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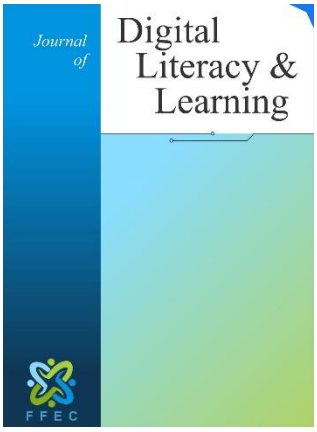

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Recalibrating the Role of Financial Inclusion in Promoting Digital Literacy: Evidence from Pakistani Banking Industry

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Recalibrating the Role of Financial Inclusion in Promoting Digital Literacy: Evidence from Pakistani Banking Industry

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Abstract

Financial inclusion and digital literacy are considered key to economic development and bringing the population out of poverty. Keeping this goal in mind the objective of this study is to test the impact of financial inclusion in promoting digital literacy through the banking industry. In this study, the data taken from the period of 2005 to 2023 has been used. The panel data analysis method is employed to examine the impact of financial inclusion on digital literacy in Pakistan. The results show that the banking industry has an overall significant impact and leads to changes in deposits, population, and loans, while GDP grows with the expansion of the banking industry. Financial inclusion can be utilized as a tool to enhance digital literacy. The study has noteworthy implications for future researchers and policymakers. Policymakers should formulate strategies to promote financial inclusion, and the government in developing countries like Pakistan should launch programs and support initiatives to advance financial inclusion and digital literacy. Digital literacy can enable individuals to embrace financial services and navigate digital transactions proficiently. Future researchers should explore how financial inclusion and digital literacy are transforming lives.

Keywords: Loan, GDP, Financial Inclusion, Financial Services, Digital literacy.

Introduction

Literacy can be from the basic knowledge of reading and writing to the highest level. In this present era of globalization and technological development, digital literacy is gaining popularity because of its role in skill development as well as in eradicating poverty and socio-economic development (Gautham et al., 2022). Financial literacy can be studied at both individual levels as well as at a national level. At the individual level, greater level of financial literacy gives access to consumers for financial opportunities through the power of digital technologies and at the national level digital literacy results in a literate public that engages in economic activities that promote the economic activities as well as financial development (George et al., 2020).

Governments are taking initiatives to promote digital literacy among their citizens irrespective of their social class. Taking the example of India which is the second largest populated

country its goal is to provide digital literacy to up to 60 million of its citizens Nedungadi et al .,(2018). Financial Inclusion is debatable at the national level in many countries and special attention is given to the phenomena of financial inclusion. Since 1990s the financial inclusion special attention has been given to this issue because it is an emerging issue for policymakers (Leyshon & Thrift 1993). Most countries are committed to supporting the agenda of sustainable development goals (SDGs) by eliminating poverty and this goal can be achieved through financial inclusion specifically in Asia (Sha'ban et al.,2020). World financial inclusion does not encompass the economic concept, but it is also a socioeconomic concept because it provides ease in terms of having security for future well-being as well as taking people out of poverty and helping them to face the challenges ahead of life (Menon, 2019). Financial inclusion occupies the central position in the global development agenda and at the country level studies have found that financial inclusion fosters economic development as well as leads to a reduction in poverty and tax evasion (Kim et al.,2018; Dou & Dong et al.,2023).

Digital literacy is crucial to experiencing new technologies because it ensures socio-economic development and helps them to be a part of a modern digital society that has better infrastructure and tools to communicate (Beja Kovic et al., 2020). In rural areas, cash is still used for day-to-day transactions and the savings are kept in physical form such as gold or land (Matin et al., 2002; Zelizer et al., 2021). However, with the introduction of digital financial services and the government efforts and programs for promoting financial inclusion the people are shifting towards the management of financial services (Cohen et al., 2011). The major challenge regarding rural financial management is the lack and awareness of digital literacy (Arora et al., 2016). Building financial inclusion is a complex phenomenon. If we look at the literature, there are five types of financial exclusion. Access exclusion is due to the remoteness of the location due to the terrain or mountainous region, so the segment of the overall population is unable to access financial services. The second is the condition exclusion which refers to the condition which is unacceptable for some people and the third one is the price exclusion which is due to the too much higher prices of the financial products and financial services. The fourth exclusion is the marketing exclusion which is due to targeting the specific market and segment for the financial instruments. The fifth type of exclusion is due to self-exclusion which is due to the barriers of the same kind, such as religious barriers or psychological barriers (Kempson & Whyley, 1999).

