

Understanding the Determinants of FinTech Adoption Intention: Integrating UTAUT2 and Financial Literacy with Mediating Role of Attitude

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Abstract

The study aims to figure out the key determinants that influence intention of consumers to adopt FinTech services in a developing country like Pakistan by extending the lens of Unified Theory of Acceptance and Use of Technology2 (UTAUT2) model. Financial literacy is kept as an additional independent variable while using attitude as a mediator and demographic variables like age, gender, experience and risk taking behavior are introduced as moderators. Data was being gathered through a structured questionnaire and purposive sampling technique was being employed that resulted in 200 valid responses from FinTech users. A five point likert scale was used to measure the constructs, followed by an analysis using Smart PLS for Structural Equation Modeling and SPSS for descriptive statistics. Results highlight that all the independent variables in the study have significant impact on attitudes towards FinTech and eventually strongly influencing adoption intention. Attitude fully mediates the relationship between all predictors and adoption intention. In addition to that, various moderating effects were also confirmed. The conceptual model explained 68.1% of variance in attitude while adoption intention had 59.8% thereby indicating considerable explanatory power of model. The findings of the study provide support (empirical) for the extended UTAUT2 model thereby highlighting the significance of financial literacy and tailoring of demographics. This research is very useful for stakeholders like FinTech developers, marketers and policy makers in order to tailor and enhance inclusion of digital financial strategies in the emerging markets like Pakistan.

Keywords: FinTech adoption intention, attitudes, performance expectancy, effort expectancy, social influence, hedonic motivation, habit, financial literacy

Introduction

Financial technology has fundamentally reshaped how individuals and organizations manage, move, and monitor their money (Asif et al., 2023). Innovations such as peer-to-peer lending platforms and robo-advisers exemplify the sector's role in setting new benchmarks for digital finance (Hasgöl et al., 2023). A major attraction of these tools is their ability to deliver tailored fi-

financial guidance (Asgari & Izawa, 2023). Although rapid growth has produced a diverse range of practical, inventive, and efficient solutions, users are chiefly drawn to FinTech because of the convenience it offers (Bajunaied et al., 2023). When compared to traditional banking, financial technology (FinTech) services are now more affordable and accessible thanks to the widespread use of smartphones and internet access. Through mobile apps, digital wallets, and online platforms, users can now avoid many of the fees associated with conventional banks, which is particularly beneficial for financially underserved populations (Shaikh et al., 2023).

In Pakistan, FinTech adoption is influenced by the country's technological infrastructure, legal environment, and economic conditions. The government has taken measures to promote the inclusion of digital financial services. However, key obstacles, such as a lack of financial literacy and awareness of digital financial tools, continue to limit adoption (Zhao et al., 2024). FinTech is still in its infancy despite the growing digital economy and widespread use of mobile phones. Using the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework, this study investigates Pakistan's intention to adopt FinTech services and incorporates financial literacy as a crucial factor. Performance expectancy, effort expectancy, social influence, facilitating conditions, price value, hedonic motivation, and habit are all included in UTAUT2. This study also looks at how attitudes toward FinTech act as a mediator between these concepts and adoption intentions. To comprehend individual differences in FinTech engagement, demographic factors such as age, gender, prior experience, and risk-taking tendencies are also taken into consideration. (Carè et al., 2023; Azeem et al., 2023) have found that sociocultural norms and familiarity with technology play a significant role in influencing consumer behavior in Pakistan. By developing an integrated framework that combines UTAUT2 with financial literacy, the primary objective is to identify both drivers and barriers to the adoption of FinTech in Pakistan. This is crucial because the existing literature lacks context-specific insights into how technology adoption in developing nations is influenced by financial knowledge. Policies and strategies aimed at enhancing financial inclusion and digital empowerment in Pakistan can be informed by an understanding of these dynamics.

Literature Review

Performance Expectancy

“Performance expectancy is the degree to which an individual believes that using the system will enhance their job performance” (Venkatesh et al., 2003, p. 447).

Using the technology improves performance expectancy in the UTAUT 2 framework. According to Kumar and Rani (2024), one of the main factors influencing consumers' intention to adopt FinTech is their expectation of better financial outcomes. According to research, people are more likely to adopt FinTech when they believe that these tools are helpful, especially in developing countries like Pakistan (Alzyoud et al., 2025; Khan et al., 2024; Sharma et al., 2024). Furthermore, earlier research shows that perceived usefulness has a significant impact on user attitudes and adoption intention (Hu et al., 2019; Crabbe et al., 2019). Therefore, the following hypothesis can be made in light of this.

As a result, the following hypothesis can be put forth in light of this.

- H1. Performance expectancy has a significant positive effect on user's attitudes towards FinTech adoption.
- H1a. Attitudes mediates the relationship between performance expectancy and FinTech adoption intention.

Effort Expectancy

"It is the degree to which an individual believes that using the system will require little effort" (Alzyoud et al., 2025, p. 157).

It refers to users' perceptions of the ease with which technology can be utilized (Venkatesh et al., 2003). According to Amnas et al. (2023), factors like the complexity of the tasks and the overall ease of use of the technology shape this perception. Users' attitudes toward FinTech are influenced by effort expectancy, which in turn influences their willingness to adopt it (Thusi & Maduku, 2020; Bajunaied et al., 2023). According to research, people are more likely to adopt FinTech solutions if they are perceived as simple to use. Positive user attitudes and intentions to adopt are significantly influenced by effort expectancy (Hu et al., 2019). Henceforth, following hypothesis can be proposed.

- H2. Effort expectancy has a significant positive effect on user's attitudes towards FinTech adoption.
- H2a Attitudes mediates the relationship between effort expectancy and FinTech adoption intention.

Social Influence

"Perceived social pressure to or not to engage in certain behaviors" (Omotayo & Adebayo, 2015, p. 20). "Individual internalization of the reference group, subjective culture, and specific interpersonal agreements that the individual made with others in a specific social situation" (Mazman et al., 2009, p. 224).

Social influence shapes individuals' attitudes to FinTech adoption thereby affecting their beliefs and behaviors (Venkatesh et al., 2003; Lema, 2017; Cheng et al., 2015). Support and encouragement from family, peers, and social networks can positively reinforce individuals' perceptions of technology, encouraging them to adopt FinTech solutions. In addition to that risk taking behavior moderates the relationship between social influence and attitudes towards FinTech adoption. Furthermore, social support especially when accompanied by approval from influential others, significantly enhances the likelihood that individuals will adopt emerging technologies like FinTech by fostering positive attitudes and increasing adoption intention (Ojiaku et al., 2024). In light of this, following hypothesis can be formulated.

- H3. Social influence has a significant positive effect on user's attitudes towards FinTech adoption.
- H3a. Attitudes mediates the relationship between social influence and FinTech adoption intention.
- H3b. Risk taking behavior moderates the relationship between social influence and attitudes towards FinTech adoption.

