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Fintech Innovation and its Impact on Financial Services in Pakistan

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Abstract
This study researches the impact of Financial Technology (FinTech) in the areas of banking transformation in Pakistan. It highlights particular adoption barriers such as regulatory restrictions, cybersecurity issues, trust deficits, and consumer apprehensions. The primary data was collected through the online survey distributed among respondents who are interested in FinTech across the country of Pakistan. A descriptive analysis alongside structural equation model (SEM) analysis was conducted for assessment of consumer adoption patterns and key determinants. Based on the facilitators, results suggest that 72% of the consumers are currently using the FinTech services. These results show increased usage, availability, and affordability. Risk of fraud and data compromise concerns, however, hinder adoption by a wider audience. Mainstream banks are also limited in their adoption of FinTech because of regulation and the technology resistance. There is progress However, Government initiatives like Raast (instant payment system) in Pakistan is boosting aid in financial access but there is still room for improvement. This study contributes to empirical knowledge in the FinTech exploring consumer behavior, challenges of regulation/law and future trends related to adoption in Pakistan. It provides strategic guidance for policy makers, investors, and banks in emerging markets.

Keywords: FinTech, Financial Inclusion, Mobile Banking, Cybersecurity, Regulatory Barriers, Pakistan.

Introduction
Over the past few years, Pakistan has witnessed a major and revolutionary transformation in its financial services domain, uniquely led by the rise of the Fintech industry. Fintech is a term that captures a wide variety of technological innovations from mobile banking apps and digital payments systems to peer-to-peer lending platforms and blockchain technology. Such innovations have been reshaping the financial services universe while improving access, efficiency, and providing convenient solutions for consumers (Arner et al., 2016).

In a country like Pakistan, where a huge share of its population has been unbanked or underbanked, fintech could have the capability to bring about the long-standing obstacles to comprehensive financial inclusion to an end. According to the World Bank (2022), about 100 million adults in Pakistan are excluded from formal financial systems, creating an enormous challenge for servicing even the most basic financial needs, including credit, savings, and insurance. Individual exclusion also means limited scope in the participation and growth of small businesses in the economy (Demirgüç-Kunt et al., 2018). Nonetheless, the promise of FinTech innovations, especially mobile financial services, has opened up new pathways for millions of Pakistanis to access vital financial services through the smartphone in their hands (Rehman et al., 2023). Mobile financial services have made the opportunity move into the new world. In Pakistan, the rise of mobile wallets and digital payment platforms has meant great news too for the revolution in how people connect with financial services. Millions of Pakistanis now use mobile apps for everything from money transfers to bill payments (State Bank of Pakistan, 2023). FinTech might have great possibilities for Pakistan, but it also introduces enormous challenges in adapting to traditional financial systems. Banks are some of the oldest institutions and have outdated infrastructure, complicated regulations, and an excessively slow operational style. This creates a dilemma in which they cannot catch up quickly with challenges posed by the new products in the era of technology in financial services (Khan & Khan, 2022). Pressure on traditional banks increases from consumers who often require faster, more convenient, and user-friendly financial services to close the gap created by developing digital finance (Ahmed & Ali, 2023). Research has shown that banks often resist digital transformation in developing economies such as Pakistan because of very large legacy infrastructures in place, and regulatory barriers that do not help (Malik & Hussain, 2023). The thesis seeks to study how FinTech innovations have affected financial services in Pakistan, especially on their traditional financial institutions and consumer behavior. Using a mixed-methods approach-comprising quantitative surveys from consumers alongside qualitative interviews with industry experts-the study strives to provide a comprehensive understanding of all these forces reshaping the Pakistani financial ecosystem (Rehman et al., 2023). These research findings are highly important both for banks and financial institutions wishing to remain competitive within a rapidly changing market and policymakers and regulators whose job is to create an environment in which innovation can thrive but at the same time ensure consumer protection (World Bank, 2022). Ultimately, the study will offer viable and practicable insights to all stakeholders on how to capitalize on the potential afforded by FinTech within the financial services sector in Pakistan.

The rapid expansion of FinTech services in Pakistan is driven by increased smartphone penetration, improved internet connectivity, and government support for digital financial inclusion (Malik & Hussain, 2023). The introduction of branchless banking, led by initiatives such as Microfinance Banks and Telecom-led Banking Models, has enabled millions to perform financial transactions from remote locations. According to Rehman et al. (2023), digital wallets and mobile banking applications have witnessed a 30% annual increase in active users in recent years, reflecting a growing acceptance of digital finance solutions. Peer-to-peer lending platforms are another significant factor contributing to the success of FinTech in Pakistan; they provide an alternative to traditional credit systems. With the use of AI and Big Data, these platforms assess borrower risk and prescribe individualized financial solutions while bypassing all the traditional lending obstacles (Khan et al., 2024). The technology is also gaining traction in secure payments, remittances, and identity verification areas, greatly ensuring transparency and security in financial transactions due to block chain. Nonetheless, several challenges stall the crypto’ s burgeoning adoption in Pakistan. One of these is the issue of low levels of digital literacy amidst threats posed by cybersecurity (Abbas & Khan, 2024). Many people, especially in rural areas, are still hesitant to adopt digital financial services since they lack confidence in using them due to concerns over fraud, data breaches, and financial scams. The State Bank of Pakistan (SBP, 2023) has called for stronger consumer protection measures and increased regulatory controls, as both consumer protection and regulatory oversight are needed to instill public confidence in such digital financial platforms. Perhaps the greatest hurdle remains the interface of FinTech with traditional banking institutions. A number of banking institutions in Pakistan tend to operate on outdated platforms that do not mesh with modern financial technologies (Khan & Khan, 2022). Another hindrance to widening the scope for FinTech has been the lack of cooperation from the slow pace of regulatory approvals (Rehman et al., 2023). Furthermore, interoperability between various digital payment platforms has been a major hindrance in executing a smooth transaction, requiring cooperation of financial institutions, regulators, and technology providers to increase overall compatibility. Various initiatives have been introduced by the State Bank of Pakistan (SBP) and Securities and

