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# Digital Finance, Fintech, and Income Inequality: Opportunities and Risks for Financial Inclusion in Pakistan

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## Abstract

The present study investigates the transformative character of digital finance and financial technology (fintech) in supporting financial inclusion in Pakistan and discusses their impact in terms of income inequality critically. Pakistan is also experiencing tremendous expansion in the digital financial service category in the last ten years that is comprised of mobile money, digital payments and alternative credit scoring due to growth in mobile and internet penetration, favorable regulatory environment and new fintech solutions. Improved access to cheap financial services has the potential to strengthen the marginalized groups, boost entrepreneurship, and ease the process of adopting the formal financial system. Nevertheless, this paper also emphasizes risks that could potentially arise on the high pace of digitalization of finance. Using empirical data based on national surveys, fintech adoption data, and examples of the Pakistani digital finance ecosystem, the study appraises the effect of digital finance on economic participation behaviour by various groups of people, based on income. Results indicate that although digital financial services can potentially lessen the risks of inclusion and help eradicate poverty, policy interventions and design principles is the key to reducing risks.

**Keywords:** Digital Finance, Fintech, Financial Inclusion, Income Inequality, Digital Literacy, Financial Technology, Pakistan, Poverty Alleviation, Economic Participation, Algorithmic Bias.

**Introduction**

The sudden rise of digital finance and financial technology (fintech) has transformed the financial ecosystem across the globe and is turning out to be a catalyst of inclusive economic growth in the developing economies. Mobile banking as well as online payments, peer-to-peer lending or block chain based solutions can all be considered digital financial services (DFS), which have transformed how people and companies access, manage, and transfer funds. Digitization of finance is set to democratize access to financial services among the unbanked and underbanked groups, thereby becoming financial inclusive (Demirgüç-Kunt et al., 2022; Suri and Jack, 2016). Fintech solutions in the emerging markets where financial participation remains a critical theme to reduce poverty and equal economic growth, like Pakistan, can provide alternative avenues of increasing financial involvement and enhance the economic well-being. However, in the context of these opportunities, a growing number of concerns exist that digital finance may also support or even increase the whatever income disparity there is in the first place due to unequal access, bad digital literacy, and algorithmic bias (Ozili, 2023; Gabor and Brooks, 2017).

The revolution in digital finance has been acclaimed a pioneer to inclusive development in the world. The World Bank (2023) believes that increasing the digital financial inclusion has emerged as the core part of the Sustainable Development Goals (SDGs) including alleviating poverty (SDG 1) and enhancing gender equality (SDG 5). Research conducted in Sub-Saharan Africa, South Asia, and Southeast Asia has suggested that broadening of mobile money services has proven to have great impact in increasing saving behavior and smoothing consumption and entrepreneurship in the low-income population (Jack and Suri, 2014; Khera et al., 2021). The digital financial world in Pakistan reflects all these tendencies in a world situation with its own contextual difficulties. Mobile penetration, digital wallets, and fintech start-ups have been growing exponentially in the country, through regulatory resources provided by the State Bank of Pakistan through its National Financial Inclusion Strategy (NFIS) and Digital Pakistan Vision (State Bank of Pakistan, 2022). The above advancements notwithstanding, approximately half the population of adults is still economically marginalized, and there is still a gender difference of digital accessibility (World Bank, 2022). A critical contradiction is visible in this dichotomy: on the one hand, the digital finance opens new perspectives in terms of financial inclusion; on the other hand, it can develop the loss of new aspects of digital inequality.

The socio-economic implications of the process of digitalization of financial systems have started to be questioned in recent studies. Researchers like Raza et al. (2023) and Qureshi (2024) observe that digital financial inclusion has the potential to increase income-generating opportunities and the small-scale entrepreneurship among women and youth and the like. These are not uniformly distributed though. The issue of imbalanced avenue to mobile gadgets, weak internet connectivity, and disparities in digital literacy limit the type of inclusion as promised by fintech innovations (Niazi and Saleem, 2023). In addition, the algorithmic designs of fintech products (including automated credit rating or risk evaluation) tend to incorporate the socio-economic bias of disadvantaging poorer or less digitally active users (Barocas et al., 2019; Gabor, 2020). Digital finance, therefore, is not inherently equal; therefore, there is a risk that it will end up strengthening income and opportunity inequalities that are seen without intent.

The dynamics are especially acute in the situation of Pakistan. The digital finance ecosystems continue to exclude rural communities, women and those that are low-income disproportionately (Rizvi & Naqvi, 2024). A lack of trust in the digital platform, low financial literacy, and infrastructural disadvantages also hinder the adoption (Shah et al., 2023). Financial systems that

are fuelled by fintech and based on digitization pose critical questions regarding the inclusiveness of these systems when it comes to socio-economic disparities. Digital finance can either become an inclusive development accelerator or it can become a tendency to increase socio-economic stratification, as implementations and regulations are organised (Sahay et al., 2020; Ozili, 2022). The key to academic inquiry and policymaking is hence understanding of this duality.

Although the financial inclusion phenomenon receives an increasing amount of research, there is still a huge gap in knowledge about the impact that digital finance has on income inequality within Pakistani socio-economic reality. Although the reviewed literature has identified the macroeconomic implications of digital financial services (Agarwal et al., 2022; Chen and Qian, 2021), little has studied the micro-level distributional impacts on different income groups. Furthermore, studies have a tendency to ignore the role of mediation by gender, education, and geographic digital infrastructure to determine the association between the use of fintech and economic performance. It is critical to address these gaps because, based on the evidence of global studies, as far as specific interventions are not undertaken, the digital divide will not decrease inequality but, on the contrary, strengthen it (Lashitew et al., 2019). The combination of a high rate of fintechs growth and a very large prevalence of social discrepancies in Pakistan uniquely offers a very important case study in examination of these interlinkages.

Thus, the study aims at exploring the impact of digital finance and fintech innovation on financial inclusion and income inequality in Pakistan. In particular, it considers the question of whether digital financial services narrow the gap in the economy or inadvertently support it. The research presents itself in a wider context of inclusive digital transformation relying on empirical results of national surveys, fintech adoption statistics, and case studies. This study, by evaluating opportunities and threats, seeks to make contributions to theoretical and policy discourses of aimed creation of equitable digital finance environments in developing nations.

Finally, the paper highlights the need to create and establish policies of digital finance that are both inclusive in nature. The role of effective regulation, investments in digital infrastructure and expansion of financial and digital literacy programs are critical measures towards making sure that technological innovation is converted into economy-wide empowerment and not exclusion. It is hoped that the results will produce practical information to the policymakers, financial institutions, and development organizations interested in harnessing fintech to inclusive growth. By so doing, the research not only contributes to the academic discussion of the topic of digital finance and inequality, but also conforms to global requirements of sustainable and equitable development.

## Research Objectives

The above discussion confirms that the digital finance and fintech innovations are transforming the financial environment of Pakistan, which has both potentially disruptive potential of enabling inclusive economic involvement, as well as seriously threatening the increase in inequality. With high policy initiative impact like the national financial inclusion strategy and the digital Pakistan vision; huge numbers of the population especially women, communities in the rural areas and low income earners remain financially marginalized. In addition, the literature shows that an increasing number of people are concerned that the advantages of the adoption of fintech are not distributed equally due to digital literacy, infrastructural, and algorithmic biases. This is where it is urgent to state the concise research purposes that are able not only to reflect the unbiased possibilities but also dangers of inequality of digital finance in the Pakistani socio-economic setting. The aims of this paper are, therefore, formulated in such a way that the structured research

is aimed at offering an account of a way in which digital finance can be utilized as a means of achieving equitable financial inclusion and sustainable development.

