

Bridging Digital Innovation and Financial Inclusion: A Behavioral Study of FINTECH Adoption in Pakistan

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Abstract

The paper will examine the impact of FINTECH innovation on financial services in Pakistan on consumer adoption behaviour, financial inclusion and institutional issues. This study aims to determine the impacts of technology, including mobile banking, digital wallets and online payment systems in changing the conventional banking environment and solving the problem of financial exclusion. A quantitative research design was adopted, with primary data collected via structured questionnaires administered to 385 respondents. The data were processed to determine the relationships among perceived usefulness, ease of use, trust, consumer adoption, and financial inclusion using Partial Least Squares Structural Equation Modelling (PLS-SEM). The results indicate that perceived usefulness ($\beta = 0.346$, $p < 0.05$) and trust ($\beta = 0.308$, $p < 0.05$) have a significant impact on consumer adoption, whereas ease of use has a partially significant impact ($\beta = 0.179$, $p = 0.062$). Moreover, trust has a significant influence on financial inclusion ($\beta = 0.456$, $p < 0.05$). The model shows a relative explanatory power, with R^2 of 0.500 and 0.432 for consumer adoption and financial inclusion, respectively. Despite growing adoption rates, cybersecurity issues and regulatory limitations are also major obstacles. This research offers important implications for policymakers, financial institutions, and FINTECH companies, as it identifies critical forces and obstacles to the adoption process. It adds to the literature by providing empirical evidence from Pakistan and proposing future research directions, including regulatory frameworks and improvements in digital literacy.

Keywords: FINTECH, Consumer Adoption, Financial Inclusion, Perceived Usefulness, Trust, PLS-SEM, Digital Banking.

Introduction

Financial Technology (FINTECH) has greatly transformed the world's financial landscape by introducing digital innovation into the traditional financial framework. Technologies that fall under FINTECH include mobile banking, digital payments, blockchain, and peer-to-peer lending, which make financial markets more efficient, accessible, and faster in service delivery (Arner et al., 2016). The use of FINTECH has surged in the last couple of years, particularly in emerging markets, where technologies are revolutionising the financial landscape. The transition to the digital economy can also be observed in Pakistan, where an increasing number of individuals resort to mobile-based financial transactions and other online solutions for everyday financial activities (State Bank of Pakistan, 2023; Malik and Hussain, 2023). The increase in the popularity of smartphones and internet connectivity has further accelerated this

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transformation, and FINTECH is one of the key contributors to the financial sector's transformation (Abbas & Khan, 2024; Khan et al., 2024).

The adoption of FINTECH in Pakistan is a special case due to the large population of unbanked individuals and limitations of conventional banking. The World Bank (2022) estimates that a significant percentage of the population is limiting participation in the economy and financial stability. However, recent developments indicate a massive improvement: by 2023, financial inclusion had increased to approximately 64 per cent of adults participating in digital financial initiatives. Examples of FINTECH solutions that have helped to close this gap would include mobile wallets and branchless banking, which can offer affordable and convenient financial services (Rehman et al., 2023; Salman et al., 2024). Furthermore, digital tools, including mobile payment systems, have changed how people and small businesses transact, leading to economic growth and inclusion (Demirgüç-Kunt et al., 2018; Ahmed and Ali, 2023). Additionally, digital financial literacy has already proven to be a key factor in the adoption of FINTECH solutions. Technological infrastructure has been enhanced, but not all people are skilled enough on how to effectively use digital financial services, especially in rural regions (World Bank, 2021). Research shows that digital financial literacy plays a vital role in boosting user interaction with FINTECH platforms and leads to better financial decision-making (Islam and Khan, 2024; Amnas et al., 2024). Furthermore, the financial inclusion and use of FINTECH relationships underscore the importance of technology in strengthening underserved communities and ensuring inclusive economic development (Basnayake et al., 2024; Rizwan & Shahzad, 2024). However, the disparity in access to digital resources and education, which creates the digital divide, remains a challenge, limiting the full potential of FINTECH in inclusive development.

Research Questions

RQ1: How does perceived usefulness and ease of use influence the FINTECH adoption in Pakistan?

RQ2: What is the impact of trust towards digital financial platforms on consumer adoption and financial inclusion?

RQ3: How much does the adoption of FINTECH lead to financial inclusion in Pakistan?

Significance of the Research

The research is of great importance to both the academic and practical fields, as it empirically examines the adoption of FINTECH and its contribution to improving financial inclusion in Pakistan. As financial services become increasingly digital, it is important to understand the behavioural and technological predictors of adoption to develop effective strategies to expand access to financial services. The results of the present study extend the current literature by incorporating the most important constructs, like the perceived usefulness, ease of use, and trust in a single framework of analysis, filling in the gaps that have been observed in previous reports. Moreover, the research provides policy implications such as regulatory support, digital literacy, and consumer trust to promote adoption and financial inclusion to policymakers, financial institutions, and FINTECH companies. Theoretically, it enhances the use of models of technology adoption, such as TAM, in emerging economies, in contrast to earlier research that has placed greater emphasis on the role of user perception and behavioural intention in technology acceptance (Rogers, 2003; Demirguc-Kunt et al., 2018).

Literature Review

The current research project focuses on the main constructs that internalise FINTECH adoption behaviour and its implications for financial inclusion, including perceived usefulness, perceived ease of use, trust in digital platforms, consumer adoption, and financial inclusion.

