences. The utilization of convenience sampling facilitated a diverse range of perspectives in the sample by engaging individuals who were willing and able to participate in the study. Our study utilized stratified sampling for regional diversity and convenience sampling for participant accessibility and engagement with the research topic. This dual approach was consistently applied to ensure the practicality and efficiency of participant recruitment and the collection of a diverse and representative sample reflecting the Nigerian consumer base.

Data collection procedure and analysis

Data collection efforts involved the purposeful dissemination of survey invitations over eight months, commencing in April 2023 and concluding in December 2023, with varying intervals between each distribution. Subsequent survey invitations were re-sent every two weeks after the initial distribution. This method aimed to reduce the likelihood of duplicate responses by staggering the distribution of survey invitations over several months and incorporating varying time gaps between distributions. Following data acquisition, extensive data cleaning procedures were conducted using Microsoft Excel software. Initially, all responses were inputted into Excel spreadsheets, and tools such as conditional formatting and duplicate removal functions were utilized to identify and eliminate duplicate entries. Responses that

appeared suspicious, displaying anomalies or inconsistencies, were flagged for further scrutiny. Through meticulous examination and manual review, inaccurate or implausible entries were removed from the dataset. The final dataset underwent a thorough cleaning and was prepared for subsequent analysis, ensuring that only reliable and high-quality data were used.

The demographic information was gathered in the study to examine the potential variability in responses based on demographic factors. Items were measured with a 5-point Likert scale where 1 meant strong disagreement, and 5 meant strong agreement. Every construct investigated in this study have been referenced in previous works.

Demographic characteristics

Approximately 50.7% of the individuals who participated in the survey were male, while 49.2% were female. The total number of responses amounted to 473. In addition, respondents who were under the age of 18 accounted for 4.0% of the entire sample. It was found that approximately 22.8% of the participants fell within the age range of 18 to 24, 53.1% were between the ages of 25 and 34, 13.7% were aged 35 to 44, and 6.2% were 45 years old or older. A summary of the participants’ demographic characteristics can be found in Table 1.

Table 1 Demographic characteristics for the participants (n = 473)

Items	Type	Number of participants	Percent
Gender	Male	240	50.7%
	Female	233	49.2%
Age	Under 18	19	4.0%
	18–24	108	22.8%
	25–34	251	53.1%
	35–44	65	13.7%
	45–54	25	5.2%
	55 and older	5	1.0%
Education	Primary School	3	0.6%
	Secondary/High	43	9.1%
	Diploma	56	11.6%
	Bachelor’s Degree	307	64.9%
	Master’s Degree	58	12.2%
	Other	6	1.9%
Occupation	Student	123	26.0%
	Education	40	8.4%
	Healthcare	127	26.8%
	Manufacturing	42	8.9%
	Engineering	53	11.2%
	Other	88	18.6%

Results

The reliability of the variables was tested using Cronbach’s Alpha and Composite Reliability (CR) with a value larger than 0.7 for good reliability. For every construct, the average variance extracted (AVE) is more than 0.5. We evaluated discriminant validity using cross-loadings. If the outer loading of each component related to a construct is greater than any of its cross-loaded data on other constructs, discriminant validity is determined. By calculating the variance inflation factor (VIF) among the constructs in the model, multicollinearity was also evaluated. For PLS-SEM, VIF values less than 5 are considered appropriate.

Assessment of measurement model

All Alpha values and Composite Reliabilities (CRs) exceeded the recommended threshold of 0.700. Additionally, both the Average Variance Extracted (AVE) and CRs were consistently higher or in close proximity to 0.500 and 0.700, respectively, affirming the convergent validity of the measurements. With reference to Table 2, all the values of CR and Cronbach’s Alpha are 0.81 and above. VIF values between constructs were lower than 5, indicating the absence of multicollinearity. According to [37], in PLS-SEM, multicollinearity will be an issue if VIF was greater than 5.0 or less than 0.20. Consequently, the VIF outcomes fell within the range of 1.4 to 2.7, suggesting that multicollinearity is absent. Moreover, every

component had a greater loading on its own construct in contrast to the cross-loadings on other components (refer to Table 3). Hence, the discerned discriminant validity between the constructs was found to be good. Utilizing the Fornell and Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio is another way for testing discriminant validity, the associations among each factor and all other factors are assessed against the square root of the average variance extracted (AVE) of each factor in order to implement the Fornell-Larcker criterion. The HTMT ratio is utilized to examine the heterotrait-monotrait correlation between factors, with a common threshold of below 0.90 being employed to indicate discriminant validity, as recommended [67]. The results presented in Tables 4 and 5 indicate that the discriminant validity of all factors is below 0.90.