Exchange Commission of Pakistan (SECP) to encourage digital financial services while ensuring compliance with regulations (Ahmed & Ali, 2023). The policies they would fall under are the Pakistan Digital Financial Services Policy and the National Financial Inclusion Strategy (NFIS), which aim to promote a cashless economy, create financial inclusion, and improve the legal framework for consumer protection (Malik & Hussain, 2023). However, one of the challenges that a FinTech startup has to deal with is the incorporation of complex requirements of compliance and high operational costs (Khan et al., 2024). Another important study, (Rehman et al. 2023), shows that even if 72% of Pakistani consumers deal with a mobile banking application, still 25% are concerned about security risks and digital fraud. Khan & Khan (2022) point out that the factors defined for the adoption of the FinTech sector include usability, speed of transaction, cost-effectiveness, and a safer platform for transferring funds through any financial service. In fact, younger people aged between 18 and 35 years have even higher penetration in this regard due to increased technological awareness and digital financial literacy (Abbas & Khan, 2024). In contrast, the older generation and rural population remain more hesitant about digital banking, emphasizing the need for more educational campaigns and trust-building measures to encourage diverse consumer bases in adopting FinTech products. The outlook for FinTech seems promising in Pakistan, supported by investments in digital banking infrastructure, AI-driven financial solutions, and blockchain-based security mechanisms (Malik & Hussain, 2023). Initiatives such as **Raast**—the country's instant payment system—are expected to enhance financial inclusion and lower transaction costs (State Bank of Pakistan, 2023). The rise of Islamic FinTech also opens new opportunities for Sharia-compliant digital financial services within Pakistan's Islamic banking sector. Nonetheless, financial technology innovations face significant hurdles due to many challenges in regulatory framework, cybersecurity risks, consumer trust, and digital divide in achieving far-reaching implementation. Digital payments and mobile banking in Pakistan experienced an upward trend in 2022, rather furtively; however, Fintech lacks necessary regulation, resulting in insufficient consumer protection, remaining fears over data privacy, and lesser overall financial literacy (Khan, 2022). The financial services field of Pakistan is populated by an unbanked periphery of a large population; therefore, it is a must to utilize Fintech to tackle the issue of financial exclusion. However, there have not been any coherent policies or any effective governance that could have nurtured Fintech innovations, especially in the rural settings and underserved. In Pakistan, things like Easypaisa, Jazz Cash, and UBL Omni have gained momentum in the mobile wallet industry. Yet, doubts about their security and inclusive capabilities continue to arise, particularly in a country filled with an incredibly digitally illiterate population (Zaidi & Khan, 2021). Fintech innovations have revolutionized Pakistan's financial services sector, mainly through mobile banking and digital payments. Since traditional banking has been slow to innovate, this gap in the market has provided sufficient room for Fintech startups to introduce efficient, low-cost, and friendly solutions. Digital payments and mobile banking growth in Pakistan is related to coasty out mode of this facility by many millions of Pakhtoon citizens to conduct a plethora of financial transactions inside their economies independently, to access savings and loan facilities, and to carry out bill payments without the need for financial suits (State Bank of Pakistan, 2021; Zaidi & Khan, 2021). In cases, they could hardly dream of engaging with certain financial facilities such a long while in the past. With the potential to turn the financial services industry-with a focus on remittances and cross-border payments-in Pakistan completely upside-down, block chain technology and cryptocurrency are now gaining grounds (Azeem & Aslam, 2021). However, legislation has remained in the dark, with many Fintech startups reluctant to integrate block chain and cryptocurrency-knowing the uncertainty of how they will stand legally (Khan, 2022). Although digital financial solutions are gradually being adopted, several hurdles in Pakistan continue to impede the wide-scale adoption of Fintech. One key obstacle to enhancing Fintech is digital illiteracy, particularly prevalent among the older generations and rural communities. Many people continue to be uncertain of adopting technology to manage their finances (World Bank, 2021). There is also lingering consumer skepticism regarding digital financial services, often fueled by issues of cyber-security, fraud, and data protection, mainly when personal information may be at stake (Zaidi & Khan, 2021). Regulatory and Legal Frameworks include: Missing all these is the absence of a consolidated regulatory framework to be followed by Fintech startups, especially with reference to digital currencies, peer-to-peer lending, and crowdfunding. Some regulations have been put in place by SBP with respect to mobile banking and digital payments; however, comprehensive laws need to address other aspects of Fintech innovation (Azeem & Aslam, 2021). With increased use of mobile banking and online payment platforms, risk from Cybersecurity breaches and fraud also increased. Digital financial services are dynamic and have become attractive targets for hackers, says the Pakistan Cybersecurity Report, 2020. It raises concerns about the user safety and overall security of Fintech platforms (SBP, 2021). It is, therefore, necessary to achieve the required balance between developing robust security measures and consumer protection mechanisms that will build trust between the end-users and digital financial products. While there is an evident advancement in mobile phone penetration, Pakistan continues to be bedeviled by poor internet accessibility and low digital literacy levels. In a world where about one-fourth of the population remains unbanked, a large part of the rural population is still deprived of even access to use mobile banking apps and other online financial platforms effectively. This saturates the gulch of financial backslide, the Solar system's most historical problem concerning banking, involving a lot of people who simply interact daily with informal financial institutions (World Bank, 2021).Having another phobia attack from scams, many of the consumers in Pakistan remain skeptical of digital financial services which they do not understand in terms of their proper functioning. To build consumer confidence and promote uptake, awareness-building and transparency regarding pros and cons for solutions regarding Fintech would be greatly needed (Zaidi & Khan, 2021). Institutional Challenges: Traditional banking institutions in Pakistan face challenges regarding adopting and integrating Fintech innovations over into their frameworks. However, due to limited resources and infrastructural and institutional resistance to change, the entire process of digitization in the banking sector slows down (Azeem & Aslam, 2021). FinTech: Use of technology to enhance or automate financial services, which includes mobile banking, peer-to-peer lending, block chain technology, and digital payment systems (Arner, Barberis, & Buckley, 2016). Traditional Financial Services: It refers to classic banking institutions, insurance companies, and other financial intermediaries that operate under an established regulatory framework and offer traditional financial products (Lusardi, 2015). Buying behavior can be defined as the examination of distinct forms of decision-making by an individual concerning financial transactions, including resource allocation to various financial products and services (Solomon, 2017). Adoption rates could be understood as the proportion of consumers or businesses that have integrated FinTech solutions. Those factors that influence adoption include perceived usefulness, ease of use, and trust in digital financial technologies (Rogers, 2003).