Facilitating Conditions

"Facilitating conditions include type of support provided to an individual that influences the use of technology" (Lu et al., 2005, p. 221).

Facilitating conditions, such as providing resources like security and technical support, enhance the credibility and reliability of technology, making it more likely that people will adopt it. Palau-Saumell et al. (2019) highlight that infrastructure and support systems are vital in the context of e-government service adoption, especially in developing nations where there is limited access to resources and trust in technology remains low, facilitating conditions become even more critical. Furthermore, gender and age moderates the relationship between facilitating conditions and attitudes towards FinTech adoption (Venkatesh et al., 2012). These supportive factors hold a key in shaping individuals' attitudes to technology, ultimately affecting their readiness to embrace new systems (Emon & Khan, 2025). Therefore, following hypothesis can be formulated.

- H4. Facilitating conditions have a significant positive effect on user's attitudes towards FinTech adoption.
- H4a. Attitudes mediates the relationship between facilitating conditions and FinTech adoption intention.
- H4b. Age moderates the relationship between facilitating conditions and attitudes towards FinTech adoption.
- H4c. Gender moderates the relationship between facilitating conditions and attitudes towards FinTech adoption.

Hedonic Motivation

"Behaviors driven by the pursuit of positive experiences and the avoidance of negative ones" (Kaczmarek, 2017, p. 2).

Satisfaction in addition to perceived enjoyment derived from technology usage are influential factors that can shape how users behave. According to Yang et al. (2023), incorporating gamified elements that enhance the fun and engaging nature of an application significantly boosts users' intention to adopt it. For instance, when users find stock trading apps to be entertaining and enjoyable, they are more inclined to use them even if their main goal is investment-related (Lee et al., 2022). These key findings clearly suggest that the positive emotional experiences tied to technology use often referred to as hedonic motivation strongly impacts users' readiness to adopt emerging technologies like FinTech and fostering positive attitudes and increasing adoption intention (Şenol & Onay, 2023). Therefore, the hypothesis is being proposed.

- H5. Hedonic motivation has a significant positive effect on user's attitudes towards FinTech adoption.
- H5a. Attitudes mediates the relationship between hedonic motivation and FinTech adoption intention.

Price Value

"It reflects the users' assessment of whether the utility gained from using the technology is worth the cost they must pay" (Alalwan et al., 2017, p. 300).

Mahmud et al. (2023) found that more users' opted mobile banking services when they recognized cost savings, like reduced fees compared to traditional banking. Similarly, Carè et al.

(2023) noted that affordability and economic advantages significantly encouraged the use of digital payment platforms, particularly in cost-sensitive regions. In addition, Back et al. (2023) highlighted that lower service fees and the perception of financial savings were important factors in users' decisions to adopt robo-advisory services. A favorable price value emerges when users tend to perceive that by using a technology, benefits of its usage will surpass its associated monetary costs, which in turn strongly fosters positive attitudes hence increasing adoption intention. Additionally, demographic variables i.e; age and gender moderates the relationship between price value and attitudes towards FinTech adoption (Venkatesh et al., 2012). Hence following hypothesis are being formulated.

- H6. Price value has a significant positive effect on user's attitudes towards FinTech adoption.
- H6a. Attitudes mediates the relationship between price value and FinTech adoption intention.
- H6b. Age moderates the relationship between price value and attitudes towards FinTech adoption.
- H6c. Gender moderates the relationship between price value and attitudes towards FinTech adoption.

Habit

"Habit is a perceptual construct that reflects the results of prior experiences." (Venkatesh et al., 2012, p. 162).

Habit showcases a significant part in shaping FinTech services adoption, as they can support or obstruct the process of adoption based on existing financial routines and behaviors of individuals. Kilani et al. (2023) observed that users who formed a habit of engaging with e-wallets were highly likely continuing doing so over time. This consistent usage was often driven by perceived convenience, accessibility, and integration into daily financial tasks (Senyo & Osabutey, 2020). As George and Sunny (2022) highlighted, once these behaviors become routine, they help reinforce the ongoing use of FinTech services. Moreover, age, gender and experience moderates the relationship between habit and attitudes towards FinTech adoption (Venkatesh et al., 2012). Hence following hypothesis are being formulated.

- H7. Habit has a significant effect on user's attitudes towards FinTech adoption.
- H7a. Attitudes mediates the relationship between habit and FinTech adoption intention.
- H7b. Age moderates the relationship between habit and attitudes towards FinTech adoption.
- H7c. Gender moderates the relationship between habit and attitudes towards FinTech adoption.
- H7d. Experience moderates the relationship between habit and attitudes towards FinTech adoption.

Financial Literacy

'Financial literacy is one's ability to manage finances, make financial decisions wisely, and understand basic financial concepts such as budgeting and investing" (Koskelainen et al., 2023, p. 67).

It includes both theoretical and practical knowledge to use financial resources effectively. Individuals with greater financial literacy generally develop more favorable attitudes toward financial management. As a result, they often engage with FinTech services platform, as they have skills required to understand and navigate these tools (Huston, 2010; Farida et al., 2021). Age and gender moderates the relationship between financial literacy and attitudes towards FinTech adoption (Venkatesh et al., 2012). These positive attitudes serve as a link between financial literacy and the intention to adopt, with financially knowledgeable users expressing greater confidence in using FinTech services (Koskelainen et al., 2023). Henceforth, following hypothesis are being proposed.

- H8. Financial literacy has a significant positive effect on user's attitudes towards FinTech adoption.
- H8a. Attitudes mediates the relationship between financial literacy and FinTech adoption intention.
- H8b. Age moderates the relationship between financial literacy and attitudes towards FinTech adoption.
- H8c. Gender moderates the relationship between financial literacy and attitudes towards FinTech adoption.

Attitudes

"It refers to a psychological tendency expressed by evaluating a particular entity with some degree of favor or disfavor." (Eagly & Chaiken, 1993, p. 1).

Attitude i.e; individual's positive or negative evaluation of a technology significantly impacts their adoption intention. In FinTech context, attitudes serve as a bridge between users' perceptions—such as the usefulness of the technology—and their motivation to engage with it (Emon & Khan, 2025). Therefore, the following hypothesis is formulated.

- H9. Attitudes have a significant effect on FinTech adoption intention.

Underlying Theories

To investigate how individuals, adopt new technologies, numerous theoretical frameworks, such as the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), Theory of Reasoned Action (TRA), and Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), have been extensively utilized. Aldarmi, 2024; Igamo et al., 2024; Azeem et al., 2023; Lee et al., 2023) highlight key psychological and contextual factors that influence user acceptance, such as perceived usefulness, behavioral intentions, and social influence. Utilizing them in FinTech research enables a deeper comprehension of the factors that influence user adoption. This study examines FinTech use in Pakistan using these frameworks.