Investigating how indicators load onto their constructs in relation to other constructs is referred to as cross-loading. Attaining discriminant validity occurs when indicators exhibit a more robust loading on their designated construct than other constructs. The rigorous demonstration of discriminant validity using these approaches enhances the analysis’s robustness and validity. It is ensured that each latent construct within the PLS-SEM framework remains distinct and contributes uniquely to the overall comprehension of the research model [84].

The common method variance/bias was assessed through variance inflation factor (VIF) values of the

Table 2 Construct reliability, convergent validity of the constructs, and VIF

Constructs	items	t-values	AVE	Composite reliability	Cronbach’s alpha	VIF
IL	IL1	58.496	0.768	0.900	0.899	2.231
	IL2	78.126				2.694
	IL3	67.251				2.539
	IL4	82.247				2.671
Attitude(AT)	AT1	35.362	0.703	0.793	0.788	1.485
	AT2	56.467				1.784
	AT3	52.502				1.817
Perceived control(PC)	PC1	71.953	0.771	0.854	0.852	2.170
	PC2	90.971				2.270
	PC3	56.562				1.913
WOM	WOM1	59.944	0.780	0.860	0.859	2.064
	WOM2	48.316				2.118
	WOM3	86.021				2.408
Trust(T)	T1	78.467	0.788	0.866	0.865	2.160
	T2	70.119				2.299
	T3	65.831				2.255
Adoption of E-pharmacy(AEP)	AEP1	63.933	0.742	0.834	0.825	1.993
	AEP2	106.163				2.392
	AEP3	39.171				1.665

Table 3 Cross-loading matrix for the measurement items

	IL	AT	PC	WOM	T	AEP
IL1	0.855	0.454	0.686	0.462	0.524	0.592
IL2	0.889	0.484	0.691	0.507	0.533	0.614
IL3	0.874	0.454	0.673	0.441	0.510	0.595
IL4	0.886	0.482	0.686	0.458	0.516	0.638
AT1	0.399	0.792	0.497	0.481	0.585	0.498
AT2	0.481	0.858	0.534	0.513	0.611	0.589
AT3	0.462	0.863	0.491	0.526	0.612	0.602
PC1	0.708	0.509	0.883	0.496	0.595	0.651
PC2	0.730	0.552	0.895	0.537	0.619	0.685
PC3	0.615	0.533	0.856	0.436	0.598	0.651
WOM1	0.489	0.518	0.507	0.877	0.538	0.527
WOM2	0.457	0.532	0.456	0.872	0.504	0.501
WOM3	0.466	0.553	0.516	0.901	0.564	0.534
T1	0.517	0.640	0.589	0.602	0.882	0.610
T2	0.521	0.646	0.629	0.492	0.892	0.689
T3	0.543	0.628	0.614	0.523	0.889	0.679
AEP1	0.677	0.537	0.657	0.547	0.589	0.862
AEP2	0.648	0.613	0.724	0.537	0.686	0.908
AEP3	0.461	0.594	0.559	0.436	0.646	0.811

Table 4 HTMT

	AEP	AT	IL	PC	T	WOM
AEP						
AT	0.835					
IL	0.802	0.634				
PC	0.896	0.740	0.890			
T	0.880	0.871	0.674	0.802		
WOM	0.698	0.735	0.606	0.651	0.704	

Table 5 Fornell-Larcker criterion

	AEP	AT	IL	PC	T	WOM
AEP	0.861					
AT	0.674	0.838				
IL	0.695	0.535	0.876			
PC	0.754	0.605	0.781	0.878		
T	0.744	0.719	0.594	0.688	0.887	
WOM	0.590	0.605	0.533	0.559	0.606	0.883

inner model. All VIF values are lower than 3.33, and as a result, the model can be considered free from common method variance [45]. Result summary is shown in Table 2.