Literature Review

The literature review employs an assortment of theories as part of the theoretical framework through which Fintech can be explained by integrating these models into financial services. When it comes to Fintech in Pakistan, if an average user sees mobile banking or digital wallets as something easy to learn and valuable in managing their finances, they are more likely to adopt these technologies. It was further demonstrated that perceived usefulness and ease of use play a significant role in shaping attitudes toward new technology, especially in developing economies. Furthermore, Rahman et al., 2024, in their study reinforce this by highlighting the critical roles of usability and perceived security, further emphasizing the importance of user experience in fostering technology adoption within similar developing contexts.

Hypothesis 1: The adoption of Fintech in Pakistan is positively influenced by perceived usefulness and ease of use.

The impact of institutional factors on Fintech adoption can be understood through the lens of recent research. Ahmed & Raza, 2023, in their work explain how both formal and informal institutions shape economic behavior, providing a framework to assess how Fintech has been adopted in Pakistan within its unique institutional environment, including regulatory frameworks, cultural attitudes, and traditional banking practices. Furthermore, Hussain and Mahmood, 2024, argued that traditional financial institutions in the region face the dual challenge of being unable to implement Fintech innovations due to outdated technologies and rigid organizational infrastructures. Additionally, regulations and institutional structures often prioritize stability over the introduction of new technological advancements.

Hypothesis 2: Traditional financial institutions in Pakistan find it very difficult to adopt Fintech due to obsolete technology and organizational inertia.

Rogers (2003) Diffusion of Innovations theory provides a valuable framework for understanding how new technologies spread. The theory's categories of innovators, early adopters, early majority, late majority, and laggards remain relevant in the context of Fintech adoption. Recent research has built upon this foundation, examining the factors that influence diffusion in the digital age. (Li, X., & Chen, Y., 2023) For example, studies have shown that the speed of diffusion has increased drastically due to digital communication and social media. (Sharma, R., & Gupta, A., 2024) When looking at the adoption of Fintech in Pakistan, we can see how these factors play a role. The adoption of Fintech in Pakistan mirrors this, with early adopters employing digital wallets and mobile banking, while the subsequent categories rapidly catch up as infrastructures and user familiarity rise.Furthermore, research continues to investigate the determinants of diffusion, such as relative advantage, compatibility, and complexity, as highlighted by earlier work. (Ali, Z., & Khan, I., 2023) Recent studies also place greater emphasis on the influence of social media and online networks in the diffusion process.

Hypothesis 3: The developments in the regulatory frameworks in Pakistan are anticipated to be cemented in times to come as the adoption of Fintech sets into motion with balancing actions in favor of innovation along with consumer protection.

Financial inclusion means that all individuals and businesses have access to affordable and accessible financial services, especially those underserved or excluded from the formal banking system. According to the Asian Development Bank (2023), in their report, *Financial Inclusion in Asia and the Pacific: Progress and Challenges*, there are a very large number of unbanked adults throughout the Asian pacific region, including Pakistan, and this creates an exceptional opportunity for Fintech solutions to fill this gap. Rizwan and Shahzad (2024) assert in their study that Fintech has the potential to provide affordable and scalable solutions in rural areas to carry out financial inclusion and further boost economic growth. This section will organize the literature according to central themes about the impact of Fintech on financial services, consumer behavior and digital finance adoption, challenges for traditional banks, and the regulation which aids Fintech growth.

Impact of Fintech on Financial Services in Pakistan

The Fintech revolution has ensured that global financial services do have their place to shine, and Pakistan is no exception. The growth of technologies such as mobile wallets, digital payments, and others presents an opportunity for expanding financial inclusion. Interviewed by the State Bank of

Pakistan in 2023, some growths of Fintech solutions like Easy Paisa, Jazz Cash and Ufone Wallet have extended a greater share of the populace toward accessing banking services in a digital format. It explains that digital payment systems help curtail cash-based transactions and provide a way for persons, especially those in rural areas, to perform financial operations without really having to rely on brick-and-mortar branches. However, Schindler warns that Fintech does not fully take the place of traditional banking systems: it goes along with them. Several traditional banks in Pakistan have collaborated with Fintech startups to offer digital services, integrating the old system with the new. This hybrid model would allow consumers to access services, which would have until now been out of reach of the unbanked populations, such as loans, money transfer, and bill payments.

Consumer Behavior in Digital Finance

The decision to adopt Fintech is highly influenced by behaviors, such as trust, perceived usefulness, and perceived ease of use. Davis (1989) suggests that when individuals perceive something to be of use in their daily life, they are most likely to adopt it as a new technology. According to Naseem and Rahman (2023), in Pakistan, people's acceptance of mobile banking is associated with how much they trust digital transactions, along with their general perception of security and privacy. This concept of fear of data breach, fraud, or privacy issues will hinder the adoption of Fintech, particularly in such markets where people are anxious for their financial security. For Naseem and Rahman (2023), digital literacy takes an important position in the process of adoption. By virtue of their geographic placement, urban dwellers are witnessing rapid adoption; on the other hand, the rural people might have an uphill task due to inadequate smartphone access, poor internet connectivity, and lower levels of digital literacy. To conclude, digital education and awareness campaigns are essential to promote Fintech across all demographic segments in Pakistan.

Challenges for Traditional Financial Institutions

The traditional financial institutions face considerable challenges for adopting and integrating these Fintech solutions. According to Gomber et al. (2018), the legacy systems of the banks are not compatible with newer digital platforms. This makes the process of digital transformation much more cumbersome and expensive. Adding to this, the cultural resistance from employees and managers who have been used to traditional banking practices in many areas of the banking sector further adds complication to the adoption of Fintech. While Frost (2017) points out that larger banks are increasingly adopting Fintech services, it is smaller banks that innovate more slowly for resource reasons. This has created a digital divide in banking, with those in the largest banks providing very comprehensive digital services, while smaller banks still work with a traditional banking model. Other glaring challenges are captured in the discussion virtually confused and mismatched by the pieces of Naseem & Rahman (2023). Banks thus have to navigate through an extremely complicated regulatory setting, ranging from compliance with respect to data protection laws to approvals of new financial products, which, in turn, could hinder and delay innovation.