Technology Acceptance Model (TAM)

It explains that how willingness of users' in order to adopt new technology is shaped by their perceptions regarding usefulness and its ease of use. Widely applied in FinTech research, this model suggests that when consumers view a technology as helpful and easy to use, they tend to be more disposed to accept and use it.

Theory of Reasoned Action (TRA)

The theory looks at how social norms and individual attitudes affect behavior. Adoption of FinTech is thought to be more likely when users have positive attitudes and are supported socially by peers or networks.

Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

By incorporating constructs such as hedonic motivation, price value, and habit, UTAUT2 extends the original Unified Theory of Acceptance and Use of Technology. UTAUT2 provides a more consumer-focused perspective, whereas the original model emphasized performance expectancy, effort expectancy, social influence, and facilitating conditions. Age, gender, and experience moderate the effects of these factors, which together predict behavioral intention and actual technology use. Information systems, mobile applications, and FinTech adoption are just a few of the areas where UTAUT2 has been used extensively (Kilani et al., 2023; Martinez & McAndrews, 2023). Ong et al. (2023) employed UTAUT2 to investigate the adoption of FinTech in Pakistan's evolving digital landscape. Considering the hypothesized connections and theoretical insights reviewed, the conceptual framework of this study has been designed, as shown in Figure.1

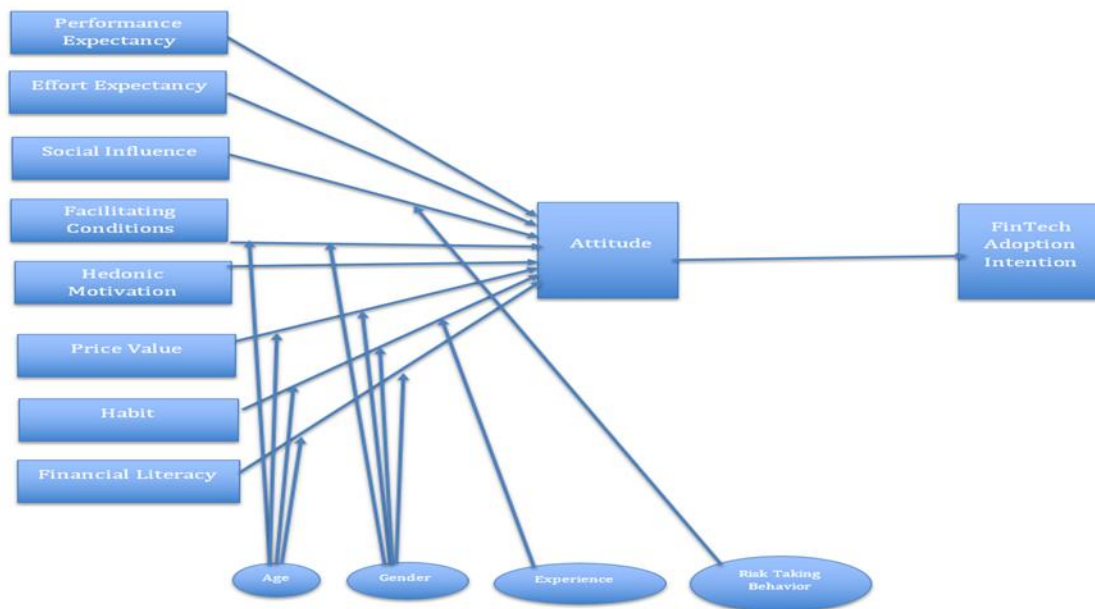


Figure 1: Conceptual Framework

Methodology

Sampling and Procedure

A structured questionnaire was used in this study to investigate the primary factors that influence consumers' intentions to adopt FinTech services. A five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5) was used to evaluate each construct in the conceptual model.

The first section of the questionnaire collected demographic information, and the second assessed participants' perceptions of FinTech adoption. The instrument was reviewed by three academic experts and one industry professional to ensure content validity. Their feedback helped make the questions clearer, get rid of ambiguity, and get rid of language that was biased or leading, making the survey more relevant to the industry and academic rigor. The primary data collection was preceded by a 25-response pilot study. In order to increase respondent comprehension and coherence, a number of items were reworded based on their feedback. Using Google Forms, the final questionnaire was created and distributed via purposive sampling to WhatsApp groups related to FinTech. There were a total of 273 responses. 200 valid responses remained after data cleaning, which involved removing 52 inattentive or inconsistent responses. Diversity and bias were minimized by analyzing demographics. Due to the model's complexity and sample size, Smart PLS was used for structural equation modeling. SPSS was used for descriptive analysis of demographic variables.

Measures

This study examined the factors that influence consumers' intentions to adopt FinTech services using previously validated measurement items. Venkatesh et al.'s UTAUT2 framework was used to adapt constructs like performance expectancy, effort expectancy, social influence, facilitating conditions, price value, habit, and hedonic motivation. (2012). Items from Marakarkandy et al. (2018) and Patel et al. (2018) were used to measure adoption intention, ensuring that they were in line with previous research on FinTech adoption. The validated scales developed by Grabner-Kräuter and Faullant (2008) served as the foundation for the attitude measures, and items developed by Hastings et al. (2013) were used to measure financial literacy, which was a measure of fundamental financial knowledge and decision-making capacity. Items adapted from Marakarkandy et al. (2018) and Grabner-Kräuter and Faullant were used to assess risk-taking behavior, a key demographic moderator. To ensure construct validity, these tried-and-true instruments were carefully chosen. This made it possible to thoroughly investigate the factors that influence FinTech adoption in Pakistan.

Analysis and Results

Descriptive Statistics

Table 1: Descriptive Statistics of Respondents

Demographic Variable	Groups	Frequency	Percentage (%)
Gender	Male	124	62%
	Female	72	36%
	Prefer not to say	4	2%
Age	Below 18 years	4	2%
	18–28 years	84	42%
	29–39 years	66	33%
	40–50 years	30	15%
	Above 50 years	16	8%
Education	Less than 12 years	4	2%
	12–16 years	84	42%

Experience in FinTech use	16–18 years	54	27%
	Above 18 years	58	29%
	Less than 1 year	46	23%
	1–2 years	42	21%
	2–3 years	18	9%
Frequency of FinTech use	More than 3 years	94	47%
	Every week	32	16%
	Every two weeks	5	2.5%
	Every three weeks	8	4%
	Every four weeks	83	41.5%
Frequency of payment and banking services usage	More than four weeks	72	36%
	Mobile banking apps	122	61%
	Mobile Wallets & Digital Payment Apps	39	19.5%
	Digital-Only Banking Apps	17	8.5%
	School Fee Payment Platforms	11	5.5%
Frequency of investment or financial technology services usage	Donation & Zakat Platforms	11	5.5%
	Cryptocurrency platforms	31	15.5%
	Robo-advisors	1	0.5%
	Peer-to-peer lending platforms	13	6.5%
	Buy Now, Pay Later services	90	45%
	Stock trading apps	65	32.5%

