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The Role of Financial Literacy and Technology savviness on Fintech Adoption in Traditional Banking, the Mediating Role of Trust in Technology

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ABSTRACT

This study explores the drivers of fintech adoption, such as financial literacy and technological savviness, considering trust in technology as the moderating variable. Based on a quantitative analysis conducted on survey data related to users of both fintech and traditional banking in Pakistan, this research determines that financial literacy and technological savviness are statistically significant and positively influencing Fintech adoption. The role of trust in technology as a moderator is also substantial, showing the nuances involved in its influence on adoption. These results bring the need for financial and technological education and user-friendly fintech solutions to promote further financial inclusion toward an active digital financial ecosystem. These findings suggest that policymakers and fintech developers should increase efforts toward digital literacy improvement, the accessibility of platforms, and trust through increased data security to ensure that fintech services are indeed adopted in the long run.

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1. Introduction

Fintech has disrupted the financial services industry, as it provides improved access, at reduced costs, through innovative solutions, including blockchain and mobile banking (Elsaid, 2023). However, the phenomena of fintech are global. Various economists have also observed that FinTech adoption is lower than most expectations in emerging economies, the factor for which lower financial literacy, technological knowledge, and trust on the technology. The rapid growth of fintech has cracked the conventional landscape in the financial world and forced traditional banks to evolve with time by developing a digital framework and partnering with Fintech firms (Elia, Stefanelli, & Ferilli, 2023). While fintech has introduced unparalleled opportunities for greater financial inclusion and efficiencies, it has also uncovered challenges like market volatility, consumer trust issues, and regulatory gaps (Gomber et al., 2018). The major issues are digital illiteracy, insufficient technological infrastructure, and a general mistrust of digital channels. Added to this is inequality in access to traditional banking services and different socio-economic conditions in countries like Pakistan, where the issue of financial inclusion already prevails. This calls for focused, improper strategies that surmount these barriers for equal access to digital financial services. Several studies have been conducted on the similar topic but very few research has been conducted in the context of Pakistan to determine the behavioural factors of fintech adoption. Most important areas in developing countries like Pakistan remain less explored, interlinking financial literacy with technology savviness and trust in technology. This makes the present study need to assess the interlinking dynamics of Fintech adoption and its consequences on consumer behavior, market structures, and regulatory frameworks.

Hence, this study investigates the roles of financial literacy and technological savviness in fintech adoption mediated by trust in technology. This study is expected to add value to the existing literature by identifying key issues that policymakers and financial institutions must address to effectively facilitate financial inclusion using fintech services. More precisely, from this analysis, it is hoped to extract some actionable insights that might inform the policy directions on financial and technical issues, thereby enlightening the financial institutions and Fintech firms

on how best to serve the causes of financial inclusions, driving innovation, and engendering consumer confidence in digital financial services. These would help bridge the gap between fintech and traditional banking and contribute to a more inclusive and efficient financial ecosystem(Akram et al., 2011).

2. Literature Review

This study investigates the effect of financial literacy and technological savviness on using fintech services in conventional banking settings, with a mediating role from trust in technologies. Theoretically, it is primarily derived from an amalgamation of the Technology Acceptance Model (TAM) and the essential elements underpinning Diffusion of Innovations (DOI) theories. The two theories provide a basis that can be applied to understand individuals' interactions with and influencers of their adoption behaviors of technology advancements in the financial services industry. Among the most popular conceptual frameworks of research on the adoption of technologies is TAM, proposed by Davis (1989), stating that an individual's acceptance and usage of technology are majorly affected by two factors: perceived usefulness and perceived ease of use (Mugo et al., 2017). Perceived usefulness defines the degree to which a person may believe in using a given system that would improve their performance, whereas perceived ease of use concerns the effort required to use this system. Financial literacy in this context of fintech contributes significantly to PU since the ability to weigh the benefits against the risks associated with digital financial tools, including mobile banking apps, robot advisors, and peer-to-peer lending platforms, is acquired (Henderson & Divett, 2003).