The Role of Regulatory Frameworks in Facilitating FinTech Adoption

The importance of regulation in ensuring safe and effective development through Fintech cannot be overemphasized. The regulatory framework, according to Arner et al. (2016), should balance innovation and consumer protection. There is regulation by the State Bank of Pakistan (2023) regarding digital payments and Fintech solutions, the aim of which would be to promote these services: the Payment System Operators and Payment Service Providers Regulations. The frameworks ensure that new digital payment systems are secured and that consumers are protected against fraud. Unfortunately, rapid technological change often outstrips the regulatory frameworks, which create a gap through which changes can undermine the stability of the financial system, according to Frost (2017). Therein lies the importance for regulatory bodies in Pakistan to develop adaptive and flexible regulations as a way to curb such an eventuality while enabling Fintech to innovate.

Scope of the Study:

This research will narrow its scope to the consumer market in Pakistan, analyzing the fairly new trend of adopting FinTech innovations, namely, mobile banking and digital wallets. The study tries to understand the determinants of preference for these innovations by the Pakistani consumer in adopting or rejecting them. Such mindset will provide a fairly well-dimensioned insight into the nature of the consumer vis-a-vis the changes triggered by FinTech in the financial services sector, particularly in a young market like Pakistan wherein the insights of the research are meant to help understand these broadly identifiable socio-economic and regulatory factors specific to the context of Pakistan, which otherwise may not hold valid in other markets where banking is more developed or endowed with higher digital infrastructure (Azam, 2020; Khan, 2021).While the analysis presents valuable insights regarding trends in mobile banking and digital wallet adoption in Pakistan, the context surrounding these findings is also very important, given the country has specific, and often incomprehensible, socio-economic conditions and a regulatory framework. Since low banking penetration is combined with other factors, such as heavy reliance on cash for transactions, and great dependence on mobile services, the findings may not be so easily transferable to other countries, particularly those with well-established banking systems and high levels of financial inclusion (Ghafoor, 2019; Rana & Qureshi, 2020). For instance, more developed countries with established banking regimes that, in turn, provide for a higher penetration rate for internet usage may witness an entirely different pattern of FinTech adoption in comparison to Pakistan's disparate market scenario (Rehman & Zia, 2021). The present study has entirely zeroed in on the use of mobile banking and digital wallets, while other innovations within FinTech- for instance, block chain technologies, peer-to-peer lending, or crowdfunding-are being left out of the scope. These would be considered new technologies, each with its special challenges and opportunities where consumer adoption is concerned, and would thus require separate investigation (Iqbal & Javaid, 2020).This study highlights mobile banking and digital wallets as the technologies that are the most widely used within FinTech in Pakistan besides pointing out that other FinTech innovations may directly relate to different patterns of engagement with consumers (Raza, 2020). The findings of this study will thus hold local policy and marketing strategies with orientation towards the Pakistani context, while other contrasting regions may not readily generalize without further tweaks within their given socio-economic and technological contexts (Khan & Mahmood, 2021).

Research Methodology

This chapter talks mainly about the methodology of how the effects of the FinTech innovation on financial services in Pakistan are to be analyzed, focusing on the tangled interconnectedness between the adoption of digital finance, consumer behavior, institutional responses, and regulatory challenges. The mixed-methods approach allows for great detail to be achieved in the study of this nascent field. To offer insights into the depth of impact FinTech has on financial services in Pakistan, the study will encompass a quantitative survey and qualitative interviews.

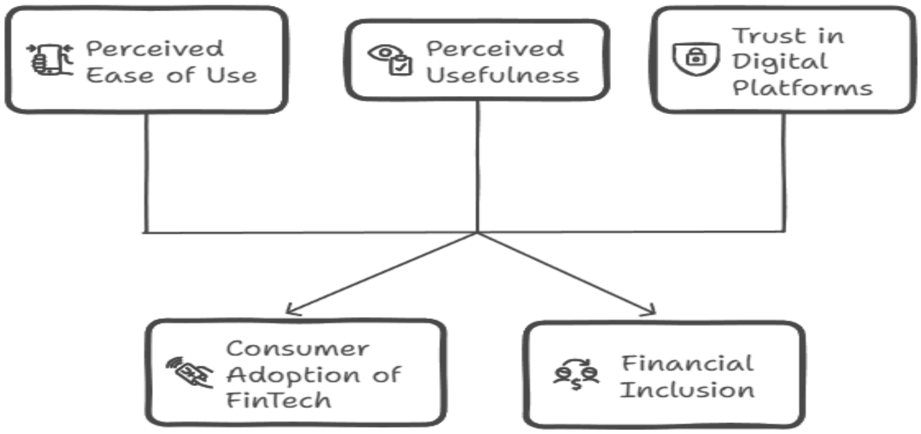
Conceptual Model

Independent Variables:

Perceived Usefulness
Perceived Ease of Use
Trust in Digital Platforms

Dependent Variables:

Consumer Adoption of FinTech
Financial Inclusion



The model in question suggests that perceived usefulness and perceived ease of use determine the adoption of FinTech services, with trust acting as a moderator. In addition, the enabling environmental conditions for FinTech growth and consumer protection by the regulatory framework further influence the adoption process.

Research Design and Methodology

Type of Research:

This study adopts a quantitative research approach to examine the factors contributing to FinTech adoption in Pakistan. A quantitative approach was deemed suitable since it allows the investigation of relationships among variables using statistical techniques. This method will allow measurement of factors such as perceived usefulness, ease of use, and trust in relation to consumer behavior. This research follows an empirical study; data were collected through a structured survey based on consumers who had already used or shown interest in FinTech services. The survey had closed-ended questions so that quantitative insights could be captured. In tandem, secondary data, such as industry reports from State Bank of Pakistan and World Bank, shall provide the developed understanding for the broader context.