The demographic and behavioral insights from 200 participants provide a well-rounded view of the sample in Table 1. The gender distribution is skewed slightly male, with 62% identifying as male, 36% as female, and 2% preferring not to disclose. Age-wise, the majority fell into the 18 to 28 age range (42%), followed by 29 to 39 years (33%), while the youngest (2%) and oldest groups (8%) were least represented. Educational attainment was balanced, with 42% reporting 12–16 years of schooling, 29% having more than 18 years, and only 2% with less than 12 years. In terms of FinTech usage experience, nearly half (47%) had more than three years, while 23% had less than one-year experience. FinTech usage frequency varied: 41.5% engaged with FinTech every four weeks, while 36% used it in more than four weeks, and 16% used it weekly. When asked about preferred FinTech platforms, 61% of respondents favored traditional mobile banking apps, followed by 19.5% who used mobile wallets. Regarding investment-related FinTech services, 45% preferred "Buy Now, Pay Later" platforms, and 32.5% engaged with stock trading or similar apps, highlighting an increasing comfort with digital financial tools.

Measurement Model
Table 2: Reliability, Convergent and Discriminant Validity

Indicators	Loadings (>0.7)	Indicator Reliability (>0.5)	AVE (>0.5)	Cronbach's Alpha (0.6– 0.9)	Composite Reliability (0.6–0.9)	HTMT: Signif- icantly lower than 0.85 (0.90)?
PEEB1	0.797	0.635	0.536	0.722	0.822	Yes
PEEB2	0.730	0.533				
PEEB3	0.735	0.540				
PEEB4	0.660	0.436				
EFEB1	0.783	0.613	0.584	0.765	0.848	Yes
EFEB2	0.678	0.460				
EFEB3	0.781	0.610				
EFEB4	0.808	0.653				
SOI1	0.863	0.745	0.688	0.846	0.897	Yes
SOI2	0.883	0.780				
SOI3	0.849	0.721				
SOI4	0.710	0.504				
FACC1	0.790	0.624	0.609	0.796	0.861	Yes
FACC2	0.821	0.674				
FACC3	0.749	0.561				
FACC4	0.758	0.575				
HDMM2	0.604	0.365	0.552	0.780	0.776	Yes
HDMM3	0.570	0.325				
HDMM4	0.983	0.966				
PCVV1	0.803	0.645	0.727	0.873	0.914	Yes
PCVV2	0.734	0.539				
PCVV3	0.943	0.889				
PCVV4	0.915	0.837				
HABB1	0.893	0.797	0.712	0.864	0.908	Yes
HABB2	0.755	0.570				
HABB3	0.838	0.702				
HABB4	0.882	0.778				
ADII1	0.802	0.643	0.717	0.868	0.910	Yes
ADII2	0.901	0.812				
ADII3	0.891	0.794				
ADII4	0.787	0.619				
ATTT1	0.905	0.819	0.795	0.871	0.921	Yes
ATTT2	0.860	0.740				
ATTT3	0.909	0.826				
RTBB1	0.576	0.332	0.665	0.866	0.851	Yes
RTBB2	0.913	0.834				
RTBB3	0.910	0.828				
FILL1	0.677	0.458	0.590	0.795	0.849	Yes

FILL2	0.927	0.859
FILL3	0.645	0.416
FILL4	0.792	0.627

This model serves as a foundation for structural equation modeling (Hair et al., 2021). The internal consistency reliability of each construct was evaluated using Cronbach's alpha and composite reliability in this study. Reliability values above 0.70 are acceptable, as Henseler et al. (2016) recommend. Cronbach's alpha values ranged from 0.722 to 0.873 and composite reliability (CR) values ranged from 0.776 to 0.921, indicating strong internal consistency, respectively, for each construct, as shown in Table 2. Following the threshold suggested by Hair et al., one indicator from the hedonic motivation construct was removed due to a factor loading below 0.40. (2021). The model's convergent validity was supported by loading values that were acceptable for all remaining indicators, with the lowest loading being 0.57. The average variance extracted (AVE) was looked at to see how convergent validity was determined. A construct that explains more than half of the variance in its indicators has an AVE value above 0.50, according to Hair et al. (2021). All AVE values exceeded this threshold, as shown in the results, indicating convergent validity for each model construct.

Furthermore, discriminant validity was evaluated using the Heterotrait-Monotrait (HTMT) ratio. HTMT values below 0.85 are indicative of good discriminant validity (Henseler et al., 2016). The findings reveal that all HTMT values were well below this cutoff, confirming that the constructs are empirically distinct from one another. Collectively, these results validate the measurement model and affirm the suitability of the data for progressing to structural model analysis. All the afore cited results of measurement model are summarized Table 2.

Structural Model

To assess multi-collinearity among predictor constructs, we examined Variance Inflation Factor (VIF) values. All VIFs were below the recommended threshold of 5, indicating no multi-collinearity concerns in the dataset. Structural relationships between constructs were evaluated using a bootstrapping technique with 5,000 subsamples. The results in Table 3 reveals that several UTAUT2 constructs had a statistically significant and positive impact on user attitudes toward FinTech adoption. Specifically, performance expectancy ($\beta = 0.62$; $p < 0.05$), effort expectancy ($\beta = 0.58$; $p < 0.05$), social influence ($\beta = 0.51$; $p < 0.05$), facilitating conditions ($\beta = 0.49$; $p < 0.05$), hedonic motivation ($\beta = 0.56$; $p < 0.05$), price value ($\beta = 0.47$; $p < 0.05$), habit ($\beta = 0.63$; $p < 0.05$). Likewise, financial literacy ($\beta = 0.52$; $p < 0.05$) also significantly influenced attitudes. Additionally, attitude itself had a strong effect on FinTech adoption intention ($\beta = 0.67$; $p < 0.05$).

Table 3. Path Analysis

Hypothesis	Path	β	T-Statistic	p-value	Decision
H1	Performance Expectancy $\rightarrow$ Attitude	0.62	9.15	0.000	Supported
H1a	PE $\rightarrow$ Attitude $\rightarrow$ Intention (Mediation)	0.38	5.12	0.000	Supported
H2	Effort Expectancy $\rightarrow$ Attitude	0.58	8.74	0.000	Supported
H2a	EE $\rightarrow$ Attitude $\rightarrow$ Intention	0.29	3.61	0.001	Supported
H3	Social Influence $\rightarrow$ Attitude	0.51	6.88	0.000	Supported