Rogers, Singhal and Quinlan (2014) explained the process through which the diffusion of innovation happens within a population. This identified five significant characteristics that decide the adoption rate: Relative Advantage, Compatibility, Complexity, Trialability, and Observability (Sahin, 2006). The relative advantage pertains to the perceived advantages offered by services related to fintech over traditional banking. This is closely related to financial literacy in that a financially literate person would be capable of realizing their relative advantages in terms of low transaction cost, speedier processing time, and access. Technological savviness supports the complexity dimension of DOI, whereby people who are more at ease with technology find fintech platforms less complex and, thus, easier to fit into everyday life (Pipitwanichakarn & Wongtada, 2021). Trialability, which may be facilitated in fintech solutions by demo accounts or free trials, can affect adoption by allowing users to gain confidence in technology. Again, observing the ability or the visibility of the benefits being experienced by other users strongly reinforces adoption, especially in peer-oriented communities (Amnas et al., 2023). As per the theory, the higher the technological savvy is, the higher the PEOU since people with advanced end-user computing skills find the solutions much more accessible and less complex. Furthermore, TAM considers the role of exogenous variables such as demographic factors and belief in technology that impact PU and PEOU. Trust in the adoption of fintech, given that it reduces concern for data privacy and security issues, thus leads to better confidence in using digital services for financial activities (Amnas et al., 2023). The theoretical framework identifies various actionable insights that might be important for policymakers and fintech developers. Educational programs on financial literacy and technological readiness significantly increase fintech adoption by increasing perceptions of usefulness and ease of use. Besides, confidence in the technology through appropriate regulatory regimes and open communication will go a long way in sustaining the fintech adoption economy. Such could contribute toward a more inclusive and efficient digital financial ecosystem (Ahmed, Azhar, & Mohammad; Dler M Ahmed, Z Azhar, & Aram J Mohammad, 2024; Dler Mousa Ahmed, Zubir Azhar, & Aram Jawhar Mohammad, 2024; Mohammad, 2015a, 2015b; Mohammad & Ahmed, 2017).

2.2. Financial Literacy and Fintech Adoption

The development and adoption of fintech services depend on various variables, including financial literacy, technological savviness, and access to traditional banking facilities. Financial literacy can be defined as managing one's finances effectively. In this respect, research has indicated that a financially literate consumer has a higher chance of adopting fintech products since they find it easy to handle digital financial phenomena such as mobile wallets, robot advisors, and peer-to-peer lending platforms (Grohmann, Klühs, & Menkhoff, 2018). These consumers can better assess the benefits and risks brought about by fintech and motivate them to use the technologies more. Financial literacy reduces perceived risk and builds trust in the

services offered through fintech; it is an especially important factor in its broad diffusion (Grohmann, Klühs, & Menkhoff, 2018).

H_1: Financial literacy has a significant influence on fintech adoption.

2.3. Technological Savviness and Fintech Adoption

Technological savviness refers to the individual's proficiency in using digital gadgets and tools. Research has shown that technologically adept consumers find innovative, efficient, and user-friendly fintech solutions, enhancing adoption. Younger, more tech-savvy consumers are particularly attracted to fintech platforms due to their familiarity with mobile applications and online interfaces(Chien et al., 2021). Additionally, tech-savvy users tend to trust fintech platforms more because they understand the security features, reducing concerns about privacy and fraud. However, trust remains pivotal in encouraging users to transition from conventional banking systems to fintech services (Zhou, 2012).

H_2: Technological savviness has a significant influence on fintech adoption.