Structural model analysis

The outcomes of hypothesis testing for the path coefficients are summarized and presented in Tables 6 and 7 and visually represented in Fig. 2.

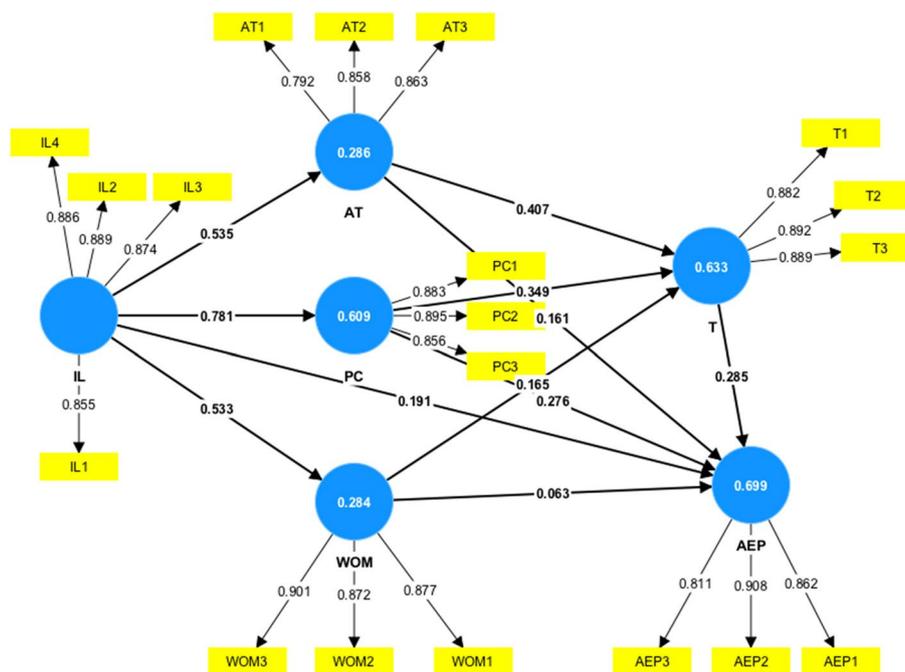


Fig. 2 Structural modeling result

Table 6 Direct relationships

Hypotheses	Path coefficient	Standard deviation	t-value	p-value	Supported
H1	0.535	0.038	14.126	<0.001	Yes
H2	0.781	0.019	41.446	<0.001	Yes
H3	0.533	0.035	15.218	<0.001	Yes
H4	0.407	0.042	9.647	<0.001	Yes
H5	0.349	0.041	8.567	<0.001	Yes
H6	0.165	0.042	3.896	<0.001	Yes
H7	0.285	0.047	6.123	<0.001	Yes
H8	0.191	0.047	4.074	<0.001	Yes
H9a	0.161	0.042	3.817	<0.001	Yes
H9b	0.276	0.050	5.527	<0.001	Yes
H9c	0.063	0.037	1.709	0.088	No

Table 7 Mediation analysis

	Path coefficient	SD	T value	P values	Support
H10a	0.116	0.023	5.147	<0.001	Yes
H10b	0.100	0.020	4.930	<0.001	Yes
H10c	0.047	0.014	3.267	0.001	Yes

Direct effect analysis

The significance of the relationship was assessed through the direct effect analysis of the Hypotheses. The outcome

of this analysis is presented in Table 4. Furthermore, the replacement technique was employed for bootstrapping with 5000 samples in order to ascertain the significance of each path coefficient. As indicated in Table 6, all the path coefficients were found to be statistically significant, with the exception of H9c. H9c evaluates whether WOM significantly affects AEP directly. The results showed that WOM does not directly affect AEP. (B=0.063, P=0.088). Thus, H9c is not accepted.

Mediating effect analysis

The bootstrapping method analyzed the mediating effect of Trust through the execution of 5000 bootstrap sub-samples. The outcome confirmed T plays a significant mediating role between AT, PC, WOM, and AEP. Specifically, T mediated the relationship between AT, PC, WOM and AEP. H10a, H10b and H10c was supported and therefore, H10 was supported. Table 7 summarizes the result of this analysis.