Primary Data:

Surveys were conducted on the FinTech users in Pakistan to determine some aspects of mobile banking services, digital wallets and other FinTech products. In addition, secondary source reports from the State Bank of Pakistan, World Bank and other relevant financial institutions or industry bodies providing insights into the digital finance landscape in Pakistan are also reviewed. The survey will use Likert scale questions to assess consumer attitudes toward FinTech solutions, their adoption behaviors, and perceptions of the usefulness and ease of use of digital finance tools. Demographics such as age, income level, and education have to be collected in order to analyze how these factors influence FinTech adoption. Further, questions on trust in FinTech services and concerns about security will be featured because these are the most decisive factors in influencing adoption (Laukkanen, 2016). The data will be analyzed using PLS-SEM technique via SmartPLS software. SmartPLS is a very good and widely used tool for performing structural equation modeling (SEM), most useful with a multitude of interconnected variables when the sample size is small to medium. With the use of SmartPLS, the model for measurement (the reliabilities and validity of the constructs) and the model for structure (the supposed relationships between variables) could be investigated. SmartPLS could be harnessed to assess these proposed paths involving the Perceived Usefulness, Perceived Ease of Use, and Trust in the Digital Platforms, Consumer Level of Adoption of FinTech, and Financial Inclusion for keeping the analyses of data comprehensive and accurate. SmartPLS aligns very well with social science and business studies, embraced for its intuitive interface.

Population:

The study includes people from different financial and social backgrounds. These individuals should either be current users of FinTech services or potential users (i.e., individuals familiar with the technology but not yet using it). The industry population includes senior executives from commercial banks, representatives from FinTech firms, and government officials involved in financial regulation.

Sample Design:

A stratified random sampling technique will be used to ensure that the sample includes various segments of the population, including: Geographic regions: Both urban centers (e.g., Karachi, Lahore, Islamabad) and rural areas, reflecting the different levels of FinTech adoption in these regions. The study aims for a sample size of 151 respondents for the survey, ensuring a 95% confidence level and a 5% margin of error. Quantitative Analysis: Data from the consumer survey will be analysed using descriptive statistics to summarize demographic characteristics, consumer attitudes, and adoption patterns. The main focus will be on the correlation between perceived usefulness, ease of use, trust, and the likelihood of adopting FinTech solutions. Multiple regression analysis will be employed to examine the impact of these factors on adoption rates, considering other variables such as age, income, and education.

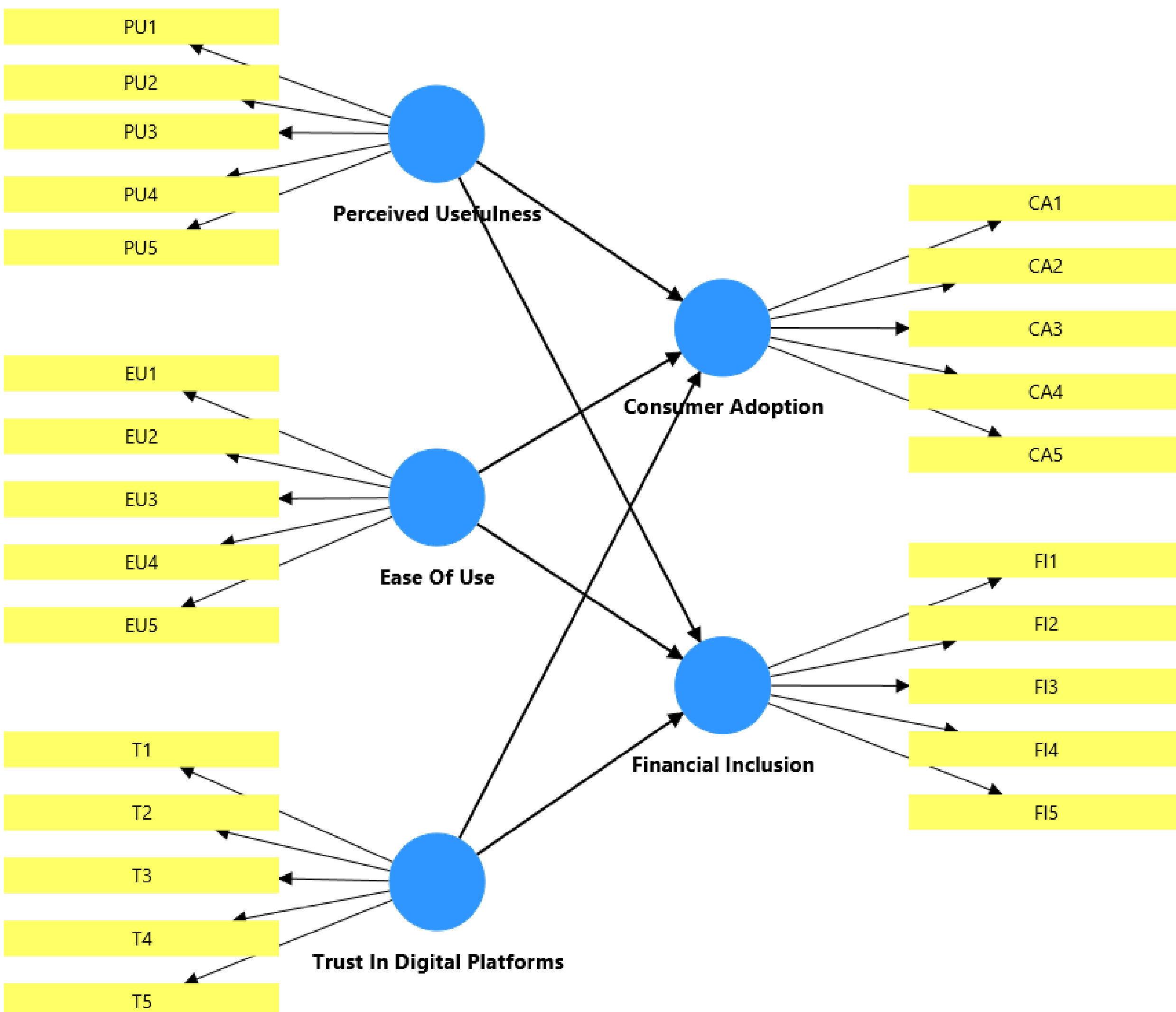
Results and Findings

All the respondents of our sample are common people who use fintech for their day-to-day activities. Table 4.1 shows that there is not a significant difference in gender ratios of our sample, which minimizes the chances of gender-biased responses. Table 4.2 also shows a little variation in the job status of our respondents. From table 4.3 we can see that more than half our respondents are youngsters who have greater knowledge of fintech thus, they have responded to the questionnaire with better understanding. As we can see in table 4.4 that we have almost all types of income ranges people which means we have gathered views from a wide range of people.