With the advancement in technology and COVID-19 disruptions, a shift has been seen in accessing financial services through financial digitization through the optimum use of technology. Nowadays, with the emergence of digital financial services, there are many digital platforms which are adapted to meet their needs Tay et al., (2022). Greater financial inclusion, the more it brings with itself the greater stability. World financial inclusion has been one of the most promising research areas since the 1990s and at the international level a lot of research has been done in this area, especially in developing countries, but still, this concept needs to be addressed, as the policymakers real concern is people who are socially excluded and the recent studies have focused on these people how they can be brought and lined with the formal financial institutions (Leyshon & Thrift, 1993, 1994, 1995; Collard, 2010). Bertram et al., (2016) defined financial inclusion as the ease of access and availability of financial services to all people, especially the underrepresented and those who are not economically well off at a lower and affordable cost. The fintech plays a crucial role in endorsing financial inclusion and helps in overcoming the barriers.

Economic theory proposes that financial exclusion results in increased inequality. If there is the existence of a credit market and it is imperfect the individual's initial wealth justifies their

ability to make investments in both human as well as physical capital which prevents the social mobility of the poor and leads to increased inequality (Banerjee and Newman 1993; Galor and Zeira 1993; Aghion and Bolton 1997; Ghatak and Jiang 2002; Galor and Moav 2004; Mehrotra and Yetman 2014). Social network theory was first proposed by renowned sociologist as well as psychologist Jacob Menro he introduced the concept of "sociometry" which encompassed the mapping as well as visualization of relationships within groups hence becoming the father of modern social networks. Stack (2008) postulates that most financial literacy initiatives take place within the prevailing social network through which financial knowledge and skills attained are turned into tangible financial choices. Reagans and McEvily (2003) claimed that social networks acts as a channel through which financial knowledge and expertise can be transferred to the deprived members of a particular social group. Therefore, those who are linked with networks may enhance their existing financial knowledge and skills making them capable of making wise financial decisions and choices Cohen et al., (2011). Woolcock (1999) proposes that a network creates information channels, eases transactions, and lessens the cost of retrieving financial services such as credit. The social network acts as a medium for the transition of information about prevailing sources of financial services amongst the poor (Grootaert, 2001). Accordingly, Okten and Osili (2004) contend that social networks result in the transfer of information about the accessibility of credit chances. Similarly, social networks amongst the poor turn into a transmission device to regulate their creditworthiness and being designated to accept loans Aryeetey. E, (2005).

Digital literacy has an eminence important for individuals to participate in daily economic activities such as making an investment decision in consumption and as well as in employment (Qing et al., 2021). Financial literacy plays a role of catalyst in economic growth as well as in development importance of skill and knowledge has been acknowledged by many studies (Sey et al., 2019) and UNESCO (2017) however fewer studies incorporate the role of skills and digital literacy in adopting the digital banking services. The societies with a low level of financial inclusion people strive for due to the unavailability of financial services. Financial inclusion differs across the globe. In many developing countries the share of financial exclusion can be as high as 90 per cent in adults. However, due to the efforts in developing countries, financial inclusion may increase in the coming years. Financial inclusion also varies based on income level from region to region and on ethnicity. The proportion of adults who have accounts with a formal financial institution ranges from 20 out of hundred in low-income countries and 90 out of hundred people in high-income countries and cases of emerging countries such as India, Mexico Nigeria the percentage is 40 per cent and in China, it is 60 per cent. (Mehrotra, 2015).