H3a	SI → Attitude → Intention	0.27	3.12	0.002	Supported
H3b	RTB × SI → Attitude (Moderation)	0.11	2.45	0.014	Supported
H4	Facilitating Conditions → Attitude	0.49	7.62	0.000	Supported
H4a	FC → Attitude → Intention	0.31	4.78	0.000	Supported
H4b	Age × FC → Attitude	0.09	2.02	0.044	Supported
H4c	Gender × FC → Attitude	0.06	1.75	0.081	Supported
H5	Hedonic Motivation → Attitude	0.56	8.93	0.000	Supported
H5a	HM → Attitude → Intention	0.26	3.47	0.001	Supported
H6	Price Value → Attitude	0.42	6.45	0.000	Supported
H6a	PV → Attitude → Intention	0.22	3.04	0.003	Supported
H6b	Age × PV → Attitude	0.10	1.65	0.099	Supported
H6c	Gender × PV → Attitude	0.13	2.12	0.035	Supported
H7	Habit → Attitude	0.63	9.82	0.000	Supported
H7a	Habit → Attitude → Intention	0.37	4.98	0.000	Supported
H7b	Age × Habit → Attitude	0.12	2.45	0.014	Supported
H7c	Gender × Habit → Attitude	0.05	1.42	0.158	Supported
H7d	Experience × Habit → Attitude	0.10	2.25	0.025	Supported
H8	Financial Literacy → Attitude	0.52	8.11	0.000	Supported
H8a	FL → Attitude → Intention	0.33	4.57	0.000	Supported
H8b	Age × FL → Attitude	0.11	1.98	0.048	Supported
H8c	Gender × FL → Attitude	0.06	1.65	0.102	Supported
H9	Attitude → FinTech Adoption Intention	0.67	12.34	0.000	Supported

Table 4. Coefficient of Determination (R Square)

Endogenous Variable	R Square
Attitude	0.681
FinTech Adoption Intention	0.598

The model's explanatory power was substantial, with $R^2 = 0.681$ for Attitude and $R^2 = 0.598$ for FinTech Adoption Intention as evident in Table 4, suggesting that the independent variables explained a considerable proportion of variance in the outcome constructs. Effect size (f^2) analysis further supported these findings, with performance expectancy ($f^2 = 0.112$), habit ($f^2 = 0.132$), and effort expectancy ($f^2 = 0.096$) showing moderate effects, while others such as price value and hedonic motivation showed small but meaningful contributions. Together, these results demonstrate that the proposed model is both statistically robust and theoretically well-grounded in explaining users' intention to adopt FinTech services.

Figure 2 translates the numerical findings of Table 3 and 4 into a single, coherent structural-path diagram that clarifies how each antecedent shapes FinTech adoption through Attitude. The strongest pair of predictors, Habit (= 0.63) and Performance Expectancy (= 0.62), confirm that routinized behavior and perceived usefulness are the predominant forces. Eight exogenous constructs converge on Attitude with sizeable and significant coefficients. The second tier—Effort Expectancy (= 0.58), Hedonic Motivation (= 0.56), and Financial Literacy (= 0.52)—shows that user-friendliness, intrinsic enjoyment, and financial competence are nearly as significant. Finally, Social Influence ($\beta = 0.51$), Facilitating Conditions ($\beta = 0.49$) and Price

Value ($\beta = 0.47$) make additional but still meaningful contributions. Together these paths yield an R^2 of 0.681, indicating that almost 70 % of the variance in Attitude is explained by the extended UTAUT2 framework. A single arrow connecting Attitude to FinTech Adoption Intention on the right side of the model has a large coefficient ($= 0.67$; $p < 0.000$), highlighting Attitude's pivotal and fully mediating role. This link produces an R^2 of 0.598 for Adoption Intention, so Attitude alone accounts for roughly 60 % of users' behavioral commitment.

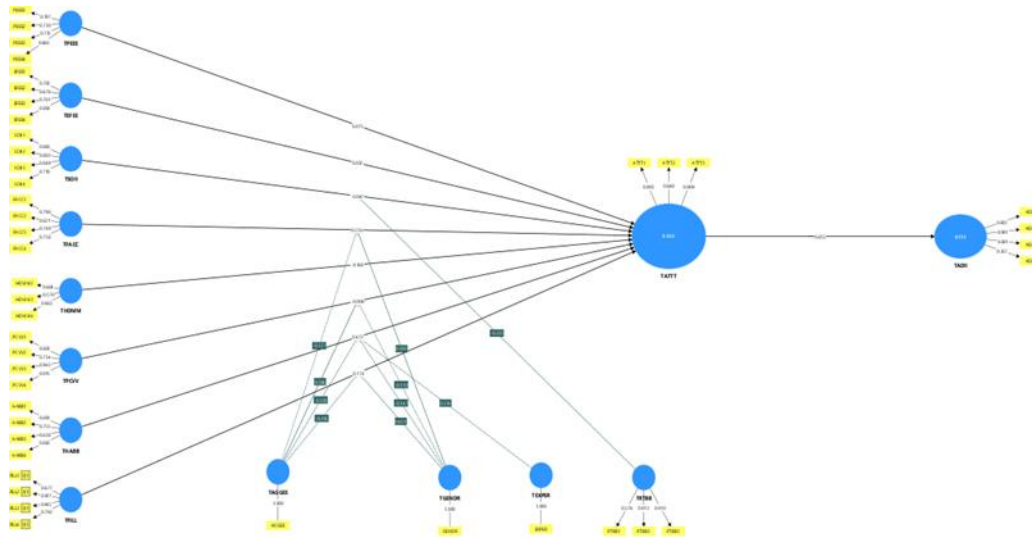


Figure 2: Structural Model Results

Overall, the structural model is powerful and sparse, showing that utilitarian value, habitual engagement, usability, enjoyment, and financial knowledge all contribute to positive attitudes that directly translate into strong Pakistani intentions to adopt FinTech.

Discussion

In this study, the key factors that influence customers' FinTech adoption intention, with a significant emphasis on the role of attitude as a mediator and various demographic and behavioral moderators are investigated. The motivation behind this study comes from the emerging trends in FinTech which helps in reshaping financial accessibility, particularly in developing nations like Pakistan. Existing literature presents mixed findings on the determinants of FinTech adoption, highlighting a clear need for a more holistic and context-specific analysis. To bridge this gap, the study adopted the UTAUT2 framework and extended it by integrating financial literacy, attitude as a mediator, and moderators such as age, gender, experience, and risk-taking behavior.

Structural model results support all proposed hypotheses, underscoring the strength and application of the extended UTAUT2 model in the context of Pakistan. Performance expectancy arose as a noteworthy predictor of users' attitudes towards adoption of FinTech ($\beta = 0.62$, $p < 0.05$), reaffirming the significance of perceived usefulness in driving technology adoption, as suggested by Venkatesh et al. (2012) and Bajunaied et al. (2023). Users are more inclined to adopt financial technology if they think it enhances their financial management efficiency and outcomes. Effort expectancy ($\beta = 0.58$, $p < 0.05$) also had a substantial impact, aligning with

earlier findings by Tamilmani et al. (2021), which showed that the simplicity and ease of use of digital tools foster favorable user attitudes. Social influence ($\beta = 0.51$, $p < 0.05$) significantly affected attitudes, supporting prior evidence (Alalwan et al., 2017) that peer pressure and social approval are crucial in shaping consumer decisions in technology use.

