

INFLUENCE OF FINTECH ADOPTION ON FINANCIAL INCLUSION IN SELECTED DEVELOPING ECONOMIES

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Abstract

The study is designed to evaluate the impact of Fintech Adoption on Financial inclusion of selected developing Asian economies such as Pakistan, India, China, Afghanistan, Kenya, Nigeria, Malaysia, Indonesia and Bangladesh. In the philosophy of research we have used quantitative research design with a Positivist approach. The data for this study was acquired from WDI, Findex, UNDP and FAS. We used Panel ARDL estimation along with co-integration test, Co relation analysis, cross-sectional dependency and unit root test. This study suggests that one of the main drivers of financial inclusion in developing countries is fintech, specifically mobile subscriptions. Mobile technology makes banking services more accessible, but internet use has conflicting effects. Infrastructure for technology and inclusive design are more significant than GDP and population growth. Demographic factors like income inequality also affect access, which highlights the need for targeted and regulated fintech solutions.

Keywords: Mobile phone subscription, Internet Usage, GDP growth, Population, Inflation, Age dependency, Income Inequality

1. INTRODUCTION

Fintech refers to innovations in advanced technologies to modernize and enhance traditional financial services through new software applications, processes, products, or business prototypes within the financial services industry. According to Popescu (2019), fintech strives to enhance financial services. Sahay et al. (2020) assert that fintech disrupts the status quo of financial services landscapes as it upends those institutions that depend on transactions that are cash-based and contact-based. With the development of digital platforms offering a wide variety of financial services—accessible via mobile phones or computers—traditional face-to-face services are gradually declining. However, the OECD (2020) raises a critical question: Are fintech companies and services replacing traditional banks, or are they making banking more competitive and efficient while minimizing disruption?

Navaretti, Calzolari, Mansilla-Fernandez, and Pozzolo (2017) posit that fintech companies may not swap banks but could rather increase competition in the financial market, fill gaps, where traditional institutions fail, and increase productivity. Similarly, Gomber, Koch, and Siering (2017) define fintech firms as companies that use internet-enabled technologies such as cloud computing and mobile internet to offer financial services such as lending and transaction banking, which in many cases are more adaptable, secure, and cost-effective than traditional financial services. These innovators may include start-ups, for example, the Malaysian mobile lending application Branch; established ICTs, for example, Vodafone and Safaricom with M-Pesa; or old financial institutions, for instance, Societe Generale.

Arner et al. (2020) classify fintech into five key areas: finance and investment, operations and risk management, payments and infrastructure, data protection and monetization, and customer interfaces. This research concentrates on internet and mobile payments. However, one of the major challenges of financial inclusion research is that data is scarce. Though data on internet and mobile subscriptions and digital payment services is available, information on crowd funding, insurance, and digital financial advisory services is rare or nonexistent.

Therefore, it is important to assess the potential of fintech in driving the progress of financial inclusion. A significant point is that it has been used for poverty reduction, which is the aspect of international discourse. The G20 Summit in Seoul in 2010 and the Maya Declaration in 2012 stressed the importance of financial inclusion in poverty reduction and formed global partnerships for achieving this goal. Likewise, the G20 Summit in Hangzhou in 2016 reaffirmed financial inclusion for the non-G20 nations. This transformation further shows that many developing nations have taken financial inclusion very seriously. Thus, there is now a financial inclusion

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unit at the central banks and ministries of finance as well as particular financial inclusion targets (Thorsten Beck et al., 2018).

The financial systems in developed nations are more inclusive than in developing ones. Kendall et al. (2010) explained that 81 percent of adults in developed nations have a formal bank account, while in less developed nations, the figure is 28 percent. Empirical data further reveals that close to 50 percent of the world's adult population remains unbanked (Chaia et al., 2009), with financial exclusion being most pronounced in the least developed nations. The key indicators for evaluating financial inclusion are the percentage of the population with formal accounts, savings, and borrowing from official financial institutions.