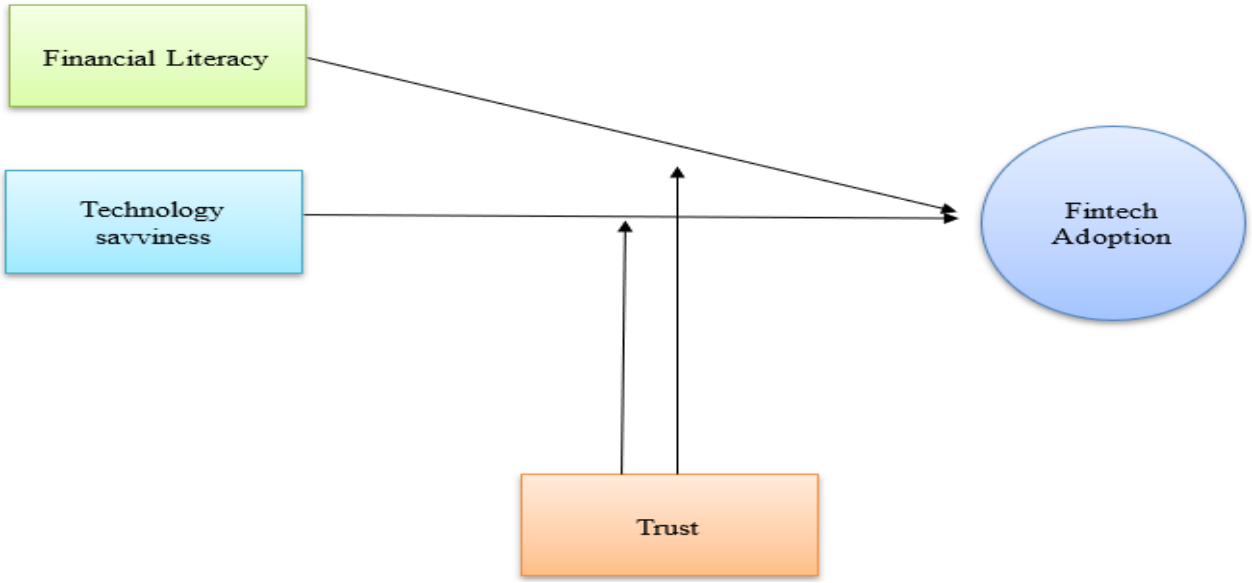
2.4. Trust in Technology as a Moderating Factor

Trust in technology moderates the relationship between financial literacy, technological savviness, and fintech adoption. Direct trust in digital platforms depends on perceptions of security, reliability, and transparency, which are crucial for fintech adoption (Gefen, Karahanna, & Straub, 2003). Pavlou (2003). Consumers with higher trust in technology are likelier to adopt fintech services, even with low digital literacy or heightened concerns about data security (Zhou, 2012). Regulatory frameworks and encryption technologies play a significant role in building trust by addressing concerns about privacy and fraudulent activities (Donovan, 2012). In addition, McKnight, Choudhury and Kacmar (2002) focus on institution-based trust based on regulatory frameworks and secure systems to create trust in digital environments. Further, the more the user-friendly interface user experience, as identified by Gefen, Karahanna and Straub (2003), the fewer the barriers to trusting the technology and, thus, the better the levels of adoption among users, significantly less tech-savvy users. Trust is especially critical in developing markets, where skepticism toward digital financial services often inhibits adoption (McKnight, Choudhury, & Kacmar, 2002). In such contexts, initial trust barriers must be addressed by simplifying tools and clear communication of security measures to drive broader adoption (Zhou, 2012).

H_3: Trust significantly moderates the impact of financial literacy and technological savvy on fintech adoption.

Extensive studies have been conducted on Fintech adoption. However, there is a vast knowledge gap in understanding how financial literacy, technological savviness, and trust influence the process of this adoption, especially in countries where conventional banking facilities remain limited. Most research so far focuses on the limited detail in the way of technological innovations or regulatory frameworks, failing to delve deep down into how such aspects converge towards shaping the consumers' response and the nature of markets in a varying socioeconomic setting (Nawaz et al., 2023). In addition, very little research has focused on trust as a moderating factor, especially in those contexts where the use of digital financial services is suspected of data security and privacy. This study's significance lies in its effort to fill these gaps by providing an integrated framework on how financial literacy, technological proficiency, access to traditional banking, and trust collectively facilitate fintech adoption(Bhatti & Nawaz, 2020). The findings will help in policy interventions focusing on enhancing fintech strategies and creating inclusive financial ecosystems targeted at underbanked and under-observed populations. Based on the literature review, the below framework in Figure 1 has been constructed:

Figure 1: Theoretical model



3. Methodology

The key variables considered in this research study are financial adoption, financial literacy, technological savviness, and trust in technology. Data collection was done quantitatively through structured surveys, targeting 250 respondents who were users of conventional banking and Fintech services (Setia, 2016). The survey instrument was designed to capture the perceptions, behavior of participants, and level of trust using the validated scale. For example, the items used to measure financial literacy were about confidence in managing financing and having basic knowledge of financial concepts. Technological savvy was assessed using questions about comfort level and ease of use. The Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), has been used to record the responses. Using Cochran's formula, the sample size was calculated at 150, which would be statistically reliable. The sample size was estimated using the maximum variability in the estimate of a population proportion ($p = 0.5$), a 95% confidence level, and a margin of error of 5%. The method allows a sufficient sample size to get statistically significant results within the available resources for the study. To gather the data, questionnaires have been distributed using the online platform Google Forms because of its easy accessibility and efficiency in handling responses. This method granted flexibility to the participants regarding the time and place they would choose to fill out the questionnaire, thus minimizing response fatigue and increasing the rate of return. Furthermore, it also allowed data collection to be taken from a wide geographical dispersion without the challenges encountered when taking the physical survey. However, one of the limitations of this method was that participants without access to the internet or lacking technological proficiency might have been excluded, therefore introducing some bias into the sample.

The respondents were chosen randomly from the major cities of Pakistan, including Lahore, Karachi, Faisalabad, and Rawalpindi, ensuring demographic and socioeconomic diversity. The sample included 45 private banks in these cities. The public sector banks were excluded solely to keep the focus on private banks because of their proactive approach towards fintech solution adaptation. Moreover, the regulatory controls and models relating to customers of private banks are also different concerning public banks, which was also a reason not to add this variability in this study. After careful consideration, 8 banks have been selected for this study based on convenience. Thus, it focuses on an analysis of the adoption of fintech apps of fintech apps among people familiar with traditional banking services. Data collection strictly followed ethical guidelines to ensure the confidentiality and anonymity of the respondents. Online questionnaires distributed allowed the most expansive response while ensuring ease in data management. Quantitative data analysis comprised correlation coefficient regression analysis and moderation analysis to analyze relationships among variables (Andrade, 2019). The software used was Smart PLS, considered adequate for handling small sample sizes, performs PLS-SEM, and manages complex relationships of latent variables. Unlike other covariance-based SEM,

Smart PLS does not need multivariate normality; thus, it was considered suitable for the study. Initial convergent and discriminant validity were tested using factor analysis, Cronbach Alpha, average variance extraction, and heterotrait monotrait ratio. The value of factoring loading item, Cronbach Alpha greater than 0.70, and Average variance extraction above 0.50 provides evidence that data is reliable for the analysis. The acceptable value of the Heterotrait Monotrait ratio is below 0.90.

4. Findings

Table 1 represents the demographical distribution of the sample. The demographic analysis of the sample reveals a heterogeneous distribution in terms of gender and age. Most respondents were male, about 66.9% (n=101), while females were 32.5% (n=49), reflecting a remarkable gender imbalance in the sample. The imbalance introduces the bias, as male and female customers may vary in their orientation towards and utilization of fintech services based on differences in financial literacy, perception of risks, and technological savviness. This suggests that this study's findings are less generalized, especially in a setting with a more balanced gender distribution or females are more prevalent users of fintech services. The age distribution was more balanced; most respondents were between 35 and 44 years, with 29.8% (n=44). The second higher age group between 18 - 24 years, taking 29.1% (n=44), and those between 25-34 years, accounting for 27.2% (n=42). The least number of participants was those over 44 years, constituting about 13.2% (n=20) of the entire participants. These findings indicate a good balance regarding age brackets while revealing a gender imbalance. The age data indicates that most respondents are in the early and middle stages of their professional or personal development and could, therefore, study representing their perceptions. The reliability and validity of the data collected have also been tested.