The main objective of this research is to study how financial inclusion plays a role in promoting digital literacy. In this research, the crucial role of digital literacy in promoting financial inclusion in the banking stock return of Pakistan has been investigated because the financial system is based largely on the banks for the channeling of the funds from the savers to the borrowers. The bank also plays the role of the backbone in the economic system and the economies are heavily dependent on banks for the day-to-day business. In this era, countries need to have a competitive edge over other countries. The role of digital literacy in promoting financial inclusion is evident at both national as well as individual levels. Financial inclusion concerning access to financial instruments by people is necessary for bringing financial stability and economic growth to the country. This research also helps in determining whether financial inclusion traps poor households or it can help in increasing their wealth and leading to profitable investments such as business or educational purposes. So, it is essential to investigate whether or not financial inclusion affects

socioeconomic empowerment in developing economies like Pakistan where there is social and economic disparity at its peak. Digital literacy can act as a big leapfrog to overcome poverty as well as the division of classes within Pakistani society because the financial inclusion role in uplifting GDP as well as promoting financial development cannot be ignored.

The significance of the study not only covers financial inclusion but also provides ways for economic and sustainable development when combined with digital literacy. The main significance is that financial inclusion is at the forefront in the elimination of poverty and also strengthening and bringing economic development in the countries. The majority of the world's adult masses do not have any kind of access to basic financial instruments and financial products (World Bank, 2015). As everything around, us is getting digitalized and it needs everyone needs to have the knowledge and understanding of how to use digital tools in every part of the country. Take the example of an ATM if people do not know how to use it all the money is wasted, which leads to financial exclusion. Financial inclusion makes it possible for the stakeholders to devise strategies that guarantee individuals and businesses may responsibly and sustainably obtain the necessary transactional, monetary, savings, credit, and insurance products and services (Chakraborty and Abraham, 2021). From the general population to the economy, financial inclusion creates a ripple impact on every aspect of life. Financial inclusion not only raises the standards of living but also creates an environment that is supportive of those in the community. In the present societal era of information and knowledge digital literacy is a contemporary and crucial "life skill." (Martin;2005). So, for survival as well as for economic development these skills must be mastered. Financial inclusion helps the poor to get out of poverty, especially in underdeveloped countries or: countries that have an informal economy. According to the State Bank of Pakistan report more than 27 million people live less than 1 dollar a day and more than 27 million live 2 dollars a day there is one branch to serve the 2000 people, so the significance of this study is evident.

As financial inclusion is a multi-dimensional concept it is measured by the different indicators and different researchers have used different indicators or measurements to measure financial inclusion. Beck et al., (2007) and the Alliance for Financial Inclusion (2013) measured financial inclusion in regard to accessibility and usage of the financial facilities by overall number of bank branches and accounts. The measures such as the branches and accounts are the tools used for measuring the banking breath whereas the amount of the credit is used for the banking depth (Beck et al., 2011). Considering these wider issues and challenges, current research is intended to identify how socioeconomic empowerment can be made with the help of financial inclusion, financial decision and behaviour Mader., (2018)

The implementation and adaptation of financial inclusion policies depend on the level of digital literacy in the population. The paper contributes to the literature in the following ways: Firstly, this paper enriches our understanding of how financial inclusion plays a role in promoting digital literacy and what effect it has in a developing country like Pakistan. Secondly, this paper is part of the large empirical literature by studying the dimensions of financial inclusion and its role in eradicating poverty. The result of this study shows that the financial inclusion dimension of availability and usage plays a crucial role in promoting digital literacy Taking Pakistan as the sample will provide valuable insight because it is the sixth largest country with a population of more than 240 million. In the end finding of this study has an important policy implication. Tackling poverty is the main objective and digital literacy can play a vital role in bringing the

masses out of poverty and it also helps them make an informed investment decision. Our findings show that financial inclusion is the way to economic development as well as easy access to credit.

Literature Review

The vital role of financial inclusion has been acknowledged, but the literature still lacks measurement tools that are used for the estimation of financial inclusion in the economy (Sarma, 2012). Tay et al., (2022) in their research found that digital financial inclusion can help in achieving sustainable development goals as well as Asian countries should focus on and embrace financial inclusion because it helps in reducing poverty. Gautham et al., (2022) studied the role of rural banks in rural development and its impact on digital literacy in India and found that rural banks have a significant positive impact in promoting digital literacy and financial development. Kumar et al., (2017) financial inclusion and digital literacy are basic free-of-cost services that are available to all the people within the society.