Variable Description

The research we carried out had two dependent variables and three independent variables. With our research, we tried to find out the impact of different elements on the adoption of fintech. The dependent variables in this research are adoption of fintech by consumers and financial inclusion. The three independent variables used in this research model are: perceived usefulness of fintech, ease of use and consumer trust in digital platforms. These are all the elements whose impact we have tried researching on the adoption of fintech by the consumers and its inclusion.

Figure 4.1: Initial Model



Validation Of Model

Confirmatory Factor Analysis

We carried out a confirmatory factor analysis to analyze the results in our measurement model. The measurement for outer loading in our research ranged from 0.522 to 0.761. Since the range is acceptable, the constructs explain more than 50% of the indicator's variance. 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).

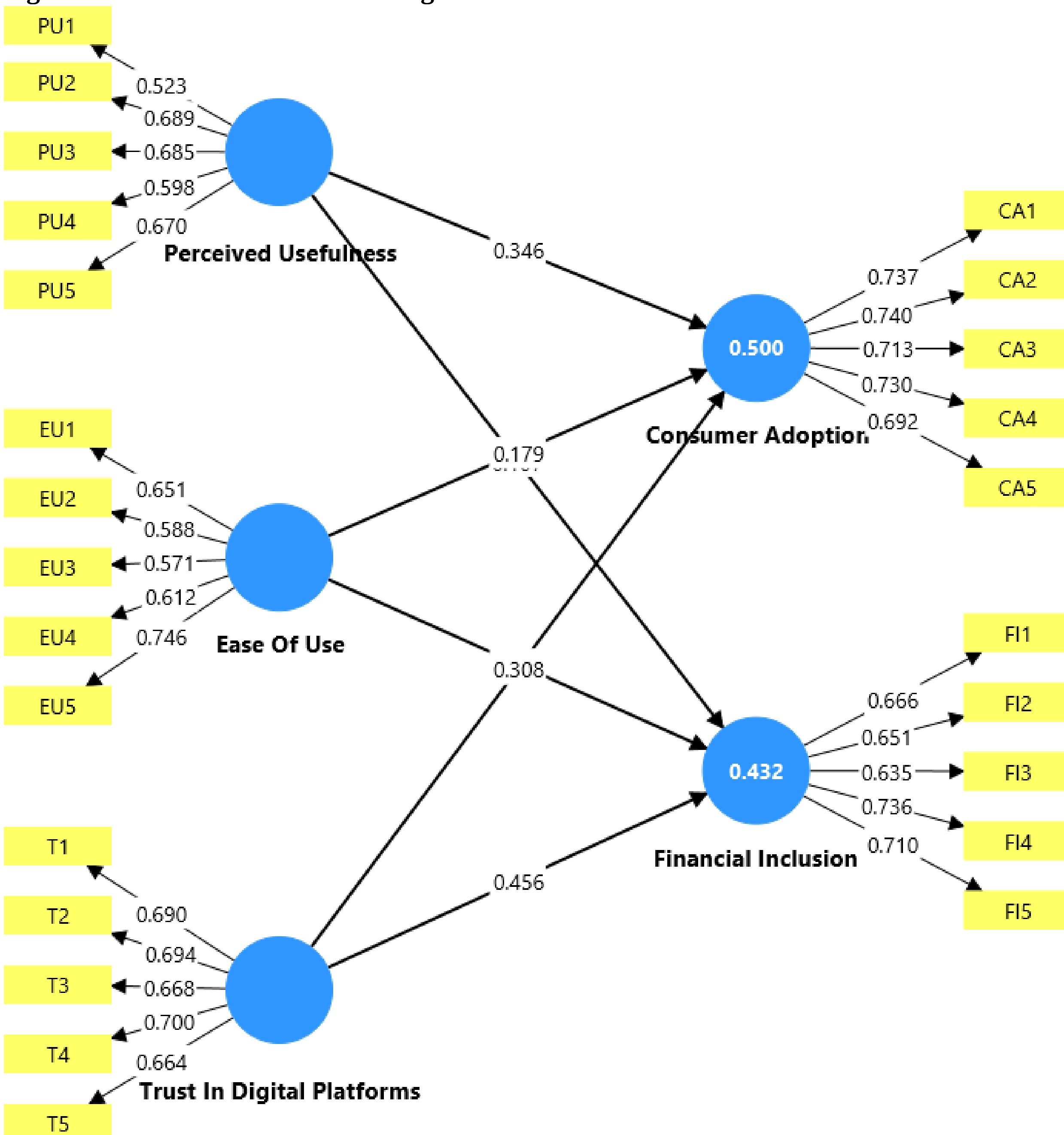
Table 4.1:

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 4.2: Model with outer loadings value



Reliability Analysis

To analyze whether our responses from the questionnaire are reliable and valid enough to proceed with the research, we conducted a Construct Reliability and Validity Test. In table 4.2 we can see all the values of our AVE above its cut point i.e.,0.5, which shows that the internal consistency established between the constructs of our model is perfect, thus the questionnaire responses are valid and reliable (Gefen, 2005). Moreover, the value of Cronbach alpha is perfect for 3 of our latent variables which is above 0.7 but 2 variables showed poor reliability as described 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 4.2:
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
Table 4.3 shows the HTMT output we achieved for our research. HTMT output can be easily calculated and obtained by using the formula from Henseler, 2015. As illustrated in the Heterotrait-Monotrait Ratio table, all the obtained values of HTMT results are below $HTMT_{0.85}$as specified by Kline, 2011. Hence, the table shows that discriminant validity at each and every level has been confirmed between the reflective constructs. Moreover, the results clearly showed that a strong correlation among all the constructs can be identified through the HTMT criterion (multicollinearity).

Table 4.3:
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
$R^{2:}$ The R^2 value evaluates the model. It indicates the variance in the dependent variable due to the independent variables collectively and shows the strength of the relationship between the dependent variable and the model. The R^2 values range from 0 to 1 with the interpretation of 0<weak<0.25, l; 0.26<weak<0.5; 0.51<substantial<0.75. In our research, the dependent variables i.e. consumer adoption and financial inclusion have the R^2 value 0.162 and 0.062 respectively. These values interpret the weak or low variance (Hair et al., 2013).

