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Evaluating the Mediating Role of Trust and Satisfaction in the Adoption of Digital Banking Services in Saudi Arabia

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ABSTRACT

The objective of this research is to examine at how perceived usefulness perceived simplicity of use, security, convenience, and website design affect trust and satisfaction, as well as their direct and indirect consequences on internet banking adoption in Saudi Arabia. Despite the country's tremendous technical improvements, use of internet banking remains low. A questionnaire study was conducted with 384 genuine internet banking customers in Saudi Arabia. Exploratory factor analysis (EFA) revealed the variables' underlying structure, whereas confirmatory factor analysis using AMOS 22 confirmed reliability and validity. Structural equation modelling (SEM) in AMOS 22 was used to examine 22 hypotheses. According to the findings, perceived utility, perceived simplicity of use, convenience, and website design all had a favourable effect on trust and satisfaction, which in turn promoted online banking uptake. However, security had no meaningful effect on trust or satisfaction. The mediation study found that trust and contentment had a role in mediating the association between perceived utility, perceived ease of use, convenience, and website design and online banking uptake. Surprisingly, neither trust nor contentment mediated the association between security and adoption. The study model explained 62% of the variation in online banking usage. These results help us understand the critical roles of trust and happiness in online banking adoption in Saudi Arabia, and they provide significant insights for the banking industry to enhance consumer adoption strategies.

Keywords: Online Banking Adoption, Trust, Satisfaction, Perceived Ease of Use, Security, Saudi Arabia
JEL Classifications: G21, M31, O33

1. INTRODUCTION

The financial services sector in Saudi Arabia is experiencing a significant change due to the rise of digital banking. This article aims to clarify how trust and satisfaction influence the adoption of digital banking services in Saudi Arabia. This research is very relevant due to the fast-paced digitalization of financial procedures and the Saudi government's Vision 2030. The advancement of advanced technology and the rise of fintech have enabled the development of creative financial solutions. However, the level of their acceptance depends largely on customer-oriented aspects, particularly trust and happiness.

An academic literature corpus highlights the importance of trust in internet banking. Trust is considered a crucial factor that influences consumer satisfaction and the decision to use a service. Research conducted by Andespa et al. (2024) has shown that in Saudi Arabia, where the banking industry is based on Islamic principles, trust is demonstrated through the security and confidentiality of transactions as well as the commitment to Shariah-compliant financial procedures. Satisfaction is often cited as a result of service quality and user experience, impacting the ongoing use of digital banking, as proposed by (Al-Fahim et al., 2024). This research uses a quantitative technique, namely structural equation modelling, to analyze the relationship between

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trust, satisfaction, and the adoption of digital banking. The study is based on the technology acceptance model (TAM) and the theory of planned behaviour (TPB), which provide a strong foundation for examining customer behaviour in the digital banking sector. This research utilizes the DeLone and McLean Information Systems Success Model to evaluate the aspects of service quality that impact customer happiness.

The mediation impact of trust and satisfaction is intriguing as it provides understanding of the psychological and behavioural factors influencing the decision-making process of Saudi customers in digital banking. Banking organizations may enhance their strategic planning by comprehending these mediating elements to create and provide services that meet their consumers' expectations and requirements.

Ultimately, the integration of digital financial services in Saudi Arabia is a complex occurrence, closely tied to the cultural and legislative framework of the Kingdom. This research enhances academic discussion by emphasizing the mediating impact of trust and satisfaction on the acceptability and use of digital banking. This study has important implications for banking authorities and practitioners in Saudi Arabia who are working to promote a financially inclusive environment that incorporates digital technology.

1.1. Problem Statement

Saudi Arabia's online banking adoption rate is 41%, which is far lower than the UAE's rate of 83%, despite substantial government investment in technology infrastructure and strong internet development during the early 2000s. This discrepancy is present despite cultural and geographical commonalities. Studies show that a lack of trust significantly hinders user satisfaction and adoption rates (Ahmad et al., 2024; Saleh, 2024). The study aims to investigate how trust and satisfaction mediate the relationship between perceived service attributes and the adoption of online banking in Saudi Arabia. It seeks to provide insights into customer attitudes and perceptions that impact their acceptance and ongoing use of online banking services.

1.2. Research Questions

This study attempts to examine the main factors that impact consumer trust and satisfaction in online banking in Saudi Arabia and to analyze their influence on the general adoption of online banking services. The research will specifically focus on the following questions:

1. How do perceptions of usefulness, ease of use, security, convenience, and website design contribute to building trust among Saudi Arabian bank customers?
2. To what extent do perceptions of usefulness, ease of use, security, convenience, and website design enhance satisfaction levels among Saudi Arabian bank customers?
3. What role do trust and satisfaction play in the adoption of online banking services in Saudi Arabia?
4. In what ways does trust act as a mediating factor between perceived usefulness, ease of use, security, convenience, website design, and the adoption of online banking in Saudi Arabia?
5. How does satisfaction serve as a mediating factor in the relationship between perceived usefulness, ease of use, security, convenience, website design, and the adoption of online banking in Saudi Arabia?

1.3. Research Objectives

1. Analyze the contributions of perceived usefulness, ease of use, security, convenience, and website design to the development of trust among customers of Saudi Arabian banks.
2. Evaluate the extent to which perceived usefulness, ease of use, security, convenience, and website design impact customer satisfaction within the Saudi Arabian banking sector.
3. Investigate the roles of trust and satisfaction in influencing the adoption of online banking services among Saudi Arabian bank customers.
4. Examine the mediating role of trust in the relationship between perceived usefulness, ease of use, security, convenience, website design, and online banking adoption in Saudi Arabia.
5. Explore how satisfaction mediates the relationship between perceived usefulness, ease of use, security, convenience, website design, and the adoption of online banking services in Saudi Arabia.

2. LITERATURE REVIEW

Arab National Bank (Akanbi and Obafemi) and National Commercial Bank (NCB) launched online banking in Saudi Arabia in 2001 in response to increased internet use (Almujamed, 2020). These early adopters established a pattern for other Saudi banks by offering cash transfers, bill payments, stock trading, and SMS alerts online. This digital growth enabled a full online banking environment for personal and business finance, including Islamic goods. All Saudi banks have multilingual (Arabic and English) websites, demonstrating their dedication to accessibility and client service. This progression, marked by online account creation, shows how Saudi banking technology adapts to local customer requirements and worldwide digital banking trends.

2.1. Previous Studies on Variables of the Study

2.1.1. Online banking and online banking adoption

Online banking's potential to accelerate financial activities remotely is highlighted in Saudi Arabia, however consumer trust and satisfaction are holding it back (Gupta et al., 2024). This difference emphasizes the necessity to identify online banking use determinants, especially in Saudi Arabia, where technology and internet penetration are strong. Research shows that convenience, cost savings, and 24/7 availability influence users' willingness to utilize online banking services (Akhter et al., 2022). However, security issues, internet and computer literacy, and diminished human connection, which might lower trust, remain significant obstacles. The advantages for clients and banks—improved service accessibility and financial management for the former and higher profitability and operational efficiency for the latter—are well-documented. These constraints and opportunities might dramatically impact regional internet banking adoption, thus stakeholders must concentrate on trust and satisfaction with customers.

2.1.2. Perceived usefulness (PU)

Perceived usefulness, which is the belief in a system's capability to improve performance, is a key factor in the Technology acceptance model (TAM). It has a substantial impact on trust and happiness, ultimately impacting the adoption of online banking (Al-Baltah et al., 2024; Salimon et al., 2020). Research from several research consistently shows that perceived usefulness has a favourable effect on the acceptability and adoption of online banking, leading to increased trust and satisfaction among users. Research by Kaur and Arora (2023) and others indicates that seeing online banking as advantageous boosts consumer trust and happiness, ultimately resulting in higher adoption rates. The connection highlights how the perceived utility influences good consumer attitudes towards internet banking, leading to its wider adoption and incorporation into everyday financial routines.

2.1.3. Perceived usefulness (PU)

Ease of use refers to the user's perception of the level of effort required while using online banking services. Banks should prioritize simplicity of use to enhance consumers' experience with online transactions, considering the potential complexity and discomfort associated with such transactions. Usability is a crucial factor in the TAM model, influencing trust and satisfaction (To and Trinh, 2021).

2.1.4. Security

Increasing security issues, especially related to technology in the banking industry, have been recognized as a major factor affecting client happiness. Customers who voice concerns about security vulnerabilities often experience reduced satisfaction levels. Wu et al. (2020) experimentally confirmed a negative association between heightened security worries and lower consumer satisfaction among their research participants. Increased security concerns resulted in a significant drop in consumer satisfaction scores. Khattak et al. (2021) describe security in online banking as the level of confidence consumers have that their personal and financial information, as well as transaction data, are protected from unauthorized access or hacking. Security involves the actions performed to protect against possible dangers. Online, this refers to banking websites' capacity to maintain the confidentiality and integrity of customer data and financial transactions while they are being sent. Perceived security controls refer to how users see an e-commerce platform's ability to safeguard sensitive information from cyber attacks (Taherdoost, 2023). This study emphasizes the crucial need to solve security issues in order to improve consumer happiness and confidence in online banking services.

2.1.5. Convenience

Online banking offers significant convenience (Godet and Durance, 2011). Convenience, as defined by Al-Gasawneh et al. (2021), refers to the extent to which a user perceives that engaging in online transactions allows them to have authority over the use, organization, and transformation of their time and energy in accomplishing their objectives related to accessing and utilizing online banking services. Convenience is a key component affecting trust and satisfaction, as shown by several studies. The research' empirical results demonstrated that convenience significantly impacts the acceptability and uptake of online banking. Users prioritize convenience while selecting online banking services (Prabhavathi et al., 2021). Customers may recognize the comfort of online banking based on the ease of logging in, completing transactions swiftly, and obtaining desired information with little time and effort. Thus, users are more inclined to embrace internet banking if they see it as more convenient for meeting their needs.

