

Majors: FIN

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**IMPACT OF FINTECH USE ON FINANCIAL INCLUSION WITH MEDIATING ROLE OF
DIGITAL FINANCIAL LITERACY: A CASE OF FINTECH USERS IN PAKISTAN**



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A thesis submitted for partial fulfillment of the M.B.A degree requirement at Bahria
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ABSTRACT

This study investigates the impact of trust, service quality and perceived security on use of FinTech services and digital financial literacy role as a mediator between the use of FinTech services and financial inclusion in Pakistan. A quantitative and cross sectional survey methodology is applied in this study. Data were collected from FinTech users in Pakistan using structured online questionnaire adopted from Amnas et al. (2024) and other validated resources. 206 complete responses were received by employing convenience and snowball sampling; The recommended sample size by G*Power was 138, which ensured good statistical power.

The measurement tool had six constructs: trust, service quality, perceived security, FinTech usage, digital financial literacy, and financial inclusion. The data were analyzed by Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS version 4.0. To test reliability and validity of the measurement model, Cronbach's alpha, composite reliability, average variance extracted (AVE) and discriminate validity were used.

Analysis found that trust and perceived security have significant positive effects on FinTech usage, whereas service quality shows a positive but insignificant effect. Fintech usage has a huge impact on financial inclusion and had a strong effect on digital financial literacy. Digital financial literacy also had a positive effect on financial inclusion and partly mediates the correlation between FinTech usage and financial inclusion.

These findings indicate that the contribution of FinTech in financial inclusion in Pakistan is not limited to technological availability but also to user trust, perceived security and digital financial literacy. The research can offer viable recommendations to FinTech companies to enhance trust and security frameworks and policy makers and educators to foster digital financial literacy, particularly among underserved groups, to ensure sustainable financial inclusion.

KEYWORDS: Trust, Service Quality, Perceived Security, Fintech, Digital financial literacy

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Financial exclusion has continued to be one of the greatest obstacles to fair development across the world, even in the context of sustainable global economic expansion (Amnas et al., 2024). As reported by the World Bank in 2021, the contrast between providing access to financial services to various populations is significant, and there is an immediate need to find innovative solutions to the problem of discrepancy in this area (Demirguc-Kunt et al., 2022). An ongoing significant population in the world runs out of the official financial structure, as there are almost 1.4 billion adults who do not hold an account at a formal institution or through a mobile money provider (Global Findex database 2021). Recently, financial technology (FinTech) has introduced itself as one of the viable solution to these potential barriers to financial inclusion (Aleemi et al., 2023). The typical definition of financial inclusion is that it is a capability to obtain and use formal financial services, i.e., savings, credit, payment, and transfer in a way that positively impacts the financial wellbeing of individuals and their involvement in the formal economy (Demiurgic & Kunt et al., 2022).

FinTech is transforming the process of managing individual finances. Individuals can now carry out financial transactions without any constraints of time or location. FinTech platforms enables them to combine their financial services with other digital services like mobile applications, electronic payment systems, and online financial portals (Yang and Zhang, 2022). FinTechs are tech companies that use technology to establish accessible and novel financial services. Among other things, the prospect of FinTech is transformative in the lack of traditional banking facilities. Users are able to conduct financial transactions via smartphones (Asif et al., 2023). FinTech provides more flexible, faster and user-oriented delivery of financial services by eliminating the use of local bank branches and traditional service delivery channels. Traditional banking companies tend to be expensive in terms of infrastructure and outdated ways of operations. FinTech companies work with digital networks that significantly lower costs of operations and transaction charges, therefore making the financial services cheaper and more reachable to a wider audience (Shaikh et al., 2023).

The paradigm shift makes financial services affordable, and available to a larger population. FinTech has a direct impact on financial inclusion in a developing nation like Pakistan. FinTech has significantly reduced the geographical challenges of household engagement in financial activities, thus making financial services accessible to more avenues (Yanga & Zhang, 2022).

FinTech has reduced the physical and procedural barriers to financial engagement and increased the household uptake in economic engagements, including savings, credit, and other digital financial services through mobile-based payments (Ahmad et al., 2022). FinTech facilitates various financial operations such as peer-to-peer transactions, bill payments, financing, saving, and investing, mostly through digital platforms and mobile apps (Ahmad et al., 2022). The necessity to deploy technology fast, the number of people using their mobile phones. The growing internet adoption, demographic shifts towards an urban, literate, and younger age group, and a population group that is not fully served by traditional banking products are among the factors highlighting the need to implement FinTech solutions (Mohamed, 2020).

Financial inclusion led by FinTech is closely connected with the Sustainable Development Goals viewed through a global development perspective. It can help reduce poverty, empower economy, and promote its inclusive growth. Financial inclusion is believed to be a means of attaining seven of the seventeen SDGs, which regulates its importance in sustainable and balanced development (Arner et al., 2020). International bodies like the World Bank believe that FinTech innovations is an effective strategy to increase availability to financial services, especially for unbanked and marginalized peoples, by lowering transaction costs and increasing savings, credit, and insurance services (Demiurgic et al., 2022). However, the FinTech adoption remains different across nations, notwithstanding its potential. Studies shows that adoption rates are higher in developed countries which have strong digital infrastructure and high digital literacy whereas at the user-level many developing countries are lagging due to institutional weaknesses and user based limitations (Kletch Lamptey et al., 2025). These global inequalities are also present in South Asia, where the rapid growth in affordability of smartphones and mobile internet access has provided some favorable conditions towards the growth of FinTech. Regardless of this technological development, the region continues to face a big financial inclusion

challenge. Millions of people are hindered by low levels of financial and digital literacy, security issues, and availability to effectively utilize FinTech services (World bank, 2021).

Different regulatory reforms have been adopted by the Government of Pakistan and the State Bank of Pakistan to increase digital access to finances, such as branchless banking regulations, payment system frameworks, electronic money institution regulations, and the implementation of RAST instant payment system (State Bank of Pakistan, 2021). In addition to regulatory initiatives, mobile innovations including Easy Paisa and Jazz Cash had already grown to a significant size by supporting activities of mobile payments, contribute to a fairly positive technological environment of FinTech development (Pakistan FinTech Report, 2021). The increase in the presence of branchless banking wallets users exceeding 68 million, means the rise in the presence of FinTech services in Pakistan. (SBP, 2025). FinTech innovations have shown their ability to make access more available, less expensive, and grant power to marginalized communities. Nevertheless, there are still such problems as the necessity of constant technological adjustment and intricate regulatory problems. Governments, banks, and FinTech companies must cooperate with one another to expand the opportunities of FinTech to maximum capacity (Karangara, 2023).