Table 4.4:
R Square

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

The F^2 size effect determines the effect on the R^2 value of a dependent variable if any specific independent variable is excluded from the model. The F^2 effect size is >0 i.e., 0.0 < small < 0.15; 0.15 < medium < 0.35; Large> 0.35. In our study, the F^2 effect size is smaller than 0.35, so the effect is medium. (Hair et al., 2013).

Table 4.5:

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<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.

Table 4.6:

Collinearity Statistics (VIF)

Outer VIF Values

	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

Table 4.7:
Collinearity Statistics (VIF)
Inner VIF Values

	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, R. & Vogel, D., 2014). However, the impact is positive as all the original values, O, are positive.

Table 4.8:
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

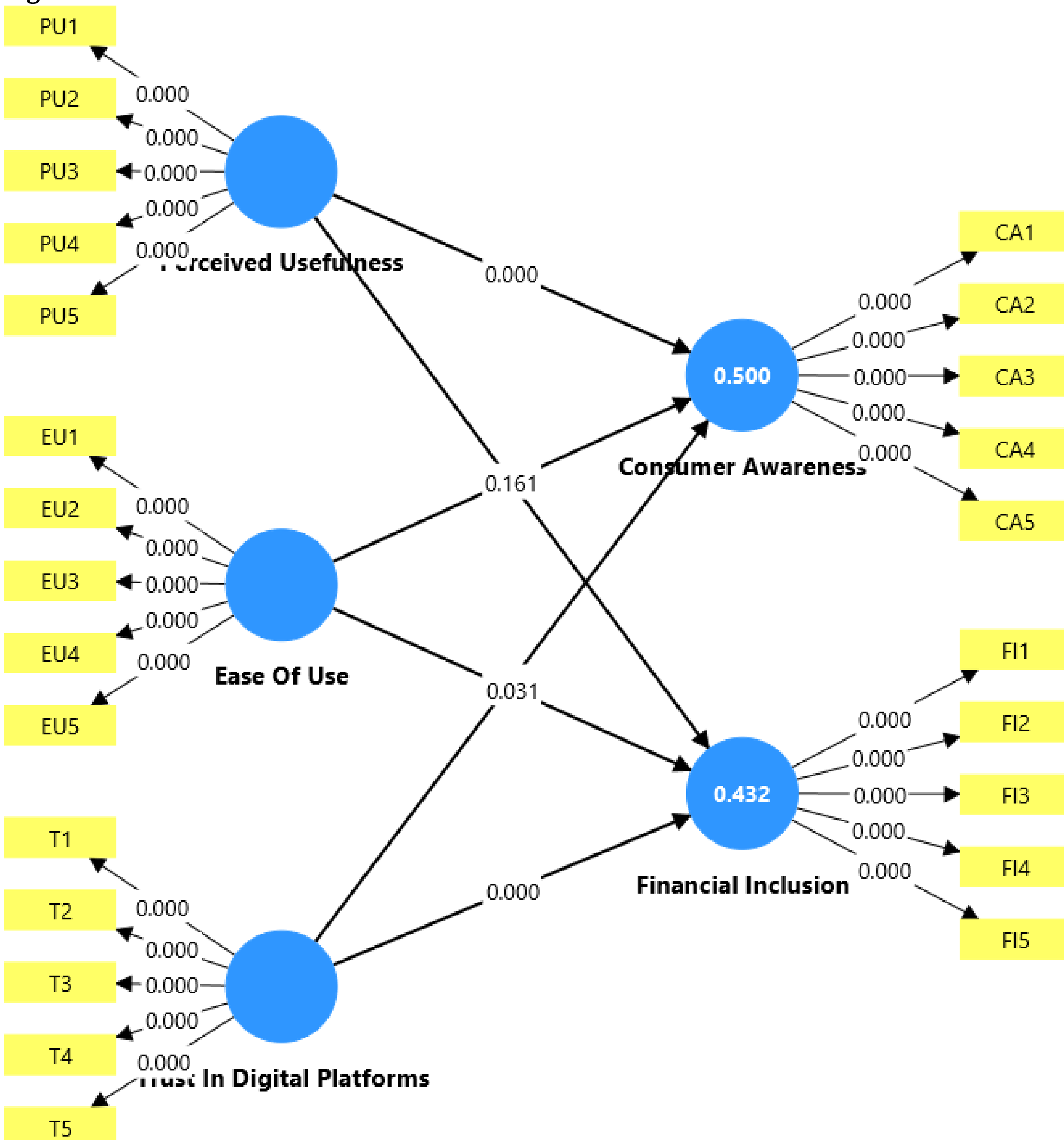
Ease Of Use -> Financial Inclusion	0.177	0.175	0.082	2.157	0.031
Perceived Usefulness -> Consumer Adoption	0.346	0.351	0.071	4.853	0.000
Perceived Usefulness -> Financial Inclusion	0.107	0.115	0.077	1.400	0.161
Trust In Digital Platforms -> Consumer Adoption	0.308	0.310	0.087	3.552	0.000
Trust In Digital 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 4.9: 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 4.3: Model with T Statistics



Hypothesis Assessment Summary

All the hypotheses generated earlier for this report were analyzed and interpreted according to the results obtained by using different statistical techniques such as descriptive analysis, EFA (Exploratory Factor Analysis), CFA (Confirmatory Factor Analysis), reliability, and validity analysis, and SEM (Structural Equation Modelling). This research shows the rapidly increasing use of fintech in the banking industry. The impact of consumer behavior constructs has been analyzed on the adoption of fintech in Pakistan. To test the validation of the model, CFA was used. All the outer loadings of research ranged from 0.522 to 0.761. Some other outer loadings that were lower than 0.5 were eliminated from the research as the recommended criteria. The results of reliability and validity analysis as illustrated in table 4.2 demonstrate that our responses are valid and reliable, and a perfect internal consistency is established between the constructs of our model framework as the AVE is above its cut point, i.e. 0.5. The discriminant validity of the model framework was analyzed through HTMT analysis which showed a strong correlation among the constructs as the results are obtained below $HTMT_{0.85}$. For hypothesis testing, the values obtained for R^2 of dependent variables i.e. consumer adoption and financial inclusion were 0.062 and 0.162, respectively, which shows a weak or low variance. Moreover, the F^2 effect size is larger than 0.35 so its effect on the R^2 value of the dependent variable is strong. The Collinearity Values as shown in table 4.6 and table 4.7 are less than and equal to 2, this interprets the ideal situation that none of the variables has any relation among each other. Lastly, the values of path coefficients showed that the constructs of consumer behavior impacts the adoption of fintech in Pakistan.