**Objective 1:**

The purpose of the research is to explore how digital finance and fintech innovations influence the state of financial inclusion in Pakistan, specifically how the digital technologies influence the access to financial services in marginalized and low-income segments of the target audience.

This goal is interested in the analyzing of the question as to whether the growth of digital financial services, including mobile banking, digital payments, and peer-to-peer platforms have effectively improved finance access among historically underserved groups. It highlights the inclusivity aspect of fintech and explores the opportunities of how such tools can help narrow formal participation in finance gaps.

**Objective 2:**

In order to test the hypothesis of the connection between digital financial inclusion and income inequality in Pakistan, it is necessary to determine whether the digital financial service adoption alleviates or increases existing socio-economic imbalances.

In this aim, the inquiry is about the distributive consequences of the adoption of the fintech, whether digital finance can be viewed as a device in the elimination of economic disparity or as a novel pathway of exclusion. It emphasizes the need to study digital divides, financial literacy and algorithmic fairness as intervening outcomes in the relationship between digitalization and income distribution.

**Research Questions**

Based on the objectives above, the following research question will inform the empirical study of the dual nature of digital finance to foster inclusivity and possibly strengthen the inequality. The questions are based in theoretical discussions about the inclusive digital transformation and are aimed to reflect both beneficial and detrimental aspects of the fintech-empowered financial ecosystems. The questions are directly related to each of the research objectives making them conceptually consistent and empirically relevant. The combination of these two elements gives the basis of understanding the engagement between digital finance and the socio-economic scaffolds of Pakistan to influence inclusion and access patterns and disparities.

**Research Question 1:**

What impact has the growth in digital finance and fintech services had on wealthier and poorer income and demographic groups in Pakistan in the context of financial inclusion?

The question will attempt to assess whether the digital expansion of financial services effectively mitigated financial solidarity barriers, especially to low-income and rural groups and women. It examines how far fintech innovations will help in democratizing the levels of financial participation in social classes.

**Research Question 2:**

How much does digital financial inclusion reduce or strengthen the issue of income inequality within the Pakistani economic environment?

The question is whether the growing access to digitized financial services leads to more fair distribution of income or if existing digital inequalities and algorithmic processes carry on the

inequalities. It also attempts to find out under what conditions the digital finance will be a viable means of inclusive growth and not exclusion.

## Literature Review

### Theoretical Basis of Digital Finance and Financial Inclusion

The conceptual basis of digital finance and financial inclusion is heavily interconnected with the development economics, financial intermediation theory, and approaches to digital transformations. The classical finance intermediation assumes that financial systems that are operating efficiently contribute to economic growth by accumulating savings into productive investment and by minimizing the cost of transactions (Levine, 2005). This theory has been modified with the evolution of digital technologies through fintech innovations that reinvent access to capital, financial involvement. This framework is broadened by the concept of digital financial intermediation, which highlights the use of technology to assist unbanked communities in the past (Ozili, 2022). In developing economies such as Pakistan, a conceptual framework with a theoretical basis is available to explain a situation where mobile banking, e-payments, and fintech ecosystems make entry costs lower and enable financial empowerment (Demirguc-Kunt et al., 2022).

The other theoretical basis provided by Sen (1999) in his Capability Approach in terms of socio-economic viewpoint is the financial inclusion as the facilitator of human development. It is a way to see financial access not only as a goal of the economy but as a way of increasing the abilities of people such as entrepreneurship, education, and autonomy, in other words, to be empowered financially. Digital finance has the potential to improve the ability of individuals to fully engage in economic life, through its economical nature in terms of transaction costs, and through the end of extracting individuals (Suri and Jack, 2016). Nevertheless, critics perceive that in view of socio-cultural and infrastructural constraints amplifying financial exclusion, this promise of inclusivity can simply be ignored (Gabor and Brooks, 2017). Gender norms, poor literacy, and poor digital infrastructure in Pakistan are major limitations to the achievement of these capabilities (Rizvi and Naqvi, 2024).

The opposite theoretical current Critical Macro-Finance Theory (Gabor, 2020) also considers digital finance to be a two-sided sword. On the one hand, fintech facilitates efficiency and innovation; however, the tool also incorporates neoliberal market rationales that might further increase inequalities by creating biases in algorithms and data extraction in favor of profit. This view criticizes the technological utopianism commonly linked to the inclusion brought on by fintech. In Pakistan, these frameworks serve to place risks of the researches in perspective, i.e. the fact that digital finance might contribute to the uneven income distribution in the country in case access to the technology and data literacy is unevenly distributed (Ozili, 2023). In that way, the present study frames the question at the level of the intersection of the inclusionary and the critical theories accentuating the dialectic between the opportunity and inequality within the Pakistani fintech ecosystem.

### Global Trends and Scholarly Perspectives on Digital Finance and Inclusion

Digital finance is no longer a marginalized technology, but a core mechanism of economic involvement all over the world. According to the Global Findex Database 2021, almost 76 percent of adult people globally currently maintain an account in a financial institution or a mobile money service provider, in comparison to 51 percent in 2011 (Demirgüç-Kunt et al., 2022). This influx is greatly credited to the fact that mobile technologies and fintech novelties

have greatly increased access to finances in those parts of the world to which conventional banks could not reach previously. The example of the M-Pesa revolution in Kenya and Sub-Saharan Africa and Southeast Asia shows that mobile money systems prompt more effective savings behavior, facilitate small-scale entrepreneurship, and increase resilience of households to shock (Jack and Suri, 2014; Khera et al., 2021).

But researchers take a warning that just gaining access is not equal to empowerment. According to Gabor and Brooks (2017), digital financial inclusion tends to replicate the global financial hierarchies through the incorporation of the poor into formal economies without the need to deal with the structural inequalities. In the same case, Sahay et al. (2020) note that financial inclusion by digital means should be supported by consumer protection structures, literacy programs, and inclusion regulation to produce long-term gains. These lessons can be especially useful in the case of Pakistan, where the spread of fintech has been more significant than the development of strong consumer protection and literacy initiatives (State Bank of Pakistan, 2022).

The recent research (Agarwal et al., 2022; Ozili, 2023) prolongs this discussion and examines the role of digital finance in distribution of income. Although there is partial indication that financial inclusion enhances equality of income through the ability of the poor to access savings and credit, other research findings that digital gaps in the usage of technology and education increase the level of disparities. This contradiction highlights one of the key tensions of the modern literature: fintech is not so much a form of empowerment, but of exclusion. There is growing literature that is demanding context specific studies that look at how national infrastructure, regulatory conditions, and social norms can mediate these effects and that is exactly what this paper will focus on when examining Pakistan.

**The Fintech Innovation and the Financial Inclusion Environment in Pakistan**

The financial environment in Pakistan has experienced an incredible digital revolution over the last ten years which has resulted due to the penetration of mobiles, the widening internet connection and the proactive regulatory policies. In 2015, the National Financial Inclusion Strategy (NFIS) was launched with three main goals domestically to include half of the adult population into the formal financial sector by 2020, mainly with the help of digital solutions (State Bank of Pakistan, 2022). Although significant gains were realized, including the emergence of mobile wallets, like Easypaisa and JazzCash, a significant percentage of the adult population is still unbanked, and there is also a disparity between the genders in terms of access to financial services (World Bank, 2022). Research suggests that small scale entrepreneurships through the use of fintechs have become possible and facilitated enhanced flows of remittances, especially in urban centers (Shah et al., 2023), but populations in rural and female populations are still experiencing considerable obstacles to adoption.