According to Demircuc-Kunt and Klapper (2013), seven countries—China, Pakistan, Indonesia, Bangladesh, Vietnam, India, and the Philippines—account for nearly 92% of the 1.5 billion unbanked individuals in Developing Asia. Although the savings rate in South Asia is relatively high at 32%, most people save through informal channels. This means that 21% of adults in Asia save with financial institutions, whereas 300 million adults or about half of the population keep their savings outside the formal banking system.

Accessing loans from formal financial institutions plays a crucial role in promoting financial inclusion. High reliance on informal credit shows that the traditional banking systems cannot fulfill the credit requirement of people due to various bottlenecks. While a very high percentage of 83% of adults rely on formal institutions for taking credits in high-income economies, only 38% of adults in Asia rely upon them. The borrowing pattern is varying with countries based on social and economic factors and respective requirements of the population groups.

Pakistan ranks among the lowest countries with regards to financial inclusion in the world. Indeed, most of the population lacks access to both formal and informal financial services. Only around 47 percent of the population has any form of access to financial services. Of these, only 23 percent are served by formal institutions, and 24 percent rely on informal sources, while an overwhelming 53 percent are not served at all. For instance, in Bangladesh, 40% of adults and in India 35% have an account with formal financial institutions. Other measures of financial inclusion in Pakistan paint a similar dire picture.

2. LITERATURE REVIEW

Fintech is crucial to assess the speed at which financial institutions and the financial system are changing. These include new delivery methods like payment systems, savings platforms, borrowing mechanisms, risk management tools, and financial advisory applications that have made the access to financial services much easier (He et al., 2017). Consumer demand for technologically advanced financial products has grown in response to the digital revolution experienced in other industries (Saal et al., 2017). The companies respond by offering ways that are more economical and convenient to borrow, invest, and transfer funds (Manyika et al., 2016).

In addition to the traditional banking and investment services, FinTech has spread into industries such as retail and telecommunications where companies use their current networks to offer advanced financial services. Even though many FinTech companies expand and expand their services, only a small percentage of people use these services, which calls for a more detailed investigation of the variables affecting their use. The majority of the previous work (Gao et al., 2011; Safeena et al., 2011; Teo and Pok, 2003; Rodrigues et al., 2016) targeted behavioral intention to adopt FinTech, leaving a lack of knowledge in terms of utilization. Most of them focus on behavioral intention or continuous usage intention, and they rarely look at how the relationship between intentions influences adoption. This difference highlights how crucial it is to investigate the moderating and mediating factors that influence this relationship. This study fills the gap by using an adaptation of the widely-tested Technology Acceptance Model (TAM) (Davis, 1985; Davis et al., 1989), a framework for realizing technology uptake. It has been successfully predicted and explained by TAM the variety of information systems, like online platforms and e-commerce, which users accept (Davis et al., 1989; Adams et al., 1992; Gefen and Straub, 2003). Since FinTech is a retail innovation, TAM is appropriate for examining consumer uptake and impressions.

Neoclassical economic frameworks have traditionally been used to study financial and social activities such as corporate governance, securities markets, and banking. These frameworks were developed since the 1870s, with a focus on statistical analysis and behavioral decisions over the qualitative elements of technological progress (Masoud, 2014; Sarkar, 1998). However, the focus shifted to economic growth driven by higher factor inputs after the post-World War II technological revolution (Atkeson and Kehoe, 2007; Perez, 1983). Lack of data on financial inclusion and institutional stability is the main reason for the scarcity of research on the stability-inclusion relationship at the institutional level (Danisman and Tarazi, 2020). The pre- and post-IR4.0 eras, FinTech-driven financial inclusion, and institutional quality are the main topics of this study, which looks at the stability of financial institutions in organization of the Islamic corporation (OIC) nations.