Perceived usefulness is the degree to which individuals believe that using a certain technology increases their performance, whilst perceived ease of use is the degree to which individuals perceive the technology as free of effort (Davis, 1989). Recent research underscores that these constructs continue to play a pivotal role in explaining the adoption of FINTECH in emerging economies, where usability and efficiency are important factors in users' acceptance (Nizam et al., 2024; Abbas and Khan, 2024; Li and Chen, 2023). Another construct of great significance, trust, is central to shaping users' readiness to adopt digital financial services, particularly in contexts where cybersecurity and data privacy apprehensions are widespread (Naseem & Rahman, 2023; Sharma & Gupta, 2024). Also, consumer adoption is the actual usage behaviour of FINTECH services, and it is heavily determined by these psychological and technological determinants (Rogers, 2003). Financial inclusion, as a construct of dependency, is a measure of the availability and affordability of financial services to underserved groups. FINTECH has become a driver of financial inclusion in developing nations such as Pakistan, enabling people to access banking services through digital channels (Demirgüç-Kunt et al., 2018). According to recent empirical findings, digital wallets, mobile banking, and branchless banking systems play a significant role in increasing access to financial services, especially among low-income and rural populations (Rizwan & Shahzad, 2024; Salman et al., 2024; Ahmed & Ali, 2023). However, trust, perceived benefits, and ease of use of these innovations are related to the adoption rates, which are all included (Islam & Hassan, 2024; Rehman et al., 2023). Therefore, a conglomeration of these constructs has provided a comprehensive view of the interactions among technological, behavioural, and institutional forces, and their impact on adopting FINTECH and financial inclusion in Pakistan.

Model Development

The theoretical frameworks used in this research include the Technology Acceptance Model and the Diffusion of Innovations theory, both of which are well-established. According to the Technology Acceptance Model, created by Davis (1989), perceived usefulness and perceived ease of use are the key factors that determine users' behavioural intentions to use new technologies. This paradigm has been widely used in FINTECH studies to describe users' acceptance of digital financial services (Venkatesh et al., 2012). Recent research also confirms the applicability of TAM in new economies, revealing that user perceptions, along with issues of trust and security, play a critical role in the adoption of FINTECH (Nizam et al., 2024; Naseem and Rahman, 2023; Abbas and Khan, 2024). Also, there is the DOI theory (Rogers, 2003), which describes the spread of innovations in a population and highlights the importance of relative advantage, compatibility, and complexity, which is pivotal in the context of the spread of FINTECH solutions in Pakistan (Li & Chen, 2023; Sharma & Gupta, 2024).

Using these theoretical foundations, the present research integrates the TAM and DOI to develop a holistic model to explore the relationships among perceived usefulness, ease of use, trust, and their impact on consumer adoption and financial inclusion. The adoption of these theories aims to provide a structured explanation of how behavioural and technological factors drive FINTECH adoption in a developing economy. Even though the past studies have largely focused on single constructs, the recent studies suggest that joint models are needed, which can be applied to explain not only behavioural intentions but also such systemic outcomes as financial inclusion (Rizwan & Shahzad, 2024; Salman et al., 2024; Ahmed & Raza, 2023). The research, by taking these theoretical approaches, will fulfil its primary goal of determining the critical factors behind FINTECH adoption and assessing their role in financial inclusion in Pakistan. This theoretical combination not only enhances the analytical framework but also provides a basis for empirical testing using advanced techniques such as PLS-SEM.

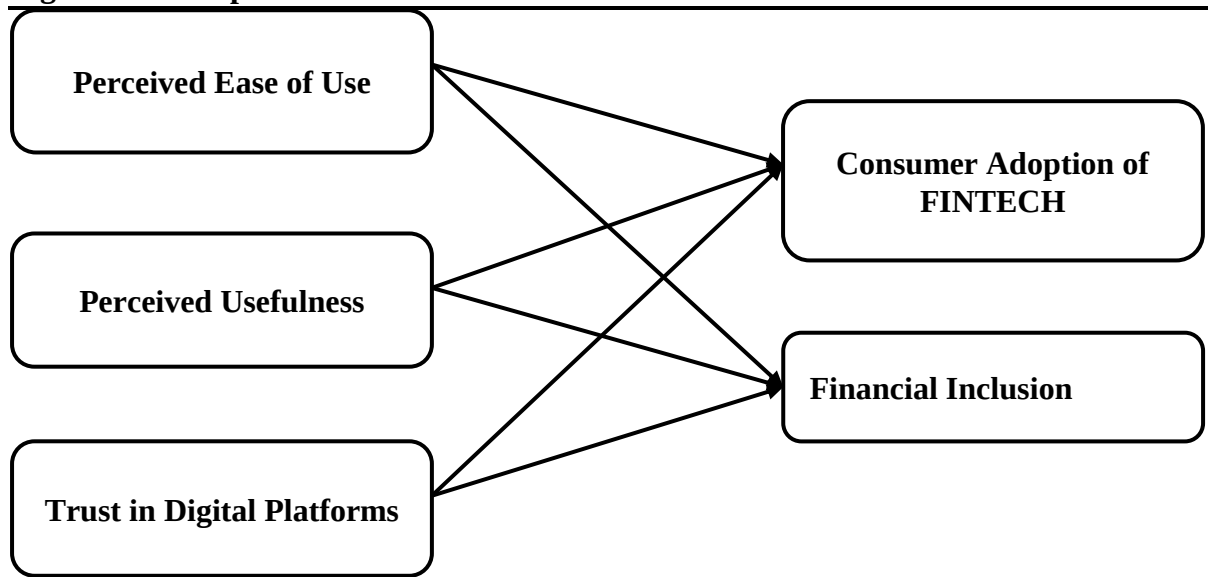
Overview of the Variables

The correlation between technological variables such as perceived usefulness, ease of use, and trust and the adoption of FINTECH has been extensively documented in the recent literature. Research shows that users are more inclined to adopt digital financial services when they view them as useful, effective, and convenient, especially in emerging markets (Nizam et al., 2024; Abbas & Khan, 2024; Sharma & Gupta, 2024). Trust also enhances this relationship by reducing doubt and perceived risks associated with digital exchanges (Naseem & Rahman, 2023). The empirical results indicate that trust and perceived usefulness have a significant positive impact on user intention and actual adoption behaviour, resulting in better financial inclusion outcomes (Rizwan & Shahzad, 2024; Salman et al., 2024). Previous background research also supports these arguments by presenting the fact that user perception and behavioural intention are the drivers of technological acceptance (Davis, 1989; Rogers, 2003). All of these views indicate that positive user perception and technological advantages may be the key factors in FINTECH adoption.