Financial inclusion and digital literacy play a vital part in the socio-economic development country and banks are at the forefront in promoting this development Soni et al., (2013). Academic researchers and policymakers acknowledge the role of financial inclusion in promoting economic growth and sustainable development and it has also lowered the poverty level in many countries (Gurley & Shaw, 1955; Goldsmith, 1969; Greenwood & Jovanovic, 1990; Cull et al., 2014). The concept of financial inclusion provides the solution which can help and enable all the people of the society to have access to formal financial services especially those that are at the bottom of the economic system (World Bank., 2017 report).

Prior studies have found that individuals who have digital literacy can use digital platforms better than others and are important members of society. Bergdahl et al., (2020) in his study found that students with high tech-related skills are more engaged and adapt more quickly to the technology learning environment. The Financial Action Task Force defined financial inclusion as all means of ensuring that the financially excluded people and groups such as low-income level, below in the pyramid of the economic system or rural people help in the fight against money laundering and terrorism financing. Financial inclusion helped in the channeling of the funds from the savers to the borrowers and fulfilling the demand and supply by creating liquidity and allocating the funds efficiently, hence promoting economic development. Rangarajan (2008) documented that financial inclusion is no longer an option but a necessity". Saif Ullah et al., (2022) studied the relationship between mobile banking and digital literacy as well as financial literacy in Pakistan and found that digital literacy has a strong and positive relationship with behavioural intention to adopt mobile banking. These results are in line with the past studies of (Darsono, 2005; Bergdahl et al., 2020).

The participation did not include undocumented or low-income levels but also all the strength of the society. Demirguc-Kunt & Klapper (2012) defined financial inclusion as a scenario that depicts access to financial services without any price barriers or any barrier to the use of those services. Chakravarty and Pal (2013) defined financial inclusion as the delivery from the economic-financial system to its members and is the opposite of banking inclusion. According to Steiner et al., (2009), there are three types of financial services the first one is saving products the second is the loan offered by the financial institution and the third is the insurance services.

The World Bank Report on Financial Inclusion and Development stated that despite all the rigorous efforts there are more than two billion people around the world who do not have an

account with formal financial institutions and half of the poorest population of the world are unbanked, which means they do not have any kind of the saving-investment or insurance access. So giving access or easing the process of the transaction is the first step for financial inclusion because it can help people save money, send money or receive it. And financial inclusion is the topmost goal in the 2020 Universal Financial Access agenda. And the economies which are resource-strapped face difficulty in achieving financial inclusion (World Bank Report, 2017).

In resource-strapped economies, the lack of access to financial services can result in the prohibition of women from economic empowerment. There are more than 50 per cent poor people around the do not have any kind of account with the formal financial institution or any kind of link with the financial institutions. This devastation is the result of the inaccessibility of the banks accessing the areas and these individuals are at the risk of slipping into the poverty line. Financial inclusion helps in creating solutions for the people in bringing them into the financial system especially those who are in the bottom line. Financial inclusion has helped in achieving growth and according to the World Bank, financial inclusion can help in the alleviation of poverty and also helps in prospering the country (World Bank Report, 2017).

Many motives push us for financial inclusion but first, we would look at the financial exclusion. There are numerous reasons for not having an account with the formal financial institution and we could not ignore the behavioral aspect. Fungov and Weill (2015) come up with the following reason based on the survey financial institutions were too far away and too expensive to operate an account. Some other reasons were the lack of trust or lack of money. One of the main reasons was the religion some people do not want to have an account with the formal institution because of religious reasons. It also helps in understanding and predicting voluntary exclusion or involuntary exclusion. The voluntary exclusion was due to lack of funds or religious reasons and involuntary reason can be the lack of trust" \too far away" (Allen et al., 2012).

So these were the motives behind the financial exclusion and the differentiation between the voluntary and non-voluntary exclusion was necessary because it had implications in the policy-making but one of the dominant reasons in developing countries was the lack of funds and the second reason was the religion which also plays a pivotal role to be financially excluded.