FINI, financial services accessible and not expensive for individuals and enterprise, are mentioned by Sahay et al., 2015. According to different studies, income inequality can be reduced with the decrease in financial inequality (IIE) through financial inclusion (Turégano & Herrero, 2018). Income gap is relatively less in those countries, which have a higher count of bank branches per population (Mookerjee & Kalipioni, 2010; Honohan,

2007). There is now evidence suggesting that increased access to financial services through digital platforms, among other things, reduces rates of inequality and poverty (Aslan et al., 2017; Park & Mercado, 2018).

To Bashayreh and Wadi (2021), fintech represents an emerging challenger to traditional financial services that meets the needs of consumers for a more modern, innovative solution and various digital transactions. FinTech fills the gaps in marginalized communities by promoting financial inclusion through digital payments, block chain technology, and mobile banking (GPFI 2016; Demirguç-Kunt et al., 2018).

The present paper is reviewed based on models such as those published by Galor and Zeira in 1993. Inequality in the loan market prevents low-income households from investing, hence maintaining inequality. The increase in financial access means they can invest in enterprises and education, elevating equity and economic progress, as argued by Demir et al. (2020).

The current state still lacks research on the relation between FinTech and economic inequality. Studies indicate that adopting FinTech, which provides easier access to financial opportunities, reduces inequality among the developing nations, mainly when mobile banking is utilized (Asongu & Nwachukwu, 2018; Asongu & Odhiambo, 2019).

It has also been proven that the adoption of FinTech reduces household poverty, particularly among women (Suri & Jack, 2016). There is a need to further research and explore how FinTech influences several SDGs to tackle the problems in the world.

This study is underpinned by the Financial Intermediation Theory (FIT) by Pyle (1971), which outlines how financial intermediaries enhance resource allocation, thereby lowering transaction costs and information irregularity. FinTech enhances the living conditions of vulnerable populations through technologies like digital payment and mobile banking (Ali & Abdullah, 2020; Mehrotra, 2019). Financial inclusion is an essential tool in economic development, and evidence-based research confirms that lower levels of poverty and inequality are associated with higher financial inclusion (Chibba, 2014; Lyons et al., 2020). Asongu and Nwachukwu (2018) as well as Demir et al. (2022), established that FinTech usage is linked with lower-level poverty and income inequality captured by the Gini at the national level. "ICT can reduce inequality," studies such as this one, Richmond and Triplett 2018, show not only how FinTechs may transform the financial landscape. FinTech is the game-changing factor that fosters economic growth, reduces income inequality, and promotes financial inclusion. FinTech improves access to financial services and allows more people to exploit economic opportunities, reducing structural inequality and promoting sustainable growth.

3. METHODOLOGY

The data which are utilizing for research is secondary data. To extract a data we used different global websites like World Development Indicators (WDI), World Bank Global Index (Findex), International Monetary Fund Financial Access Survey (FAS) etc. This research study concentrates a different statistical measure to investigate the data which is descriptive analysis, ARDL model. This method used for the examination the data which collected by utilizing the data assortment approach. Data which is used to create research is a secondary quantitative data.

The basic econometric model for the panel dataset of this study is as follows:

$$ATM = \beta_0 + \beta_1 Fintech\ Adoption_{it} (Mobile\ Phone\ Subscription + Internet\ Usage) + \sum \omega GDP + POP + INFR + Age + Income + \mu_{it} \quad (Eq.1)$$

$$Branches = \beta_0 + \beta_1 Fintech\ Adoption_{it} (Mobile\ Phone\ Subscription + Internet\ Usage) + \sum \omega GDP + POP + INFR + Age + Income + \mu_{it} \quad (Eq.2)$$

$$Borrowers = \beta_0 + \beta_1 Fintech\ Adoption_{it} (Mobile\ Phone\ Subscription + Internet\ Usage) + \sum \omega GDP + POP + INFR + Age + Income + \mu_{it} \quad (Eq.3)$$

$$Depositors = \beta_0 + \beta_1 Fintech\ Adoption_{it} (Mobile\ Phone\ Subscription + Internet\ Usage) + \sum \omega GDP + POP + INFR + Age + Income + \mu_{it} \quad (Eq.4)$$