In Pakistan, the indicators of financial inclusion are very low despite the huge advances made in digital financial infrastructures. The ownership of accounts is only approximately 21 percent, significantly lower than the average in South Asia, and both the use of digital financial products and services remains significantly lower (Sabaa et al., 2023). Such paradox demonstrates a bigger structural problem where supply-side innovation of FinTech production is a sharp contradiction to inertia on demand side. Like other emerging economies, Pakistan has yet to overcome the barriers associated with the low access to technology and official financial services, therefore effecting the adoption of FinTech (Mohammad, 2022). In addition to the infrastructural barriers, behavioral and perceptual ones play an increasingly essential role in the readiness of individuals to adopt and use FinTech services, which makes Pakistan a very complex and policy relevant case in the South Asian region.

The demand side factors, trust, the quality of the service, and the perceived security have become significant determinants of the use of FinTech. Customer trust is

important in enabling continuous use and long-term adoption of FinTech firms as operational inefficiencies and service failures may cause the loss of trust (Geidam and Hassan, 2024). At the same time, a fear of cybersecurity risks, data breaches, online fraud, and privacy releases still affect the lack of consumer trust and hinder its adoption (Jafri et al., 2023).

In Pakistan, digital illiteracy is still a common issue because a significant portion of the population cannot assess online services, have a sense of financial risks, and conduct safe digital payments. Therefore, perceptions of security and reliability of services are the central determinants of trust and behavioral involvement with FinTech services.

In this framework, digital financial literacy is recognized as a key facilitator. To make good use of FinTech services, education should go beyond existing financial education to provide people with digital skills that allow them to navigate platforms, assess security options, and safely perform transactions (Kakinuma, 2022). Digital financial literacy enables users to perceive and reduce the risks of fraud and online attacks by combining financial literacy with digital literacy, generating greater trust and encouraging continued use of FinTech (Prete, 2022).

Based on this, the present paper will address one of the research gaps identified by Amnas et al. (2024), who suggested the lack of empirical research focusing on digital financial literacy as a mediating variable between FinTech use and financial inclusion. Although they already tested the validity of their model in India, its relevance is not fully investigated in Pakistan where demand-side limitations and behavioral aspects are stronger. Based on this, the present paper investigates the impact of trust, the quality of services and the perception of security on the adoption of FinTech in the Pakistani market and evaluates the intermediate impact of digital financial literacy on promoting financial inclusion. Developing on this framework to bring this framework to the specific socio economic and institutional setting of Pakistan, the study will establish context specific evidence regarding the relationship between trust, perceived security, service quality and the digital capabilities of users in influencing the adoption of FinTech and inclusive financial participation. It is assumed that the results will offer practical information to policy makers, financial institutions and FinTech providers who would want to instill greater trust, increase the perception of security

and maximize service delivery in an attempt to ensure a sustainable financial inclusion in Pakistan.

The remaining part of the paper is designed in the following manner, Chapter 2 contains the literature review, theoretical background, and hypothesis development. Chapter 3 describes the methodology and data employed in the research. In Chapter 4, the findings from the data analysis are presented. The final chapter, chapter 5 ends the study with conclusion and puts forward limitations and some suggestions to be considered in future research.

1.2 Problem Statement

Even though the adoption of digital financial services grows at an impressive pace, the acceptance of FinTech in Pakistan is disproportionate due to the presence of literacy and infrastructure gaps and consumer mistrust (Mohammad, 2022). The issue of data security and privacy further diminishes the trust in digital platforms, and many potential users are not willing to use FinTech solutions (Senyo and Osabutey 2020). Meanwhile, perceived service quality in the form of reliability, responsiveness, and ease of use have a decisive influence on the level of user satisfaction and further use of FinTech applications (Patnaik et al., 2023).

Regional studies have shown that the applications of FinTech can enhance financial inclusion, particularly when the users have enough digital financial literacy. The importance of trust, service quality, and perceived security is also on the focus of a recent in-depth study undertaken in India (Amnas et al., 2024), which emphasizes that these elements are key factors of FinTech adoption. It also discovered that digital financial literacy serves as a mediator in the relationship between FinTech usage and financial inclusion, and perceived regulatory support serves to further strengthen the relationship. The same was indicated in a study conducted in Iran by Zaredoost and Bahramzadeh (2025) on the users of a bank FinTech services that had similar positive impacts on trust, quality of service, perceived security, and digital financial literacy.

1.3 Research Gap

The unique socio economic and digital ecosystem of Pakistan's has not been explored thoroughly within this framework. The variations in the regulatory perception, digital literacy, presence of platforms in the various countries, and the

trust of the users in these countries indicate that the results of India and Iran

cannot be translated to Pakistan. Thus, this paper will fill this gap by empirically investigating how trust and service quality represent influential factors in FinTech use among general FinTech users in Pakistan and how digital financial literacy acts as a mediator in the connection between FinTech use and financial inclusion. The paper purposefully focuses on the issue of trust and service quality as one of the factors that provide context-specific understandings that can inform policy and industry response towards a more inclusive digital financial ecosystem in Pakistan.

1.4 Study Objectives

1. To investigate the effect of trust, perceived security, and quality of service on the adoption patterns of FinTech services among FinTech users in Pakistan.
2. To examine the mediating effect of digital financial literacy on the relationship between FinTech usage and financial inclusion.
3. To analyze the direct effect of FinTech usage on financial inclusion within the Pakistan's context.
4. To offer evidence-based recommendations to improve trust, service quality, and digital financial literacy to promote a more inclusive digital financial ecosystem in Pakistan.

1.5 Study Questions

- How does trust, service quality, and perceived security affect user's decisions to adopt FinTech services in Pakistan?
 1. How does digital financial literacy mediate the association between FinTech usage and financial inclusion?
 2. Does the FinTech services use have a direct impact on financial inclusion in Pakistan?

1.6 Significance of Study

The present study is guided by behavioral theory, which explains how perceptions like trust, quality of service, and security affect technology related

decisions. The theory has several important implications in the context of FinTech adoption and financial inclusion in Pakistan.

First, this study focuses on how trust, perceived security, service quality collectively influences FinTech use and financial inclusion, while digital financial literacy as a mediating variable. Unlike the previous studies in India and Iran, which focused on more mature FinTech markets, this study puts these in context relationships within the evolving digital ecosystem of Pakistan, addressing a critical study gap in developing economies.

Second, the study provides useful insights for financial institutions and FinTech providers. By looking at the behavioral drivers of FinTech adoption, stakeholders can design ways to enhance trust among users, increase the reliability of services, enhance cybersecurity, and introduce digital financial literacy programs that enable individuals to participate confidently and safely with digital financial platforms.

Third, by identifying drivers of financial inclusion in terms of behavior and literacy, this study is crucial in informing policy initiatives aligned to Pakistan's National Financial Inclusion Strategy (NFIS). It also contributes to UN SDGs (SDG 8 and SDG 9), which promote inclusive economic growth and innovation through digital finance, contributing to broader developmental goals.