Mediation and Moderation Perspectives.

Mediating and moderating processes tend to enhance the relationship between perceived usefulness and FINTECH adoption. According to recent research, trust is an important mediator which increases the impact of perceived usefulness on adoption by minimising perceived risks and maximising user confidence (Nizam et al., 2024; Naseem & Rahman, 2023). Meanwhile, this relationship can be moderated by regulatory support and digital literacy, which either reinforce or undermine the adoption process depending on the degree of institutional development (Rizwan & Shahzad, 2024; Rogers, 2003). Nevertheless, other evidence suggests that, despite the robust mediating influence of trust, external risks, e.g., cybersecurity threats and regulatory ambiguity, can undermine adoption outcomes (Abbas & Khan, 2024; Frost, 2017).

Likewise, there are mediating and moderating variables in the relationship between ease of use and FINTECH adoption, including user experience and demographic traits, respectively. Empirical studies show that ease of use has an indirect impact on adoption, mediated by user satisfaction and perceived value, which in turn shape behavioural intention (Sharma & Gupta, 2024; Li & Chen, 2023). Additionally, this relationship is highly moderated by age, education, and digital literacy, with younger, more educated users being more likely to use FINTECH solutions (Rehman et al., 2023; Davis, 1989). Conversely, research indicates that in low-technology-exposure populations, ease of use is not enough to encourage adoption because it is not known and is constrained by infrastructure (Ahmed & Raza, 2023; Rogers, 2003).

Figure 1: Conceptual Framework

Hypothesis Development

The theoretical framework used in the literature review that utilizes a variety of theories to explain FINTECH through the incorporation of the models into the realm of financial services. In the case of FINTECH in Pakistan, when an average user perceives mobile banking or digital wallets as something that is easy to use and beneficial in taking care of their finances, they will adopt the technologies. It was also established that perceived usefulness and ease of use is very important in forming attitudes towards new technology particularly in emerging economies. Moreover, in their research, Rahman et al., 2024, support this fact, noting the significant importance of usability and perceived security, but further add that user experience plays a crucial role in technology adoption among the same developing circumstances.

H1: Perceived usefulness and ease of use have a positive impact on the implementation of FINTECH in Pakistan.

Recent research may be applied to the understanding of the effects of institutional factors on FINTECH adoption. In their article, Ahmed and Raza (2023) describe the influence of formal and informal institutions on the formation of economic behavior and offer a methodology that can be used to evaluate how FINTECH has been used in Pakistan with its specific institutional context, such as regulatory frameworks, cultural attitudes, or traditional banking practices. Furthermore, Hussain and Mahmood, 2024, contended that conventional financial institutions in the region are confronted with the twin challenge of not being able to adopt FINTECH innovations because of their old-fashioned technologies and inflexible organizational systems. Moreover, policies and institutional frameworks tend to favor stability as opposed to the establishment of new technological innovations.

H2: It is highly challenging to implement FINTECH in traditional financial institutions in Pakistan because of outdated technology and the organizational inertia.

The theory of diffusion of innovations by Rogers (2003) is a useful theory in explaining the spread of new technologies. The groups of innovators, early adopters, early majority, late majority, and laggards which are the categories of innovators formed by the theory still apply to FINTECH adoption. New studies have added to this base and looked at what affects diffusion in the digital era. As an illustration, the research has revealed that the pace of diffusion has rocketed by the advent of digital communication and social media (Li & Chen, 2023). In

the adoption of FINTECH in Pakistan, we will find how these factors are involved when we look at it. This can be observed in the adoption of FINTECH in Pakistan, where the early adopters are using digital wallets and mobile banking, with the latter categories quickly following suit as infrastructures and user familiarity grow. Moreover, studies are still in progress to determine the factors that determine diffusion, including relative advantage, compatibility, and complexity, as emphasized by the previous studies. Recent literature also puts more focus on the role of social media and online networks in the process of diffusion. (Ali & Khan, 2023).

H3: It is expected that the regulatory advances in terms of the regulatory frameworks in Pakistan will be solidified in the future as the uptake of FINTECH implementation becomes a reality with moderating measures towards innovation and consumer protection.

Research Methodology

This chapter discusses primarily the methodology of how the impact of the FINTECH innovation on financial services in Pakistan are to be examined, due to the convoluted interdependence of the adoption of digital finance, consumer behavior, institutional responses, and regulatory issues. The mixed-methodology can be utilized to an enormous degree of detail in the research of this young field. The study will include a quantitative survey and qualitative interviews to provide an insight into the magnitude of influence that FINTECH can have on financial services in Pakistan.

Research Design

This paper uses a quantitative method in research to study the determinants of FINTECH adoption in Pakistan. Primary data is collected by means of a structured survey approach of current and prospective users of FINTECH services. The quantitative methodology is suitable since it allows measuring the associations between the most important variables, including perceived usefulness, ease of use, and trust with the assistance of statistical methods. Supporting contextual knowledge is also done through secondary data sources like the State bank of Pakistan, and world bank. The structured questionnaire was used to gather primary data on the basis of a Likert scale to determine the perceptions of the respondents about the adoption of FINTECH in terms of usefulness, ease of use, and trust. Demographic data including age, education and income were also included in the survey to determine their impact on adoption behavior. Moreover, there were questions associated with security issues and trust, which are the key determinants of acceptance of digital financial services by users (Laukkanen, 2016). A review of secondary data on concerned financial reports was also conducted to supplement the results.

Data Analysis Technique

The data collected was analyzed with the help of Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. The method is appropriate when it is necessary to analyze complicated models comprising of various constructs and relationships. It allows both the assessment of the measurement model (reliability and validity) and the structural model (hypothesized relationships). The analysis is aimed at exploring the impacts of perceived usefulness, ease of use and trust on consumer adoption and financial inclusion.