However, due to the objective of the study as to estimate the long run and short impact of fintech adoption on financial inclusion for a panel of seven developing countries, the following general ARDL model is applicable:

$$Y_{it} = \sum_{j=1}^p \gamma_j Y_{i,t-j} + \sum_{j=0}^q \delta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (Eq.5)$$

Where,

Y_{it} = Financial Inclusion,

X_{it} = Fintech adoption and controls,

p = optimal lag order for financial inclusion,

q = optimal lag order for fintech adoption and controls,

γ_{ij} = slope coefficient for measuring the changes in lagged financial inclusion,

δ_{ij} = slope coefficients for measuring changes in fintech adoption as well as controls,

μ_i = country fixed effect,

ε_{it} = error term in panel model.

4. RESULT AND FINDINGS

4.1. Descriptive Profile of the Data

The analysis covered the years 2005–2023, using unbalanced panel data for a few selected developing economies: Bangladesh, Malaysia, Indonesia, Nigeria, Kenya, China, Afghanistan, India, and Pakistan. Key variables were extracted from international sources like the WDI, FAS, Findex, and UNDP. Its data covers the level of financial inclusion (ATMs, bank branches, borrowers, and depositors) and adoption of fintech (network use, mobile cellular subscription). Macroeconomic control variables consisted of age dependence ratio, GDP growth, inflation, population growth and income inequality (Gini Index).

The descriptive statistics Table 4.1 summarizes some of the important features of the data set. The mean values represent central tendencies with variables with relatively high average values such as Depositors (430.73) and Borrowers (162.29) compared to other variables such as GINI (0.443) and GDP (5.21). There was moderate financial penetration, with ATMs averaging 20.31 and Internet use averaging 26.07. Large standard deviations indicate that there is significant spread, particularly in Depositors (407.36) and Borrowers (161.60) suggesting variation in observations. The distributions of ATMs, Borrowers and Inflation are right skewed (above 1) while GDP is highly left skewed (-1.50). The values of high kurtosis in GDP (14.69) and Inflation (6.22) suggest that there may be outliers or fat tails present. Most variables appear to be non-normal (e.g. p-Values < 0.000 for ATMs, Borrowers, Inflation), apart from Branches ($p = 0.173$) and GINI ($p = 0.000$); this means that, except for the latter two, attention should be paid to the models that assume normality. These insights are crucial for preparing the data for econometric modeling and transformation.

Table 4.1: Descriptive Statistics

Item	ATM	Branches	Borrowers	Depositors	Subscription	Internet	GDP	Population	Inflation	Age	GINI
Mean	20.311	8.221	162.285	430.732	75.592	26.071	5.210	1.709	6.693	65.356	0.443
Median	10.510	8.347	86.078	288.884	73.422	16.700	5.556	1.596	5.876	60.040	0.424
Maximum	96.420	17.585	640.721	1887.652	164.535	97.700	21.391	4.093	27.851	109.729	0.588
Minimum	0.060	0.583	2.919	6.501	4.916	0.242	-20.739	-0.104	-5.992	37.241	0.378
Std. Dev.	22.825	3.897	161.601	407.356	36.687	24.219	3.972	0.877	5.477	19.284	0.049
Skewness	1.456	0.342	0.902	1.464	0.124	1.176	-1.504	0.401	1.421	0.385	1.481
Kurtosis	4.295	2.751	2.783	5.454	2.322	3.435	14.689	2.533	6.224	1.956	4.393
Jarque-Bera	63.518	3.507	16.923	63.249	3.502	39.544	1038.084	6.334	131.588	11.989	76.342
Probability	0.000	0.173	0.000	0.000	0.174	0.000	0.000	0.042	0.000	0.002	0.000
Sum	3046.710	1307.204	19961.090	44796.090	12170.320	4327.862	890.947	292.177	1144.516	11175.810	75.677
Sum Sq. Dev.	77624.010	2399.823	3186016.000	17091704.000	215347.500	96782.080	2682.158	130.656	5099.375	63215.170	0.403
Observations	150	159	123	104	161	166	171	171	171	171	171

4.2 Unit Root Test

Unit root tests, specifically the Augmented Dickey-Fuller (ADF) Fisher Chi-square and Choi Z-stat, were conducted to check for stationarity as shown in Table 4.2. Most series became stationary after first differencing, indicating that the data were integrated of order 1 (I(1)), which is suitable for regression analysis.