2.1.6. Website design

Website design has a crucial part in e-service quality, as highlighted in marketing literature, emphasizing its significance at many stages of online shopping: information, agreement, fulfillment, and after-sale (Ferraz et al., 2023). The website's design and content are crucial, particularly in the early phases of the buying process, since they greatly impact consumer choices (Palacios-Ibáñez et al., 2023). An well designed website functions as a digital sales representative by aiding in product selection, minimizing search time with high-quality content, and encouraging purchases (Yuniarti et al., 2024). El-Manstrly et al. (2024) emphasize the significance of website characteristics such aesthetics, ease of navigation, product availability, price information, and customization in the first stages of online purchasing. These components improve user experience, resulting in increased consumer engagement and satisfaction throughout the online shopping process.

2.1.7. Trust

Trust is crucial in online banking, acting as a cornerstone for the effective implementation and use of digital financial services. Trust is acknowledged as the confidence in the dependability, honesty, and goodwill of a service provider. In online banking, this means having the certainty that financial transactions and personal information are securely handled and safeguarded from unauthorized access. This notion is essential in an environment marked by anonymity and physical isolation, when direct connections and concrete reassurances are lacking.

Scholars like McGowan et al. (2024) agree that trust involves being open to vulnerability with the belief that the other person would act in one's favour. Online banking involves users trusting banks with sensitive data, expecting them not to misuse this vulnerability. Research has shown that the lack of trust might cause reluctance in using online banking due to concerns about privacy and financial security issues (Salem and Rassouli, 2024). Additionally, the digital aspect of online banking heightens worries about security and privacy, emphasizing the need of trust in managing the uncertainties and dangers associated with online transactions. Building trust is crucial for both the initial and ongoing usage of online banking services, as it guarantees customers of the security and reliability of their digital interactions with banks (Melnyk, 2023).

2.1.8. Satisfaction

Satisfaction in online banking refers to how clients assess whether a service meets their expectations, as outlined by Tahtamouni (2023). It represents consumers' overall sentiments and impressions of a service or product, providing a thorough evaluation based on personal experiences, expectations, and the quality of service provided Nur explain that satisfaction refers

to a bank's capacity to meet the psychological, emotional, and practical demands of its clients, recognizing the differences in consumer expectations and satisfaction levels. This research defines satisfaction as the customer's view of online banking services, assessing whether these services meet, exceed, or fall below their expected expectations and needs. It is a crucial measure of how well a bank's online services are performing and how attractive they are to customers. Satisfaction plays a crucial role in a bank's capacity to keep its customers and adjust its offerings to match changing consumer needs and desires (Hidayat and Idrus, 2023).

2.2. Relationships between Constructs

2.2.1. The relationship between perceived usefulness and trust and the relationship between perceived usefulness and satisfaction

Usefulness refers to the degree to which a user believes that using online banking services would enhance his or her banking experience (Singh and Srivastava, 2020). Within the framework of TAM, usefulness is a significant factor that has a strong impact on trust Choung et al. (2023) and satisfaction in determining the acceptance and adoption of online banking.

Many researchers have empirically demonstrated the positive effect of usefulness on trust and satisfaction towards accepting and adopting technology services in general and online banking in particular (Islam et al., 2024; Rahman et al., 2023). If the customer perceives that online banking is useful, most likely that will increase his or her level of trust and satisfaction which leads to developing positive beliefs about usefulness. Consequently, the customer will adopt and accept online banking services. As usefulness positively affected trust and satisfaction, the researcher hypothesised that:

- H_{1a}: Perceived Usefulness has a positive influence on trust
- H_{1b}: Perceived Usefulness has a positive influence on Satisfaction.

2.2.2. The relationship between perceived ease of use and trust and the relationship between perceived ease of use and satisfaction

Ease of use is defined as the extent to which a user believes that using online banking services would be free of effort Given that online transactions may seem complex and not so comfortable for customers, ease of use becomes a main variable that should be taken into account by banks to improve the customers' experience. Ease of use is a key variable in TAM model and has an impact on trust and satisfaction. The Relationship between Security and Trust and The Relationship between Security and Satisfaction Security is defined as the extent to which a user believes that using online banking services is safe and protected provided that the bank will be able to protect his or her information and financial transactions dates from being hacked In the online environment, security is perceived to be a significant variable that has a high impact on customer attitudes towards online transactions.

Due to the high level of uncertainty and danger in the online environment, security is an important factor of trust and satisfaction in the acceptance and adoption of online banking. The inherent danger of internet transactions, which lack face-to-face connection, emphasizes their relevance (Ozuna and Steinhoff, 2024). Several studies have shown that security has a substantial influence on trust and satisfaction. Increased security precautions by banks boost client acceptability and use of online banking services (Quan et al., 2023). However, Ahmad et al. (2024) noted that security is still a serious concern in online banking since total eradication of virus, theft, and fraud is impossible.

Based on empirical evidence from previous research, the following hypotheses are proposed:

- H_{3a}: Security has a positive influence on trust
- H_{3b}: Security has a positive influence on satisfaction.

2.2.3. The relationship between convenience and trust and the relationship between convenience and satisfaction

Convenience has regularly been proven in research to have a substantial impact on both trust and satisfaction with online banking. Convenience, defined as ease of use and accessibility, improves consumer experiences by making transactions easier and more efficient (Godet and Durance, 2011). According to studies, when banking services are easy, clients are more likely to trust the platform's security and reliability, since the seamless experience convinces them of the service's trustworthiness (Choudhuri et al., 2024; Krishna et al., 2025). Furthermore, convenience improves client happiness by saving them time and lowering the effort necessary for financial transactions. This improved satisfaction leads to a more positive impression of the service, fostering more trust and commitment to the service provider. By emphasizing convenience, banks may increase their clients' confidence and satisfaction, thereby boosting the adoption and sustained use of online banking services. As a result, ease is important to the effective adoption and long-term usage of online banking services. Therefore, customers are more likely to adopt online banking if they perceive it as more convenient to fulfil their requirements. Hence, based on this review, the following hypotheses have been formulated.

- H_{4a}: Convenience has a positive influence on trust
- H_{4b}: Convenience has a positive influence on satisfaction.

2.2.4. The relationship between website design and trust and the relationship between website design and satisfaction

The design of a website plays a pivotal part in the acceptance and usage of online banking, directly impacting users as they carry out their transactions (Saoula et al., 2023). The properties of a website, such as its features, aesthetics, and arrangement, have a substantial impact on customers' opinions of online banking. Usability, dependability, and quality are crucial factors that significantly impact consumers' acceptance and usage of online banking services. There exists a well proven relationship between website design and both trust and satisfaction. A bank's website functions as its representative, facilitating consumers to effortlessly engage in a variety of financial operations. The attributes and qualities of a website may bolster user assurance and augment the adoption of online banking. The efficacy of website design has a favourable influence on both trust and satisfaction (Chungu and Phiri, 2024). Features such as innovation, visual appeal, ease of use, and robust security measures are expected to enhance

consumer trust, resulting in increased acceptance and usage of online banking services. The following hypotheses are given to clarify the impact of website design on trust and satisfaction.

- H_{5a}: A well-designed website has a positive influence on trust
- H_{5b}: A well-designed website has a positive influence on satisfaction.

2.2.5. The relationship between trust and satisfaction on online banking adoption

The role of trust and satisfaction is consistently documented by the previous literature. Previous studies provided empirical evidences for the relationship between online banking adoption and trust (Abdul Sathar et al., 2023; Geebren et al., 2021) these studies showed that when the levels of trust and satisfaction are increased, the users feel confident to execute more online banking transactions. Arshad Khan and Alhumoudi (2022) confirmed the mediating role of customer satisfaction in increasing the customers' adoption of online banking. According to Rawwash et al. (2020) access to account, control of account, usage of account, awareness and retention are very significant factors influencing customers to adopt online banking. As per their study, there is a strong and positive relationship between consumer satisfaction and consumer adoption of online banking.

Thus, the researcher proposes the following hypotheses:

- H_6: Trust has a positive influence on the adoption of online banking
- H_7: Satisfaction has a positive influence on the adoption of online banking.

2.2.6. Mediating role of trust and satisfaction

The significant role of trust and satisfaction in the adoption of online banking has been consistently discussed. The vast majority of researchers (Almaiah et al., 2023; Zhang et al., 2023) considered trust and user satisfaction as the heart of any relationship that should be firmly maintained to make customers adopt and continue using online banking.

Abu-AlSondos et al. (2023) emphasized that trust is extremely important for consumers to acquire a certain comfort level with online banking to keep using it. Nawafleh and Khasawneh (2024) found that trust-based issues are important in increasing customer's behavioural to use online banking services. Zhang et al. (2023) also argued that trust is an important element that influences customer behaviour and determines the success of technology adoption such as online banking. Satisfaction is also a central factor impacting adoption and continuity of the use of online banking services. Several studies have found that trust serves as a meditating variable to maintain the usage of online banking. For instance (Haron et al., 2020; Khatoon et al., 2020) that trust has a mediating role in the adoption of online banking. The role of satisfaction as a mediator has also been deliberated in the literature. Abdul Sathar et al. (2023) documented the mediating role of satisfaction on customers' attitudes towards adoption and the continuous use of online banking services. Rahi et al. (2020) investigated the mediating role of satisfaction and found it statistically significant in customers' adoption of online banking services.