Finally, this study contributes to the FinTech literature in presenting an integrated behavioral model in terms of a developing economy context, which has been largely underexplored. The findings contribute to knowledge of how digital financial literacy and behavioral factors interact in promoting financial inclusion, providing a basis for future research in emerging markets.

CHAPTER 2

THEORETICAL FRAMEWORK, LITERATURE REVIEW AND HYPOTHESIS

2.1 Theoretical Framework

Even though this study will have the use of the verified model and measuring scales developed by Amnas et. al. (2023), the theoretical framework will be crucial to explain correlation between constructs in the Pakistani society. Both the Unified Theory of Acceptance and Use of Technology (UTAUT2) and the Technology Acceptance Model (TAM) outline the role of trust, perceived security, and service quality in determining behavioral intention and eventually affecting the use of FinTech. The theories emphasize that the perceived benefits, user-friendliness, and the risk by the users are the key factors that define technology adoption, which makes them especially relevant in explaining FinTech behavior in the developing markets.

The Value Based Adoption Model (VAM) provides further theoretical support in that the adoption of technology happens when the perceived advantages are greater than the perceived risks. The perceived security, trust and quality of services add to the perceived value of FinTech, hence, corroborating this concept of VAM interpreting value-based adoption. The holistic view of the UTAUT2 and VAM, therefore, explain why the two variables serve as pivotal precursors of FinTech adoption in the Pakistani digital environment.

Financial Literacy Theory (FLT) goes further to justify the study, as it identifies a conceptual framework of digital financial literacy (DFL) as an ability, which enables the user to navigate digital financial services, risk assess and make informed choices. As a result, DFL serves as an intermediary, which strengthens the connection between FinTech use and financial inclusion by building the competence and confidence of users in online financial markets.

Additionally, the Diffusion of Innovation Theory is used to contextually justify this by suggesting that adoption of technology in different societies differs based on digital readiness, literacy and socioeconomic factors. Since Pakistan is a divergent country compared to the previous study setting conditions, DOI highlights the necessity

to investigate how the model adopted functions in a geographically and culturally different environment.

LITERATURE REVIEW AND HYPOTHESIS

2.2 Trust and Fintech Use

In the FinTech context, trust is defined as the extent to which users perceive financial technology platforms as safe, reliable, and ethically responsible (Alward et al., 2023). Trust is a key factor affecting the decision of individuals to use FinTech products in the digital environment of Pakistan, where cases of online fraud and unauthorized data access are becoming more frequent, as it helps to reduce the sense of risk and uncertainty and condition the intentions and attitudes to digital financial solutions among users (Bajunaied et al., 3023). Trust represents a key factor that can influence the attitudes and behaviors of users towards FinTech, as it will form the basis of perceptions of reliability and integrity (Zarifis and Cheng, 2022). In the context of payment services there are frequent instances of fraud that demonstrate the importance of good trust relationships (Kilani et al., 2022). It has been empirically proven that customers who trust FinTech platforms are likely to use them to fulfill their financial needs (Nasir et al., 2023) and maintain assurance regarding the privacy and integrity of digital transactions (Zhang et al., 2023). Moreover, it improves user confidence, perceived uncertainty, loyalty, and positive interpersonal communication behavior (Amnas et al., 2023).

There is also reduced perceived risk with trust, which increases user loyalty, and positive word of mouth that makes long term use of FinTech services more robust (Shahzad et al., 2022). Trust, in line with this, is a determinant of FinTech adoption as a condition and a prerequisite of financial inclusion. Based on the empirical results reviewed, the following hypothesis was proposed.

H1. Trust has a positive and significant effect on FinTech usage.

2.3 Service Quality and Fintech Use

Service quality refers to how a service meets or even surpasses the expectations of the customers. Service quality can be deemed as one of the most vital factors that

can impact the willingness and use of digital financial services among people (Ahmed et al., 2021). As Gautam and Sah (2023) state, it presupposes its specific applicability

in Pakistan where numerous customers believe that conventional banks do not meet their financial needs. Therefore, FinTech services with reliable, convenient, and easily accessible experiences have a clear edge and have better chances to gain the trust and loyalty of users (Ahmed et al., 2021). Users who feel content with the seamless and effective experiences of FinTech apps are likely to repeat these services and would be inclined to pay more attention to them (Gautam and Sah, 2023). Furthermore, when a customer is convinced that FinTech services are of high quality, they are likely to choose them and use them in financial transactions (Ghosh et al., 2018).

The customers also assess the total worth of FinTech platforms depending on the level of service they get (Patnaik et al., 2023). Good service quality raises the perceived value, motivates future engagement, and creates loyalty towards users (Roh et al., 2022). Also, reliable and safe service performance contributes to the credibility of users in the integrity and reliability of the platform (Mujinga et al., 2020). Overall, the long-term high quality of the services provided fosters customer satisfaction, stimulates reuse, and leads to the long-term trust in the offered FinTech services (Sultana et al., 2023). Accordingly, the following hypothesis was proposed.

H2. Service quality has a significant positive influence on the use of FinTech services.

2.4 Perceived Security and Fintech Use

Perceived security means how much the users feel assured that their sensitive personal and monetary data is protected when they utilize digital channels (Nikkhah and Sabherwal, 2022). Here, in FinTech, it demonstrates that the users of a service are convinced that their sensitive information is not used inappropriately, accessed by unauthorized parties, or it has not been compromised. Cybersecurity and data privacy are the issues that are of critical importance to users in Pakistan where digital financial services are developing fast, and thus, the behavior of users is primarily defined by these concerns. Such a sense of security is one of the main psychological elements that define the way users engage with financial technologies. Users become confident and assured by FinTech applications, which positively affects how much they are willing to use and embrace the use of these applications (George and Sunny, 2023). The high level of security eases online transactions and enhances the loyalty of the clients too (Zhang et al., 2023). On the other hand, perceived low security can serve as a barrier to the

adoption of FinTech as it will make a user less likely to use it because of the fear of personal data theft or violation of privacy or unauthorized access. According to the empirical facts and understanding of the concept presented above, the following hypothesis is proposed.

H3: Perceived Security significantly and positively influences the use of FinTech services.

2.5 Fintech Use and Financial Inclusion

The integration of technology to support financial transactions and provide access to financial services in an online platform is known as FinTech utilization. FinTech platforms have been growing at a fast rate in recent years. These platforms have penetrated all parts of society. Consumers can use these platforms to deal with money transfer, savings, and payments (Nandru et al., 2023). The related applications offer convenient and fast cost-saving alternatives to the traditional banking. With the help of FinTech services, people can get more convenient and efficient access to the financial service (Karbavolord et al., 2021). Information and communication technology (ICT) innovations and developments is further reinforcing FinTech as a powerful tool to increase the financial accessibility of the areas where the regular banking services are not as prevalent (Asif et al., 2023). The constant technological advancement enables FinTech to break the old divisions by making online financial services more universally available to everyone (Aleemi et al., 2023).