According to Demirgc-Kunt and Klapper (2013), there were three main indicators of financial inclusion. The first and foremost is the ownership of an account. It means holding an account with a formal financial institution. The second indicator was the saving behaviour and it is associated with those who have saved or trying to save something in the formal account. The second indicator helps in measuring the willingness and propensity of people to save money in the account of a formal financial institution rather than going for another available alternative. The third indicator is the utilization of bank credit. The people go for a loan to the formal financial institution. The financial inclusion is in different forms, but the bigger one is in the form of the ownership of an account with the formal financial institution.

According to Kunt and Klapper (2013), the GDP per capita was vital in explaining the cultural differences in using accounts with formal financial institutions. In their research, they found a wide range of inconsistencies in the usage of an account with the formal financial institution between higher-income and low-income levels countries. Choa et al., (2012) found that wealth has a significantly strong relationship with the saving among individuals who are at the lower levels in the economic cycle. The level of income that an individual earns depends on the level of education that individual had and the gender roles that were played by him play a vital

role in distinguishing the savers and borrowers in the overall population. Poor access to credit can create problems for policymakers. Several studies have confirmed that credit from financial institutions serves as a bloodline for small businesses and also promotes entrepreneurship.

It played a vital role in developing and prospering small businesses, but it is also a concern for small businesses compared to large businesses who enjoy the credit facilities from formal financial institutions, especially banks without any difficulty (Hale & Long, 2010). The limitations of the credit can result in economic loss for the country as the easy access to the credit had fruitful results in the form of eliminating poverty from society and overall having a good impact on society (Bruhn & Love, 2014). Limited access to credit can result in concentrated banking harming financial stability and also encouraging people to use informal ways for the channelling of funds. It also affects economic growth because the industries have difficulties in obtaining financing from the financial institution which can result in slow economic activities (Iorgova & Liu, 2013).

The other indicators of financial inclusion are education, gender, and age. Education has a great impact on deciding the sources from where we can borrow and how we can borrow. Gender has also influenced such as being a woman reduces the chances to obtain credit. Last but not Age is also an indicator that being older increases the chances of a formal financial institution (Zuzana et al., 2014). If we look at the existing literature on financial inclusion the main concern of the researchers is (1). How financial inclusion can be measured (Chattopadhyay, 2011; Gupte, Venkataramani, & Gupta, 2012; Arora, 2014 Wang & Guan, 2017) and (2).what were the factors that impact financial inclusion or have any kind of link with the financial inclusion. (Chithra & Selvam, 2013; Martinez, Hidalgo,& Tuesta, 2013, Chakravarty & Pal, 2013; Corrado & Corrado, 2015; Sahoo, Pradhan, & Sahu, 2017; Wang & Guan, 2017).

From a measurement perspective, two dimensions must be considered: the first dimension is access to financial services and the second dimension is the usage of the financial services. The first dimension can be explained by the ability to access financial services physically and the inability to access financial services can result as a main ingredient for financial exclusion and it also affects the usage of financial services (Amidzic et al., 2014; Beck, Demirguc-Kunt, & Peria, 2007). Most of the studies proved that when the countries had well-established financial institutions and ease of using financial services, they saw a reduction in poverty and inequality was lower in countries (Beck, DemirgucKunt, & Levine, 2007; Beck, Demirguc-Kunt, & Peria 2007; Jeanneney & Kpodar, 2011).

The literature on financial inclusion focused on the four main areas. The first one implied financial inclusion as the financial inclusion arises from the microfinance and microcredit which were in line with the financial exclusion. In 2005 the United Nations proposed the establishment of a unified financial inclusion system worldwide to include the low-income and the aged population (Chauvet &Jacolin, 2017; Conroy, 2005).