2.2.7. Mediating role of trust in the relationship between (a) perceived usefulness, (b) perceived ease of use, (c) security, (d) convenience and (e) website design and online banking adoption in Saudi Arabia

Despite some studies supporting the direct association between perceived usefulness, perceived ease of use, security, convenience and website design with online banking adoption, possible effect that the relationship between perceived usefulness, perceived ease of use, security, convenience and website design o online banking adoption may be mediated by trust.

In fact, the previous set of hypotheses H_{1a}, H_{2a}, H_{3a}, H_{4a} and H_{5a} and H_6 implicitly suggest the mediating role of trust. Previous studies also supported the influence of perceived usefulness, perceived ease of use, security, convenience and website design with trust. Previous studies also supported the influence of trust on online banking adoption.

2.2.8. Mediating role of satisfaction in the relationship between (a) perceived usefulness, (b) perceived ease of use, (c) security, (d) convenience and (e) website design and online banking adoption in Saudi Arabia

Despite some studies supporting the direct association between perceived usefulness, perceived ease of use, security, convenience and website design with online banking adoption, possible effect that the relationship between perceived usefulness, perceived ease of use, security, convenience and website design and online banking adoption may be mediated by satisfaction.

In fact, the previous set of hypotheses H_{1b}, H_{2b}, H_{3b}, H_{4b} and H_{5b} and H_7 implicitly suggest the mediating role of satisfaction. Previous studies supported the influence of perceived usefulness, perceived ease of use, security, convenience and website design with satisfaction. Previous studies also supported the influence of satisfaction on online banking adoption.

Previous research has demonstrated that simplicity of use has a substantial impact on trust and satisfaction levels (Moon et al., 2023). Customers define ease of use as online banking services that are user-friendly, simple to utilize, and easy to remember. Customer trust and satisfaction are more likely to rise when online banking services become more user-friendly (Almansour and Elkrghli, 2023). Customers are more likely to use and interact with online banking if the service is simple to use. Based on this knowledge, we suggest the following hypotheses:

- H_{2a}: Perceived ease of use has a positive influence on trust
- H_{2b}: Perceived ease of use has a positive influence on satisfaction.

2.3. Research Hypotheses

The following hypotheses are derived from the proposed research framework (Table 1).

2.4. Research Framework

Conceptual research model is presented in Figure 1.

Table 1: Summary of hypotheses

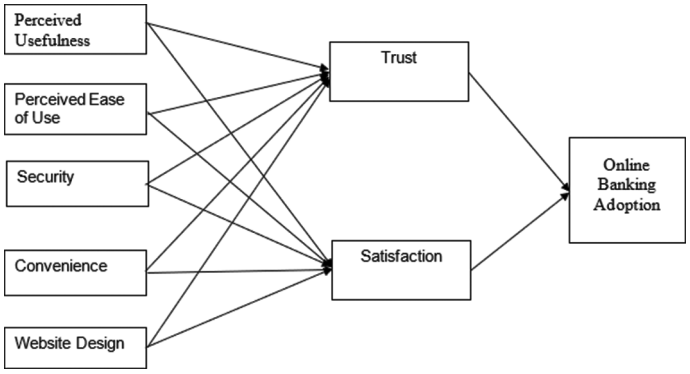
No	Relationship	Statement of hypotheses
H_{1a}	PU->TRU	Perceived usefulness has a positive influence on trust
H_{1b}	PU->SAT	Perceived usefulness has a positive influence on Satisfaction
H_{2a}	PEU->TRU	Perceived ease of use has a positive influence on trust.
H_{2b}	PEU->SAT	Perceived ease of use has a positive influence on satisfaction.
H_{3a}	SEC->TRU	Security has a positive influence on trust.
H_{3b}	SEC->SAT	Security has a positive influence on satisfaction.
H_{4a}	CONV->TRU	Convenience has a positive influence on trust.
H_{4b}	CONV ->SAT	Convenience has a positive influence on satisfaction.
H_{5a}	WD ->TRU	A well-designed website has a positive influence on trust.
H_{5b}	WD->SAT	A well-designed website has a positive influence on satisfaction
H_{6}	TRU->ODA	Trust has a positive influence on the adoption of online banking.
H_{7}	SAT->ODA	Satisfaction has a positive influence on the adoption of online banking.
H_{8a}	PU->TRU->OBA	Trust mediates the relationship between perceived usefulness and online banking adoption
H_{8b}	PEU->TRU->OBA	Trust mediates the relationship between perceived ease of use and online banking adoption
H_{8c}	SEC->TRU->OBA	Trust mediates the relationship between security and online banking adoption
H_{8d}	CONV->TRU->OBA	Trust mediates the relationship between convenience and online banking adoption
H_{8e}	WD->TRU->OBA	Trust mediates the relationship between website design and online banking adoption
H_{9a}	PU->SAT->OBA	Satisfaction mediates the relationship between perceived usefulness and online banking adoption
H_{9b}	PEU->SAT->OBA	Satisfaction mediates the relationship between perceived ease of use and online banking adoption
H_{9c}	SEC->SAT->OBA	Satisfaction mediates the relationship between security and online banking adoption
H_{9d}	PEU->SAT->OBA	Satisfaction mediates the relationship between convenience and online banking adoption
H_{9e}	WD->TRU->OBA	Satisfaction mediates the relationship between website design and online banking adoption

3. RESEARCH METHODOLOGY

This study uses a quantitative research design to examine the behaviours and perceptions of Saudi bank customers towards internet banking. It employs a survey approach based on the empiricist paradigm for data collecting (Alarifi and Husain, 2023). Quantitative approaches have the benefit of generalizability, enabling results to be applied to wider settings (Ateeq, 2024).

The study population consists of Saudi bank clients who use online banking services. Sampling is a crucial step in research when a subset of the population is chosen to make inferences about the broader group's attributes, beliefs, and attitudes. This research focuses on Saudi bank customers who are actively using online banking systems due to their large number.

Figure 1: Conceptual research model



This research establishes a sample size of 384 individuals based on the standards provided by (Garad et al., 2025) for big populations. For populations larger than 100,000 persons, a sample size of 384 is considered statistically significant, providing reliability and validity in study results.

The instrument used in this propose study will employ from past establish studies on each construct. Ateeq (2023) suggested a number of methods to collect data including, mail, telephone, web-based survey and self-administrated survey. The latter can be distributed by the researcher him/her self or by mail, but in the current time self-administrated survey is being extensively used for online questionnaire (Alzoraiki et al., 2024). Since this study is focuses on customers' intention towards online banking adoption, accordingly the researcher applied self-administrated survey with two methods to collected data namely face to face and online survey. Selecting one or more methods depends on several factors such as cost, time availability, convenience and researcher's experience (Milhem et al., 2024).

3.1. For Fact to Face, the Researcher Met Participants by Visiting the Following Saudi Banks

The research focuses on the five biggest Saudi banks, as determined by SAMA, because of their vast number of customers. This influenced the decision to distribute questionnaires in person. The online survey approach was selected for its speed, simplicity of follow-up, and capacity to collect a comprehensive sample of responses.

4. RESULTS

4.1. Demographic Profile of the Respondents

This section shows the demographic information for the participants in the pilot study (Table 2).

The survey included 100 participants, with 68% male and 32% female, indicating the prevalence of male-dominated social positions in Saudi Arabia. 75% of the participants were between the ages of 18 and 40, with the largest proportion (44%)

being between the 21-30 age range. 64% of participants were married. In terms of education, 48% had a bachelor's degree, 22% had a master's degree, and 5% had a Ph.D. This indicates that internet banking consumers have a significant level of knowledge, which may improve their usage of financial services. Employment statistics indicated an equal distribution between the public sector (40%) and private sector (38%), while 22% were company owners. The study's response rate of 41% enables initial statistical analysis, suggesting a sufficient sample size for early conclusions.

4.2. Reliability of the Instrument

The Table 3 illustrates the reliability coefficients, assessed using Cronbach's Alpha, for several constructs associated with the adoption of online banking. The variables include Perceived Usefulness (PU) with a coefficient of 0.812, Perceived Ease of Use (PEU) at 0.821, security (SEC) at 0.793, Convenience (Alshammari et al., 2025) at 0.850, website design (WD) at 0.848, trust (TRU) at 0.872, Satisfaction (SAT) at 0.753, and Online Banking Adoption (OBA) at 0.889. The coefficients indicate that the scales used to measure these constructs are reliable (Ateeq et al., 2024) since they exceed. A number of 7 is often seen acceptable in social science research, with higher values suggesting more dependability (Ibrahim et al., 2024).

The value of Cronbach's alpha for all measured constructs in the pilot test showed adequate reliability ranged between 0.753 and 0.889. These results show the validity of the constructs for further proceeding with collecting data for main study.

Table 2: Displays respondents' gender, marital status, age, education and occupation

	Frequency	Percentage
Gender		
Male	34	68.0
Female	16	32.0
Total	50	100.0
Age		
18-19	2	4.0
20-30	22	44.0
31-40	12	24.0
41-50	8	16.0
51-60	4	8.0
+61	2	4.0
Total	50	100.0
Marital status		
Married	32	64.0
Single	18	36.0
Total	50	100.0
Education		
High school	2	4.0
Diploma	10	20.0
Bachelor	24	48.0
Master	11	22.0
Ph.D.	5	10.0
Total	50	100.0
Occupation		
Student	2	4.0
Private sector	19	38.0
Public sector	20	40.0
Self-employed	11	22.0
Total	50	100.0

4.3. Structural Equation Modelling Analysis

Structural equation modelling (SEM) is used to explore complex relationships between observable and underlying variables and is well-suited for evaluating theoretical frameworks. The method use Confirmatory Factor Analysis (Macfarlane, 2010) to validate constructs. It follows a two-step process: first creating the measurement model using CFA to determine factor relationships, and then examining hypotheses using the structural model to identify variable interdependencies. This research utilizes the approach outlined by Ali et al. (2022) utilizes AMOS software for the analysis.