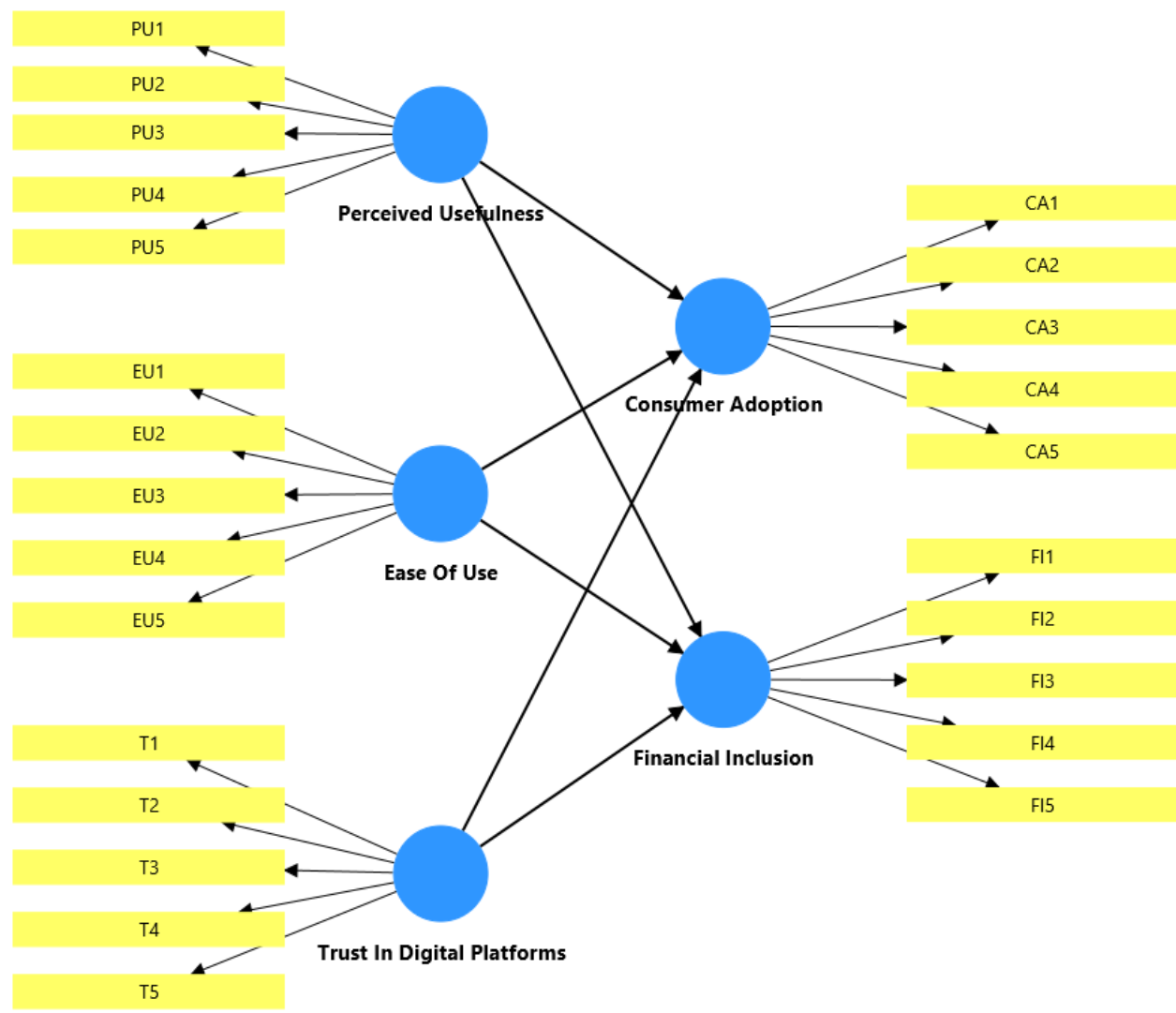
Population

The intended audience comprises people of various financial and social statuses in Pakistan, who are current or potential users of FINTECH services. Also, the feedback of industry

stakeholders, including banking professionals and FINTECH experts, is taken into consideration to learn about more extensive adoption patterns. Stratified random sampling method was used to ensure that various geographic and demographic lines such as urban and rural areas are represented. The sample size of the study was 385 respondents with a 95% confidence level and a 5% margin of error. Regression analysis and descriptive statistics were used to analyse the relationships between variables and select the key factors that affect the adoption of FINTECH.

Results and Discussion

The results of this study provide valuable insights into the factors influencing FINTECH adoption and financial inclusion in Pakistan. The sample is demographically mixed with similar representation of male and female respondent, as well as income and occupational groups. The percentage of respondents aged 40 and less is a high percentage that means that more of these respondents are more familiar and exposed to digital financial services. This indicates the increasing popularity of FINTECH solutions in the context of technologically conscious members of society, especially in cities. Measurement model assurance indicates the accuracy and validity of constructs and the outer loadings are acceptable values, composite reliability and average variance taken out (AVE). The HTMT is also used to determine discriminant validity, meaning that the constructs are different and can be used to further analyze them. These findings confirm the soundness of the research model and guarantee the validity of the future findings. The structural model analysis demonstrates that the positive influence of perceived usefulness and trust toward digital platforms on consumer adoption of FINTECH services is important. Perceived usefulness happens to be the strongest predictor, which implies that the users are more likely to adopt FINTECH solutions when they think that they will undoubtedly see benefits in efficiency and convenience. It also plays a significant role in trust, particularly to banish the apprehensions of the safety and privacy of data. Even though perceived ease of use is positively related to adoption, its influence is not as strong. Furthermore, both trust and user-friendliness are also crucial elements of financial inclusivity, and user confidence and access are relevant factors in expanding digital financial services. All in all, the evidence indicates that building trust, making usability more friendly, and focusing on the practical benefits will be critical in boosting the adoption of FINTECH in Pakistan and fostering financial inclusion.