Data Description & Research

Methodology

The methodology part includes studying the impact of digital literacy through the lens of financial inclusion in Pakistan. The impact of financial inclusion is measured by the dimension of availability and usage. The banking stock returns are used to measure the impact the bank has on financial inclusion in promoting digital literacy. The present study intends to scrutinize the impact

of digital literacy through financial inclusion in Pakistan. This research intends to identify the specific factors which are influencing the adaptation of financial inclusion in Pakistan. So, it can be said that this is casual research because it examines whether the change in one variable has an impact on the change in another variable and the keen interest of the researcher is in explaining the factors which have a significant impact on the studied problem (Bougie et al., 2016). The quantitative research method has been used because the numerical data is being used. The study uses the deductive research approach because it has a theoretical background about the linkage of digital literacy and financial inclusion.

A financial system needs to have many users meaning that the penetration of the banking must be as high as possible. Considering this approach measure of Sarma (2012, 2015, 2016), we use the data of deposits to measure financial inclusion. The financial inclusion definition includes both the availability and usage of financial services. So, the availability and usage together can build an inclusive financial system which can help promote digital literacy and the banks are the gateway for this process (Sarma et al., 2008; Nguyen et al., 2021).

Data Description

The study investigates the impact of digital literacy in promoting financial inclusion. The secondary data has been used because the data is collected from existing sources and databases (such as reports, websites etc.) and this data is being used for research purposes. Further, the panel data is used in this study and the data of sample banks has been collected repeatedly from 2005-2023. This data is analyzed for multiple periods. Ans one of the basic characteristics of the panel data is the reputation of the observations of the same entities (Andre et al., 2013). In the panel data, there are numerous ways to tackle the econometric problems such as multicollinearity (Hsiao 2014). How to measure financial inclusion is a topic of great interest to researchers and policymakers. To study the impact of financial inclusion on the banking industry the banking stock returns are taken because we are dependent on banks for transactions as well as day-to-day business activities., the data sources include the Statistical yearbook published by the Pakistan Bureau of Statistics, state bank of Pakistan reports and Ministry of Finance Government of Pakistan on yearly are used.

Table 3.1 Financial Inclusion Dimensions

Dimension	Variables	Abbreviations	Period
Availability &Usage	Loan& Advances	Loan	2005-2023
	Deposits	Dep	2005-2023
	Gross Domestic Products	GDP	2005-2023
	Population	POP	2005-2023
	Premium income (insurance)	Inc	2005-2023

Table no. 3.1 includes the variables used for measuring the financial inclusion

Table 3.2: List of Banks

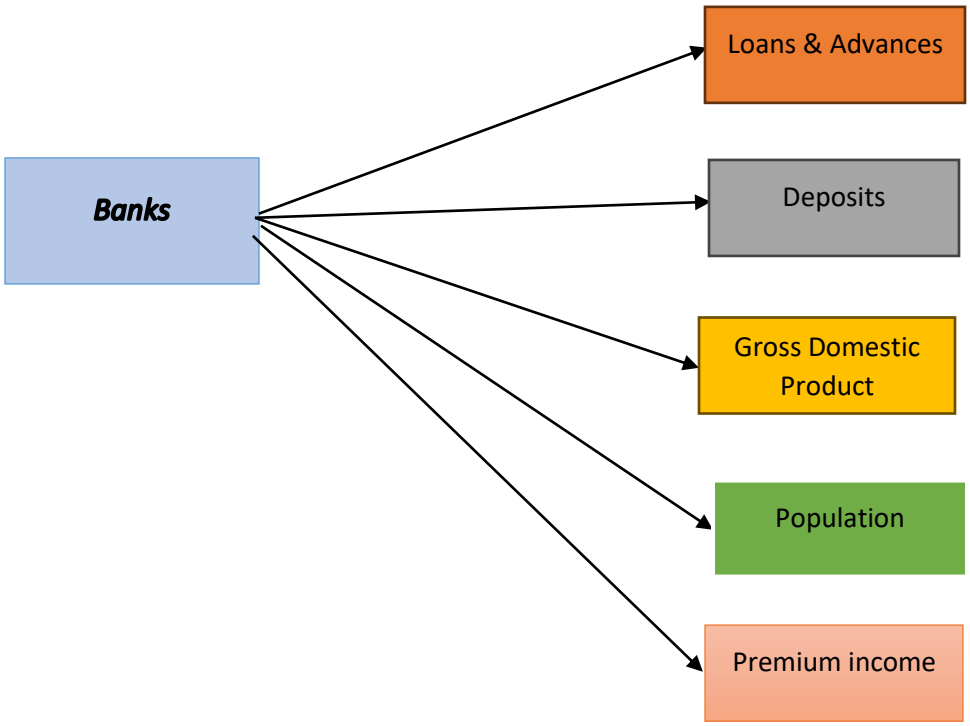
No.	Banks	Symbol	Data period
1.	Allied Bank Limited	ABL	2005-2018
2.	Askari Bank Limited	AKBL	2005-2019
3.	Bank Alfalah Limited	BAFL	2005-2020
4.	Bank AL-Habib Ltd	BAHL	2005-2021
5.	The Bank of Punjab	BOP	2005-2022
6.	Faysal Bank Limited	FABL	2005-2023
7.	Habib Bank Limited	HBL	2005-2024
8.	Habib Metropolitan Bank Limited	HMB	2005-2025
9.	MCB Bank Limited	MCB	2005-2026
10.	Meezan Bank Limited	MBL	2005-2027
11.	National Bank of Pakistan	NBP	2005-2028
12.	United Bank Limited	UBL	2005-2029