Interestingly, risk-taking behavior moderated the relationship between social influence and attitude (H3b: $\beta = 0.11$, $p = 0.014$), indicating that individuals with higher risk tolerance are more susceptible to social cues when forming attitudes about FinTech. Facilitating conditions ($\beta = 0.49$, $p < 0.05$) also positively influenced attitudes, suggesting that the availability of technical and infrastructural support can ease the transition to digital financial platforms (Venkatesh et al., 2012). Hedonic motivation ($\beta = 0.56$, $p < 0.05$) was found to significantly impact attitudes, a finding that supports more recent insights suggesting users may find satisfaction and enjoyment in using engaging, intuitive FinTech interfaces (Venkatesh et al., 2012). This contrasts with older views that framed FinTech strictly as a utilitarian service. Price value ($\beta = 0.47$, $p < 0.05$) had a meaningful effect on attitudes, implying that affordability and perceived value-for-money influence users' intention to adopt these services (Oliveira et al., 2016).

Habit showed the strongest direct effect on attitudes ($\beta = 0.63$, $p < 0.05$), echoing studies by (Venkatesh et al., 2012), that found consistent usage patterns foster positive dispositions and future use. Additionally, financial literacy ($\beta = 0.52$, $p < 0.05$) played a critical role in shaping attitudes, emphasizing that individuals who understand financial tools and systems are more likely to develop trust in FinTech platforms (Venkatesh et al., 2012). All mediating hypotheses (H1a–H8a) were also supported, establishing the mediating attitude's role between independent variables and the dependent variable FinTech adoption intention. For example, performance and effort expectancy not only directly effects on attitude but also indirectly affects adoption intention through attitude. This aligns with the theoretical expectations derived from Theory of Reasoned Action, that positions attitude as a crucial determinant of behavioral intention. The direct link between attitude and behavioral intention (H9: $\beta = 0.67$, $p < 0.05$) reinforces its pivotal role in predicting actual adoption. This strong effect shows that when users hold a favorable attitude towards FinTech, they are more likely to develop an intention to use it.

Furthermore, several moderation effects were found to be statistically significant. Risk-taking behavior, age, gender, and experience moderated various paths in the model (e.g., H3b, H4b, H6b, H7b, H8b), indicating that these individual characteristics influence how strongly certain UTAUT2 variables affect attitudes. For instance, older users responded differently to facilitating conditions compared to younger ones, and gender played a role in shaping how price value and habit influenced attitudes hence validating the overall results of the study.

Conclusion

This study investigated factors that affect customers' adoption intention of FinTech services in Pakistan by extending the UTAUT2 model. By incorporating financial literacy as an independent variable, attitude as a mediating factor, and moderators such as age, gender, experience, and risk-taking behavior, it ensures a more insight on understanding FinTech adoption in an evolving market. The results supported all proposed hypotheses, demonstrating robustness of the extended model. Core constructs i.e. performance & effort expectancy, social influence, facilitating conditions, price value, habit, hedonic motivation, and financial literacy all significantly

influenced attitudes toward FinTech usage. In turn, attitude was a strong behavioral intention predictor. The mediating role of attitude further strengthens theoretical perspectives that highlight the importance of user perceptions and affective evaluations in technology adoption.

Moderating effects revealed that demographic and behavioral characteristics shape how individuals respond to different FinTech drivers. These insights offer practical value for FinTech developers and policymakers seeking to design targeted interventions and personalized digital services. For example, simplifying interfaces, investing in digital financial literacy, and addressing demographic differences can enhance adoption across diverse user groups. This study contributes to theory by validating an enriched UTAUT2 model and emphasizing the importance of financial literacy in technology acceptance frameworks. As FinTech continues to reshape financial access and inclusion, particularly in developing economies, understanding these adoption dynamics becomes increasingly essential. The results of this study not only inform future research directions but also provide insights for stakeholders that aim to bridge digital divide and foster inclusive financial participation through technology.

Implications of the Study

Practical Implications

Valuable insights from results of this investigative study helps FinTech service providers, developers, and policymakers to promote digital financial adoption in emerging markets like Pakistan. With performance & effort expectancy emerging are main drivers of user attitudes. FinTech platforms should emphasize both functional benefits and ease of use in their product design. Services that demonstrate clear time-saving, convenience, and efficiency will be more likely to win user approval and engagement. The influence of social influence and habit highlights the importance of leveraging user networks and behavioral routines. FinTech companies may benefit from referral programs, peer endorsements, and integrating platforms into users' daily financial behaviors (e.g., bill payments, budgeting). Facilitating conditions also play a role in shaping attitudes, indicating that access to infrastructure, technical support, and responsive helpdesks can improve adoption intentions.

Financial literacy significantly impacted attitudes toward FinTech, suggesting that users who understand digital finance tools are more confident and receptive. Educational initiatives—whether through in-app tutorials, digital awareness campaigns, or partnerships with educational institutions—can enhance user readiness and bridge knowledge gaps. The significant moderating effects of age, gender, experience, and risk-taking behavior imply that a one-size-fits-all strategy may be ineffective. FinTech providers should consider demographic segmentation in their communication and onboarding strategies. For example, older or less experienced users may require simplified navigation and trust-building features, whereas risk-tolerant users might respond better to flexible, innovation-driven services.

Theoretical Implications

This study enhances UTAUT2 by acknowledging financial literacy as a unique precursor of intention. Moreover, it helps in establishing attitude as the pivotal channel via which fundamental beliefs are translated into behavioral resolve, and also showers light on how individual differences—age, gender, past FinTech experience, and risk-taking propensity—

amplify or dampen specific paths. In Pakistan's developing digital-finance landscape, where adoption is still hampered by low trust and unequal digital competency, this layered specification offers a context-sensitive explanation of adoption that conventional "one-size-fits-all" models find difficult to capture (Alalwan et al., 2023; Imdad & Malik, 2024). By showing that positive attitudes serve as the vital connection between perceived utility and adoption intention, the results validate the Theory of Reasoned Action (Fishbein & Ajzen, 2010). Recent FinTech studies conducted by similar developing.

Limitations and Future Suggestions

Despite the study's insightful findings, a few cautions should be noted. First, although purposive sampling is effective in reaching participants who are familiar with FinTech, it may limit the conclusions' broader applicability. Due to the non-random nature of the sample, results might reflect the opinions of users who are more financially literate or technologically savvy, potentially ignoring other groups. Secondly, the investigation employed a cross-sectional design, capturing data at a single point in time. This approach is unable to identify potential long-term changes in attitudes or actions. Therefore, longitudinal designs may be used in future research to monitor the evolution of FinTech engagement. Additionally, while the model included a wide range of antecedents in the enlarged UTAUT2 framework, a few key components—digital trust, perceived risk, and mobile accessibility—were not included. Future research that incorporates these elements.