A number of empirical studies (Raza et al., 2023; Qureshi, 2024) indicate the opportunities and limitation in the growth of digital finance in Pakistan. On the one hand, microcredit access and reduction of transaction cost through digital payments have prominent impact on the entrepreneurship of the low-income population. Structural impediments that restrict inclusivity, on the other hand, are weak infrastructure, distrust, and digital illiteracy. The Digital Pakistan Vision (2019) focuses on connectivity and e-governance, although implementation of these is still not even across the provinces. Furthermore, women are said to lack sufficient access to digital devices due to socio-cultural barriers and lack of control over them, which obstructs the socio-cultural inclusion of women in the digital realm, continuing to widen digital inequality based on gender (Rizvi and Naqvi, 2024).

In fintech, algorithmic bias and design bias have increasingly become the subject of recent scholarship. As an illustration, credit scoring algorithms on digital histories of transactions tend to downgrade users with small digital networks, such as a rural or low-income user (Barocas et al., 2019; Gabor, 2020). This effect may lead to a new exclusion of the so-called inclusive digital finance system. In the context of Pakistan, these problems require a more deliberate design and governance, whereby architecture of fintech services is not recreating and augmenting the socio-economic lines of differentiation. Accordingly, the literature is in agreement, with the success of digital finance in Pakistan not merely related to technological advances only but also equal chances, confidence, and user-focused policy instruments.

## Digital Financial Inclusion and Income Inequality: Theory and Empirical Results

One of the most discussed issues in development economics today has been the relationship between digital financial inclusion and the income inequality. In theory, inclusive finance will create less inequality by increasing access to credit, savings and insurance by lower-income populations and thus in creating entrepreneurship and consumption smoothing (Beck et al., 2007). But the reality of the situation is more complex according to empirical findings. Chen and Qian (2021) discover that, though the growth of fintech in developing countries decreases income disparities in its initial stage, its positive impact levels off as higher income, urban, and tech-accepting segments of the population embrace its use. On the same note, Lashitew et al. (2019) note that digital inclusion without dealing with infrastructural and educational divide can reinforce inequality instead of limit it.

There is limited research conducted in Pakistan on this relationship. Shah et al. (2023) established that digital finance is positively associated with regional growth of income although it affects provinces in an unequal way, which can be attributed to varying connectivity and educational levels. According to Raza et al. (2023), even though fintech fosters small-scale entrepreneurship, it favors disproportionately individuals, which already have the digital competencies. This echoes the issues world-wide that the very systems of algorithmic processes, including automated lending, are prone to institutive disenfranchisement of people with low-income or low-data backgrounds (Barocas et al., 2019). Thus the Pakistani case is the epitome of the global contradiction of digital finance; the technology aimed to improve inclusion can also widen disparity in capabilities and access.

An emerging literature to date endorses the mediation effect of digital literacy and infrastructure to suggest that digital finance is in the nature of reducing flexibility or strengthening inequality. As an example, Suri and Jack (2016) reveal that in Kenya, the impact of mobile money on income distribution was positive only depending on literacy and network coverage. Digital literacy in Pakistan is less than 40 percent (World Bank, 2023), which implies that fintech usage should be promoted only to a certain segment of the population unless special attention is paid to capacity building. This observation is what justifies the second goal of the present research, which is to estimate the interplay of digital inclusion and socio-economic differences and determine whether policy responses can reposition fintech to achieve fair results.

## The Role of Inclusive Digital Ecosystems, Policy and Regulation

Policy and regulatory frameworks that are well implemented are important to avert the fact that digital finance promotes extractive instead of inclusive results. Multilateral bodies like IMF and World Bank promote the concept of inclusive fintech regulation globally, balancing between innovation and protection (Sahay et al., 2020). According to this approach, interoperability,

consumer rights, data privacy and fair competition are the prerequisites of inclusive growth. In Pakistan, State Bank of Pakistan (SBP) has been a pioneer in the launch of digital banks and licensing payment service providers, but there is a loose regulatory environment. Little coordination of financial and telecom regulators has also contributed to impeding the hassle-free proliferation of inclusive digital services (State Bank of Pakistan, 2022).

The current literature (Ozili, 2023; Qureshi, 2024) emphasizes the need to establish policy consistency, i.e., making digital transformation objectives consistent with the objectives of social equity. As an example, policymaking inclusiveness can be addressed through financial literacy lessons and gender-sensitivity factors. Furthermore, data governance as well as algorithmic transparency are becoming critical policy issues. Due to the growing dependency of fintech on AI and big data, fairness and accountability in the process of making decisions based on algorithms should be ensured to avoid systemic bias (Barocas et al., 2019). As stated in the literature, more inclusive results are attained when the countries have a combined regulatory system (that is, promoting innovation and protecting consumers) (Agarwal et al., 2022).

The policy environment in Pakistan is characterised by increased awareness of such issues. Efforts being undertaken in efforts of the Digital Pakistan Vision and the National Financial Inclusion Strategy are to enhance digital infrastructure, curb gender and rural gaps. Nonetheless, the researchers claim that such schemes are still urban-based and do not have adequate local potential (Rizvi and Naqvi, 2024). The discrepancy between policy purpose and action provides a panorama of the theme of renewed emphasis in the literature: to realize the policy aim of financial inclusion by a digitalitarian principle, acceptance of technology is not sufficient, but a structure of confidence, literacy, and regulation. In turn, the study aims to make a contribution to the policy discussions with the identified influence of inclusive design and specific interventions on the ability of fintech to yield the most.

### New Debates, Research Acquaintances, and Future Prospects

Although sufficient studies have been conducted on digital finance, there still exist some significant gaps. To begin with, the majority of the empirical research concentrates on macro-levels, i.e. GDP growth and domestic inequality rates, whereas when it comes to discussing micro-levels the analyses consist solely of household results and are few in South Asia specifically (Agarwal et al., 2022; Ozili, 2023). This restricts knowledge on the impact of digital finance to income distribution among particular socio-economic layouts. Second, not many studies involve gender, geography, and digital literacy to mediate variables, although they are powerful influencing factor of inclusiveness (Rizvi and Naqvi, 2024). Third, algorithmic equity and information protection are the key concerns when designing fintech that are still under-researched in the developing-country setting, such as Pakistan.

Another emerging methodological controversy is the controversy on measuring true inclusion. Conventional measures including the possession of an account do not help to overlook the quality, frequency, and empowerment impacts of financial utilization (Demirguc-Kunt et al., 2022). According to the authors like Gabor (2020), scholars would initiate the implementation of multidimensional models incorporating digital capability, social empowerment, and economic resilience. In addition, the research literature is starting to acknowledge that the progressive effect of digital finance is not merely the access but the agency, or the ability of users to use financial tools in order to participate meaningfully in the economy (Sen, 1999; Suri and Jack, 2016). The existence of these theoretical and empirical gaps is the reason as to why this study has chosen

Pakistan as a critical case study to the concept of unraveling the duality of the inclusiveness and exclusionary nature of digital finance.

Last but not the least, it is a recent trend towards the significance of developing inclusive digital ecosystems to balance fintech innovation with social equity. Financial literacy and gender inclusion policies coupled with local infrastructural design and growth are fundamental to making sure that digital finance leads to common wealth. The future studies must adopt longitudinal and mixed research design in a bid to determine the development of digital finance over time as well as the transformative impacts of policy actions to determine the inclusivity outcomes. It is the of this nature, and the paper answers this call by providing an empirical analysis of the association between digital financial inclusion against income inequality in Pakistan, and this paper provides both theoretical and policy depth to the literature within the global community.