4.3.1. Measurement model and confirmatory factor analysis

The study conducted CFA on the measurement model to validate measurement model of latent factors, reliability and validity.

4.3.1.1. Goodness of fit

Three categories of fit indices measures should be performed namely, absolute fit indices, incremental fit indices, and parsimonious fit indices. Cheung et al. (2023) suggested recommended levels to be achieved for fit measures as follows in Table 4.

Initial CFA for the measurement model consisted of eight latent factors: Perceived usefulness (PU), perceived ease of use (PEU), security (SEC), Convenience (Contador et al., 2023), website design (WD), trust (TRU), satisfaction (SAT) and online banking adoption (OBA). 39 items were used to measure these latent factors as suggested by EFA (Figure 2).

The following Table 5 reports the goodness of fit indices for initial CFA model for the present study.

Table 5 reported that the values of GFI and AGFI were not within the proposed criteria for the goodness of fit indices. Therefore, further examination has been taken to improve the discriminant validity as suggested by the literature. In case that goodness

Table 3: Cronbach's alpha (reliability coefficient)

Construct	No. of items	Cronbach's alpha
Perceived usefulness	5	0.812
Perceived ease of use	5	0.821
Security	5	0.793
Convenience	5	0.850
Website design	5	0.848
Trust	6	0.872
Satisfaction	4	0.753
Online banking adoption	6	0.889

Table 4: Criteria for goodness of fit

Measure fit	Index	Acceptance level
Absolute fit	x^2/df	$x^2/df < 3$
	RMSEA	RMSEA < 0.05
	GFI	GFI ≥ 0.90
Incremental fit	NFI	NFI ≥ 0.90
	CFI	CFI ≥ 0.90
Parsimonious fit	AGFI	AGFI ≥ 0.90

X^2: Chi-square, df: Degree of freedom, RMSEA: Root mean square error of approximation, GFI: Goodness of fit, NFI: Normed-fit-index, CFI: Comparative fit index, AGFI: Adjusted goodness of fit index

Figure 2: Initial CFA model for the study

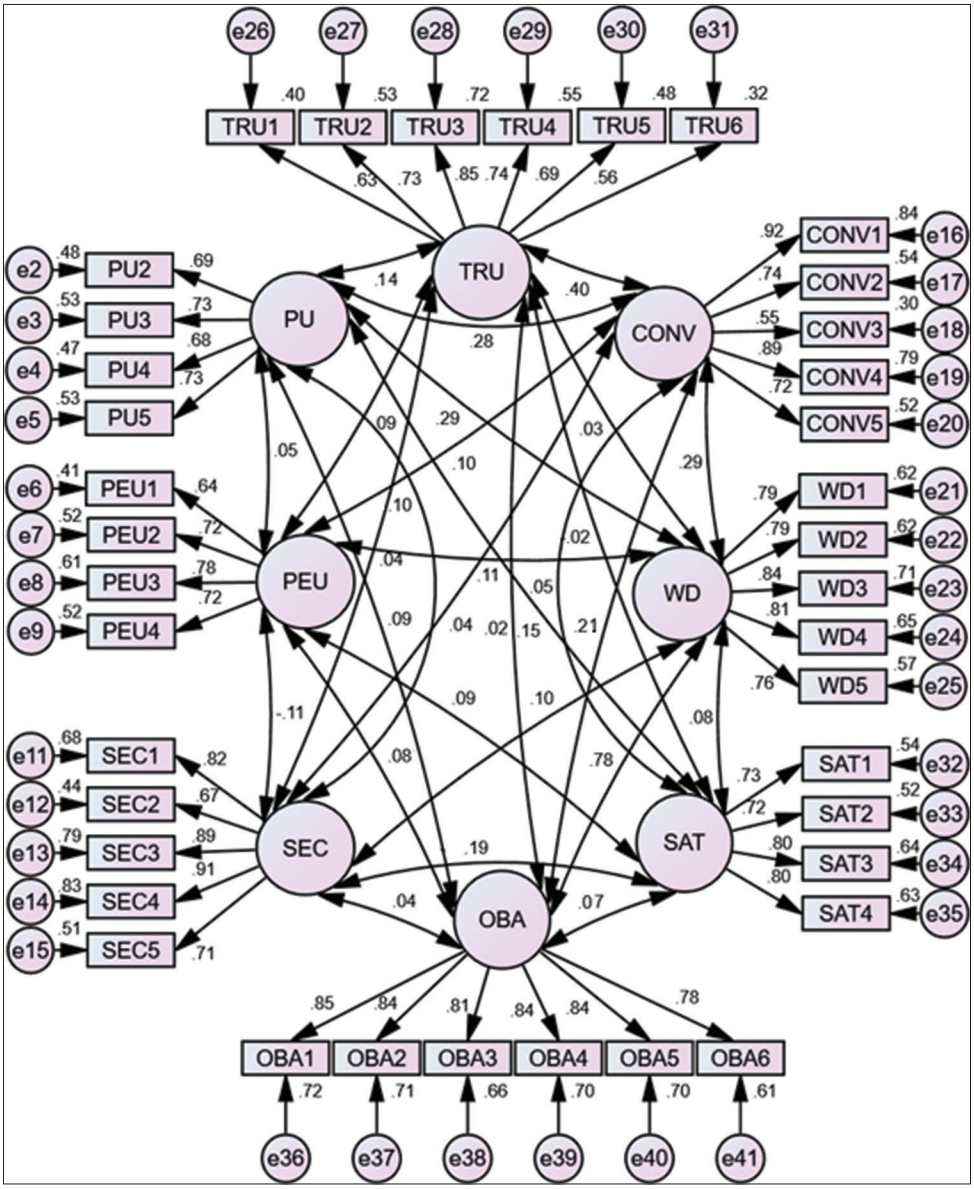


Table 5: Goodness of fit indices for the initial CFA model

			Absolut fit			Incremental fir		Parsimonious fit
	x^2	*df*	x^2/df	RMSEA	GFI	NFI	CFI	AGFI
Criteria			$/df < 3$	<0.05	≥0.90	≥0.90	≥0.90	≥0.90
Observed	833.33	674	1.236	0.025	0.898	0.903	0.980	0.889

of fit indices values do not fall withing recommended criteria, (Al-Zwainy and Al-Marsomi, 2023) suggested to check the factor loading and squared multiple correlation (R^2) values. Loading factor value should be 0.6 or greater while the squared multiple correlation value should be 0.4 or greater.

Looking at the Figure 3, the initial measurement model has 8 factors with 39 observed variables (items). The standard regression weight for all measurement items were significant and higher than 0.6 threshold except for TRU6 and CONV3. Bothe items have lower values for loading factors and R^2 as follows: TRU6 with 0.56 (loading value) and 0.32 value for R^2, and OCNV3 has 0.55 loading value with R^2 value of 0.30. These items were dropped from the model in order to improve the goodness of fit indices. The measurement model was run again and the final CFA model was depicted in the Figure 3.

After assessing the model again, all goodness of fit indices showed improvement and satisfied a better fit to the model as the Table 6 revealed.

4.3.1.2. Convergent and discriminant validity

Construct reliability (CR) and average variance extracted (AVE) were implemented to assess the convergent and discriminant validity. (Ali et al., 2023) maintained that the cut-off criteria for CR is 0.7 and 0.5 for AVE. The following Table 7 reported the result for