Econometric Models

The panel data model (PDM) is generally employed to analyze the data in this study. The panel data model integrates elements of the additional renowned analytic models, cross-sectional and time-series Lovagelio et al., (2024). As a result, it has been revealed that PDM can disclose far more information than a single time series or cross-section analysis. The panel data and regression analysis have been applied to study the impact of financial inclusion on banking stock returns. For this purpose, simple regression has been estimated.

$$Banks_t = \beta_0 + \beta_1 DEP_{it} + \beta_2 POP_{it} + \beta_3 GDP_{it} + \beta_4 INC_{it} + \beta_5 LOAN_{it} + \mu_{it}$$

In the above equation, $Banks_t$ stands for the banks operating in Pakistan DEP_{it} is for the total deposit in Pakistan and t is modelled as a function of deposit. POP_{it} stands for the population at time t, GDP_{it} for the Gross Domestic Product, INC_{it} for insurance and $LOAN_{it}$ for the total loans. At the Micro level: Impact of financial inclusion on the banking industry.



The framework of the role of financial inclusion in promoting digital literacy

Results & Discussion

The results & discussion include the data on the population deposit and other variables that are taken from the study of (Zhu, He & Zhai, 2019) for the measurement of financial inclusion. The first set the data is examined by the descriptive statistics and correlation matrix the independent variable is banks.

Descriptive Statistics

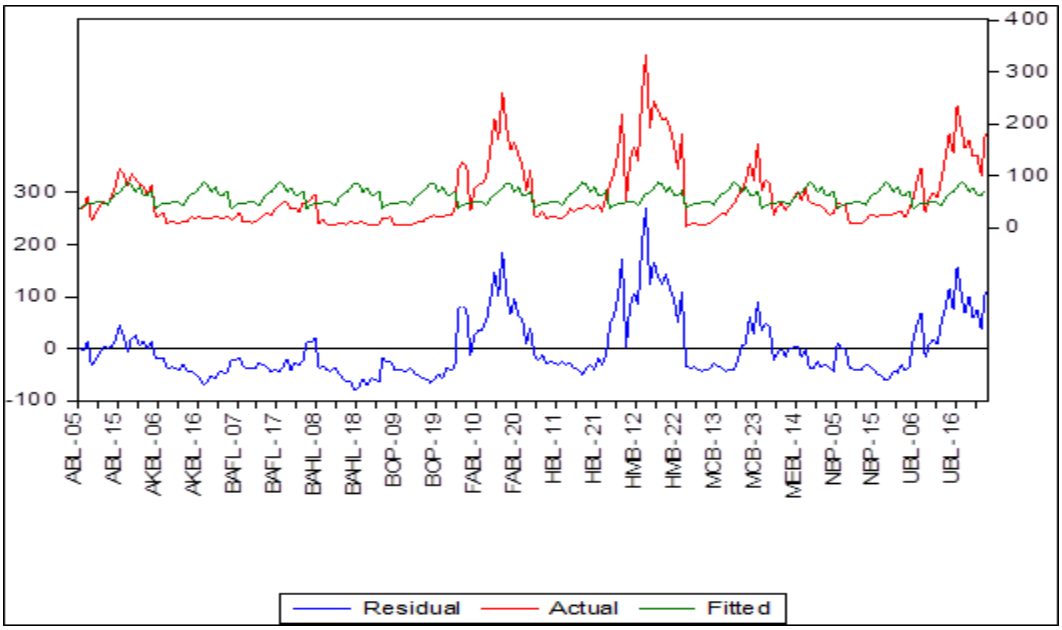
Table 4.1 reports the descriptive statistics of banks and other industries. In descriptive statistics, the characteristics of the data are captured. Those are the Mean, Variance, Kurtosis and Skewness. The sample period for the data is from 2005 to 2018.