In addition to personal use, FinTech facilitates financial inclusion by making services available to rural areas that do not have proximate banking services (Arner et al., 2020; Shaikh et al., 2023). FinTech lowers the costs of transactions and expands the sphere of access to financial resources and thus allows everyone and small businesses that were previously not a part of the formal banking framework to engage in economic activity (Bongomin and Munene, 2021). In addition, some solutions identified as innovations, including peer to peer lending, micro-finance, and state supported digital initiatives, have been influential in entrepreneurship and economic participation among such communities (Asif et al., 2023). Based on this, following hypothesis was developed.

H4. FinTech use significantly and positively influences financial inclusion.

2.6 Fintech use and Digital Financial Literacy

Digital financial literacy (DFL) denotes an individual's capacity to effectively employ digital tools for accessing, managing finances, and making informed financial decisions (Choung et al., 2023). It combines conventional digital literacy and financial literacy one needs to safely access online financial services (Lyons & Hanna, 2021). DFL is designed to enable a user to evaluate the risk, protect financial data, and use digital tools without fear (Keyvani et al., 2023). In Pakistan, more digitally financially literate people are more likely to assess the reliability of the services, the risk online, and make proper financial choices (George and Sunny, 2023).

Other than offering financial services, learning is also aided by many FinTech platforms in Pakistan. I have found tutorials, budgeting applications, and tips on how to manage money responsibly in many of these apps. Others have also added games to make the learning process more interactive as a learning process in a virtual setting (Care et al., 2023). These funds lead to creation of DFL, which is an ability that becomes especially significant to young people and women that often fail to engage in the financial system of Pakistan.

H5. The use of FinTech services significantly and positively influences digital financial literacy.

2.7 Digital Financial Literacy and Financial Inclusion

Digital Financial Literacy has been identified as an Important determinant of financial inclusion. Digital literate people are more capable of managing, evaluating, and using digital financial services in a wise manner (Choung et al., 2023). This competency will increase trust in making online payments, acquiring digital loans as well as investment management in Pakistan. In the case of DFL growth, people will have a greater interest in financial platforms and, thus, will expand the scope of opportunities to use services (Hasan, Le and Hoque, 2021). DFL can also help overcome informational and psychological obstacles limiting the FinTech uptake in Pakistan. Previous studies show that the high DF level of individuals leads to increased confidence in using digital services and better financial management; moreover, it is characterized by an active desire to use FinTech platforms (Youngjoo et al., 2023).

H6. Digital Financial Literacy has significant and positive influence on the use of FinTech services.

2.8 Digital Financial Literacy as a Mediator

According to the previous study, the link between FinTech usage and financial inclusion is complex and depends on many contextual factors (Wang, 2023). As an example, digital consumer protection was found to mediate the link between FinTech adoption and financial inclusion Bongomin and Ntayi (2020) and Khan et al (2024) identified a comparable mediating effect with mobile money adaptation. Despite these understandings, little focus has been given to the analysis of DFL as a possible mediating factor in this relationship. This paper argues that the FinTech use both directly and indirectly creates access to financial services through the reinforcement of the DFL of individuals.

The engagement with the FinTech platforms tends to develop the digital and financial competencies of users due to the presence of learning experience and exposure to the interactive resources, as well as the self-confidence to handle online financial operations. The more digitally literate people are, the more likely they will be able to review financial products and understand what happens throughout their transactions and use digital channels in a safe and efficient way (Kumar et al., 2023). As a result, DFL is a pathway of critical importance, which connects FinTech usage to financial inclusion as it allows users to convert digital access to meaningful and sustained financial engagement. Based on existing literature, the following mediation hypothesis was formulated.

H7. Digital financial literacy mediates the relationship between FinTech use and financial inclusion among FinTech users.

2.9 Financial Inclusion

Financial inclusion has been identified as a crucial factor towards the promotion of economic growth and social equity. It involves providing financial services that are not only affordable but also easily accessible to everybody. It is specifically relevant to

the unbanked population of Pakistan, particularly the people who have a low-income background and live in rural regions (Mahdavipanah et al., 2024). The financial inclusion is also seen as an important tool in reducing poverty and economic growth; it coincides with the United Nations (SDGs) (Ahmed et al., 2024). To enhance financial inclusion by using FinTech solutions, policymakers all over the world have launched multiple programs. Internet and mobile banking have greatly boosted the availability of financial products, especially in developing countries such as Pakistan (Ahmed et al., 2024).

FinTech companies can become innovative collaborators and provide digital financial services to help people overcome the challenges related to traditional banking (Alimi et al., 2023). The recent study also focuses on the fact that the role of FinTech on financial inclusion is not only direct but is also greatly dependent on the Digital Financial Literacy (DFL) levels of individuals, who are able to utilize the digital platforms are effective (Kumar et al., 2023). Through digital financial literacy, individuals develop capacity to evaluate digital financial products, assess risks, and make informed choices regarding finances (Choung et al., 2023). High DFL makes perceptions of trust and security, reduces uncertainty in online transacting, and transcends individuals to engage with formal financial institutions (Hasan et al., 2021).

H8: Digital Financial Literacy (DFL) has significant and positive influence on Financial Inclusion.