Discussion & Conclusion

In conclusion, this study has successfully demonstrated the profound impact of fintech innovation on the financial services landscape of Pakistan. The findings strongly support all three hypotheses, revealing a clear picture of the drivers, challenges, and critical factors influencing fintech adoption in the nation. Firstly, the acceptance of the hypothesis that perceived usefulness and ease of use positively influence fintech adoption underscores the importance of user-centric design and value proposition in driving widespread acceptance. As the Pakistani consumer realizes an increasing level of familiarity with Fintech solutions, their uptake will only go higher. Secondly, the substantiation of the challenges confronting the traditional financial institutions due to antiquated technology and institutional inertia further underscores a crucial transformational juncture. These banks must upgrade technologies and inculcate a culture of agility if they aspire to remain in the race, provided adaptability in the new paradigm is given to be a change agent. With a shift in paradigm overly apparent, the speed of change these institutions adopt will determine their relevance in future. The confirmation of the regulatory framework's cardinal role in this study emphasizes the much-needed intervention to shape the very future of Fintech in Pakistan. Creating a balanced regulatory environment would allow innovation to thrive while still ensuring consumer protection; the latter can help policymakers keep the Fintech sector alive. An appropriate regulatory framework will help with both investment prospects and the development of trust among consumer and stakeholder. Essentially, the adoption of Fintech in Pakistan is not just a technological leap but rather a transforming propeller that can change the realm of financial incorporation, efficiency, and approachability. This study acts as a resource guide for policymakers, financial institutions, and the founders of Fintech, helping them have an insight into the drivers of successful incorporation of Fintech in Pakistan's financial services sector. The future study can also explore some of the specific Fintech sub-sectors that may have more scope in their detailed analysis in terms of studying their longitudinal socio-economic impacts and the different dynamics in the changing landscape of regulative frameworks. In all these efforts, it is obviously these intercessions that will give a direction as to the optimum maximization of the innovative efforts in Fintech and give Pakistan an inclusive and sustainable relevant financial architecture.

The insights from this study render a big picture of interactions of Fintech innovation and development of financial services in Pakistan. Strong positive correlation between perceived usefulness and ease of use with Fintech adoption, corroborating established models of technology acceptance, depicts the readiness of Pakistani consumers to embrace innovations that evidently ease financial transactions along with tangible benefits. The limitations of the traditional financial institutions imposed by their legacy systems and organizational inflexibility exert pressure on them to undergo digital transformation. The inertia is detrimental not only to the competitiveness of such institutions, but also impedes the overall progress of Fintech integration. Besides, the affirmation of the study's most important results is another important impetus for an appropriate regulatory frame due to the need to balance support of innovation, and conservation of consumer interest and financial stability without compromise. The affirmation of the three hypotheses proposes a convoluted system in which technological, organizational, and regulatory components are interlinked. This study contributes to the growing body of knowledge on fintech in emerging markets, offering valuable insights for stakeholders navigating this dynamic landscape. It also emphasizes the necessity for continuous monitoring and adaptation to ensure that Pakistan's financial sector can effectively leverage fintech to drive economic growth and financial inclusion. Time constraint was the biggest hurdle while doing this research. We couldn't achieve that quality of research because we didn't have any funds for downloading research articles. Variation in responses is not achieved up to the desired level due to limited time. No experience of doing the research before was the greatest limitation during this report and it will have errors to some extent although we tried a lot to give our best.

Limitations and Future Research Direction

For traditional financial institutions, the study strongly implies that traditional banks and financial institutions in Pakistan cannot afford to ignore the fintech revolution. Their survival and competitiveness depend on their ability to adapt and integrate fintech solutions. This necessitates significant investments in technology, talent, and organizational restructuring. Also, the findings highlight the urgent need to address organizational inertia and outdated technology. Institutions that fail to do so risk being marginalized in the rapidly evolving financial landscape. For fintech startups and entrepreneurs, the study suggests that the positive correlation between perceived usefulness and ease of use with fintech adoption implies a significant market opportunity for fintech startups in Pakistan. Nevertheless, they must focus on user-centric design and work on providing solutions that meet the very needs and challenges pertinent to the Pakistani market. The pivotal role of the regulatory frameworks stresses the urgency for all such Fintech startups to engage actively and meaningfully with policymakers and regulators alike in creating a conducive regulatory environment. Irrespective of this, the study points to policy and regulatory frameworks as key for encouraging innovation in Fintech and ensuring, at the same time, consumer protection. In this connection, the policymakers have to create regulatory environment that encourages innovation without compromising competitiveness and risk mitigation. Such findings call for an active assessment of the regulatory frameworks and their modifications to stay abreast with innovations accruing in the world of Fintech. The research also found that there is a need for policies that would enhance digital financial literacy and advance digital infrastructure. Further, based on the findings, several key recommendations aimed at developing a flourishing Fintech ecosystem in Pakistan could be drawn. Traditional financial institutions should focus on digital transformation with technology investments and innovations while building user-centered digital experiences in their organizations. A bespoke team for Fintech, enterprise partnerships with startups, comprehensive training for staff on digital platforms - all these together will help to move mountains. Startups in Fintech, however, need to do thorough market research, have a great UI/UX integration, develop relationships with established financial players and regulators upfront, and above all, protect data and earn trust as the highest priority. Policymakers and regulators are advised to develop a global national Fintech approach, start regulatory sandboxes, streamline processes, and put investments into infrastructure and digital literacy. Developing clear guidelines on data protection and cyber security will remain an important milestone. In addition, raising the cooperation between regulatory authorities, financial institutions, and Fintech startups to create a win-win regulatory environment would totally be on the agenda for nurturing innovation while protecting the interests of consumers. Ultimately, a concerted effort from all stakeholders is required to fully unlock the potential of fintech innovation in Pakistan and drive financial inclusion and economic growth.

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