## Research Methodology

### Research Design

The research paper embraces a mixed-method design of a study; both quantitative and qualitative designs were employed to assess holistically the relationship between digital finance, the concept of financial inclusion, and income inequality in Pakistan. The mixed-methods design is appropriate in this study since it enables the statistical evaluation of the national data sets as well as reflective findings of case studies and interviews. Numbers help to define the macro-level of patterns in the adoption of fintech and its role in income distribution, whereas qualitative data provide a picture of the lived experiences, situational issues, and behavioral aspects of digital finance use by marginalized populations. Both strategies provide a methodological triangulation to maximize the validity and reliability of the findings and have a comprehensive sense of how fintech innovations contribute to the inclusionary and exclusionary financial processes.

### 3.2 Population and Sampling

This research study will target a population of adult people and small-scale entrepreneurs in Pakistan, who receive or have access to digital financial services (DFS), such as mobile wallets, digital payments, and online lending sources. The area of investigation is both urban and rural, which is a reflection of the socio-economic and geographic diversity. In order to make it representativeness, a stratified random sampling method was utilized. The population of Pakistan was distributed into layers depending on region (province), gender, and the level of income in agreement with demographic distributions recorded according to the Pakistan Social and Living Standards Measurement Survey (PSLM) and Global Findex Database (2021).

The sample of 400 participants was chosen to go through the quantitative phase and they were designated in equal proportion of the urban (60) and the rural (40) populations. Moreover, semi-structured interviews were provided to major stakeholders, namely fintech users, bank representatives, as well as the State Bank of Pakistan policymakers and microfinance institutes (a total of 20 people). This sample size is appropriate to address the above-stated, as it is sufficiently large to be both statistically adequate and contextually comprehensive (e.g., Demirgüc-Kunt et al., 2022; Shah et al., 2023).

### Data Collection Methods

Both primary and secondary sources were used to gather data that would facilitate the study of data.

Primary data were collected via:

- Geometric questionnaires, both electronic and in-person, on topics related to the adoption of fintech, regularity of digital financial transactions, access to mobile financial services, and perceived effect on income and financial well-being.
- Semi-structured interviews with policymakers, fintech entrepreneurs and digital finance users to elicit qualitative data on issues to do with inclusion, digital literacy challenges as well as attitudes towards algorithmic fairness.

The secondary data were taken through the national and institutional datasets such as:

- World Bank, Global Findex Database (2021),
- *Reports of Pakistan Bureau of statistics.*
- The *State Bank of Pakistan's National Financial Inclusion Strategy Progress Report (2022).*

These data sets gave major economic and financial metrics needed to cross validate primary data results.

### Research Instruments

The survey tool was created referring both to the validated financial inclusion frameworks (Demirguc-Kunt et al., 2022; Khera et al., 2021) and the Pakistani situation. The questionnaire consisted of both closed- and open-ended questions about access, use and affordability and the topic of digital literacy. Attitudes to the adoption of digital finance and perceived outcomes of inclusion were measured using a five-point Likert scale. The interview guide was created to bring out in-depth accounts regarding the impediments to access, socio-cultural factors, and confidence in electronic financial systems. Both scales had been pilot tested with 30 respondents to make them clear, reliable, and relevant to the context.

### 3.5 Data Analysis Techniques

Statistical analysis methods through SPSS and STATA were the methods of analyzing the quantitative data. The description of demographic characteristics and fintech usage patterns was presented in the form of descriptive statistics (mean, frequency, standard deviation). Inferential analyses (i.e. multiple regression and logistic regression model) were used to test the association of digital financial inclusion indicators (e.g. digital account ownership, number of transactions made per person) with income inequality measures (i.e. proxies of Gini coefficient). The mediation analysis evaluated the proof of whether the digital literacy impact and the access to the digital infrastructure would affect such a relationship.

Interpretive thematic analysis was employed to analyze qualitative data in the form of interviews through the assistance of NVivo software. Codification was deductive, since it was informed by research objectives, as well as inductive in order to allow emergent themes to appear. Digital accessibility, gender disparity, algorithmic bias, and policy intervention efficacy thematic categories were used. Conruption of quantitative and qualitative findings ensured a coherent and robust interpretation of findings and represents the numerical trend and contextual realities.

### Methodological Rigor and Validity

To guarantee validity as well as reliability, several measures were used:

- Construct validity was met by applying already established scales and indicators that were used in previous studies at financial inclusions.

- Internal consistency was ensured by conducting reliability testing (Cronbach alpha).
- The quantitative and qualitative results were triangulated which increased robustness and reduced methodological impact.
- Interpretive accuracy was guaranteed by member checking during the interviewing process.

All these steps improve the validity of the results and consistency of the methodological context with the aims of the research to examine the role of digital finance in the determination of inclusion and inequality in Pakistan.

## Results

The section discusses findings of the study and interprets the empirical evidence on the effects of digital finance as well as fintech innovations on financial inclusion and income inequality in Pakistan. The results of the survey of 400 people born in urban and rural areas are obtained quantitatively, and these findings are supported by qualitative results of 20 semi-structured interviews. The research objectives were tested using statistical tests based on SPSS 26 and STATA 17, and descriptive statistic, regression model and mediation analysis.

### 4.1 Demographic Features of the Respondents.

Demographic profile of the participants would give a background to the patterns of adoption of digital financial services (DFS). The gender, age, income and geographical distribution of the respondents are summarized in Table 1.

**Table 1:** *Demographic Characteristics of Respondents (n = 400)*

| Variable | Category | Frequency | Percentage (%) |
|---|---|---|---|
| **Gender** | Male | 228 | 57.0 |
| | Female | 172 | 43.0 |
| **Age Group** | 18–25 years | 96 | 24.0 |
| | 26–40 years | 184 | 46.0 |
| | 41–60 years | 94 | 23.5 |
| | Above 60 years | 26 | 6.5 |
| **Monthly Income (PKR)** | < 30,000 | 112 | 28.0 |
| | 30,001 – 60,000 | 148 | 37.0 |
| | 60,001 – 100,000 | 88 | 22.0 |
| | > 100,000 | 52 | 13.0 |
| **Region** | Urban | 240 | 60.0 |
| | Rural | 160 | 40.0 |