Table 1: Demographical Information of Respondents

Variables	Categories	Frequency	Percent
Gender	Male	101	66.9
	Female	49	32.5
Age	18-24 years	44	29.1
	25-34 years	42	27.2
	35-44 years	44	29.8
	Over 44 years	20	13.2

Table 2 and Figure 2 shows the loading items, Cronbach Alpha, Composite Reliability, and Average Variance Extracted confirm the convergent reliability and validity. The results indicate that all constructs have a Cronbach's alpha above the threshold for acceptability; hence, they are internally consistent and reliable. The CR's highest value is financial literacy with 0.80, followed by trust in technology with 0.77, fintech adoption with 0.76, and tech savviness the lowest with 0.69, which approximately meets the threshold criteria. The AVE values of all constructs are also more significant than the threshold value of 0.5, representing good convergent validity.

Table 2: Factor Analysis

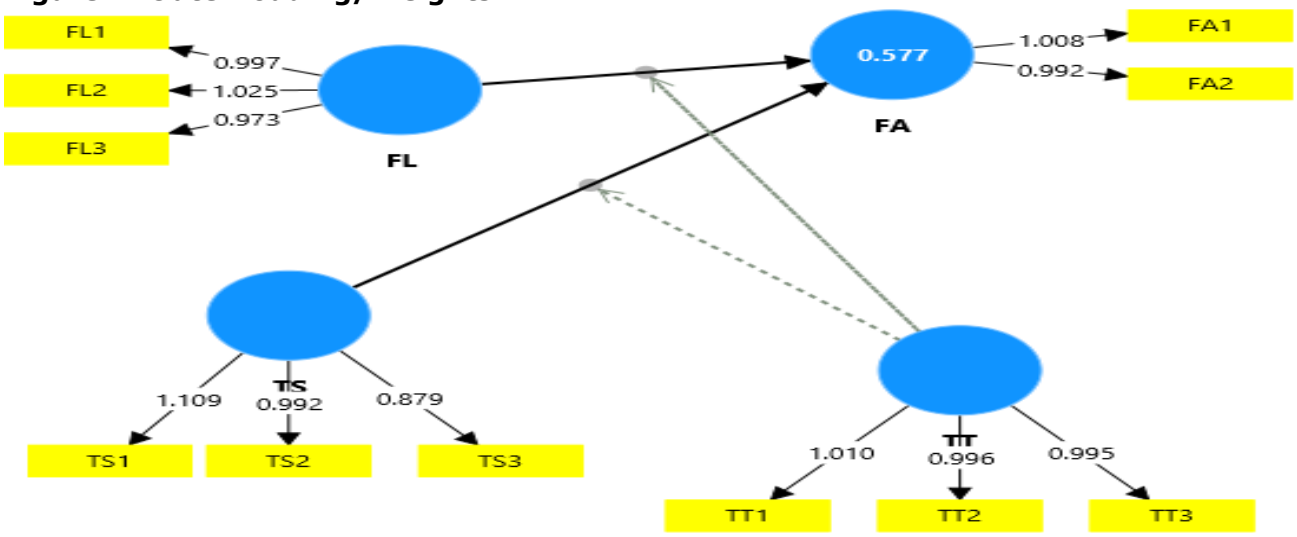
		Loading Items	CR	AVE
Financial Adoption	FA1	0.91	0.76	0.81
	FA2	0.89		
Financial Literacy	FL1	0.84	0.80	0.72
	FL2	0.88		
	FL3	0.82		
Tech Savviness	TS1	0.83	0.69	0.62
	TS2	0.82		
	TS3	0.70		
Trust on Technology	TT1	0.81	0.77	0.69
	TT2	0.87		
	TT3	0.80		

The value of the Heterotrait-Monotrait ratio of all variables falls below the acceptable threshold criteria, which provides evidence that the data confirms the discriminative validity, as shown in Table (3) below.