Figure 3: Final CFA model

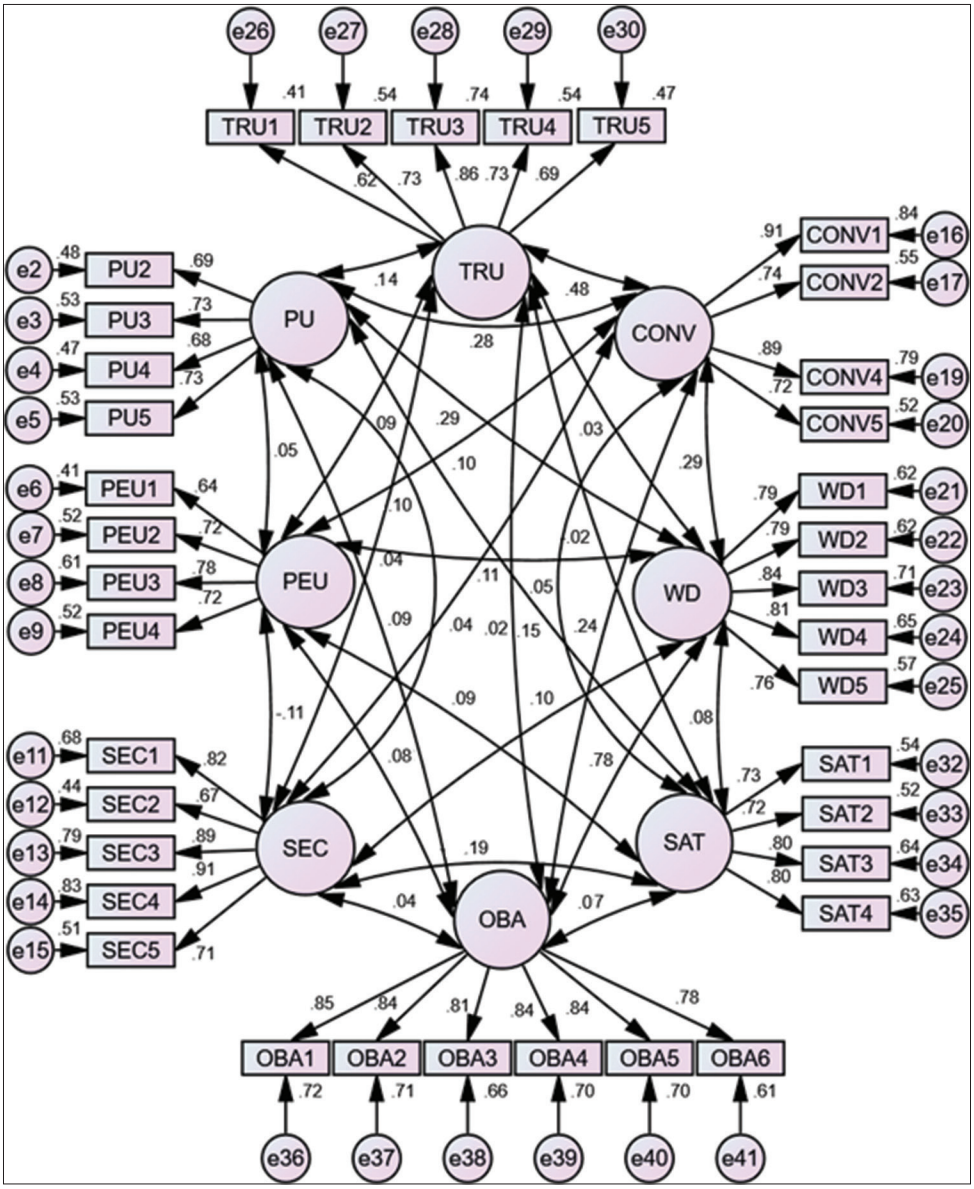


Table 6: Goodness of fit indices for the revised CFA model

Fit index			Absolut fit			Incremental fir		Parsimonious fit
	x^2	*df*	x^2/df	RMSEA	GFI	NFI	CFI	AGFI
Criteria			$x^2/df < 3$	<0.05	≥0.90	≥0.90	≥0.90	≥0.90
Observed	725.99	666	1.208	0.023	0.911	0.912	0.984	0.902

Table 7: Convergent and discriminant validity

Construct	CR	AVE	PU	PEU	SEC	CONV	WD	TRU	SAT	OBA
PU	0.800	0.501	**0.7`08**							
PEU	0.808	0.514	0.053	**0.717**						
SEC	0.901	0.650	0.103	−0.080	**0.806**					
CONV	0.891	0.674	0.276	0.101	0.035	**0.821**				
WD	0.897	0.635	0.294	0.108	0.102	0.295	**0.797**			
TRU	0.850	0.534	0.141	0.090	0.038	0.480	0.030	**0.730**		
SAT	0.848	0.582	0.150	0.095	0.194	0.052	0.078	0.071	**0.763**	
OBA	0.929	0.684	0.087	0.083	0.037	0.241	0.782	0.016	0.073	**0.827**

CR, AVE and square root of the AVE (diagonal values [in bold]). All CR values were >0.70 cut-off point. Similarly, AVE values for all constructs were >0.5 threshold, and square root values (diagonal) of the AVE were the highest in their respective columns.

All constructs fulfilled the required level of the convergent and discriminant validity (Ateeq et al., 2024).

The final CFA model satisfied all goodness of fit indices criteria and showed satisfactory level of convergent and discriminant validity. In summary, CFA model has a good and an adequate level of reliability, convergent and discriminant validity.

4.3.2. Structural model assessment

In this section, the study discussed the hypotheses testing. There were 22 hypotheses used to evaluate the casual relationship between latent constructs (Table 8). Perceived usefulness (PU), perceived ease of use (PEU), security (SEC), convenience (Contador et al., 2023), Website design (WD) were classified as exogenous variables. On the other hand, Trust (TRU), satisfaction (SAT), and online banking adoption (OBA) were categorized as endogenous variables.

The AMOS software was used to examine the structure of the model and applied the same goodness of fit criteria that used in Table 9 revealed the values for goodness of fit for the structural model assessment. All goodness of fit values were within accepted level of criteria.

The standardized path coefficients and the covariance matrix among the constructs were applied also to determine the acceptance or rejection of the hypotheses. Ateeq (2023) claimed that the critical ratio (CR) (t-value) for standardized path coefficients should be ($CR < -1.96$, $CR > +1.96$) with $P < 0.05$. The t-value (critical ratio) was obtained by dividing the regression weight estimate by the estimate of its standard error (S.E).

Table 8: Hypothesized paths for casual relationship

Hypothesis	Hypothesized casual relationship
H_{1a}	PU->TRU
H_{1a}	PU-> SAT
H_{2a}	PEU-> TRU
H_{2b}	PEU->SAT
H_{3a}	SEC->TRU
H_{3b}	SEC->SAT
H_{4a}	CONV-> TRU
H_{4b}	CONV->SAT
H_{5a}	WD->TRU
H_{5b}	WD->SAT
H_{6}	TRU->ODB
H_{7}	SAT->ODB
H_{8a}	PU->TRU->OBD
H_{8b}	PEU->TRU->OBD
H_{8c}	SEC->TRU->ODB
H_{8d}	CONV->TRU->ODB
H_{8e}	WD->TRU->ODB
H_{9a}	PU->SAT->ODB
H_{9b}	PEU->SAT->ODB
H_{9c}	SEC->SAT->ODB
H_{9d}	CONV->SAT->ODB
H_{9e}	WD->TRU->ODB

Based on Figure 4, the structural model was evaluated by conducting a structural relation test, which examined the relationships between latent constructs through unstandardized and standardized regression weights, as well as path analysis.

Table 10 showed regression weights and P-values for all latent constructs. The P-values indicated that ten paths significant while two are not significant. The following section explains the hypothesis testing results.

4.3.3. Hypotheses testing and results (direct relationship)

In this section, the study tested the proposed twenty-two hypotheses and provided answer to the research questions based on theoretical framework. In this section, direct relationship hypotheses were tested and the indirect relationship hypotheses will be tested in the following section.

Path analysis was applied to test the significance of casual relationship of twelve hypotheses: H_{1a}, H_{1b}, H_{2a}, H_{2b}, H_{3a}, H_{3b}, H_{4a}, H_{4b}, H_{5a}, H_{5b}, H_6, and H_7.

Table 11 revealed the result of hypotheses testing for the direct model. Ten hypotheses H_{1a}, H_{1b}, H_{2a}, H_{2b}, H_{4a}, H_{4b}, H_{5a}, H_{5b}, H_6, and H_7 were positive and statistically significant. On the other hand, H_{3a} and H_{3b} were found not statistically significant and consequently were rejected. The study will provide further explanation as follows.

4.3.3.1. Relationship between perceived usefulness (PU) and trust (TRU) and satisfaction (SAT)

H_{1a}: Perceived usefulness has a positive influence on trust

Perceived usefulness has a significant positive effect on the trust. The results from the 23 reveal that standardised regression coefficient was 0.494 with P = 00. If the perceived usefulness increases by 1, trust to use online banking services will increase by 0.494 with 99.9% of significance level. This result suggests that perceived usefulness has significant positive influence on trust to use online banking services. As a result, this hypothesis is supported.

H_{1b}: Perceived usefulness has a positive influence on satisfaction

The results indicate that perceived usefulness with standardized coefficient of 0.266 and P = 00 exerts a significant positive effect on satisfaction toward using online banking services. This implies that users relate perceived usefulness of online banking services with satisfaction. Therefore, the hypothesis is supported.

In summary, perceived usefulness was found to be an important factor that has a positive effect on trust and satisfaction toward adopt online banking services.

Table 9: The structural model fit

				Absolut fit		Incremental fit		Parsimonious fit
	x^2	*df*	x^2/df	RMSEA	GFI	NFI	CFI	AGFI
Criteria			$/df < 3$	<0.05	≥0.90	≥0.90	≥0.90	≥0.90
Observed	746.64	605	1.234	0.037	0.902	0.910	0.981	0.900

4.3.3.2. Relationship between perceived ease of use (PEU) and trust (TRU) and satisfaction (SAT)

Perceived ease of use is one of the core variables of TAM, which has a great impact on trust and satisfaction as discussed in section 2.4.2. Perceived ease of use is a critical determinant that plays a significant role in adaption of online banking. It is established that perceived ease of use impact customer attitudes towards trust and satisfaction to use and adopt online banking (Al-Sharafi et al., 2017; Almaiah et al., 2023; Jahangir and Begum, 2008).

As confirmed by previous researches, the current study found that perceived ease of use has positive and significant influence on trust and satisfaction in the context of Saudi Arabia.

H_{2a}: Perceived ease of use has a positive influence on trust

The results in the Table 11 show that perceived ease of use significantly and positively impact the trust toward using online banking. The standardized coefficient estimate value is 0.458 with P = 00. This result reveals an existent of significant positive impact of perceived ease of use on trust to use online banking services. Since the beta and P values are higher than threshold values, the hypothesis is supported.

H_{2b}: Perceived ease of use has a positive influence on satisfaction

Similarly, the results show that perceived ease of use has a significant and positive influence on satisfaction because the standardized coefficient value is 0.15 with P = 01. Since the perceived ease of use has positive impact on satisfaction, the hypothesis is supported.

4.3.3.3. Relationship between security (SEC) and trust (TRU) and satisfaction (SAT)

H_{3a}: Security has a positive influence on trust

Based on the results from the Table 11, standardized coefficient value for the security construct is 0.156 with P = 0.201. The significance level of P > 0.05, which is statistically not significant. The result indicates that security has no significant effect of the trust. Therefore, the hypothesis H_{3a} is not supported by the model.