Table 4.2: Data Stationarity

Variable	Statistic	Level	1st Difference	2nd Difference	Obs
ATMs	58.225	0.1517	-	0.0000	114
Branches	37.3380	0.0047	-	-	141
Borrowers	21.2784	0.1681	0.0347	-	99
Depositors	46.4907	0.6660	-	0.0000	71
Mobile Cellular Subscription	39.0409	0.0028	-	-	143
Internet	51.6369	0.9995	-	0.0000	128
GDP	53.3259	0.0000	-	-	153
Population	45.1782	0.8282	0.0004	-	144
Inflation	43.1422	0.0008	-	-	153
Age	66.5000	0.0000	-	-	153
Income inequality	43.0531	0.0008	-	-	153

When we use unit root test we need to do at level, after applying unit root test at level all variables should be Stationary, not only at level but any level or 1st difference or 2nd difference for all variables, we select all the variables to check whether there is effect of time here or not, when we work on time-series data there must be significant impact with respect to time.

To check the time series impact we use unit root test, to measure the time impact at level it must be Stationary and all the variables result at level is Stationary and must be significant with time so here the probability level < 0.05 of all the variables at level unit root condition is true and Significant.

4.2. Correlation Matrix

The correlation matrix shows the linear correlations and their strength between the most important economic and financial indicators. There is a significant positive correlation between borrowers and ATMs (0.954) which indicates that the more available the ATMs the more the borrowers; this may be because they find it easier to get financing. The same is true with Internet use and borrowers (0.839) and ATMs (0.864) revealing the importance of digital connectivity in the fight for financial inclusion. There is a strong negative correlation between age dependency and both ATMs (-0.706) and borrowers (-0.811), which suggests that a region with a greater proportion of dependents may also have a lower level in its financial activity. Other correlations, if less strong, suggest that there is a relationship between financial/digital access and the other macroeconomic indicators of inflation (-0.162) or inequality (GINI Index, -0.262). Overall, the matrix illustrates the links between financial access, socio-economic indicators and digital infrastructure as shown in Table 4.4 on page 7.

4.4 Co-integration Test (Kao Test)

In Table 4.3 results of Augmented Dickey-Fuller (ADF) test confirm co-integration between the financial inclusion variables selected. The results of the ADF test show that all the dependent variables (ATMs, Commercial Bank Branches, Borrowers from Commercial Banks & Depositors with Commercial Banks) have probabilities (p-values) < 0.05, which are statistically significant, and they are all found to be non-stationary at level but there is long run relationship between them. Specifically, ATMs (-2.716), bank branches (-2.135), and borrowers (-1.803) have all been shown to be negative and statistically significant. Depositor has a positive ADF value (1.939) but is still statistically significant with a p-value of 0.026. The findings reveal co-integration relationships between the variables, hence the adoption of long run panel regression models, and the presence of a stable relationship over time between financial infrastructure and financial inclusion in the countries studied.

Table 4.3: Co-Integration Analysis

Equation	Dependent Variable	ADF Statistic	Prob.	Conclusion
1	Automated Teller Machines	-2.716	0.003	Co-integrated
2	Commercial Bank Branches	-2.135	0.016	Co-integrated
3	Borrowers from Commercial Banks	-1.803	0.036	Co-integrated
4	Depositors with Commercial Banks	1.939	0.026	Co-integrated