Goodness of fit and effect size

In this study, the effect size of the model is assessed with the coefficient of the F² test and the predictive relevance is established using the Q², since values were greater than 0, predictive relevance is established [36, 53]. We employed cross-validated redundancy (Q²) in order to evaluate the efficacy of the model, wherein values exceeding 0 signify the presence of predictive significance. The

predictive significance of a specific endogenous construct towards an exogenous construct is categorized as small, moderate, or substantial, corresponding to the values of 0.02, 0.15, and 0.35, respectively. The findings from these various tests, as presented in Tables 8 and 9. In the PLS-SEM approach, researchers employ various performance metrics, which include R² and adjusted R², to evaluate the coefficient of determination. The R² values are considered weak, moderate, or substantial if they are 0.19, 0.33, and 0.60, respectively [24]. The analysis result is also presented in Table 8.

Discussion of results

In this study, we aimed to investigate the association between IL and the adoption of e-pharmacy, employing the TRA as a theoretical framework.

First, the framework posited that IL would impact the factors, AT, PC, and WOM, ultimately impacting trust and e-pharmacy adoption. The analysis of this showed that AT (b=0.535; *p*<0.001), PC (b=0.781; *p*<0.001), and WOM (b=0.533; *p*<0.001) are all impacted by IL, the analysis of the research findings validated the positive influence of IL on AT, PC and WOM. The growing acknowledgment of the advantages associated with the utilization of e-pharmacy is fueled by the aspirations of consumers, particularly as they acquire IL skills, which include proficiency in health, digital interfaces, and healthcare technologies. The distinct socio-economic characteristics of Nigeria emphasize the significance of IL, amplifying the perceived benefits of e-pharmacy and enabling individuals to interact with these solutions. This

significant result provides valuable insights for stakeholders aiming to facilitate the efficient integration of e-pharmacy into the healthcare framework of Nigeria, highlighting the crucial role of IL in accomplishing this goal. These findings are consistent with the results of IL research conducted previously [43, 46, 54]. Therefore, H1, H2, and H3 are accepted. Additionally, IL (b=0.191; *p*<0.001) can also exhibit a Substantive positive association with AEP, as shown by the result of the analysis. Hence, Hypothesis 8 is verified.

Second, the analysis suggests that the three factors AT (b=0.407; *p*<0.001), PC (b=0.349; *p*<0.001), and WOM (b=0.165; *p*<0.001) directly impacted trust. Therefore, Hypotheses 4, 5, and 6 are accepted. A positive AT towards technology can bolster confidence in e-pharmacy platforms. A user who frequently utilizes these platforms might place trust in e-pharmacy services if they believe in their efficacy and dependability. This trust elevates the probability of embracing such services. Likewise, an individual who exhibits proficiency in maneuvering an e-pharmacy application, placing orders, and managing prescriptions online will encounter an increased sense of authority. When this sense of authority is coupled with trust in the platform’s security and user-friendliness, the likelihood of adopting the e-pharmacy service rises. Furthermore, WOM plays a pivotal role in shaping trust. Upon receiving positive endorsements from a reliable acquaintance regarding the dependability and quality of an e-pharmacy service, a user’s trust in the service is reinforced. This heightened trust directly influences their inclination to utilize the service. For instance, a resident of Lagos may opt to engage with an e-pharmacy based on favorable testimonials from their social network, underscoring the direct correlation between WOM and trust. These results are consistent with the findings of these studies [30, 79].

The analysis result of H7 revealed that the factor T (b=0.285; *p*<0.001) significantly affects AEP. Therefore, hypothesis 7 is accepted. In the Nigerian market, trust plays a crucial role in the acceptance of novel technologies and services. This holds especially true for e-pharmacy services, where issues pertaining to the legitimacy

Table 8 Structural model fit

Constructs	Q ²	R ²	R ² adj
AT	0.282	0.286	0.285
PC	0.608	0.609	0.608
WOM	0.280	0.284	0.283
T	0.350	0.633	0.631
AEP	0.481	0.700	0.696

Table 9 F² analysis

	AEP	AT	IL	PC	T	WOM
IL	0.045	0.401	-	1.559	-	0.397
AT	0.037	-	-	-	0.240	-
PC	0.077	-	-	-	0.192	-
WOM	0.007	-	-	-	0.042	-
T	0.101	-	-	-	-	-
AEP	-	-	-	-	-	-

of drugs, safeguarding of data, and dependability of distribution hold great significance. For example, when an e-pharmacy platform has built a reputation for robust security protocols, alongside providing authentic and superior quality medications, trust in this service is heightened and can significantly influence the consumer's choice to utilize the service. This finding is supported by these previous studies [59, 71] on consumer behavior.