H_{3b}: Security has a positive influence on satisfaction

Similarly, security does not show an impact on satisfaction as the standardized coefficient value is 0.193 with P = 0.067. The P value is higher than significance level of 0.05 which implies that security has no effect on satisfaction. The user may not relate security with satisfaction toward using online banking services.

4.3.3.4. Relationship between convenience and trust (TRU) and satisfaction (SAT)

H_{4a}: Convenience has a positive influence on trust

The statistical result from the Table 11 show that convenience has a significant positive effect on trust as the value of standardized coefficient value is 0.233 with a P = 0.00. Since the statistical

Table 10: Unstandardized and standardized regression weights

Hypothesized casual relationship	Unstandardized estimate	S.E.	C.R.	Standardized estimate	P-value
TRU<---PU	0.531	0.16	3.318	0.494	***
SAT<---PU	0.253	0.07	3.63	0.266	***
TRU<---PEU	0.566	0.089	6.397	0.458	***
SAT<---PEU	0.116	0.045	2.575	0.150	0.01
TRU<---SEC	0.21	0.164	1.28	0.156	0.201
SAT<---SEC	0.077	0.043	1.785	0.113	0.367
TRU<---CONV	0.271	0.08	3.364	0.333	***
SAT<---CONV	0.782	0.366	2.138	0.771	0.032
TRU<---WD	0.415	0.073	5.682	0.401	***
SAT<---WD	0.134	0.042	3.184	0.192	***
OBA<---TRU	0.061	0.026	2.369	0.437	0.018
OBA<---SAT	0.678	0.065	10.452	0.803	***

S.E: Standard error, C.R: Critical ratio, P: Significance value. ***P<0.001

Table 11: Hypotheses testing for the direct model

Construct	Code	Hypotheses	Relationship (positive) 11	Beat estimate	P-value	Result
Perceived usefulness	PU	H_{1a}	PU ---> TRU	0.494	***	Supported
		H_{1b}	PU ---> SAT	0.266	***	Supported
Perceived ease of use	PEU	H_{2a}	PEU ---> TRU	0.458	***	Supported
		H_{2b}	PEU ---> SAT	0.150	0.01	Supported
Security	SEC	H_{3a}	SEC ---> TRU	0.156	0.201	Note supported
		H_{3b}	SEC ---> SAT	0.113	0.367	Not supported
Convenience	CONV	H_{4a}	CONV ---> TRU	0.333	***	Supported
		H_{4b}	CONV ---> SAT	0.771	0.032	Supported
Website design	WD	H_{5a}	WD ---> TRU	0.401	***	Supported
		H_{5b}	WD ---> SAT	0.192	0.001	Supported
Trust	TRU	H_6	TRU ---> OBA	0.437	0.018	Supported
Satisfaction	SAT	H_7	SAT ---> OBA	0.803	***	Supported

***P<0.001

results demonstrate the significance effect of convenience on trust, the hypothesis is supported by the model.

H_{4b}: Convenience has a positive influence on satisfaction

This hypothesis as previous hypothesis shows that convenience significantly and positively influences satisfaction. The standardized coefficient value is 0.771 with a P = 0.032 which is less than significance level of 0.05. The result demonstrates the positive impact of convenience on satisfaction and as a result the hypothesis is supported.

4.3.3.5. Relationship between website design (WD) and trust (TRU) and satisfaction (SAT)

H_{5a}: Website design has a positive influence on trust

The standardized coefficient and P value for the impact of website design on trust are 0.401 and 0.00 respectively. The result suggest that the website design statistically has a significant positive effect on trust. Accordingly, the hypothesis is supported by the model.

H_{5b}: Website design has a positive influence on satisfaction

Similarly, the results demonstrate the existent effect of website design on satisfaction where the values of standardized coefficient (0.192) and (P = 001) are satisfied the required levels. Therefore, hypothesis H_{5b} is supported.

4.3.3.6. Relationship between trust (TRU), satisfaction (SAT) and online banking adoption (OBA)

H6: Trust has a positive influence on the adoption of online banking

The results from Table 11 reveal that trust statistically has a significant positive influence on online banking adoption. The value of the standardised coefficient is 0.108 with a P = 0.018

Figure 4: The structural model

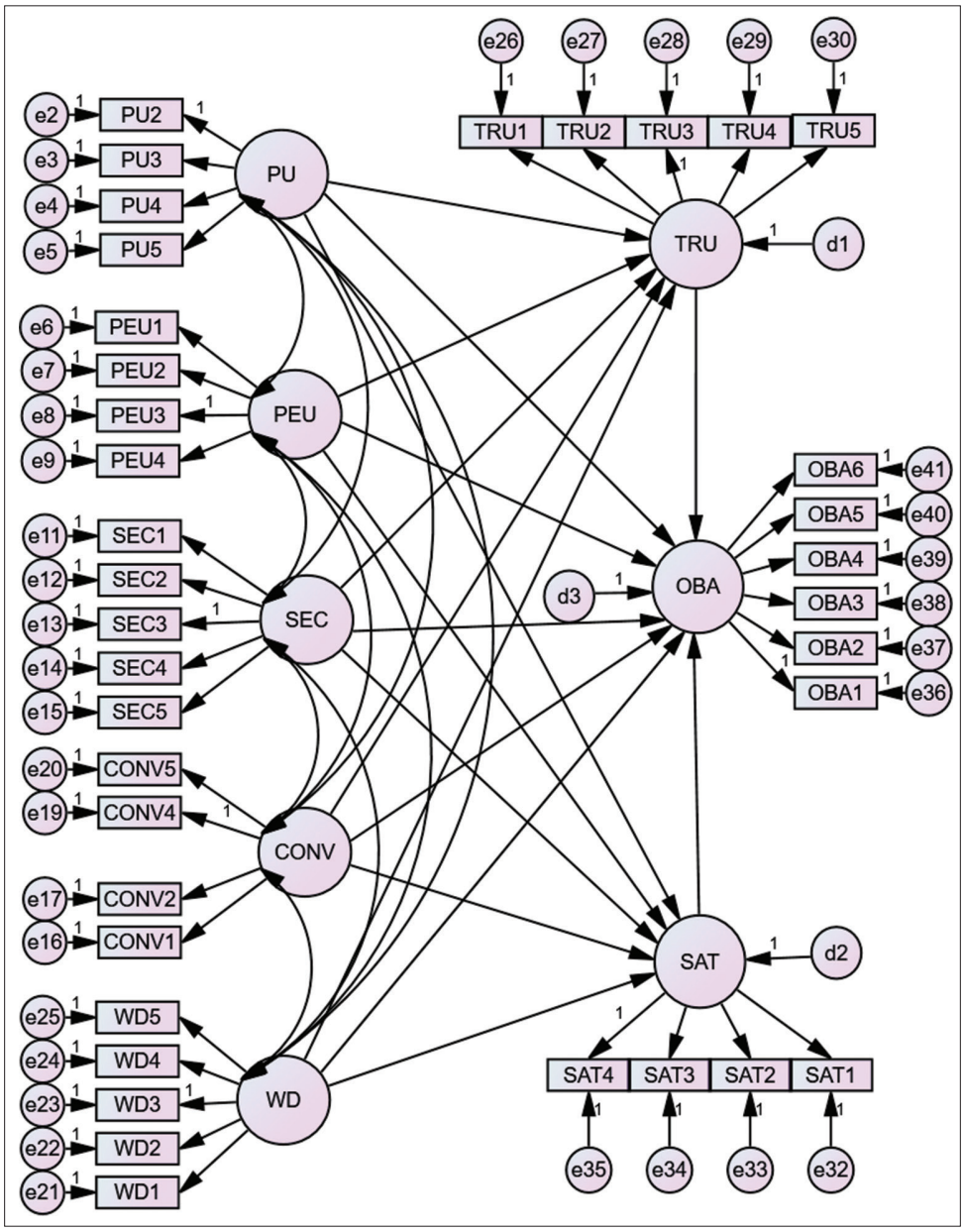
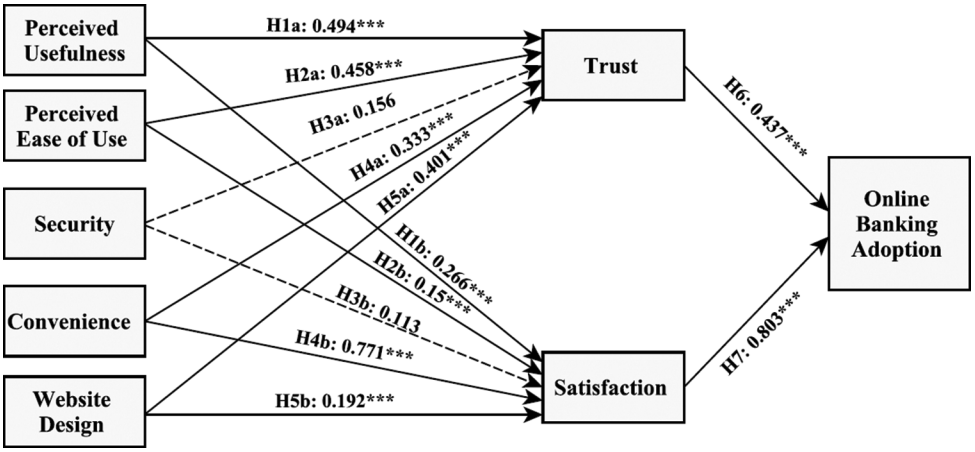


Figure 5: Hypotheses testing results for the direct model



***P<0.001, dotted paths indicate not supported hypotheses

which is less than significance level of 0.05. The results reveal the statistical significance of path estimates. Thus, H_6 is supported.