Table 3: Discrimination Validity

	FinTech Adoption	Financial Literacy	Tech Savviness	Trust on Technology
FinTech Adoption				
Financial Literacy	0.858			
Tech Savviness	0.843	0.798		
Trust on Technology	0.856	0.772	0.899	

Figure 2: Outer loading/Weights



A regression analysis was performed to test the hypothesis of the study. Column (1) of Table 4 and Figure 3 shows the influence of the independent variable's financial literacy, technological savviness, and access to traditional banking on fintech adoption. The p-value of financial literacy is below 0.01, which provides evidence in favor of hypothesis 1 that financial literacy significantly influences fintech adoption at a 1% significance level. Technological savviness is also having a significant favorable influence on fintech adoption as a p-value < 0.05. The relationship is significant at a 1% significance level. Column (2) represents the moderation impact of trust on the relationship between financial literacy, technological savviness, and fintech adoption. According to the findings, the p-value of the interaction variable of trust in technology with financial literacy and technological savviness is significant at a 1% significance level. However, the beta coefficient was reduced.

Table 4: Regression Analysis

	Beta	Standard Deviation	T-statistics	P value
FL → FA	0.674	0.068	11.109	0.00
TS → FA	0.618	0.085	9.574	0.00
TS* TT → FA	0.659	0.012	10.664	0.00
FL * TT → FA	0.707	0.011	12.155	0.00

5. Discussions

These findings contribute to understanding the drivers of fintech adoption and add value to the growing literature on the topic. Results support previous studies that identified the influence of financial literacy and technology savviness on fintech adoption. The mediating role of trust in technology has also been considered. The study also confirms that financial literacy significantly positively influences fintech adoption. This result aligns with earlier studies that indicate that financial literacy is vital in enabling more and more consumers to face intricate financial products to confidently adopt a digital solution like fintech. People knowledgeable about the financing aspect are thus better positioned to weigh the associated risks and gains toward enhancing fintech adoption rates. It supports the TAM theoretical framework, which postulates that perceived usefulness and ease of use increase adoption. Financial literacy enhances perceived usefulness, allowing users to make insightful decisions about fintech services like mobile banking, robot advisors, and peer-to-peer lending platforms.

Moreover, prior literature on digital competence also supports the positive influence of technological savviness on adopting fintech. Thus, a technological person can perceive these fintech platforms as not complex and easy to use, breaking all barriers to adopting technology. This finding also supports the TAM framework, pointing out the perceived ease of use in technology adoption. The finding also aligns with the TAM framework, where perceived ease of use plays a promoting role in the adoption of technology. Further, the result of this study finds resonance with studies indicating that technological savvy facilitates adoption and trust in the fintech platforms by enabling them to comprehend and work out security features (Van Deursen & Van Dijk, 2023).

It showed that including trust as a moderating variable indicated its importance. A slight decrease in the beta coefficient of access to technology and technological savviness evidences the moderating role of trust. These results support previous studies that have stressed the importance of trust as a driver for fintech adoption, especially in mitigating data privacy and security issues. The study's findings are similar to the multiple studies that focused on the significant role of trust in facilitating fintech adoption, explicitly dealing with issues like data security and privacy (Gefen, Karahanna, & Straub, 2003; Pavlou, 2003). According to Pavlou (2003), the two factors important to building trust in fintech are perceived security and reliability. However, this can be more relevant in fintech since people usually perceive more significant risks regarding their financial data safety. McKnight, Choudhury and Kacmar (2002) have found institution-based trust, disposition to trust, and trusting beliefs to be categories of trust that explain how trust interacts with regulatory measures, cultural factors, and user experiences. More precisely, institution-based trust develops in the findings of this study since fintech adoption in Pakistan has benefited from the robust regulatory frameworks and enhancements of data security. A comparative analysis of related studies reveals some consistencies and unique features. In developed economies such as the United States and Western Europe, for example, trust is a key driver for fintech adoption due to the more stringent regulations and increased expectations over data security. Roca, García and De La Vega (2009) established that perceived trust and perceived security were significant drivers of adoption in online transactions. Zhou (2012) has discussed that the role of trust cannot be ignored in rural parts of China, where skepticism regarding fintech is high. This contrasts with emerging economies, where confidence in the systems, such as in India or Kenya, reflects basic financial literacy and technological savvy more than trust. For example, in the Indian fast-evolving digital ecosystem, there are greater emphases on issues of usability and access than concerns of trust. At the same time, M-Pesa, described as a simple and broad adoption in Kenya, automatically implies the derivation of confidence in the service.