1.7 Conceptual Model

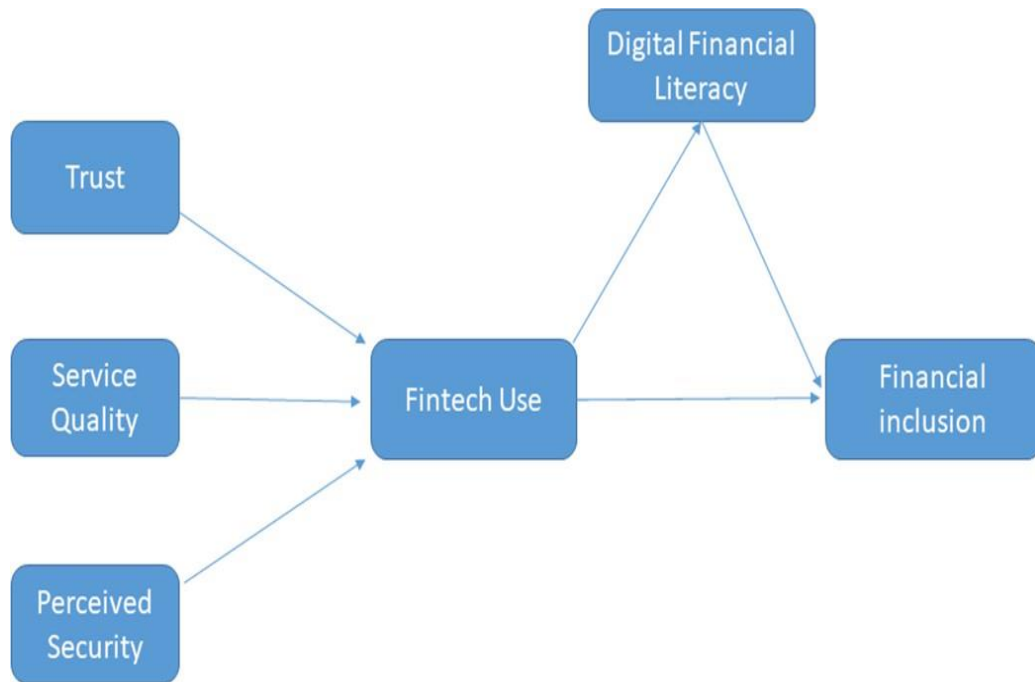


Figure 2.1: Study's Conceptual Model

CHAPTER 3

METHODOLOGY & DESIGN

3.1 Instrument Design

Data was collected through a structured questionnaire within a quantitative, cross-sectional research framework. This questionnaire approach was chosen because it is a simple and efficient way to collect information from respondents. A deductive methodology was employed since the study experimented on previous theoretical associations in a new geographic area. The whole study framework, constructs, and items of the measurement were taken over by Amnas et al. (2024) and other approved sources. The implementation of a proven model provides methodological consistency and the possibility to meaningfully compare with prior research in addition to assessing its relevance in the context of FinTech in Pakistan.

This study uses six constructs including Trust, service quality, perceived security, FinTech use, digital financial literacy and financial inclusion. While these constructs have been widely studied in the global literature their combined relationship is understudied in the context of Pakistan. The construct of trust was measured using the measurement items that were adopted from the previously validated scales developed by Singh and Srivastava (2018) and Kumar et al. (2018). Perceived security was evaluated according to indicators based on George and Sunny (2023), and the quality of service was evaluated using a scale based on Zhou (2013). The measurement of FinTech usage variable was measured by items derived from Venkatesh et al (2012). FinTech platforms are mostly being used to provide payment, investment or wealth management, credit, and insurance services. Items from Venkatesh et al. (2012) were used in the measurement of these four FinTech services. To illustrate, the statement ‘I leverage FinTech investment platforms to oversee my investment portfolio’ was used to determine user’s engagement with FinTech based investment management. Senyo and Osabutey (2020) and George and Sunny (2023) also adopted some items from Venkatesh et al. (2012) in measuring user’s engagement with mobile money services. Previous studies (e.g., Xie et al., 2021) have also borrowed some items from Venkatesh et al. (2012) to measure wealth measurement. Similarly, in this research, we have used items from Venkatesh et al. (2012) to assess FinTech platform usage. To assess

digital financial literacy and financial inclusion, items were adopted from Ravikumar et al. (2022), Bongomin and Ntayi (2020), respectively.

The questionnaire consisted of two parts. The first part was used for gathering participant's socio-demographic information, and the second one was organized to collect participant's views on each variable. Before proceeding to the items, there was a properly written introduction to the questionnaire which explained the objective of the study, the meaning of FinTech, and the guarantee of data privacy to the respondent. FinTech was defined in simple words as the use of mobile applications such as Easy Paisa, Jazz Cash, Sada Pay, online banking, and other digital tools for saving, sending, borrowing money or making payments. Additionally, all the constructs such as trust, service quality, perceived security, FinTech use, digital financial literacy and financial inclusion, were defined in user friendly terms. These definitions helped the respondents to understand each item accurately and to minimize misunderstandings and enhance the validity of the responses.

Fintech use is defined as it means using digital platforms (like Easy paisa, Jazz cash, online banking) to send, receive, save, or borrow money. Service quality refers to how well fintech services meet your needs in terms of speed, reliability, and customer support. Perceived security is defined as how safe you feel your money and personal information are when using fintech services. Trust reflects the confidence you have that fintech services are honest, reliable, and will work as promised. Digital financial literacy refers to your knowledge and skills in using digital financial tools safely and effectively. Financial inclusion refers to having easy and affordable access to financial services (like payments, savings, credit, and insurance) through fintech.

Each of the measurement items was assessed on a five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". Since the adoption of the measurement tool was based on the results of previous validated studies, a pilot test was not considered necessary.

3.2 Sample Size and Data Collection

The customers of FinTech in Pakistan have been the target of the study such as those who were using mobile wallets, digital banking applications, digital insurance services, and online investment platforms. Google Forms was used to develop a

structured survey, which was distributed to the users of FinTech. The population is undefined as there is no identified or list of FinTech users in Pakistan which is officially or available to access. That is why the convenience sampling technique was used in the study because it was suggested by previous research (kilani et al., 2023; Alrawad et al., 2023). Data collection was done within a period of two months between October and November 2025. Snowball sampling technique was used in the study because there was no official list of FinTech users. The Google Forms was shared via various social media platforms, such as WhatsApp, Facebook, and email. The first members were asked to share the link with other FinTech users within his or her network. This was the most effective way by which a sample of users who are geographically diverse can be accessed, and the approach is feasible and reliable.

There were 206 complete surveys. Google Forms also enables the question to be made mandatory such that a respondent cannot get past without answering the entire questions.

The required sample size was computed with G Power software. G Power suggested 138 participants to be the minimum in the sample. The study was able to obtain 206 valid responses which were more than the minimum requirement and the statistical power was sufficient in analyzing the PLS SEM. Table 3.1 provides the demographic information of the participants.

Table 3.1: Demographic detail of Respondents

Demographic Variables	Groups	Frequency	Percentage
Gender	Male	113	54.9
	Female	93	45.1
Age (in years)	15 25	97	47.1
	26 35	75	36.4
	36 45	22	10.7
	46 55	9	4.4
	Above 55	3	1.5
Education Level	Secondary	16	7.8
	Graduation	108	52.4
	Post-Graduation	63	30.6
	Professional Qualification	19	9.2
Place of residence	Urban	146	70.9
	Rural	60	29.1
Experience in Fintech use	Less than 1 year	30	14.6
	1-2	38	18.4
	2-4	56	27.2
	More than 4 years	82	39.8
Frequency of Fintech use	Rare	22	10.7
	Often	56	22.6
	Sometimes	58	28.2
	Always	71	34.5

CHAPTER 4

DATA ANALYSIS AND RESULTS

4.1 PLS-SEM Data Analysis

To analyze measurement and structural models, this study employed partial least squares structural equation modeling (PLS SEM) for data analysis, which was performed using Smart PLS version 4.0 (Hair et al.,2019).