Table 4.4: Correlation Table

Items	AGE	ATMs	Borrowers	Depositors	GDP	GINI Index	Internet	Inflation	Subscription	Population	Branches
Age Dependency	1.000										
ATMs	-0.706	1.000									
Borrowers	-0.811	0.954	1.000								
Depositors	-0.024	-0.100	-0.158	1.000							
GDP	-0.040	0.006	0.083	-0.283	1.000						
GINI Index	-0.173	-0.029	0.011	-0.060	0.027	1.000					
Internet	-0.694	0.864	0.839	0.225	-0.135	-0.262	1.000				
Inflation	0.251	-0.394	-0.405	0.194	-0.177	0.222	-0.391	1.000			
Mobile Cellular Subscription	-0.646	0.754	0.708	0.415	-0.170	-0.337	0.908	-0.300	1.000		
Population	0.865	-0.518	-0.627	-0.006	-0.057	-0.470	-0.417	0.163	-0.407	1.000	
Branches	-0.776	0.430	0.488	0.124	-0.003	0.333	0.432	-0.019	0.470	-0.703	1.000

4.5 Regression Analysis (Panel Least Squares)

The regression results in Table 4.5 show that mobile cellular subscription has a consistent and significant impact on all financial inclusion indicators. Internet usage and the Gini index also display strong significance in most models. GDP growth, inflation, and age dependency ratio shows inconsistent significance, indicating limited explanatory power in some contexts.

Table 4.5: Regression Analysis

Variables	ATM (Eq.1)	Branches (Eq.2)	Borrowers (Eq.3)	Depositors (Eq.4)
Mobile Subscriptions	-0.001	0.000	0.000	0.000
Internet Usage	0.000	0.000	-0.122	-0.043
GDP Growth	-0.047	-0.680	-0.068	-0.919
Population Growth	-0.337	-0.598	-0.648	-0.268
Inflation	-0.681	-0.258	-0.056	-0.022
Age Dependency	-0.399	0.000	0.000	-0.214
Gini Index	-0.608	0.000	0.000	0.000

5. DISCUSSION

The purpose of the present study was to investigate the impact of the use of fintech on financial inclusion within the selected developing countries for the time frame 2005-2023. The results offer strong evidence that fintech innovations, and specifically mobile phone subscriptions and Internet use, are important drivers of financial inclusion, but with different impacts depending on the type of financial service or the macroeconomic environment.

The analysis found that mobile phone subscriptions have a significant effect on all four indicators of financial inclusion: ATMs, commercial bank branches, the number of borrowers and depositors. This corroborates past studies by Demircuc-Kunt et al. (2018) and Kamara and Yu (2024) which had noted that mobile phones are a key means of accessing financially excluded populations because of their ubiquitous presence and capacity for mobile money and microfinance.

Use of the internet, on the other hand, presented mixed effects. While it significantly and positively impacts ATM expansion, it was negatively associated with the number of bank branches and depositors, and showed no significant effect on borrowers. It's a sign of the duality of digital adoption: With more online services, a physical bank might seem less relevant. A similar finding was observed by Ashenafi and Dong (2022) where they discovered that fintech online may be a replacement for the traditional route, rather than supplementing it, especially in the least well-served markets.

The study also revealed that neither GDP growth nor population growth are significant factors influencing financial inclusion. The finding fits in with Banna et al. (2021) and Chinoda and Mashamba (2021) who state that economic growth does not always lead to better access to financial services. It focuses on targeted digital strategies as opposed to generic economic expansion.

In certain cases, significant inflation and age dependency ratios were identified. However, branch growth was negatively affected by inflation whereas deposit behaviors were positively affected—likely because people would turn to banks in times of inflation for financing. Demographic factors, such as age dependency relations, were positively associated with the availability of ATMs and the amount of loans disbursed, which suggests that age dependency can stimulate the demand for financial services. Finally, all financial inclusion indices were consistently impacted by the Gini index, which measures income inequality. By offering services to marginalized groups, inclusive fintech approaches can help reduce income inequality, which is consistent with the findings of Demir et al. (2022) and Usta (2023).

6. CONCLUSION

The results of the study show how adopting fintech can significantly advance financial inclusion in developing countries. The study demonstrates how mobile technologies, in particular mobile phone subscriptions, are crucial in increasing access to financial services using panel data from nine countries between 2005 and 2023. These technologies significantly promote the expansion of ATMs, banking branches, borrowing, and deposit operations in order to help bridge the gap in financial accessibility.