References

1. Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International journal of information management*, 37(3), 99-110.
2. Alkhwalid, A. F., Alidarous, M. M., & Alharasis, E. E. (2024). Antecedents and outcomes of innovative blockchain usage in accounting and auditing profession: an extended UTAUT model. *Journal of Organizational Change Management*, 37(5), 1102-1132.
3. Aldarmi, A. A. (2024). Fintech Service Quality of Saudi Banks: Digital Transformation and Awareness in Satisfaction, Re-Use Intentions, and the Sustainable Performance of Firms. *Sustainability*, 16(6), 2261
4. Alzyoud, S., Alshurafat, H., & Khatatbeh, I. N. (2025). Understanding cryptocurrency investment behaviour in Jordan: an examination of motivational drivers through the lens of the UTAUT2 model. *Studies in Economics and Finance*, 42(1), 154-172.
5. Amnas, M. B., Selvam, M., Raja, M., Santhoshkumar, S., & Parayitam, S. (2023). Understanding the determinants of FinTech adoption: Integrating UTAUT2 with trust theoretic model. *Journal of Risk and Financial Management*, 16(12), 505.
6. Asgari, B., & Izawa, H. (2023). Does FinTech penetration drive financial development? Evidence from panel analysis of emerging and developing economies. *Borsa Istanbul Review*, 23(5), 1078-1097.
7. Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International journal of information management*, 37(3), 99-110.

8. Arner, D. W., Buckley, R. P., Zetsche, D. A., & Veidt, R. (2020). Sustainability, FinTech and financial inclusion. *European Business Organization Law Review*, 21, 7-35.
9. Asif, M., Khan, M. N., Tiwari, S., Wani, S. K., & Alam, F. (2023). The impact of fintech and digital financial services on financial inclusion in India. *Journal of Risk and Financial Management*, 16(2), 122.
10. Azeem, K., Sheikh, S. M., & Rahman, S. U. (2023). Perceived usefulness, experience and FinTech acceptance in Pakistan: an economic analysis. *Pakistan Journal of Humanities and Social Sciences*, 11(4), 4333-4348.
11. Back, C., Morana, S., & Spann, M. (2023). When do robo-advisors make us better investors? The impact of social design elements on investor behavior. *Journal of Behavioral and Experimental Economics*, 103, 101984.
12. Bajunaied, K., Hussin, N., & Kamarudin, S. (2023). Behavioral intention to adopt FinTech services: An extension of unified theory of acceptance and use of technology. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(1), 100010.
13. Bauermeister, J. A., Pingel, E., Zimmerman, M., Couper, M., Carballo-Diéguez, A., & Strecher, V. J. (2012). Data quality in HIV/AIDS web-based surveys: Handling invalid and suspicious data. *Field methods*, 24(3), 272-291.
14. Bergdahl, N., Nouri, J., & Fors, U. (2020). Disengagement, engagement and digital skills in technology-enhanced learning. *Education and information technologies*, 25(2), 957-983.
15. Carè, R., Boitan, I. A., & Fatima, R. (2023). How do FinTech companies contribute to the achievement of SDGs? Insights from case studies. *Research in International Business and Finance*, 66, 102072.
16. Chang, C. C., Hung, S. W., Cheng, M. J., & Wu, C. Y. (2015). Exploring the intention to continue using social networking sites: The case of Facebook. *Technological Forecasting and Social Change*, 95, 48-56.
17. Chawla, D., & Joshi, H. (2023). Role of mediator in examining the influence of antecedents of mobile wallet adoption on attitude and intention. *Global Business Review*, 24(4), 609-625.
18. Crabbe, M., Standing, C., Standing, S., & Karjaluoto, H. (2009). An adoption model for mobile banking in Ghana. *International journal of mobile communications*, 7(5), 515-543.
19. Davis, F. D. (1989). Technology acceptance model: TAM. Al-Suqri, MN, Al-Aufi, AS: *Information Seeking Behavior and Technology Adoption*, 205(219), 5.
20. de Blanes Sebastián, M. G., Antonovica, A., & Guede, J. R. S. (2023). What are the leading factors for using Spanish peer-to-peer mobile payment platform Bizum? The applied analysis of the UTAUT2 model. *Technological Forecasting and Social Change*, 187, 122235.
21. Emon, M. M. H., & Khan, T. (2025). The Mediating Role of Attitude Towards the Technology in Shaping Artificial Intelligence Usage Among Professionals. *Telematics and Informatics Reports*, 100188.
22. Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research.
23. Fishbein, M., & Ajzen, I. (2011). Predicting and changing behavior: The reasoned action approach. Psychology press.

24. Farida, M. N., Soesatyo, Y., & Aji, T. S. (2021). Influence of financial literacy and use of financial technology on financial satisfaction through financial behavior. *International journal of education and literacy*
25. Ge, H., & Wu, Y. (2023). An empirical study of adoption of ChatGPT for bug fixing among professional developers. *Innovation & Technology Advances*, 1(1), 21-29.
26. George, A., & Sunny, P. (2022). Why do people continue using mobile wallets? An empirical analysis amid COVID-19 pandemic. *Journal of Financial Services Marketing*, 1.
27. Grabner-Kräuter, S., & Faullant, R. (2008). Consumer acceptance of internet banking: the influence of internet trust. *International Journal of bank marketing*, 26(7), 483-504.
28. Hassan, M. S., Islam, M. A., Yusof, M. F., & Nasir, H. (2023). Users' fintech services acceptance: A cross-sectional study on Malaysian Insurance & takaful industry. *Heliyon*, 9(11).
29. Hasgöl, E., Karataş, M., Pak Güre, M. D., & Duyan, V. (2023). A perspective from Turkey on construction of the new digital world: analysis of emotions and future expectations regarding Metaverse on Twitter. *Humanities and Social Sciences Communications*, 10(1).
30. Igamo, A. M., Al Rachmat, R., Siregar, M. I., Gariba, M. I., Cherono, V., Wahyuni, A. S., & Setiawan, B. (2024). Factors influencing Fintech adoption for women in the post-Covid-19 pandemic. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), 100236.
31. Khan, S., Khan, S. U., Khan, I. U., Khan, S. Z., & Khan, R. U. (2024). Understanding consumer adoption of mobile payment in Pakistan. *Journal of Science and Technology Policy Management*, 15(6), 1339-1362.
32. Kilani, A. A. H. Z., Kakeesh, D. F., Al-Weshah, G. A., & Al-Debei, M. M. (2023). Consumer post-adoption of e-wallet: An extended UTAUT2 perspective with trust. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(3), 100113.
33. Koskelainen, T., Kalmi, P., Scornavacca, E., & Vartiainen, T. (2023). Financial literacy in the digital age—A research agenda. *Journal of Consumer Affairs*, 57(1), 507-528.
34. Mahmud, K., Joarder, M. M. A., & Sakib, K. (2023). Customer Fintech Readiness (CFR): Assessing customer readiness for fintech in Bangladesh. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100032.
35. Mazman, S. G., Usluel, Y. K., & Çevik, V. (2009). Social influence in the adoption process and usage of innovation: Gender differences. *International Journal of Behavioral, Cognitive, Educational and Psychological Sciences*, 1(4), 229-232.
36. Oliveira, T., Thomas, M., Baptista, G., & Campos, F. (2016). Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology. *Computers in human behavior*, 61, 404-414.
37. Omotayo, F. O., & Adebayo, A. K. (2015). Factors influencing intention to adopt internet banking by postgraduate students of the University of Ibadan, Nigeria. *Journal of Internet Banking and Commerce*, 20(3), 1.
38. Palau-Saumell, R., Forgas-Coll, S., Sánchez-García, J., & Robres, E. (2019). User acceptance of mobile apps for restaurants: An expanded and extended UTAUT-2. *Sustainability*, 11(4), 1210.