4.2 Common Method Bias (CMB) Test

A common method bias (CMB) test was conducted, as data was obtained by self-administrated questionnaire. The assessment of common method bias was performed using the variance inflation factor (VIF) values of the inner model. In this study, all VIF values ranged from 1 to 2.4. The model is considered free from common method bias (CMB), as all VIF values were below the threshold of 3.33. (Kock, 2015).

4.3 Assessment of Measurement Model

In structural equation modeling, the measurement model is regarded as a central component because the relationships between latent variables and their observed indicators are specified through it. Therefore, the measurement instruments are required to be carefully validated to ensure that the intended constructs are captured accurately (Hair et al., 2021). Indicator reliability was first assessed (Appendix B). The results showed that all indicator loadings exceeded the required statistics of 0.70 (Vinzi et al., 2009). After that, Composite reliability and Cronbach score were calculated to validate the internal consistency and reliability of every construct. As a rule, reliability is generally accepted when Cronbach's alpha coefficient and composite reliability exceed the threshold value of 0.70 (Henseler et al., 2016). As reported in Table (4.1), Cronbach alpha's coefficients and the composite reliability values ranged from 0.767 to 0.947, indicating that adequate internal consistency and reliability were achieved for all constructs. In addition, convergent validity is indicated when the value of the average variance extracted (AVE) for construct exceeds the recommended

0.50 (Hair et al., 2021). Table (4.1) shows that convergent validity is high because all variables

in the study model had an AVE of above 0.50. To determine discriminant validity, the heterotrait monotrait (HTMT) ratio was used in this study (Hair et al., 2021). The Preliminary findings indicated that there is a possibility of overlap between some of the constructs because some of the HTMT values are above the recommended one. As such, the cross loading analysis was used to identify the indicators that played a role in high HTMT values. To eliminate this problem, the items leading to the overlap have been eliminated: one item of trust, two of service quality, two of perceived security, and one of FinTech use. After these changes, all the HTMT values were within reasonable ranges (Table 4.2). Also, as presented in Table (4.2), the square root of the AVE values was found to exceed the inter construct correlations coefficients, thereby providing evidence of discriminant validity in accordance with the criteria suggested by Hair et al. (2021).

Table 4.1: Reliability and Convergent Validity of constructs.

Constructs	Cronbach's Alpha	Composite reliability (rho-a)	Composite reliability (rho-c)	Average variance extracted (AVE)
Trust	0.834	0.842	0.9	0.75
Service Quality	0.763	0.781	0.893	0.807
Perceived security	0.767	0.813	0.896	0.811
Fintech use	0.792	0.813	0.876	0.702
Financial inclusion	0.894	0.899	0.927	0.76
Digital Financial Literacy	0.925	0.926	0.947	0.816

Table 4.2: Discriminant Validity: Heterotrait Monotrait (HTMT)

	DFL	FI	FU	PS	SQ	T
DFL						
FI	0.872					
FU	0.818	0.819				
PS	0.729	0.7	0.734			
SQ	0.648	0.617	0.683	0.823		
T	0.798	0.75	0.749	0.861	0.871	

4.4 Assessment of Structural Model

Following confirmation of the measurement model's validity, the study hypotheses were verified. Table (4.3) presents the results, which indicate that there is a significant positive effect of trust ($b = 0.359$; $p < 0.001$) and perceived security ($b = 0.249$; $p < 0.001$) on FinTech usage, supporting the acceptance of H1 and H3. Nonetheless, it was observed that the effect of quality services ($b = 0.144$; $p = 0.107$) on FinTech usage was not statistically significant, therefore, H2 was not confirmed. Also, it was found that FinTech usage had a significant positive effect on financial inclusion ($b = 0.28$; $p < 0.001$), providing support for the acceptance of H4. In addition, FinTech usage was found to have a statistically significant effect on digital financial literacy ($b = 0.716$; $p < 0.001$), supporting the acceptance of H5. Financial inclusion was also positively affected by digital financial literacy ($b = 0.597$; $p < 0.001$), providing evidence for H6. Finally, digital financial literacy was observed to significantly mediate the relationship between FinTech usage and financial inclusion ($b = 0.428$; $p < 0.001$), thereby confirming H7.

Table 4.3: Hypothesis Testing

Hypothesis	Path	B	SD	T	P values	Decision
H1	T > FU	0.359	0.086	4.178	0	Accepted
H2	SQ > FU	0.144	0.089	1.611	0.107	Not confirmed
H3	PS > FU	0.249	0.071	3.507	0	Accepted
H4	FU > FI	0.28	0.074	3.807	0	Accepted
H5	FU > DFL	0.716	0.04	17.989	0	Accepted
H6	DFL > FI	0.597	0.069	8.65	0	Accepted
H7	FU > DFL > FI	0.428	0.054	7.977	0	Accepted

4.5 Model Fit and Predictive Relevance

The explanatory power of the model was assessed using the coefficient of determination (R^2). This statistic represents the proportion of variance in an endogenous variable that is accounted for by its exogenous predictors. Simply, R^2 reflects the extent to which independent variables contribute to the variation in the dependent variable. The R^2 values for the endogenous constructs were as follows

- FinTech Use: 51.3%
- Financial Inclusion: 45.1%
- Digital Financial Literacy: 67.4%

These findings suggest a moderate explanatory power of FinTech use and financial inclusion, and moderate explanatory power of digital financial literacy. Besides explanatory power, the predictive relevance of the study was determined with the help of Stone Geisser Q^2 . The Q^2 values of the dependent variables were therefore computed and the result obtained were as follows:

- FinTech use = 0.407
- Financial Inclusion =0.397
- Digital Financial Literacy =0.441.

All Q^2 values exceeded zero ($Q^2 > 0$), indicating that the model demonstrates adequate predictive relevance, in accordance with the criteria outlined by Hair et al. (2021).

Table 4.4:

Coefficient of determination (R^2) and Predictive Relevance (Q^2) for endogenous construct

Construct	Q^2 value	R^2 value
FinTech Use	0.407	0.513
Financial Inclusion	0.397	0.451
Digital Financial Literacy	0.441	0.674

4.6 Discussion

Given the development of FinTech in Pakistan, the purpose of this study is to investigate how trust, quality of service, and perceived security, effects FinTech use, financial inclusion and how digital financial literacy mediates these influences.

First, findings showed that trust positively and significantly influences FinTech use with a path coefficient of 0.359, and findings are aligning with previous studies on FinTech adoption (Alrawad et al. 2023; Amnas et al. 2024; Wang et al.2019). This conclusion is explicable by the fact that trust in FinTech services is the trust and the confidence of the user of the reliability, protection of data, and integrity of FinTech platforms in Pakistan (Alrawad et al., 2023; Amnas et al., 2023). The available literature indicates that trust significantly contributes to the desire among users to adopt and use FinTech platforms. This is especially true in payment services, as it is a highly trusted area because of frequent incidents of fraud that may cause loss of money (Kilani et al., 2023). When a user is convinced that the service providers care about the security of their financial data, then they would be willing and eager to use FinTech solutions.