The results were more specific, even though internet usage is equally significant. As more people choose app-based services and digital wallets, technology may lead to the expiration of traditional banking infrastructure, including physical branches and deposit accounts, even though it makes access easier in some ways, such as the installation of ATMs. From the abovementioned finding, it can be concluded that the two financial systems, traditional and digital, will need to be integrated in a balanced way.

The absence of the influence of macroeconomic variables, such as GDP growth and population growth, supports the notion that economic growth is not enough for inclusive financial development. The impact of a good digital infrastructure and specific technology solution seems to be more direct and visible on the level of financial inclusion. Recent research, including that of Ashenafi & Dong (2022) and Ismail et al. (2024), indicates that technological advancements need to support economic growth to make it more financially accessible to those who are not being served. This is consistent with these findings.

Demographic indicators such as the age dependence ratio, and income inequality (Gini coefficient) are factors that play a critical role in financial inclusion outcomes. As mentioned above it is crucial to develop fintech solutions that meet the needs of diverse demographic segments, including those that are financially vulnerable and economically disadvantaged. To sum up, fintech is an important, inclusive and scalable solution to improve financial institutions in developing countries. But it needs to be backed up by enabling policy settings and better digital literacy, competitiveness and infrastructure.

The study's empirical findings show that the adoption of fintech, particularly through mobile subscriptions, has a positive impact on a number of aspects of financial inclusion in developing countries. Internet access also has an impact, albeit in differing ways by type of financial service, suggesting a more complex/situational relationship. The research also shows that two macroeconomic indicators, population size and GDP, are not good measures of the extent of financial inclusion. Instead, it is shown that the more equal distribution of income and the improvement of technological infrastructure have a larger effect.

The findings confirm the previous study that showed that fintech is a powerful enabler in the financial inclusion, especially for markets where financial services are not widely available. Ismail et al. (2024) and Girma & Huseynov (2023) suggest that digital finance could be a game-changer, but the key lies in the policy frameworks and inclusive development strategies in place. Again, the final recommendation of the study suggests the need for regulation that will encourage the use of digital technology and remediation of the structural injustices. These data can be used by policy makers and development partners to help direct efforts to increase the financial access to technology.

6.1. Implications

Policymakers should even look at digital infrastructure development, particularly mobile connectivity, to promote financial inclusion. Mobile subscriptions have a huge impact, as evidenced by the importance of legislative support for mobile fintech. Barriers to the adoption of fintech in low-income segments include digital literacy and cyber security risk, which require regulatory bodies to take action.

Traditional banks must adopt digital transformation by integrating mobile platforms and reducing reliance on physical branches. The negative association between internet use and branch growth implies a need for digital-first strategies. Fintech firms should collaborate with local institutions to build trust and usability among low-income users, especially in rural areas, to maximize their reach and adoption.

6.2. Limitations

Due to its limited scope and the accuracy of the study, the results may not fully apply to other regions as the pattern of Fintech adoption and financial inclusion experiences may differ. Additionally, the study was carried out from 2005 to 2023, so it might not have taken into account more recent developments in the Fintech sector. Because of the use of secondary data sources, the results are only applicable to other settings and time periods with modification.

6.3. Recommendations

Support infrastructure for mobile banking, Mobile banking subscriptions are the strongest enabler of financial inclusion (Demirguc-Kunt et al., 2018; Kamara & Yu, 2024), which therefore requires governments and regulators to encourage mobile banking infrastructure.

Improve digital literacy initiatives, as they affect the digital divide, and conduct targeted educational campaigns to make low-income and rural communities familiar with fintech platforms (Lusardi & Mitchell, 2014; Błach et al., 2021).

In developing markets, Policy frameworks need to encourage innovation, while safeguarding consumer rights and cyber security (Gupta & Xia, 2018; Nejad, 2022).

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