Figure 2: SEM Model

The results of the current research show that the perceived usefulness and trust are the main factors that influence the adoption of FINTECH in Pakistan, which means that users are more likely to use digital financial services when they see obvious advantages and feel safe using these services. Despite its positive contribution, ease of use has a comparatively lower impact, which implies that functionality and reliability are more significant than ease of use. The significant impact of trust on adoption and financial inclusion highlights the necessity to consider cybersecurity issues and improve consumer trust. Also, demographic trends indicate that younger and more technologically conscious people are at the forefront of the adoption process, and wider inclusion is possible through ensuring greater accessibility and digital literacy. Altogether, the findings indicate that to ensure that FINTECH will gain mass adoption and become an effective means of fostering financial inclusion in Pakistan, stakeholders should aim at establishing trust, increase user value, and minimize technological and behavioral obstacles.

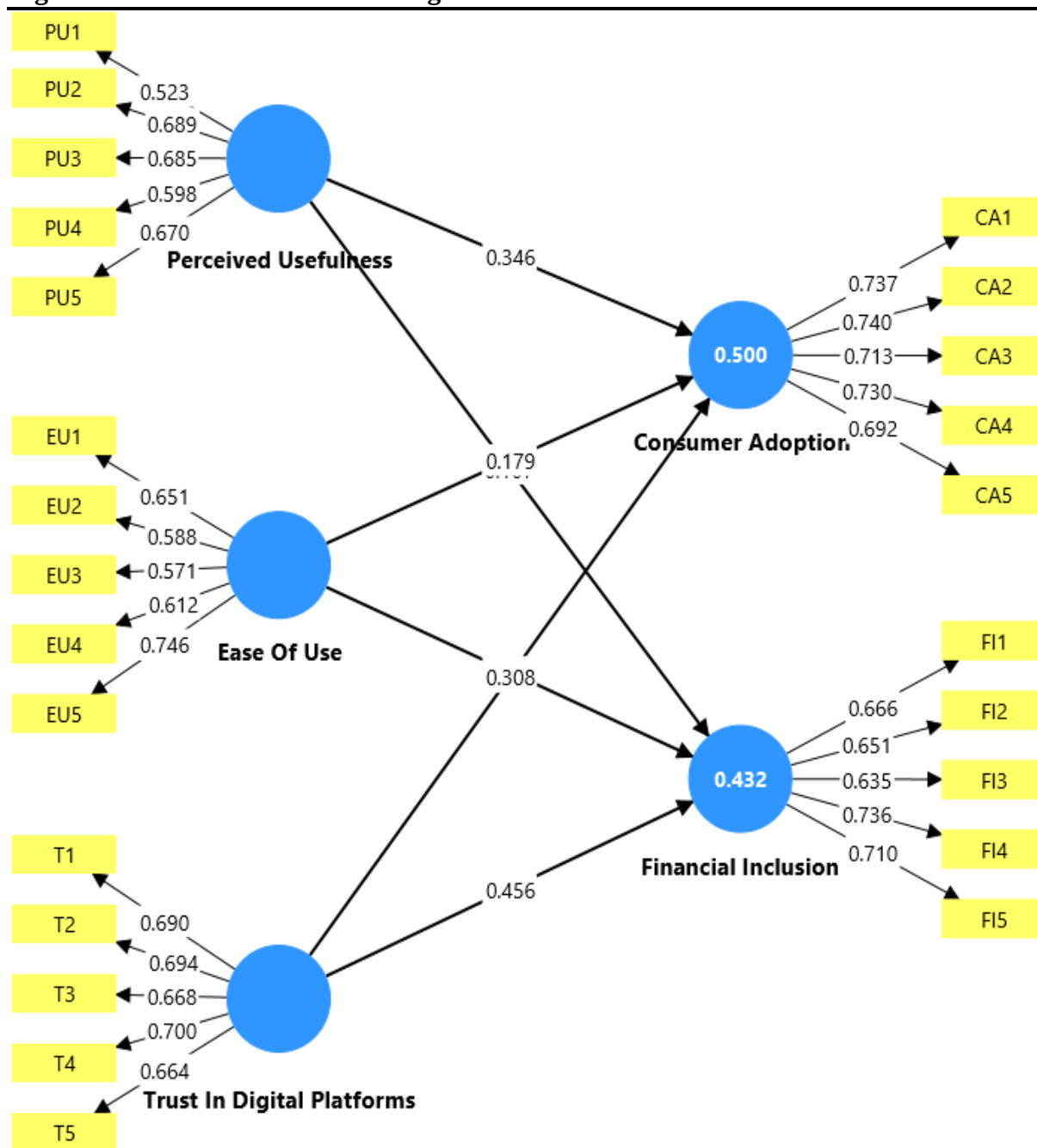
Confirmatory Factor Analysis

We carried out a confirmatory factor analysis to analyze the results in our measurement model. Our study had a measurement of outer loading of between 0.522 and 0.761. As the range is acceptable, the constructs indicate more than 50% of the variance of the indicator. Outer

loadings are the relationships among reflective constructs and measured indicator variables. Any outer loadings that were lower than 0.5 were eliminated from the research as the recommended criteria (Cannon, 2001).

Table 1: Outer Loadings

	Consumer Adoption	Ease Of Use	Financial Inclusion	Perceived Usefulness	Trust In Digital Platforms
CA1	0.732				
CA2	0.740				
CA3	0.713				
CA4	0.730				
CA5	0.692				
EU1		0.651			
EU2		0.588			
EU3		0.571			
EU4		0.612			
EU5		0.746			
FI1			0.666		
FI2			0.651		
FI3			0.635		
FI4			0.736		
FI5			0.710		
PU1				0.523	
PU2				0.689	
PU3				0.685	
PU4				0.598	
PU5				0.670	
T1					0.690
T2					0.694
T3					0.668
T4					0.700
T5					0.664

Figure 3: Model with Outer Loadings Value

Reliability and Validity Analysis

To examine the validity of our answers in our questionnaire as being reliable and valid to continue with our research, we did a Construct Reliability and Validity Test. All the values of our AVE above its cut point i.e., 0.5 are visible in table 4.2 and it indicates that internal consistency formed between the constructs in our model is ideal hence the responses to the questionnaires are valid and reliable (Gefen, 2005). In addition, the Cronbach alpha value is ideal with 3 of our latent variables that are more than 0.7 but 2 variables had low reliability as indicated in table 4.2. Perfect construct reliability was also achieved as the composite reliability of our constructs was between 0.77 to 0.845 which is above its cut point i.e., 0.5. (Staub, 2000). Hence, our overall responses are valid and reliable.