H_7: Satisfaction has a positive influence on the adoption of online banking

Statistical results reveal that satisfaction has a significant positive impact on online banking adoption with (Štaffenová and Kucharčíková, 2023) standardized coefficient of 0.803 and P = 0.00. Since the values are withing acceptable levels, the hypothesis H_7 is supported.

Figure 5 results from the direct model indicate that convenience exerted the strongest influence on satisfaction ($\beta = 0.771$), whereas perceived ease of use demonstrated the weakest effect ($\beta = 0.15$). These findings suggest that customers who perceive online banking services as highly convenient tend to report greater satisfaction with the service.

4.3.4. Hypotheses testing and results (indirect relationship)

In this section the study reports the hypotheses test results for the relationship between mediator variables, trust and satisfaction, with the independent variable online banking adoption. In order to analyse the mediating role of trust and satisfaction, the mediation analysis should satisfy four conditions as follows (Baron and Kenny, 1986):

1. The independent variable (IV) should have impact on the mediator (trust and satisfaction).
2. The mediator should have a significant effect on the dependent variable (DV) (online banking adoption).
3. The IV influences the DV.
4. The mediators and the IV simultaneously impact the DV where mediators mediate the IV-DV relationship.

The mediation relationship is said to be full mediation if the IV has no significant effect on DV after the mediator enters the model. On the other hand, partial mediation occurs when the IV still have significant impact on DV after the mediator enters the model.

The following Table 12 reports the direct effects among variables (IVs on DV):

Table 12: Direct effects

Hypothesis	Relationship	Direct effect (β)	C.R.	P-value
H_{8a}	PU--->OBA	0.370	6.039	***
H_{8b}	PEU--->OBA	0.454	8.306	***
H_{8c}	SEC--->OBA	0.016	0.251	0.801
H_{8d}	CONV--->OBA	0.048	1.527	0.127
H_{8e}	WD--->OBA	0.037	0.790	0.363

***P<0.001

The following Table 13 shows the indirect effects and summaries the hypotheses testing for mediation analysis:

4.3.4.1. Trust mediator: Hypotheses testing

H_{8a}: Trust mediates the relationship between perceived usefulness and online banking adoption

The findings supported H_{8a} where trust mediated the relationship between perceived useful ness and online banking adoption with an indirect coefficient value 0.215 at 0.00 significance level. The direct effect (Table 13) of perceived usefulness on online banking adoption was significant even after entered the model which suggested that the mediation is partial.

H_{8b}: Trust mediates the relationship between perceived ease of use and online banking adoption

The results from Table 13 revealed that trust mediated the relationship between perceived ease of use and online banking. The indirect coefficient value was 0.200 with a P = 00. The values satisfied the required level of significance which revealed that mediation relationship was existent. Thus, H_{8b} was supported. The results also implied that the mediation is partial because perceived ease of use still has significant impact on online banking after entering the model (Table 13).

H_{8c}: Trust mediates the relationship between security and online banking adoption

The findings from Table 13 did not support the H_{8c} where the trust did not mediate the relationship between security and online banking adoption. The indirect coefficient value was 0.068 with no

Table 13: Indirect effects and hypotheses testing results

Hypothesis	Relationship	Indirect effect (β)	P-value	Mediation type	Results
H_{8a}	PU--->TRU--->OBA	0.215	***	Partial mediation	Supported
H_{8b}	PEU--->TRU--->OBA	0.200	***	Partial mediation	Supported
H_{8c}	SEC--->TRU--->OBA	0.068	0.297	No mediation	Not supported
H_{8d}	CONV---> TRU--->OBA	0.145	***	Full mediation	Supported
H_{8e}	WD---> TRU--->OBA	0.175	***	Full mediation	Supported
H_{9a}	PU--->SAT--->OBA	0.213	***	Partial mediation	Supported
H_{9b}	PEU--->SAT--->OBA	0.120	***	Partial mediation	Supported
H_{9c}	SEC--->SAT--->OBA	0.088	0.447	No mediation	Not supported
H_{9d}	CONV--->SAT--->OBA	0.618	***	Full mediation	Supported
H_{9e}	WD--->SAT--->OBA	0.154	***	Full mediation	Supported

***P<0.001 (2-tailed)

significance of P value (0.297). Therefore, H_{8c} was not supported by the model.

H_{8d}: Trust mediates the relationship between convenience and online banking adoption

The findings showed that trust fully mediated the relationship between convenience and online banking with indirect coefficient value of 0.145 and significant P = 0.00. The direct effect of convenience on online banking adoption was not significant which suggested that the mediation if full. As a result, H_{8d} was supported by the model.

H_{8e}: Trust mediates the relationship between website design and online banking adoption

The finding indicated that trust fully mediated the relationship between website design and online banking adoption toward using online banking services. The indirect coefficient value was 0.175 with significant P = 0.00. The direct effect results (Table 13) reported that website design has no significant effect on online banking after entering the model which made the relationship fully mediation. Thus, the H_{8e} was supported by the model.

4.3.4.2. Satisfaction mediator: Hypotheses testing

H_{9a}: Satisfaction mediates the relationship between perceived usefulness and online banking adoption

The results form Table 13 indicated that satisfaction partially mediated the relationship between perceived usefulness and online banking adoption. The indirect coefficient value was 0.213 with statistically significant P value (0.00). H_{9a} posited partial mediation because the direct impact of perceived usefulness on the online banking is significant after entering the model. The results suggested that the H_{9a} was supported.

H_{9b}: Satisfaction mediates the relationship between perceived ease of use and online banking adoption

The path coefficient value for H_{9b} was 0.120 with a significant P = 0.00 (Table 13). This finding indicated that the satisfaction mediated the relationship between perceived ease of use and online banking adoption. The mediation in H9b was partial because the direct effect of perceived ease of use still significant on the online banking after entering the model.

H_{9c}: Satisfaction mediates the relationship between security and online banking adoption

The mediation effect of satisfaction between security and online banking adoption was not confirmed because the direct coefficient value was 0.088 with insignificant P value (0.447). The findings revealed that satisfaction did not mediate the relationship between security and online banking adoption. Therefore, H_{9c} was not supported.

H_{9d}: Satisfaction mediates the relationship between convenience and online banking adoption

Based on the result form Table 13, the mediation role of satisfaction between convenience and online banking adoption was demonstrated. The path coefficient for H_{9d} was statistically significant with indirect coefficient value of 0.619 and P = 0.00. The direct impact of convenience on online banking adoption was not significant which implied that the nature of mediation was full. As a result, H_{9d} was supported.

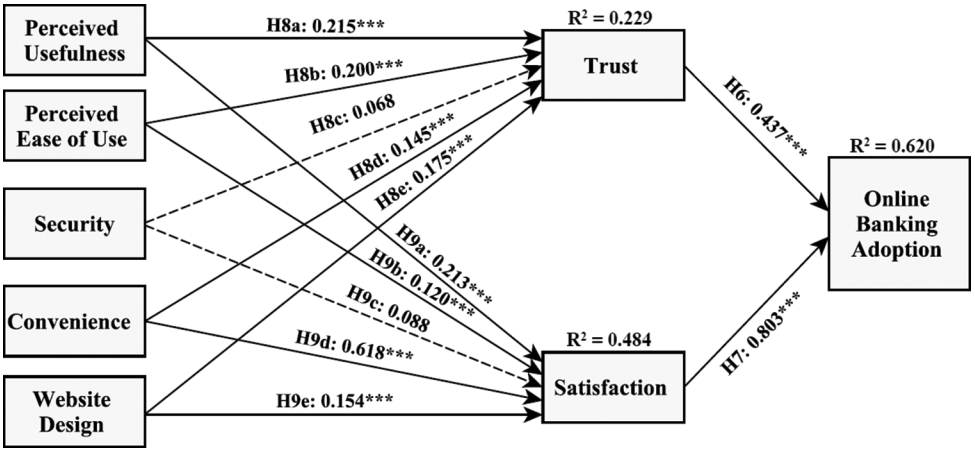
H_{9e}: Satisfaction mediates the relationship between website design and online banking adoption

The results from Table 13 showed that satisfaction mediated the relationship between website design and online banking adoption based on statistical significant value of indirect coefficient (0.154) and P value (0.00). Path coefficient showed a full mediation effect of satisfaction between website design and online banking adoption because the direct effect of website design on online banking adoption after entering the model was not significant (Table 13).

Figure 6 explains the indirect relationship between independent variables and dependent variable. The independent variables include perceived usefulness, perceived ease of use, security, convivence and website design. The dependent variable is online banking adoption. The relationship between independent and dependent variables is mediated by trust and satisfaction. That is why this model is called indirect model.

From the above discussion, perceived usefulness, perceived ease of use, convivence and website design have indirect impact on online banking adoption though trust and satisfaction. On the other hand, security has no impact on online banking adoption.

Figure 6: Hypotheses testing results for the indirect model



***P<0.001, dotted paths indicate not supported hypotheses

4.4. Evaluating the Predictive Power of the Model

Coefficient of determination (R^2) is a statistical measurement to determine the amount of variance in the dependent variable that can be explained by the independent variable. The acceptable level of R^2 is 0.10 and above (Falk and Miller, 1992). R^2 shows predictive power of the model. Chin (1998) describes the significant level of R^2 as follows:

1. Substantial predictive power if R^2 is >0.67
2. Moderate predicting power if R^2 is >0.33
3. Weak predictive power if R^2 is >0.19.