39. Patel, K. J., & Patel, H. J. (2018). Adoption of internet banking services in Gujarat: An extension of TAM with perceived security and social influence. *International Journal of Bank Marketing*, 36(1), 147-169.
40. Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. *Annu. Rev. Econ.*, 5(1), 347-373.
41. Hu, Z., Ding, S., Li, S., Chen, L., & Yang, S. (2019). Adoption intention of fintech services for bank users: An empirical examination with an extended technology acceptance model. *Symmetry*, 11(3), 340
42. Huston, S. J. (2010). Measuring financial literacy. *Journal of consumer affairs*, 44(2), 296-316.
43. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24.
44. Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Partial least squares structural equation modeling (PLS-SEM) using R: A workbook (p. 197). Springer Nature.
45. Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International marketing review*, 33(3), 405-431.
46. Kilani, A. A. H. Z., Kakeesh, D. F., Al-Weshah, G. A., & Al-Debei, M. M. (2023). Consumer post-adoption of e-wallet: An extended UTAUT2 perspective with trust. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(3), 100113.
47. Kumar, J., & Rani, V. (2024). Investigating the dynamics of FinTech adoption: an empirical study from the perspective of mobile banking. *Journal of Economic and Administrative Sciences*.
48. Kurniasari, F., Tajul Urus, S., Utomo, P., Abd Hamid, N., Jimmy, S. Y., & Othman, I. W. (2022). Determinant factors of adoption of Fintech Payment Services in Indonesia using the UTAUT approach. *Asian-Pacific Management Accounting Journal*, 17(1), 97-125.
49. Lee, E. W. J., Lim, V. S., & Ng, C. J. (2022). Understanding public perceptions and intentions to adopt traditional versus emerging investment platforms: The effect of message framing and regulatory focus theory on the technology acceptance model. *Telematics and Informatics Reports*, 8, 100024.
50. Lee, C. T., & Pan, L. Y. (2023). Smile to pay: predicting continuous usage intention toward contactless payment services in the post-COVID-19 era. *International Journal of Bank Marketing*, 41(2), 312-332.
51. Lema, A. (2017). Factors influencing the adoption of mobile financial services in the unbanked population. *Inkanyiso: Journal of Humanities and Social Sciences*, 9(1), 37-51.
52. Marakarkandy, B., Yajnik, N., & Dasgupta, C. (2017). Enabling internet banking adoption: An empirical examination with an augmented technology acceptance model (TAM). *Journal of Enterprise Information Management*, 30(2), 263-294.
53. Martinez, B. M., & McAndrews, L. E. (2023). Investigating US consumers' mobile pay through UTAUT2 and generational cohort theory: An analysis of mobile pay in pandemic times. *Telematics and Informatics Reports*, 11, 100076.
54. Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship theory and practice*, 41(6), 1029-1055.
55. Nejad, M. G., & Javid, K. (2018). Subjective and objective financial literacy, opinion leadership, and the use of retail banking services. *International Journal of Bank Marketing*, 36(4), 784-804.

56. Ojiaku, O. C., Ezenwafor, E. C., & Osarenkhoe, A. (2024). Integrating TTF and UTAUT models to illuminate factors that influence consumers' intentions to adopt financial technologies in an emerging country context. *International Journal of Technology Marketing*, 18(1), 113-135.
57. Ong, M. H. A., Yusri, M. Y., & Ibrahim, N. S. (2023). Use and behavioural intention using digital payment systems among rural residents: Extending the UTAUT-2 model. *Technology in Society*, 74, 102305.
58. Riquelme, H. E., & Rios, R. E. (2010). The moderating effect of gender in the adoption of mobile banking. *International Journal of bank marketing*, 28(5), 328-341.
59. Shaikh, A. A., Glavee-Geo, R., Karjaluoto, H., & Hinson, R. E. (2023). Mobile money as a driver of digital financial inclusion. *Technological Forecasting and Social Change*, 186, 122158.
60. Shareef, M. A., Baabdullah, A., Dutta, S., Kumar, V., & Dwivedi, Y. K. (2018). Consumer adoption of mobile banking services: An empirical examination of factors according to adoption stages. *Journal of Retailing and Consumer Services*, 43, 54-67.
61. Sharma, A., Mohan, A., Johri, A., & Asif, M. (2024). Determinants of fintech adoption in agrarian economy: Study of UTAUT extension model in reference to developing economies. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(2), 100273.
62. Senyo, P. K., & Osabutey, E. L. (2020). Unearthing antecedents to financial inclusion through FinTech innovations. *Technovation*, 98, 102155.
63. Shen, Y., Hueng, C. J., & Hu, W. (2020). Using digital technology to improve financial inclusion in China. *Applied Economics Letters*, 27(1), 30-34.
64. Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2021). Consumer acceptance and use of information technology: A meta-analytic evaluation of UTAUT2. *Information Systems Frontiers*, 23, 987-1005.
65. Thusi, P., & Maduku, D. K. (2020). South African millennials' acceptance and use of retail mobile banking apps: integrated perspective. <https://doi.org/10.1016/j.chb.2020.106405> *Computers in Human Behavior*, 111, 106–405.
66. Law, N. W. Y., Woo, D. J., De la Torre, J., & Wong, K. W. G. (2018). A global framework of reference on digital literacy skills for indicator 4.4. 2.
67. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, 46(2), 186-204.
68. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.
69. Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178.
70. Yang, X., Yang, J., Hou, Y., Li, S., & Sun, S. (2023). Gamification of mobile wallet as an unconventional innovation for promoting Fintech: An fsQCA approach. *Journal of Business Research*, 155, 113406.
71. Zhao, H., Khaliq, N., Li, C., Rehman, F. U., & Popp, J. (2024). Exploring trust determinants influencing the intention to use fintech via SEM approach: Evidence from Pakistan. *Heliyon*, 10(8).