Table 2: Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Consumer Adoption	0.771	0.773	0.845	0.522
Ease Of Use	0.632	0.643	0.771	0.613
Financial Inclusion	0.709	0.708	0.811	0.708
Perceived Usefulness	0.630	0.642	0.771	0.504
Trust In Digital Platforms	0.717	0.718	0.814	0.566

Discriminant Validity

To examine the validity of our answers in our questionnaire as being reliable and valid to continue with our research, we did a Construct Reliability and Validity Test. All the values of our AVE above its cut point i.e., 0.5 are visible in table 4.2 and it indicates that internal consistency formed between the constructs in our model is ideal hence the responses to the questionnaires are valid and reliable (Gefen, 2005). In addition, the Cronbach alpha value is ideal with 3 of our latent variables that are more than 0.7 but 2 variables had low reliability as indicated in table 4.2. Perfect construct reliability was also achieved as the composite reliability of our constructs was between 0.77 to 0.845 which is above its cut point i.e., 0.5. (Staub, 2000). Hence, our overall responses are valid and reliable.

Table 3: Heterotrait-Monotrait Ratio (HTMT)

	Consumer Adoption	Ease Of Use	Financial Inclusion	Perceived Usefulness	Trust In Digital Platforms
Consumer Adoption					
Ease Of Use	0.817				
Financial Inclusion	0.803	0.799			
Perceived Usefulness	0.850	0.846	0.650		
Trust In Digital Platforms	0.799	0.805	0.848	0.772	

Hypothesis Testing

R²: The R² is a measure of the model. It refers to the difference between the dependent variable and the impact of the independent variables in combination with each other and the strength of the correlation between the dependent variable and the model. The R² values range from 0 to 1 with the interpretation of 0 < weak < 0.25; 0.26 < weak < 0.5; 0.51 < substantial < 0.75. The R² of the dependent variables i.e. consumer adoption and financial inclusion are 0.162 and 0.062 respectively in our research. These values explain the weak or low variance (Hair et al., 2013).

Table 4: R Square

	R-square	R-square adjusted
Consumer Adoption	0.500	0.500
Financial Inclusion	0.432	0.432

The F² size effect determines the effect on the R² value of a dependent variable if any specific independent variable is excluded from the model. The F² effect size is >0 i.e., 0.0 < small < 0.15; 0.15 < medium < 0.35; Large > 0.35. In our study, the F² effect size is smaller than 0.35, so the effect is medium. (Hair et al., 2013).

Table 5: F-Square

	Consumer Adoption	Ease Of Use	Financial Inclusion	Perceived Usefulness	Trust In Digital Platforms
Consumer Adoption					
Ease Of Use	0.031		0.026		
Financial Inclusion					
Perceived Usefulness	0.157		0.013		
Trust In Digital Platforms	0.098		0.188		

Collinearity Statistics

The Collinearity statistics is done to analyze if the variables in the outer or inner model need to be eliminated, merged into one, or can be converted into higher-order model variables. The value of Collinearity comes greater than 2 i.e. if >2 , then it's the ideal situation and none of the variables has relation with each other; if $2 < \text{Collinearity} < 5$, then the variables have some relation but that's harmful and if the value is greater than 10, then it needs to be eliminated (Hair et al., 2011).

In our study, the Collinearity value is less than and equal to 2, this interprets the ideal situation that none of the variables has any relation among each other.

Outer VIF Values**Table 6: Collinearity Statistics (VIF)**

	VIF
CA1	1.486
CA2	1.514
CA3	1.458
CA4	1.447
CA5	1.39
EU1	1.263
EU2	1.165
EU3	1.196
EU4	1.14
EU5	1.353
FI1	1.381
FI2	1.227
FI3	1.199
FI4	1.431
FI5	1.444
PU1	1.177
PU2	1.458
PU3	1.399
PU4	1.401
PU5	1.248
T1	1.358
T2	1.286
T3	1.36
T4	1.263
T5	1.238

Inner VIF Values**Table 7: Collinearity Statistics (VIF)**

	Consumer Adoption	Ease Of Use	Financial Inclusion	Perceived Usefulness	Trust In Digital Platforms
Consumer Adoption					
Ease Of Use	2.099		2.099		
Financial Inclusion					
Perceived Usefulness	1.529		1..529		
Trust In Digital Platforms	1.949		1.949		

Path Coefficient

The theoretical model is justifiable by the related test results as shown in table 4.8. Precisely, Latent variable 2, shows the influence exerted by the relative advantages of consumer behavior. Our variable EU ($O = 0.179$, $t = 1.865$, $p > 0.05$) exerted partly significant impact on Latent variable 1, Consumer Adoption while PU ($O = 0.346$, $t = 4.853$, $p < 0.05$), and T ($O = 0.308$, $t = 3.552$, $p < 0.05$) exerted a significant impact as the p-values were below 1.96, which is usually considered as the cut-off value (Ho & Vogel, 2014). However, the impact is positive as all the original values, O, are positive.