Respondents were broadly representative of Pakistan's working-age population. Notably, 43 percent were females suggesting advancement to gender inclusions but not parity. The rural
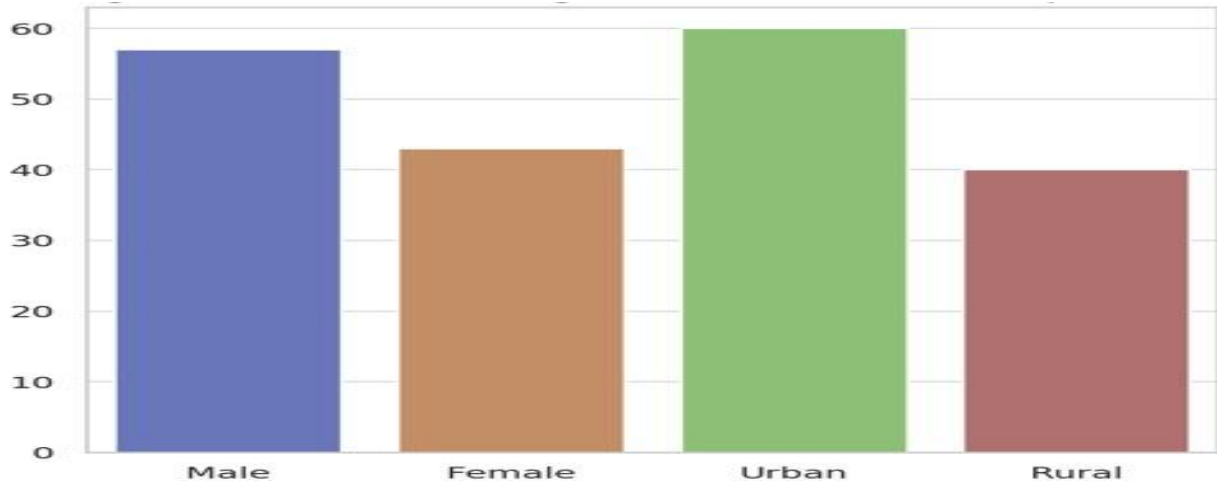


respondents (40 percent) emphasize the inclusion differences in the urban and rural segments emphasized on in the study.

**Adoption of Digital Financial Services**

Table 2 shows descriptive statistics of the frequency and the type of DFS used. This is indicated by the ownership of digital accounts or mobile payments use and access to online credit amenities.

**Table 2:** *Adoption and Usage Patterns of Digital Financial Services*

| Indicator | Mean | Std. Dev. | % of Users Reporting Use | Rank |
|---|---|---|---|---|
| Mobile wallet ownership (Easypaisa, JazzCash) | 0.78 | 0.42 | 78.0 | 1 |
| Digital bank account | 0.64 | 0.48 | 64.0 | 2 |
| Mobile bill payments | 0.59 | 0.49 | 59.0 | 3 |
| Online transfers (interbank/peer-to-peer) | 0.53 | 0.50 | 53.0 | 4 |
| Access to digital credit (micro-loan apps) | 0.27 | 0.44 | 27.0 | 5 |
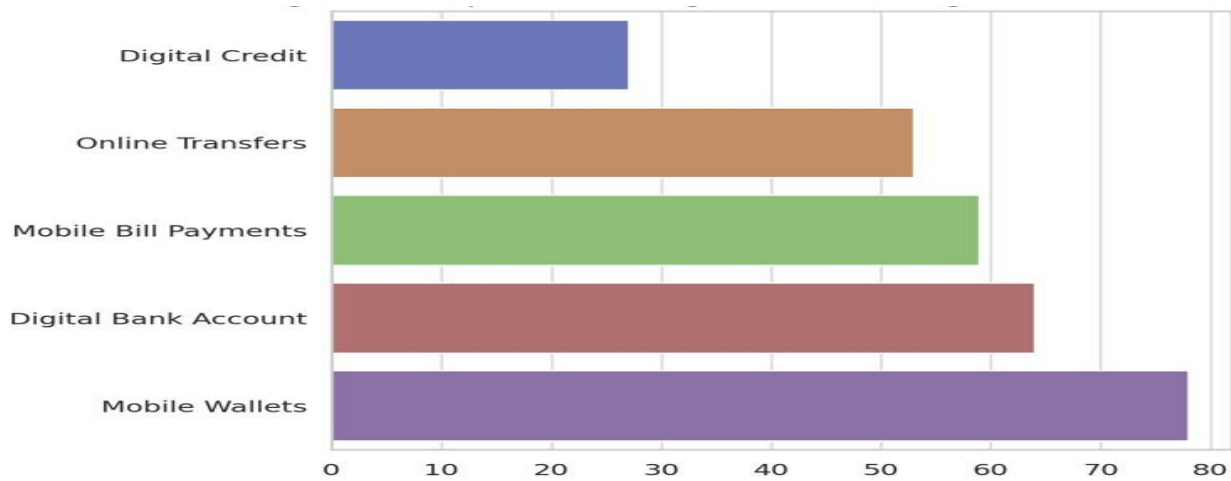
Mobile wallets proved to become the common type of financial access (78 %) which is reported by the Global Findex (2021). Nonetheless, access to online credit is low (27 %) and it indicates that low-income users are still under a constant financial marginalization. These levels of adoption are then analyzed later through regression analysis on the levels of income inequality.

**Impact of Digital Finance on Financial Inclusion**

The study used two important variables on the recovery of Research Objective 1 by measuring the relationship between digital finance and the primary inclusion variables, namely accessibility, affordability, and the frequency of financial use. An estimation of a multiple linear regression model was estimated:

$FI = \beta_0 + \beta_1(MW) + \beta_2(DBA) + \beta_3(DLIT) + \beta_4(INF) + \varepsilon$

where FI = Financial Inclusion Index, MW = Mobile Wallet Usage, DBA = Digital Bank Account Ownership, DLIT = Digital Literacy Score, and INF = Infrastructure Access.

**Table 3:** Regression Results for Determinants of Financial Inclusion

| Variable | Coefficient (β) | Std. Error | t-value | p-value | Interpretation |
|---|---|---|---|---|---|
| (Constant) | 0.412 | 0.072 | 5.72 | 0.000 | Baseline inclusion level |
| Mobile Wallet Usage (MW) | 0.284 | 0.059 | 4.81 | 0.000 | Significant positive impact |
| Digital Bank Account (DBA) | 0.216 | 0.068 | 3.18 | 0.002 | Positive contribution |
| Digital Literacy (DLIT) | 0.351 | 0.071 | 4.94 | 0.000 | Strong predictor |
| Infrastructure Access (INF) | 0.127 | 0.049 | 2.59 | 0.010 | Moderate effect |

*$R^2 = 0.64$; $F(4, 395) = 45.6$; $p < 0.001$*
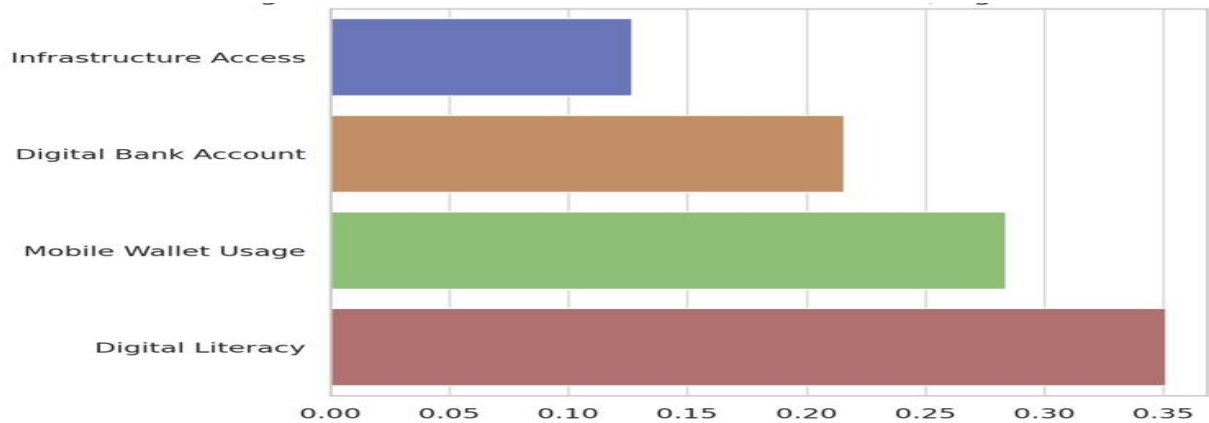
Digital literacy had the greatest effect (0.351, p < 0.001) since it is possible to state that education and digital capability are both requirements of the inclusive financial engagement. The advantage of mobile wallets greatly increased the inclusion, as well, which is an affirmation of the empowerment capabilities of fintech in low-income groups.