Second, the results showed that service quality positively but weakly affects FinTech usage. The path coefficient is 0.144 which reflects that there is not a great impact of user on adoption behavior. This observation can be attributed to the fact that the quality of the service matches the expectations of customers, and it is one of the main determinants in using FinTech (Gautam and Sah, 2023; George and Sunny 2023). The conception of service quality provided by FinTech platforms may influence their adoption because their satisfaction with the services in question is strongly linked to the quality of these services. Concurrently, the experience with the consistent and efficient interactions with FinTech platforms can determine the adoption of the latter to a significant degree (George et al., 2023).

Third, positive relationship between perceived security and FinTech usage was observed, with path coefficient equal to 0.249. Such findings can be explained by the results of the prior study and imply that the perceived security has a direct and positive

impact on the use of FinTech Platforms among FinTech users in Pakistan (Zaredoost and Bahramzadeh, 2025; Meng et al. 2019; Bajunaied et al. 2023). This observation is attributable to the fact that perceived security shows the perceptions of users concerning the security of their personal and financial information. The perceptions of security are one of the major factors affecting the adoption of these FinTech Platforms in Pakistan (Zhang et al., 2023). Furthermore, the study by Nasir et al. (2023) reveals that the more the Individuals think their personal data is sufficiently safeguarded, the more it is inclined to use FinTech platforms.

The fourth key finding of this research is that the impact of FinTech use on the financial inclusion is massive and positive, which is measured by the path coefficient of 0.28. This finding is in line with the findings of other researchers (Asif et al.2023; Yang and Zhang 2022; Shaikh et al. 2023). The latter could be justified by the fact that accessibility, quality of financial services, and use are the most significant areas in which the investigation of financial inclusion may be sought. FinTech use is the utilization of digital tools in making transactions and accessing financial services. Karbavolord et al. (2021) assert that these forms of technology can make financial services more accessible and affordable.

Fifth, this study concluded that the utilization of FinTech services is related to digital financial literacy level, and its path coefficient is 0.716. This means that FinTech is assisting people in acquiring knowledge on finances through education facilities, practical learning and live monitoring. Choung et al. (2023) identified that digital financial literacy is a key factor in defining the interactions of users within FinTech platforms. Six, the results show a significant positive effect of Digital financial literacy on financial inclusion with a path coefficient 0.597, and the results are in line with the findings of other researchers (Kumar et al 2023; Ravikumar et al. 2022). This result indicates that online financial literacy is positively and directly related to financial inclusion. Higher digital financial literacy assists consumers in avoiding and mitigating risks, which are supposed to be connected to the use of financial technologies and the ability to make informed financial decisions (Ahmed et al., 2021).

Finally, this paper has found that the use of FinTech is associated with financial inclusion mediated by digital financial literacy with an effect size of 0.428 amongst Pakistani FinTech users. The value of the path coefficient which is 0.428 confirms the

high and significant impact of digital financial literacy on the relationship between the variables of the financial inclusion and the use of the FinTech Platforms. Amnas et al. (2024) stated that the higher the digitization of financial literacy of an individual, the readier they are to access the FinTech services, and it can help reduce economic inequality in the nation (Zaidi and Shah, 2023). Also, the available literature confirms that users with a higher level of pre-existing digital financial literacy are more inclined to utilize FinTech-based services and financial inclusion (Idrees et al., 2025)

CHAPTER 5

CONCLUSION

5.1 Conclusion

The study analyzed the effect of trust, perceived security and service quality on FinTech adoption and mediating role of digital financial literacy on financial inclusion promotion towards FinTech users in Pakistan. An analysis based on quantitative and cross-sectional design revealed that the perceived security and trust is a strong motivator to the adoption of FinTech, and the quality of service is not very significant in the Pakistani context. When making decisions to use FinTech, trust and financial data security are the key interest areas users focus on instead of the functionality of the service offerings.

As the findings also demonstrate, the use of FinTech has a direct positive effect on the achievement of financial inclusion and is also significant in enhancing digital financial literacy. FinTech services boost access to formal financial systems as well as reduce transaction costs and convenience/efficiency of financial services. This is especially useful to those who may have barriers to accessing traditional banking services, which denotes the potential of FinTech in drawing more individuals into the formal financial industry.

Moreover, digital financial literacy was identified as another major factor, which can be utilized to explain the connection between the use of FinTechs and financial inclusion. Individuals with more digital financial ability are more familiar with digital tools and risk management and make informed financial decisions. FinTech is a dynamically changing digital world where the potential benefits of technological development cannot be accomplished without the required knowledge and skills users need in the use of the services.

To sum up, the present study shows that FinTech has huge potential in establishing financial inclusion in Pakistan in the case of the trust of the users in the digital platforms, safety of the users about their transactions, and enough digital financial expertise of the users. This paper provides a holistic understanding of how the

use of FinTech can result in meaningful financial inclusion in the Pakistani setting by integrating trust and perceived security and user digital financial literacy.

5.2 Theoretical Implication

The theoretical implication of this work is also substantial as the study is adding to the extant literature of FinTech adoption and financial inclusion by implementing the behavioral theory in the Pakistani setting. This research contributes to the form of a theory that has examined trust, perceived security, quality of services, and digital financial literacy and has added up to the theory of the role of behavioral factors in the use of FinTech and financial engagement. The study established that primary influences of FinTech adoption are trust and perceived security. On the other hand, service quality has been viewed as a requirement, but not a driving force. It was also established that digital financial literacy is a major mediating factor between FinTech use and financial inclusion considering capacity more than access. Lastly, the paper provides findings on a marginalized setting, showing that theories of FinTech adoption must put the behavior of users and digital literacy in their focus.

5.3 Practical Implication

This study has several implications for FinTech service providers, financial institutions, and policymakers. First, when it comes to FinTech service providers, it is necessary to develop trust. This is intended to reduce perceived risk and customer trust will be achieved through clear communication, visible safety measures and excellent customer service. Second, FinTech platforms need to work towards enhancing the quality of the services provided to increase usability and establish trust in the user. It is possible to provide clear instructions, quickness, trustworthiness and responsive services to boost user involvement and trust. Third, the role should be taken by policy makers and institutions of learning in improving the digital financial literacy among the citizens. Additional attention should be given to underserved communities and those who have never used these platforms before, especially in low income and rural regions where adoption of digital technologies is disproportionate.

FinTech platforms have the potential to enhance financial literacy through the provision of training and educational tutorials as well as practical workshops. In Pakistan, sustainable financial inclusion is not solely based on availability of FinTech services, but also on the skills and trust of the user. By addressing these issues, FinTech platforms can foster uptake and guarantee long term utilization of digital financial platforms.