6. Conclusion

The research underlines that financial literacy and technological savviness are the main drivers of fintech adoption, whereby both factors positively influence the user's engagement with digital finance tools. It has also been found that technology is moderating, even though it should be an important factor in sustained consumer confidence. These findings also underline the importance of educational work and user-friendly fintech solutions for increasing adoption toward a more inclusive financial world. These results provide fintech developers, traditional banks, and policymakers actionable insights. Targeted educational efforts in financial and technological literacy may accelerate fintech adoption even in those regions with strong traditional banking infrastructure. Secondly, even though trust in technology may not be an important moderator of the adoption decision in this environment, building and maintaining trust is crucial to sustaining long-term consumer engagement. It would be interesting to conduct further research on how trust, financial literacy, and technological savvy interact in different demographic and geographic segments, thereby explaining the dynamics of fintech adoption.

6.1. Policy Implications

The results of this study raise an immediate need for the efforts of policymakers, financial institutions, and fintech developers toward strengthening potential users' financial literacy and technological savviness. Policymakers are responsible for setting up relevant policies and teaching programs to raise the population's basic understanding of finance and digitization. This will include workshops, online courses, and focused campaigns to reduce the knowledge gap, particularly in underrepresented groups like old individuals, rural populations, and women. Additionally, integrating financial and digital literacy into school curricula would ensure that basic knowledge is imparted at a young age, resulting in more open-minded generations toward the

solutions offered by fintech. Additional concerns are the need for fintech developers and traditional banks to put their minds together in ways that make platforms more user-friendly and easier to navigate for at least less technologically savvy users. Policymakers can support this by offering grants or tax incentives for the companies that develop accessible fintech applications. Besides that, regulators should focus on establishing a strong framework to ensure security and privacy in fintech operations, instilling confidence in the technology. Such a framework can include mandatory encryption standards, transparent reporting mechanisms, and strict penalties against data breaches. Such policy dimensions will contribute to stakeholders' collaborative efforts to accelerate fintech adoption toward a more inclusive and sustainable digital financial ecosystem.

6.2. Limitations and Future Direction

This study contains a significant amount of information on drivers of fintech adoption; however, some significant limitations to this study must be considered. The research only focuses on the private banks of major countries of Pakistan*, including Karachi, Lahore, Faisalabad, and Rawalpindi.* This may not fully represent rural areas or regions with different socioeconomic dynamics. Secondly, the study has focused on private banks, thus excluding public sector banks, which may have a different customer base and pattern of fintech adoption. Including public sector banks in the study may provide a broader perspective on the landscape of fintech. Public banks deal with a broader range of demographic groups, including underprivileged categories of people. Thus, they would have given a broader view of fintech adoption for different customer profiles. Another limitation is that the research relied on quantitative data based on structured surveys that can hardly capture the nuanced motivations and barriers to adopting fintech. The limitations in this study may be overcome by including public sector banks and the participation of the rural population in further research. The adoption of fintech may also be studied in relatively underdeveloped areas to get valuable insights into the pattern of adoption influenced by diversity in socioeconomic and geographic settings. Furthermore, qualitative tools, such as interviews and focus groups, can reveal user's motivations and barriers that will be difficult to find using more structured surveys. Longitudinal studies can also follow how trust, financial literacy, and technological savviness might change over time in general and, more precisely, within an emerging market like Pakistan. Comparing fintech adoption insights between various cultural, regulatory, and economic contexts would foster a better understanding of both current trends in global adoption and directions in best practices for boosting financial inclusion. This direction will ensure an in-depth analysis of fintech adoptions for informed decisions that accommodate and direct policymakers, developers, and financial institutions.

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