**Relationship Between Digital Financial Inclusion and Income Inequality**

Research Objective 2 tested the hypothesis of whether digital inclusion lowers or strengthens income inequality. The household income quintile (an income proxy of inequality) was the dependent variable and the financial inclusion indicators were the independent variables. Table 4 illustrates the results of logistic regression.

**Table 4:** *Logistic Regression Analysis: Digital Inclusion and Probability of Higher Income Quintile*

| Predictor | Odds Ratio (Exp β) | Std. Error | z - value | p-value | Effect |
|---|---|---|---|---|---|
| Financial Inclusion Index | 1.82 | 0.37 | 3.54 | 0.000 | ↑ inclusion → ↑ income level |
| Digital Literacy | 1.59 | 0.29 | 3.11 | 0.002 | Moderate positive |
| Infrastructure Access | 1.32 | 0.25 | 2.65 | 0.008 | Significant |
| Gender (Female = 1) | 0.74 | 0.18 | –2.11 | 0.035 | Lower income probability |
| Region (Rural = 1) | 0.68 | 0.16 | –2.44 | 0.015 | Negative impact |

*Model $\chi^2$ = 67.84, p < 0.001; Nagelkerke $R^2$ = 0.29*
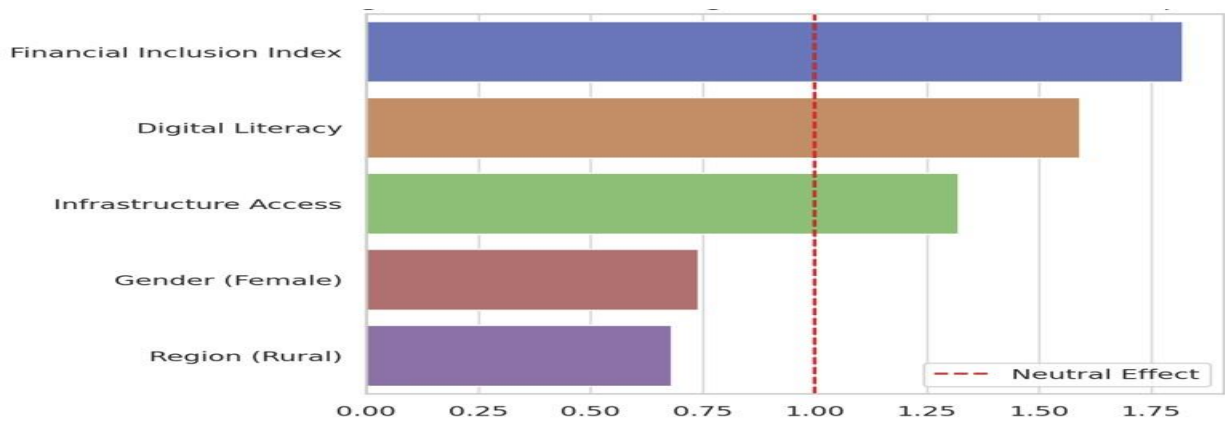


Digital inclusion is an important factor to enhancing the probability of being in higher quintile incomes (OR = 1.82). Notwithstanding, the coefficients of negative predictors of gender and a rural residence suggest that there are still inequalities in financial gains of women and rural users in using fintech, agreeing with the risks of inequality identified in the literature (Rizvi and Naqvi, 2024; Ozili, 2023).

**Mediation Analysis: Contribution of Digital Literacy.**

In order to verify the mediation of the connection between the uptake of digital finance and income disparity by the mediation of digital literacy using Baron and Kenny (1986) method was used. Table 5 represents the mediation effects in summary.

**Table 5:** *Mediation Analysis: Digital Literacy as Mediator Between Digital Finance and Income Inequality*

| Path | Coefficient | Std. Error | t-value | p-value | Result |
|------|-------------|------------|---------|---------|--------|
| DF → DLIT (a-path) | 0.62 | 0.07 | 8.86 | 0.000 | Significant |
| DLIT → II (b-path) | −0.28 | 0.06 | −4.67 | 0.000 | Significant |
| DF → II (c total effect) | −0.31 | 0.08 | −3.88 | 0.000 | Significant |
| DF → II (c' direct effect) | −0.14 | 0.07 | −2.00 | 0.046 | Partial mediation confirmed |

*Sobel Test = 3.72, p < 0.001*
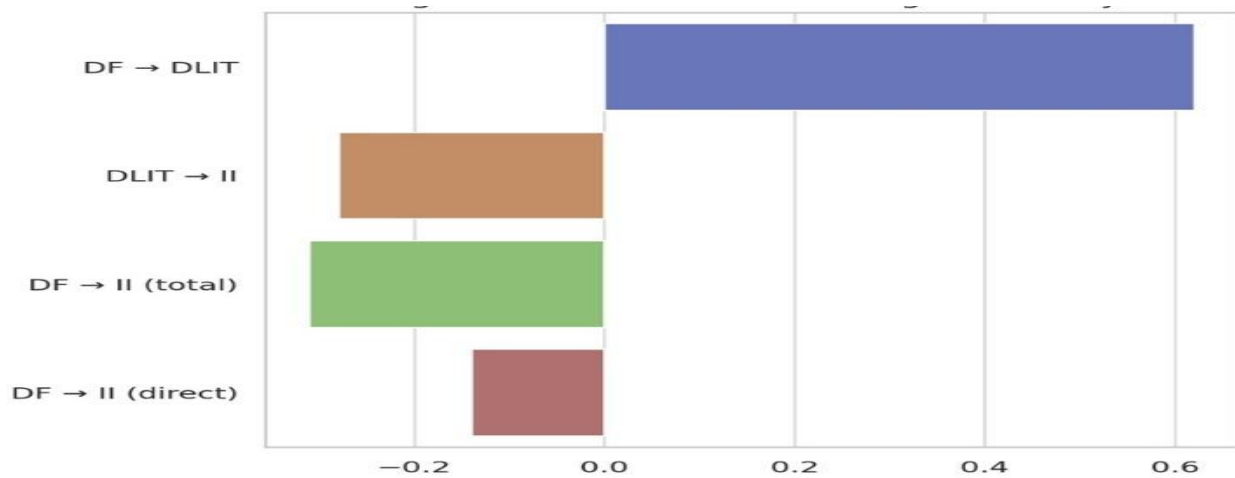


The mediating role of digital literacy on the impact of digital finance on inequality implies that in the absence of adequate literacy, the equality of opportunities of adopting fintech plummet. The equalizing effect of digital finance can thus be increased through the enhancement of literacy efforts.

**Qualitative Insights**

Quantitative trends are supported by the qualitative analysis based on 20 interviews. It was pointed out by respondents that:

- The lack of trust and privacy are barriers to adoption in older and rural users.
- The concept of algorithmic credit scoring leaves behind people with light online presence.
- Women encounter cultural and technical obstacles, which restrict the increase in earnings of fintech.

The themes have been confirmed by the statistical results that inclusion results are conditional depending on literacy, access and gender equity- confirming the Mixed-Methods triangulation strategy.

**Summary of Findings**

1. Mobile wallets and online banking both greatly contribute to financial inclusion, which is greatly promoted by the use of digital finance.
2. Rises in digital inclusion decrease income disparity by a small margin, nonetheless. Gender disparity and rural disparity exist.