Hypotheses 9a $AT > AEP$ ($b = 0.161$; $p < 0.001$) and 9b $PC > AEP$ ($b = 0.276$; $p < 0.001$) tested the direct effects of AT and PC on AEP, the result of the analysis showed that these hypotheses were supported. This finding is consistent with previous literatures [7, 28], highlighting the impact of AT and PC in consumer behavior. However, the findings did not support the direct relationship between WOM and AEP. Therefore, Hypothesis 9c $WOM > AEP$ ($b = 0.063$; $p = 0.088$) is not supported. The findings suggest that WOM, while an influential factor in various aspects of consumer behavior, may not directly impact adopting E-pharmacy services. This result is surprising, as WOM has traditionally played a pivotal role in shaping consumer choices [1, 47, 66]. Moderating factors such as culture, product, and platform may affect WOM adoption. Extant literature suggests that the impact and response to WOM can vary based on these factors [38, 82]. However, other factors, such as PC and IL, may exert stronger effects in the context of E-pharmacy adoption. This warrants further investigation to understand the nuances of WOM in the E-pharmacy adoption domain.

The analysis result indicated that trust mediates the relationship between AT ($b = 0.116$; $p < 0.001$), PC ($b = 0.100$; $p < 0.001$), WOM ($b = 0.047$; $p < 0.001$), and AEP. Therefore, H10a, H10b, and H10c are accepted. This mediation effect suggests that trust has a significant position in translating positive AT, PC, and WOM into intention usage of e-pharmacy. In Nigeria, there is a growing familiarity and comfort with technology, particularly among the younger cohorts who are increasingly dependent on smartphones and the internet for a variety of services. The significance of trust in the security and dependability of e-pharmacy platforms cannot be overstated for these individuals to embrace such services for medication procurement, thus exemplifying the mediating role of trust. The role of PC is particularly significant given the varying levels of digital literacy across the Nigerian population [60]. For instance, an individual in Lagos who perceives themselves as capable of effectively using an e-pharmacy app, placing orders, and managing prescriptions online is likely to feel a heightened sense of control. However, for this perception to translate into actual behavioral intentions, trust in the platform's user-friendliness and data security is indispensable. Trust in

the platform's security and ease of use increases the likelihood of service adoption. WOM has a significant impact on consumer behavior, with recommendations from peers and communities carrying considerable weight. Positive feedback and endorsements from friends and family regarding an e-pharmacy service can bolster trust among potential users. If, for instance, a trusted friend commends the exceptional service and authenticity of products offered by an e-pharmacy, an individual's trust in the service is reinforced, thereby increasing their inclination to use the e-pharmacy service. The outcome supports the studies previously conducted [58, 61, 91].

For Nigerian consumers, this underscores trust as a critical intermediary variable that can magnify the impacts of AT, PC, and WOM on their intention to utilize e-pharmacy services.

Discussion

Theoretical implications

Firstly, the TRA's relevance to E-Pharmacy services in Nigeria is relatively unexplored. This study intends to overcome this gap by extending the applicability of TRA by employing it to the context of E-pharmacy adoption, while acknowledging the distinct factors inherent in healthcare technology. In doing so, it broadens the utilization of TRA beyond traditional technology adoption cases, showcasing its adaptability and pertinence in forecasting behavioral intentions across various environments. The study also enhances the concept of subjective norms by concentrating specifically on WOM. Conventional subjective norms encompass a broad array of social influences, which may prove overly generalized for particular behavioral contexts. Through focusing on WOM, the investigation pinpoints a tangible and influential manifestation of social impact, especially pertinent in consumer conduct and e-pharmacy adoption. This indicates that forthcoming applications of TRA could gain from narrowing subjective norms likewise to specific, actionable social impacts pertinent to the behavior being scrutinized.