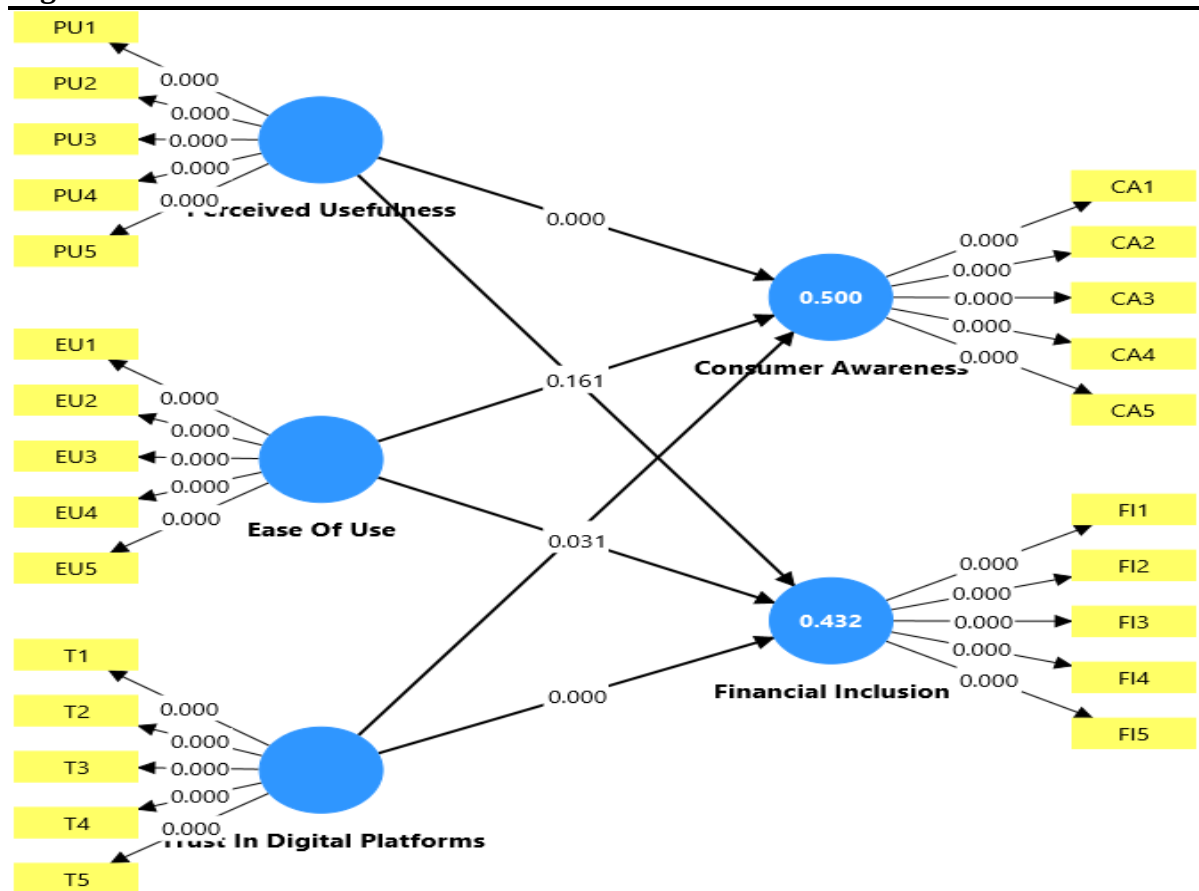
Table 8: Path Coefficients - Mean, STDEV, T-Values, P-Values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Ease Of Use -> Consumer Adoption	0.179	0.183	0.096	1.865	0.062
Ease Of Use -> Financial Inclusion	0.177	0.175	0.082	2.157	0.031
Perceived Usefulness -> Consumer Adoption	0.346	0.351	0.071	4.853	0.000
Perceived Usefulness -> Financial Inclusion	0.107	0.115	0.077	1.400	0.161
Trust In Digital Platforms -> Consumer Adoption	0.308	0.310	0.087	3.552	0.000
Trust In Digital Platforms -> Financial Inclusion	0.456	0.465	0.087	5.248	0.000

Moreover, EU ($O = 0.177$, $t = 2.157$, $p < 0.05$), and T ($O = 0.456$, $t = 5.248$, $p < 0.05$) exerted a significant impact on Latent variable 2, Financial Inclusion, while PU ($O = 0.107$, $t = 1.400$, $p > 0.05$) exerted partly significant impact. As illustrated in table 4.8, the supporting hypotheses of this research paper were accepted. It established an effect of mediation derived from the financial regulatory framework for the adoption of FINTECH while also protecting consumers from risk.

Table 9: Significance of Path Between Constructs

Hypothesis	Path	Significance
H1.1	PU-CA	Supported
H1.2	EU-CA	Partly Supported
H2.1	PU-FI	Partly Supported
H2.2	EU&T-FI	Supported
H3	T-CA	Supported

Figure 4: Model with T Statistics

Hypothesis Assessment Summary

All the hypotheses generated earlier for this report were analysed and interpreted based on results obtained using various statistical techniques, including descriptive analysis, EFA (Exploratory Factor Analysis), CFA (Confirmatory Factor Analysis), reliability and validity analyses, and SEM (Structural Equation Modelling). This study reveals the rapid growth of FINTECH in the banking sector. The effects of consumer behaviour constructs on the uptake of FINTECH in Pakistan have been examined. To test the model's validity, CFA was used. All external loading scores ranged from 0.522 to 0.761. Some other outer loadings below 0.5 were excluded from the research according to the recommended criteria. The output of the reliability and validity analysis, as shown in Table 4.2, indicates that our responses are valid and reliable, and that the internal consistency of the constructs in our model frame is optimal, as the AVEs are above the cut-off of 0.5. The model framework was tested for discriminant validity using the HTMT analysis, which indicated a high correlation between the constructs, as the results were below the HTMT threshold of 0.85. To test the hypothesis, the obtained R² values for the dependent variables, i.e., consumer adoption and financial inclusion, were 0.062 and 0.162, respectively, indicating low variance. In addition, the F² effect size is greater than 0.35, indicating a high impact on the R² value of the dependent variable. The Collinearity Values, as shown in Table 6 and Table 7, are less than or equal to 2, indicating that none of the variables is related to each other. Lastly, the path coefficients indicated that the constructs of consumer behaviour influence the adoption of FINTECH in Pakistan.