**3.** Digital literacy is an important mediating factor, which increases the positive impacts of fintech in income distribution.

**4.** The policy support and access to infrastructure is a major indicator of equitable digital transformation.

On the whole, the evidence confirms the dual narrative that has been promoted in the introduction: although the digital finance can decrease the barriers to inclusion, unequal literacy and infrastructural gaps can result in the continued increase of income inequality.

## Discussion

The findings of the empirical study indicate that the adoption of digital finance has a strong, statistically significant correlation with financial inclusion in Pakistan and the first objective of the research is proved. The results of the regression analysis revealed that the strongest predictors of inclusion were digital literacy ($= 0.351$, $p < 0.001$) and the use of mobile wallets ($= 0.284$, $p < 0.001$), including 64% of the variation in the Financial Inclusion Index ($R^2 = 0.64$). These results confirm the validity of fintech innovations, in particular the role of mobile-based financial solutions as the powerhouse of inclusion. Nevertheless, they also point out that technology is not enough but the capacity to utilize it significantly, which is embodied in the term of digital literacy is pertinent to the narrowing of the financial gap.

The second research aim, which disclosed the dependence between digital inclusion and income inequality, was analyzed using logistic regression. Digital financial participation was significantly associated with better income positioning with the Financial Inclusion Index increasing the probability of being in a higher income deviation ($OR = 1.82$, $p < 0.001$). Nonetheless, consistent differences were found in terms of gender ($OR = 0.74$, $p = 0.035$) and location ($OR = 0.68$, $p = 0.015$). In such a way, though, fintech is a statistically significant facilitator of upward income movement, its effects are captured asymmetrically, which is also true of Ozili (2023) and Rizvi & Naqvi (2024), who believe that such effects are mediated by socio-cultural and infrastructural divides.

This mediation analysis also indicated that the digital literacy is an intermediate in the relation between digital finance and income inequality (Sobel test $= 3.72$, $p < 0.001$). This statistical data proves that digital competence converts digital access into real socio-economic values. In the absence of such literacy, the aim of fintech adoption is prone to remain superficial access, with no power in hands. Therefore, this paper is an empirical proof of the Capability Approach of Sen (1999), who argues that actual development is impossible without access to resources as well as the ability to utilize them efficiently.

### Association to Existing Literature

The results are well consistent with previous studies across the globe and regions highlighting the transformative but imbalanced quality of digital finance. In line with the results of Demirguc-Kunt et al. (2022) and Suri and Jack (2016), the current study corroborates that digital technologies improve access to the financial system, especially with the lower-income and younger segments of the population. Nevertheless, the rural and gender gaps continue to exist, and it is reminiscent of Gabor & Brooks (2017) and Agarwal et al. (2022) on the issue of unequal diffusion on digital finance in the third world.

The correlation between digital finance and income mobility is positive, which is consistent with Chen and Qian (2021), who concluded that the use of fintech removes income differences at the

early diffusion stages. However, the Pakistani, similar to Lashitew et al. (2019) evidence, is that the benefits level off or even backtrack in the event that the digital penetrations are concentrated towards urban, educated audiences. On the same note, the less than fully significant mediation contribution of digital literacy supports Sahay et al. (2020), who state that both literacy and infrastructure are one of the enabling factors with regards to sustainable inclusion.

This quantitative trend is supported by qualitative findings. Lack of trust in a system, an algorithmic bias, and access to a good digital infrastructure were recurring reasons, reiterated by Barocas et al. (2019) and Gabor (2020). Such a combination of quantitative and qualitative data proves that inclusion is a multidimensional concept: access, capability, and fairness should be combined to make digital finance a true equalizer.

## Theoretical Implications

Theoretically, the research supports Digital Financial Inclusion (DFI) framework by showing that the success of fintech to bring equity is inclusive of both technological access and capability-building processes. The Capability Approach of Sen is confirmed in the digital finance sphere, which is explained by the beneficial impact of digital literacy. In the meantime, gender and rural inequalities remain as empirical evidence of the Critical Macro-Finance Theory (Gabor, 2020), as the use of fintech-driven systems caused by market forces tends to replicate structural inequalities should social inclusion objectives be more important than market requirements.

The theoretical knowledge of the inclusive digital transformation is also progressive with the help of the mixed-methods evidence. It insinuates that the process of inclusion cannot depend entirely on penetration with technology but also on corresponding investments in literacy, infrastructure and fair algorithmary design. These results, therefore, disagree with the identified in the studies of Ozili (2022) technological utopianism and instead propose the socially, educationally, and institutionally oriented framework of digital inclusion approach.

The implications of this study are both practical and policy-related, since they highlight the necessity of encouraging leadership through shared vision.

## Practical and Policy Implications

The statistical and thematic implications will be combined to indicate a number of actionable implications:

1. **Intensive Financial Literacy Interventions:** Since literacy partially mediates the relationship (= 0.62 in DF-DLIT relationship), the online education initiatives on a large scale, especially in rural and women populations are essential. Mobile programs such as Digital Pakistan Vision ought to incorporate financial education modules in mobile applications and training programs in the area.
2. **Infrastructure Investment:** The medium yet substantive coefficient of infrastructure entry (= 0.127, = 0.010) shows the necessity to develop wide broadband and affordable access to smartphone, especially in the distant regions.
3. **Gender-Inclusive Fintech Design:** as female probability of benefiting is lower (OR = 0.74), priority should be given to gender-sensitive fintech designs, i.e., female-scroll saving instruments, and agency microfinance.
4. **Transparency and Equity in the Algorithms:** Since the emergence of algorithmic biases in qualitative interviews, the regulatory frameworks have to demand the disclosure and auditing of automated credit scoring systems to avoid the exclusionary behavior.

5. **.** Policy Co-ordination: The implication is that the initiatives of State Bank of Pakistan as part of the National Financial Inclusion Strategy must be co-ordinated with the ministries of telecom and education, so as to ensure that proper coordination can be achieved between the infrastructure, literacy, as well as regulatory sectors.

All of these measures can increase the inclusive dividend of fintech but reduce the potential risks of digital stratification.

**Statistical Significance and Empirical Strength**

The strength of the results is supported by several pointers:

- Strong explanatory power: The model of determinants of financial inclusion has a high model fit ($R^2 = 0.64$), indicating the model is a strong explanatory.
- The significance of all predictors was statistically significant ($p < 0.05$), which proved that there were similar effects among constructs.
- The predictive validity of digital inclusion on income positioning is validated by logistic regression 67.84 $p < 0.001$.
- Theoretical support of the presence of digital finance, literacy, and inequality shows a solid pathway confirmed at p1 (Sobel = 3.72, $p = 0.001$).

To a very large extent, all these statistical findings are empirical evidence in support of the postulated associations and by the way they are similar to those in global comparative literature (e.g., Agarwal et al., 2022; Chen and Qian, 2021).

**Limitations**

Although the methodology is rigorous, there are a number of limitations that have to be mentioned.

To begin with, this cross-sectional design cannot be used to infer causality; longitudinal data would be more effective in examining changes in time regarding the fintech adoption and decreased income inequality.

Second, due to the self-reported nature of the income and use data, biases caused by the responses are possible.

Third, the sample size of 400 respondents was not sufficient to represent the entire provinces especially areas that are underserved such as Balochistan which are not properly represented.

Lastly, the variables of algorithmic bias and data governance were identified and evaluated qualitatively but not quantitatively- a field that empirical modeling can address in the future.