Furthermore, the integration of IL as a critical determinant within the TRA and trust frameworks enriches these theories by acknowledging the individuals' capability to obtain, comprehend, and utilize health information. This underscores the importance of IL in comprehending and predicting adoption behaviors within a healthcare setting. The research underscores IL's fundamental role in shaping AT, PC, WOM, and trust, rather than being solely a contributing element. Proficiency in accessing and comprehending health information proves essential for well-informed decision-making in healthcare. Recognizing the importance of IL unveils opportunities for further exploration into specific facets of IL, such as

health information-seeking behavior and digital literacy, and their distinct influence on adoption behavior. This strategy could yield a more nuanced comprehension of the role of information fluency in models of healthcare technology adoption, leading to more precise strategies to boost digital health literacy and endorse E-pharmacy services.

Trust emerges as a pivotal element impacting e-pharmacy adoption. The study dissects trust into general trust, trust in technology, and institutional trust, underscoring their combined influence on behavioral intentions. Trust acts as a mediator in the correlation between AT, PC, WOM, and the actual adoption of e-pharmacy services. This accentuates the significance of establishing and upholding trust in digital platforms through robust security measures, transparency, and regulatory compliance, which prove vital for consumer acceptance and utilization of online health services. Recognizing trust as a mediator clarifies the underlying adoption processes implicated in E-pharmacy. By spotlighting the mediating role of trust, this study enriches our comprehension of the intricacies linked to consumer decision-making in the context of E-pharmacy adoption. Trust effectively transforms positive attitudes, perceived control, and WOM into behavioral intentions. This mediation underscores the layered complexity of technology adoption, where intermediary psychological factors such as trust wield a critical influence on eventual behavior.

Identifying trust as a mediator elucidates the underlying adoption processes involved in E-pharmacy. By highlighting the mediating function of trust, this discovery enhances our understanding of the complexities associated with consumer decision-making in the context of e-pharmacy adoption. Further exploration of the mechanisms through which trust operates in the adoption process can provide a deeper understanding of consumer decision-making nuances. Understanding the intermediary function of trust illuminates the core mechanisms at play in the acceptance of E-pharmacy. This elucidates the correlation between WOM and the adoption of E-pharmacy, suggesting that while WOM does significantly influence trust, its effect on adoption may be indirect without the mediating role of trust. As such, efforts to cultivate trust should be seamlessly incorporated into the development and promotion of E-pharmacy platforms. Improving transparency, security, and dependability can foster consumer trust, thus streamlining the uptake of these services.

This research significantly contributes to the understanding in the field of healthcare technology adoption through an analysis of behavioral intention variables pertaining to E-Pharmacy services. The investigation of the determinants of E-Pharmacy service acceptance in

Nigeria enriches theoretical understanding and provides valuable practical implications for policymakers, healthcare practitioners, and E-Pharmacy platform developers. These implications play a crucial role in fostering user engagement and maximizing the uptake of E-Pharmacy services in the region.

Practical implications

Practically, Collaborative programs can be developed to enhance users' health IL skills, enabling them to assess health data sources and make informed healthcare decisions critically. E-pharmacy platforms can take an active role in empowering users by offering user-friendly educational resources. These resources may include tutorials, FAQs, and interactive guides, which can significantly improve users' knowledge and proficiency in effectively utilizing the platform's services. By fostering IL, providers can create a more informed and engaged user base, increasing the likelihood of e-pharmacy adoption. While the study did not explicitly observe the direct impact of WOM on adoption, its potential effect remains substantial. E-pharmacy providers are encouraged to monitor user feedback and reviews actively. Contented users can be motivated to share their experiences, which may sway potential users. To effectively leverage the power of WOM, E-pharmacy platforms can showcase positive WOM experiences on their digital media and promotional materials. Sharing testimonials and success stories from satisfied customers can amplify trust and bolster the platform's credibility. Furthermore, fostering transparent communication about data handling practices, secure transactions, and privacy policies can contribute to building trust among users. Consumer behavior in the e-pharmacy domain is heavily influenced by cultural variables. Providers operating in diverse regions should tailor their marketing and communication strategies to align with cultural preferences and values. By recognizing and respecting cultural nuances, e-pharmacy service providers can create a more inclusive and practical user experience, ultimately driving e-pharmacy adoption among diverse populations. This study provides practical recommendations and emphasizes the need for collaborative research efforts between academia, industry, and policymakers. Joint initiatives can lead to innovation in e-pharmacy services and policies. By working together, stakeholders can better address the evolving needs of consumers in the e-pharmacy landscape, ultimately promoting the growth and sustainability of e-pharmacy services while ensuring that users make informed healthcare choices in the digital era. These practical implications, rooted in the study's findings and discussion, offer a comprehensive roadmap for stakeholders in the e-pharmacy domain. By focusing on IL, trust-building, cultural