Conclusion

To sum up, this paper has demonstrated the deep-seated impact of FINTECH innovation on the financial services sector in Pakistan. All three hypotheses are strongly supported by the findings, which have provided a clear picture of the drivers, challenges, and critical factors affecting the use of FINTECH in the country. To begin with, the acceptance of the hypothesis that perceived usefulness and ease of use have a beneficial effect on FINTECH adoption demonstrates the role user-centric design and value proposition play in facilitating mass acceptance. The adoption of FINTECH solutions will continue to increase as Pakistani consumers become increasingly familiar with them. Secondly, the justification of the predicament that traditional financial institutions face due to outdated technology and institutional austerity also highlights a critical juncture of transformation. To survive in the game, these banks will need to modernise their technologies and instil a culture of agility, as long as adaptability to the new paradigm is provided as a change agent. As the paradigm shift becomes too evident, it will be the pace at which these institutions embrace the new change that will define their future. The validation of the regulatory framework as central in this paper highlights the urgent need for intervention to mould the future of FINTECH in Pakistan. The balance struck between innovation and consumer protection through regulation would allow the former to thrive and the latter to ensure the FINTECH industry lives; the latter would help guide policymakers. A competent regulatory system will support investment opportunities and build trust among consumers and stakeholders. Basically, the implementation of FINTECH in Pakistan is not only a technological giant but also a shifting dynamo capable of altering the world of financial integration, effectiveness, and accessibility. This research will serve as a resource guide for policymakers, financial institutions, and FINTECH founders, as it will assist them in gaining insight into the drivers of the successful integration of FINTECH into Pakistan's financial services sector. The future study can also address specific sub-sectors of FINTECH, which can be further extended in a comprehensive study to explore their longitudinal socio-economic outcomes and the different dynamics in the regulatory environment. Through all these endeavours, it is apparent that these intercessions will provide guidance on the best way to optimise the innovative efforts in FINTECH and to deliver a relevant, inclusive, and sustainable financial architecture for Pakistan.

The insights from this study provide a big-picture view of the interactions between FINTECH innovation and the development of financial services in Pakistan. The strong positive association between perceived usefulness and ease of use and FINTECH adoption, which is supportive of previous theories on technology acceptance, reflects Pakistani consumers' willingness to adopt innovations that facilitate financial interactions with customer needs and provide more material benefits. The constraints of the conventional financial institutions, posed by their legacy systems and their organisational rigidity, pressure them to go through digital transformation. It is harmful not just to the competitiveness of such institutions but also to the further development of FINTECH incorporation. In addition, validating the study's most crucial findings is another significant catalyst for a proper regulatory framework, as it is necessary to strike a balance between encouraging innovation and protecting consumer interests and financial stability without violating either. The confirmation of the three hypotheses indicates that there is a complex system in which technological, organisational, and regulatory factors are interdependent. A worthy contribution to the existing literature on FINTECH in emergent markets, this paper provides stakeholders with pertinent insights to help them navigate this dynamic environment. The necessity of keeping track and evolving constantly is also emphasised, ensuring that Pakistan's financial sector has the opportunity to use FINTECH to enhance economic growth and financial inclusion. The most challenging aspect during this research was the time constraint. We were not able to conduct this level of research because we had no money to download research articles. Variation in responses is not

achieved up to the desired level due to the limited time. The biggest limitation in this report was a lack of experience in conducting research, and it will contain some errors to some extent, though we did our best.

Limitations and Future Research Direction.

For traditional financial institutions, the research has strong implications: traditional banks and financial institutions in Pakistan cannot risk being left out of the FINTECH revolution. They must adapt and embrace FINTECH solutions to survive and remain competitive. This will require massive technology, talent and organisational restructuring. Secondly, the results indicate that organisational inertia and old technology must be tackled. Those institutions that do not do so are at risk of being marginalised in the fast-changing financial environment.

In the case of FINTECH startups and entrepreneurs, the research indicates a positive relationship between perceived usefulness and ease of use and FINTECH adoption, suggesting that FINTECH startups have a significant market opportunity in Pakistan. Nonetheless, they should pay more attention to user-friendly design and attempt to provide solutions to the same needs and challenges that could be applicable to the Pakistani market. The imperative nature of the regulatory frameworks underscores the high priority for all such FINTECH startups to be proactively at the forefront of positive engagements with regulators and policymakers to help build a conducive regulatory environment. Regardless, the research identifies policy and regulatory frameworks as key to not only promoting innovation in FINTECH but also guaranteeing consumer protection. In this regard, policymakers need to establish a regulatory environment that promotes innovation without affecting competitiveness and risk mitigation. These findings imply the need to actively evaluate regulatory frameworks and adjust them to keep pace with innovations in the world of FINTECH. The research also found that policies are required that would enhance digital financial literacy and build digital infrastructure. Moreover, some crucial recommendations to create a thriving FINTECH environment in Pakistan may be derived from the findings. As traditional financial institutions transform digitally, investment in and innovation with technology should be the priority as they progress toward creating user-friendly digital experiences within their organisations. A dedicated FINTECH team, working with startups on an enterprise level, extensive training of employees on digital platforms - all this will do the trick to shift mountains. The FINTECH startups will nonetheless be required to conduct a market study, incorporate an excellent user interface/experience, establish networks with current financial actors and regulators in advance, and, above all, safeguard data and build trust as the paramount priority. To policymakers and regulators, it is recommended to develop a global, national approach to FINTECH, establish regulatory sandboxes, simplify processes, and invest in infrastructure and digital literacy. Good rules to set data protection and cybersecurity will remain a pivotal step. Moreover, an increase in collaboration among regulatory bodies, financial institutions, and FINTECH startups to establish a win-win regulatory environment would be on the list of fostering innovation whilst absolutely safeguarding consumer interests. Lastly, collaboration among all stakeholders is needed to realise the full potential of FINTECH innovation in Pakistan for financial inclusion and economic growth.

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