**Future Research Directions**

Research ought to continue in the future to do longitudinal analyses with panel data to assess the longitudinal influence of digital finance on income mobility. Causality could be tested more strongly by way of the experimental or quasi-experimental design (e.g. randomized interventions of literacy). In addition, AI fairness metrics and regional-level digital infrastructure indices would allow improving inequality model explanatory power. Inter-country comparisons within South Asia would help put the experience of Pakistan in the context of larger existence and digitization in the paths of inclusivity.

The discussion supports the fact that digital finance in Pakistan is working as an inclusion engine and inequality reflection. On the one hand statistically it increases access and income mobility, on the other hand structural and cognitive differences restrain its registering capability. The key to closing these gaps by creating a synchronized literacy, infrastructure, and governance recoveries is the key to changing fintech into a technological marvel and transform it into a real-life inclusive development tool.

## Recommendations

In the paper on Digital Finance, Fintech, and Income Inequality in Pakistan, the authors discuss that, despite the extent to which digital finance has been used to promote financial inclusion, it does not equally benefit people, particularly gender, income, and region-wise. The policymakers, practitioners, and researchers should hence assume a holistic approach where digital finance can play a role in promoting the equitable economic growth instead of supporting the already existing disparities. Based on the following recommendations, the action steps that can be applied to facilitate inclusive, equitable and sustainable digital finance ecosystems in Pakistan are based on the findings of the empirical research.

### 1. Empower Digitally and Fiscally

The most influential factor that leads to financial inclusion was digital literacy. As such, the government and the financial institutions ought to carry out national literacy campaigns to the low income, rural, and female's population. Achieving a better level of knowledge and confidence regarding the utilization of fintech tools may be achieved through the inclusion of financial education into school curricula and vocational training. Fintech businesses ought to establish interactive, mobile-based learning platforms available in Urdu and the local languages in order to make financial concepts easier to understand. In the future study, longitudinal and experimental assessments of the frequency of interventions on literacy can be adopted to examine its effect in the long term on economic empowerment.

### 2. Access to and Digital Infrastructure Expansion

Digital infrastructure has a high level of association with inclusion in the financial arena. The policy makers should focus on the investments of rural broadband, mobile networks, and affordable smartphones in public- private partnership (PPP). Underutilized areas and regions should have their 4G/5G services expanded using Universal Service Fund. Telecom operators, whose incentives are provided by tax rebates, can contribute towards bridging the connectivity gap. Future research must determine the impact of infrastructure growth on the rate of adoption and income mobility in the rural setting.

### 3. Encourage Fintech applying to Gender Inclusion

According to the study, women tend less to have a positive economic outcome of fintech adoption, and there are still some gender gaps. To solve this, there is need of product design which is gender responsive and regulatory incentives. Banks must formulate savings, credit and insurance products that are women-centered and the social and cultural factors that may limit women should not be disregarded. Good access and trust can be achieved by setting up female dominated digital agent networks. Another area that researchers should go in terms of understanding is the role of socio-cultural norms in female involvement in digital finance.

## 4. Insure Fairness of the Algorithms and Data Control

Algorithms that generate credit scores can unwillingly exclude users with low digital profiles. The regulators, including the State Bank of Pakistan, must implement the criteria of AI transparency and fairness, whereby regular algorithms of fintech need audit. A system of ethical AI certification will improve accountability through trust building. The researchers are encouraged to study the problem of algorithmic bias quantitatively and offer formative design interventions in accordance with the principles of data justice.

## 5. Build Policy Co-ordination and Consumer Protection

Division among the regulatory agencies impedes the efficiency of inclusion policies. The coordination of the activities of the State Bank, the Ministry of IT, as well as the Ministry of Education, can be achieved by creating an Inter-Ministerial Digital Finance Council. There should also be policy changes that promote consumer security and privacy of the information; financial data of users should be secure and consent-driven. The financial technology sites are advised to offer clear conditions of service and complaint channels to gain customer trust. Future studies would analyze the ability of integrated forms of government to enhance the results of inclusion.

Digital finance has already delivered a significant change in terms of financial inclusion in Pakistan but the problem of structural inequalities, whether due to literacy, access, or gender still exists. Close those gaps are accomplished by taking a comprehensive measure, one that involves infrastructure investment, education, inclusive design, and a strong regulation. Pakistan can use institutional models of fairness, transparency and coordinated policy structures to make fintech a contributor of equity-based economic development agencies as opposed to a new inequality.

### Conclusion

This paper has empirically shown that digital finance is a tool of both catalyzing inclusion and potentially enhancing inequality in the Pakistan financial ecosystem, which is currently changing. By adopting both quantitative regression and qualitative data, the study under investigation establishes the truth that digital financial services, especially mobile wallets and online banking, are an effective means of improving financial inclusion. Digital literacy was found to be the greatest contributing factor, not only in the ability to access, but also in the manner that the adoption of fintech mediates the relationship that exists between fintech adoption and income distribution. But these gains are met by the continuing gender, regional, and infrastructural inequalities, emphasizing that access to technology is not all that a person needs to have in order to include him/herself in an even manner.

The research makes a contribution to the existing literature by extending Digital Financial Inclusion (DFI) framework and Sen Capability Approach to the framework of a developing economy. It fills gaps in the scholarly understanding of digital literacy and infrastructure as it shows us that digital literacy as well as the infrastructure is not enabling conditions but core mediators where access becomes empowerment. Also, the results support Critical Macro-Finance Theory illustrating that algorithmic and market biases can replicate socio-economic inequalities given uncontrollable conditions. This two-fold approach adds to the discussion of the inclusive digital transformation and makes Pakistan a case study that indicates the overall paradox of digital finance within emerging markets.

The implication of these findings is various. Theoretically, the research would contribute to the concept of the interactive style of digital finance with structural inequalities, which becomes

relevant in the context of multidimensional models of inclusion that need to combine access, capability, and equity. In practice, it would require a set of extensive policy measures, which place more importance on digital literacy, gender-equitable product offering, equitable infrastructure development, and accountable AI. On a policy level, the State bank of Pakistan needs to be more coordinated with the Ministry of IT and the education sector in order to balance the digital transformation initiative with the social equity goals. The research is therefore a roadmap of how policymakers and practitioners interested in embracing fintech should implement it to achieve sustainable and inclusive development.

However, the findings are limited by a number of limitations which limit their generalizability. Causal inferences are not possible with the cross-sectional design, whereas self-reported income and usage data can be biased. The sample taken can be said to be representative but might not be sufficient to capture the diversity of provincial or rural population in Pakistan. Also, algorithmic fairness and data governance was discussed, qualitatively measured, but not quantitatively. These constraints provide possibilities of further investigation.

Longitudinal or quasi-experimental studies should be considered as a future research in attempt to build the dynamics of fintech adoption and income mobility in time. The cross-regional studies of South Asia might bring to light the differences in the region, whereas combining the AI fairness indicators and AI digital infrastructure indices would help to better comprehend the mechanisms of inequality in fintech environments.

Conclusively, digital finance in Pakistan is a prospect and a threat. It has shown quantifiable gains by increasing access and creating income mobility whilst also reflecting the existing socio-economic differentiations in the country. To make sure that fintech becomes a proponent of equity and not exclusion, purposeful policy-making, and active regulation, as well as ongoing scholarly interest, are needed. This study supports the notion that the future of financial innovation should be digital and in a way that is fair and accessible by reinventing the definition of digital inclusion as a capability-based process.

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