sensitivity, and collaborative research efforts, e-pharmacy service providers and policymakers can create a more conducive environment for e-pharmacy adoption and improve the overall healthcare experience for consumers.

Limitations

The study is subject to some limitations worth noting. This study is subject to specific constraints primarily arising from its contextual setting in Nigeria, which may limit the broader applicability of its findings across different nations, given the presence of diverse country-specific factors. Notably, the study did not directly explore effect of WOM on adoption, potentially impeding a comprehensive understanding of WOM's role in the context of E-pharmacy adoption. Furthermore, while acknowledging the importance of IL, the study did not delve deeply into its specific facets, such as health information-seeking behavior and digital literacy, thus missing the opportunity to gain more nuanced insights. It is essential to recognize that the study's findings, centered on adopting E-pharmacy within a specific context, may not seamlessly extrapolate to diverse healthcare technology adoption scenarios or various cultural settings. Additionally, the study did not extensively address the influence of external factors, such as healthcare policies, on E-pharmacy adoption. An important aspect to note is the absence of moderators in this study, which could have provided valuable insights into the variables that potentially influence the relationships examined. Therefore, future research endeavors should consider exploring potential moderators and their impact on E-pharmacy adoption within diverse contexts, thereby enhancing our comprehensive comprehension of the multifaceted factors underpinning healthcare technology adoption.

Conclusion

This research has expanded the scope of the TRA to encompass the intricate realm of healthcare technology adoption. It has highlighted the unique considerations that come into play when adopting E-pharmacy technology. Furthermore, this study emphasized the importance of IL as a foundational determinant within the TRA framework. This underscores the critical role an individual's ability to access, comprehend, and use health information plays in healthcare technology adoption. In particular, this research has found that IL is a contributing factor and the linchpin in shaping ATs, PC, and trust. This discovery underscores the foundational importance of IL in healthcare technology adoption models and opens up new avenues for research to explore its specific components.

This study has uncovered that trust is pivotal in mediating the complex linkages between WOM and the

Adoption of E-Pharmacy (AEP). This insight provides actionable guidance for policymakers and practitioners, enabling them to design strategies that foster and maintain trust among E-pharmacy users. The comprehension of E-pharmacy adoption is yet to be fully achieved. Further studies in these areas can provide a more profound and comprehensive understanding of the complexities entailed in the adoption of E-pharmacy services. Investigating the moderating factors that affect WOM dynamics and their varying impact on E-pharmacy adoption is an area that can be explored. Knowing the circumstances under which WOM becomes a more potent influencer can help E-pharmacy providers tailor their strategies. These inquiries will enrich the academic discourse and provide practical insights for E-pharmacy providers, policymakers, and healthcare stakeholders who aim to improve healthcare accessibility and patient outcomes in the digital era.

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

O.C.U: Conceptualization, Methodology, Data collection, original draft, Data analysis, review and editing. F.M: Review and Editing, supervision, fund acquisition. All authors read and approved the final manuscript.

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Availability of data and materials

Data used in this study will be made available upon request.

Declarations

Ethics approval and consent to participate

The research followed ethical guidelines as stipulated in the declaration of Helsinki and the institutional review board of the school of management, Jiangsu University reviewed the study protocols and gave its clearance. Participants were informed of their rights to withdraw from the survey at any given time. The benefits and risks of the research were clearly made known to the participants prior to their participation. They all provided their written informed consents to participate which is according to the ethical standards of Jiangsu University. Participants were also assured of their confidentiality and no identifying information was required or collected from the participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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