Figure 6 shows that the R^2 value for trust construct has weak power predictive with a value of 0.229. On the other hand, satisfaction and online banking adoption have a moderate predictive power with values of 0.484 and 0.620 respectively.

The results from Figure 6 indicate that trust and satisfaction moderately explain 62% of the total variance in online banking adoption, which implies that there are other possible factors that could explain the variance in the online banking adoption. In addition, five exogenous variables weakly explain 22.9% of the total variance in the trust construct, while they moderately explain 48.4% of the total variance in the satisfaction construct.

5. DISCUSSION, IMPLICATION AND FUTURE STUDIES

5.1. Research Objectives and Hypotheses Results

The present study sought to achieve five objectives. The following Table 14 summarized the hypotheses testing results:

- Summary of hypotheses testing results

5.2. Research Objectives One and Two

This research investigated the factors influencing trust and satisfaction in Saudi online banking, specifically examining perceived usefulness, ease of use, security, convenience, and website design. Previous studies have shown that perceived usefulness and ease of use greatly increase trust and satisfaction, supporting the idea that they have a beneficial influence on user perception (Saksono and Untoro, 2023; Saoula et al., 2023). However, security did not have a notable impact, which differs with research emphasizing its significance in online banking (Nnaomah et al., 2024). This indicates a subtle user approach to threats in internet banking in Saudi Arabia. The favourable impact of convenience and website design on trust and satisfaction aligns with the results of Sudirjo et al. (2024) Together, these observations enhance comprehension of the uptake of online banking, highlighting the crucial importance of user-friendly functionalities compared to security guarantees.

5.3. Research Objective Three

The third objective of the current study was to examine the influence of trust and satisfaction on online banking adoption. Two hypotheses were proposed to achieve this objective as follows:

- H_6: Trust has a positive influence on the adoption of online banking
- H_7: Satisfaction has a positive influence on the adoption of online banking.

Analysis has shown that trust and satisfaction are strong predictors of adoption. As these factors grow, the probability of consumers adopting online banking services also increases. This discovery is consistent with and expands on previous studies, emphasizing the crucial impact these parameters have on consumer acceptability and ongoing use of online banking. The research strengthens the existing connection between trust, satisfaction, and adoption, within the Saudi Arabian banking industry, broadening the geographical relevance of these known theories.

5.4. Research Objectives Four and Five

The study dedicated objectives four and five to examine the mediation role of trust and satisfaction between independent variables namely, perceived usefulness, perceived ease of use, security, convenience and website design, and dependent variable online banking adoption. Ten hypotheses were tested as follows:

- H_{8a}: Trust mediates the relationship between perceived usefulness and online banking adoption
- H_{9a}: Satisfaction mediates the relationship between perceived usefulness and online banking adoption.

Table 14: Summary of hypotheses testing results

	Hypotheses	Statistical results	Results
H_{1a}	Perceived Usefulness has a positive influence on trust	β=0.494, P=0.00	Supported
H_{1b}	Perceived Usefulness has a positive influence on Satisfaction	β=0.266, P=0.00	Supported
H_{2a}	Perceived Ease of use has a positive influence on trust.	β=0.458, P=0.00	Supported
H_{2b}	Perceived Ease of use has a positive influence on satisfaction.	β=0.150, P=0.01	Supported
H_{3a}	Security has a positive influence on trust.	β=0.156, P=0.05	Not supported
H_{3b}	Security has a positive influence on satisfaction.	β=0.113, P=0.05	Not supported
H_{4a}	Convenience has a positive influence on trust.	β=0.333, P=0.00	Supported
H_{4b}	Convenience has a positive influence on satisfaction.	β=0.771, P=0.032	Supported
H_{5a}	A well-designed website has a positive influence on trust.	β=0.401, P=0.00	Supported
H_{5b}	A well-designed website has a positive influence on satisfaction	β=0.192, P=0.00	Supported
H_{6}	Trust has a positive influence on the adoption of online banking.	β=0.437, P=0.018	Supported
H_{7}	Satisfaction has a positive influence on the adoption of online banking.	β=0.803, P=0.00	Supported
H_{8a}	Trust mediates the relationship between perceived usefulness and online banking adoption	β=0.215, P=0.00	Supported
H_{8b}	Trust mediates the relationship between perceived ease of use and online banking adoption	β=0.200, P=0.00	Supported
H_{8c}	Trust mediates the relationship between security and online banking adoption	β=0.068, P=0.297	Not supported
H_{8d}	Trust mediates the relationship between convenience and online banking adoption	β=0.145, P=0.00	Supported
H_{8e}	Trust mediates the relationship between website design and online banking adoption	β=0.175, P=0.00	Supported
H_{9a}	Satisfaction mediates the relationship between perceived usefulness and online banking adoption	β=0.213, P=0.00	Supported
H_{9b}	Satisfaction mediates the relationship between perceived ease of use and online banking adoption	β=0.120, P=0.00	Supported
H_{9c}	Satisfaction mediates the relationship between security and online banking adoption	β=0.088, P=0.447	Not supported
H_{9d}	Satisfaction mediates the relationship between convenience and online banking adoption	β=0.618, P=0.00	Supported
H_{9e}	Satisfaction mediates the relationship between website design and online banking adoption	β=0.154, P=0.00	Supported

The study found that trust and satisfaction partially mediated the role between perceived usefulness and online banking adoption. This result showed that the more confident and satisfied customers (because they perceived online banking is usefulness), the more to use and adopt online banking. These results were in concordance with the studies of (Wilson et al., 2021) and (Keni, 2020) how found trust and satisfaction mediated the relationship between perceived usefulness and satisfaction.

- H_{8b}: Trust mediates the relationship between perceived ease of use and online banking adoption
- H_{9b}: Satisfaction mediates the relationship between perceived ease of use and online banking adoption.

The results confirmed that trust and satisfaction were partially mediated the relationship between perceived ease of use and the adoption of online banking. The results were consistent with the prior study such as (Sudirjo et al., 2024), (Chiu et al., 2024). The more ease of use of online banking service for customers, the more trust and satisfaction to adopt online banking services.

- H_{8c}: Trust mediates the relationship between security and online banking adoption
- H_{9c}: Satisfaction mediates the relationship between security and online banking adoption.

Trust and satisfaction were found to have no mediation role between security and the adoption of online banking. The results were not consistent with prior studies. A possible explanation for this finding could be that the customers are more conservative regarding security issues such as privacy breaches, financial risk and hacking during performing online transaction. Therefore, they perceived online banking as less secure.

- H_{8d}: Trust mediates the relationship between convenience and online banking adoption
- H_{9d}: Satisfaction mediates the relationship between convenience and online banking adoption.

The results demonstrated that trust and satisfaction fully mediated the relationship between convenience and the adoption of online banking. The findings were consistent with the studies of (Hanif et al., 2024) and (Baskara et al., 2024) who found trust and satisfaction mediated the relationship between convenience and adoption of online banking. The customers with high level of trust and satisfaction as a result of perceiving online banking convenience, the more likely to adopt online banking.

- H_{8e}: Trust mediates the relationship between website design and online banking adoption
- H_{9e}: Satisfaction mediates the relationship between website design and online banking adoption.

Trust and satisfaction were statistically found to have full meditation relationship between the website design and the adoption of online banking. The findings were in line with the studies of (Abdul Sathar et al., 2023), (Abdennebi, 2023) and Rahi et al., (2023) who found that trust and satisfaction mediate the relationship between website design and adoption of online banking. The more confident and satisfied customers as a result of well-designed of website, the more likely they adopt online banking.

5.5. Research Contribution

This research enhances comprehension of online banking adoption by Saudi consumers by examining the mediating effects of trust and pleasure within the Saudi context, a new approach not previously explored in the region's literature. The technology acceptance model (TAM) is expanded by include security, convenience, and website design in addition to the fundamental TAM elements of perceived utility and ease of use to evaluate their influence on adoption.

5.6. Theoretical Implication of the Research

This study enhances the use of technology acceptance model (TAM) by showing the importance of trust and pleasure as

mediators in the adoption of online banking. It introduces an updated model that incorporates both components. The model empirically explains 62% of the variation in adoption, indicating the significance of other variables not included in TAM.

5.7. Practical Implications of the Research

The research offers valuable insights for bank managers and regulators in Saudi Arabia, highlighting the need of improving security, perceived simplicity of use, and website design to build confidence, happiness, and user adoption. The study's use of structural equation modelling (SEM) using AMOS software and its dual data gathering strategy via face-to-face and online questionnaires signify a methodological leap in researching online banking adoption.

5.8. Limitations and Future Research

However, the study is confined to the Saudi setting, highlighting the need for additional research into similar characteristics in neighboring areas. Future studies ought to examine at other possibly relevant aspects such as perceived cost and empathy. Methodologically, substituting the Likert scale with a Slider scale may provide a more nuanced understanding of user attitudes about online banking uptake. Finally, expanding the study to include additional financial services might give more comprehensive insights into customer behaviour and technological acceptability.

6. CONCLUSION

This research emphasizes the significance of trust and satisfaction in promoting the use of online banking services in Saudi Arabia. The findings demonstrate that perceived utility, simplicity of use, convenience, and website design all improve trust and satisfaction, which in turn influences adoption. In contrast, security had no direct or indirect effect, indicating that other variables outweighed its influence in this scenario. The model explains 62% of the adoption variation, demonstrating the effectiveness of the suggested framework. The research theoretically expands the Technology Acceptance Model by incorporating additional service quality dimensions, while practically providing actionable insights for banks to focus on usability, convenience, and digital design to foster customer engagement and loyalty in Saudi Arabia's evolving digital banking landscape.

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