5.4 Limitation and future Study

Although the study offers meaningful contribution on the importance of trust, perceived security, service quality, and digital financial literacy to determine FinTech usage and financial inclusion in Pakistan, some limitations must be noted.

To begin with, the cross sectional approach captures the responses of the respondents at one moment in time. Although it is appropriate to test relationships, it cannot track how changes in FinTech adoption behavior or financial inclusion outcomes vary over time. Future studies may adopt longitudinal designs to gain more insight into how trust, digital financial literacy, and FinTech use change and the consequences of such change on financial inclusion in the long run.

Second, convenience and snowball sampling was employed because of unavailability of an official database of FinTech users in Pakistan. This design is widely used in FinTech studies and practical in developing economies, but it can reduce sample representativeness and introduce selection bias. Therefore, the results should be viewed with care. to increase the generalizability, Future study can employ larger and more diversified samples.

Third, this study is limited by its focus on general FinTech users within the Pakistani context. Future studies may focus on the analysis of platforms in FinTech, Easy paisa or Jazz Cash, and learn more on how users behave and factors peculiar to the given platform might affect adoption

Fourth, the study was limited to behavioral and technological factors, whereas other potentially important factors that include age, income level, technology readiness, and education were not tested. These Personal factors may employ a considerable

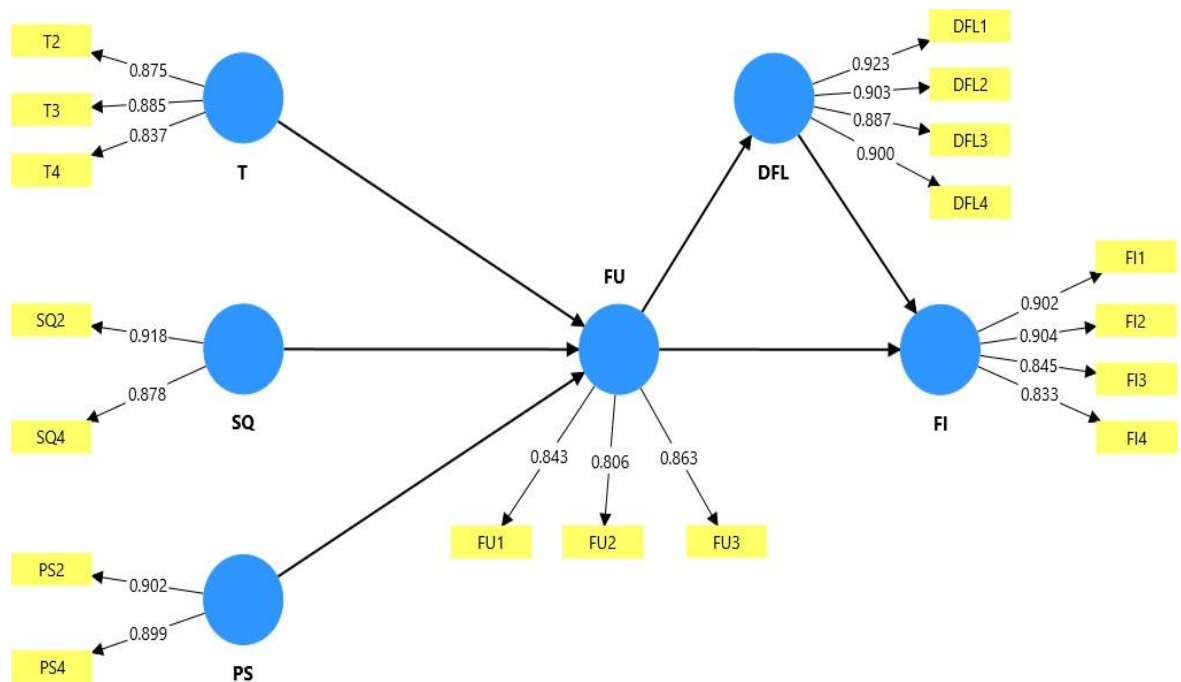
influence on the results of FinTech adoption and inclusion. Future studies can include these demographic and behavioral factors as moderating or control variables.

APPENDIX

Appendix A. Abbreviations

Description	Abbreviation used
Trust	TR
Service Quality	SQ
Perceived Security	PS
Fintech use	FU
Digital financial Literacy	DFL

Appendix B. Measurement model Loadings



Appendix B. Survey Instrument

Constructs	Items	Questions	Sources
Fintech use	FU1	I frequently use FinTech for making payments and transferring funds.	Venkatesh et al. (2012)
	FU2	I use FinTech investment platforms to oversee my investment portfolio.	
	FU3	I turn to FinTech services when I require financial assistance.	
	FU4	I actively engage with FinTech insurance services to purchase and oversee insurance policies	
Service Quality (SQ)	SQ1	FinTech services consistently meet my expectations in terms of reliability and performance.	Zhou (2013)
	SQ2	I am satisfied with the speed and efficiency of problem resolution when I encounter issues with FinTech services.	
	SQ3	The design of FinTech apps is user-friendly and easy to navigate.	
	SQ4	FinTech platforms provide clear and transparent information about fees, charges, and terms of use.	
Perceived Security (PS)	PS1	I believe that my personal and financial information is secure when using FinTech platforms.	George and Sunny (2023)
	PS2	I am confident that FinTech platforms promptly address and resolve any security risks.	
	PS3	I have confidence in the effectiveness of the authentication methods employed by FinTech services to prevent unauthorized access.	
	PS4	I believe that FinTech companies implement sufficient measures to safeguard against fraud and cyber threats	
Trust (TR)	TR1	I trust that FinTech platforms will securely handle and protect my financial information.	Singh and Srivastava (2018)
	TR2	I have confidence in the reliability and stability of FinTech services for my financial transactions.	
	TR3	I trust that FinTech platforms will promptly address any issues or concerns I may have.	
	TR4	I trust that FinTech platforms follow ethical standards and guidelines in their business practices.	

	DFL1	I am knowledgeable about the various features and functionalities of fintech apps.	
Digital Financial literacy (DFL)	DFL2	I am aware of the potential risks and security measures associated with using digital payment systems.	Ravikumar et al. (2022)
	DFL3	I know how to troubleshoot common issues related to digital financial transactions.	
	DFL4	I am familiar with the terms and concepts related to digital financial services	
	FI1	FinTech services have expanded my access to finances products and services.	
Financial Inclusion (FI)	FI2	FinTech services have increased my ability to save and invest my money.	Bongomin and Ntayi (2020)
	FI3	FinTech adoption has made it easier for me to send and receive money.	
	FI4	FinTech services have improved my ability to access credit and loans	

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