Table 4.1: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
BANKS	60.55333	36.58	333.1	4.24	61.6158	1.61208	5.28042
DEP	10574630	8342172	27840709	2661697	7144570	0.9067	2.82673
INC	315632.5	283642	631000	75097	149746.7	0.36461	2.46354
LOAN	1372528	315409	6288100	197241	1880551	1.41891	3.54255
POP	2.79E+08	1.99E+08	1.89E+09	17555609	3.83E+08	3.89881	16.5426
GDP	19972162	19197289	49856578	53317.44	15557313	0.42737	2.16062

Table no.1 shows the results of the descriptive statistics.The Loan=Loan& Advances,Dep=Deposits,GDP=Gross Domestic Products,POP=Population,INC=Premium income (insurance)

This table consists of the descriptive statistics of the financial inclusion dimension and the yearly data of the banking stocks and financial dimension that were taken in this study. The Highest means of the GDP (19972162) and the lowest is of the population of the (2.79E+08). The maximum value is of the GDP and the lowest value is of the population (1.89E+09). The Skewness tells us about the asymmetric behavior in the data and its value is positive for all the variables. And there is no Asymmetry. Kurtosis is positive and greater than 3 for the Banks, Loan, and Population which shows that all the series have fat tails with high and are leptokurtic and GDP, Deposit and insurance have a value less than 3 shows that they have a lighter tail and are platykurtic.



The Figure shows the residual graph of the data

Correlation Analysis

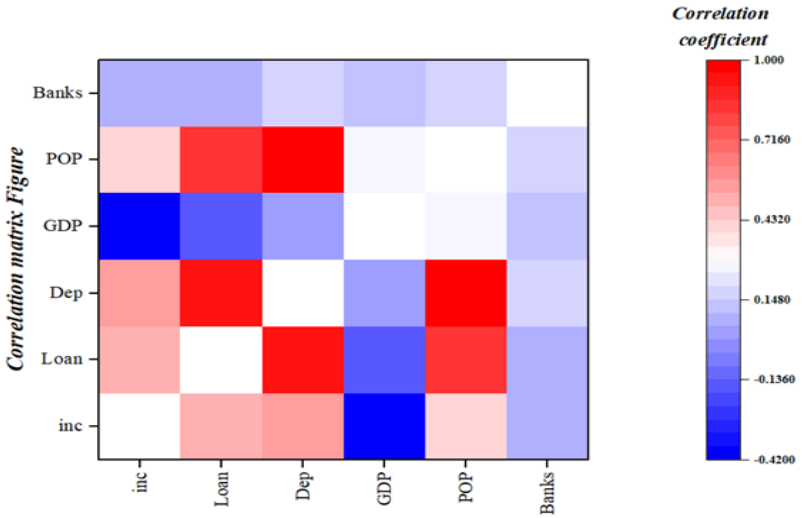
This table highlights the relationship between the variables. The Pearson correlation test is used to show the strength & direction between the variables. If the value is 1 it shows a perfect relationship with the variables and the sign shows the direction of the relationship between the variables. The positive signifies that the increase in one variable will increase to the other variable while the negative sign shows that they will move in the opposite direction.

Table 4.2: Correlation Matrix

	BANKS	DEP	GDP	INC	LOAN	POP
BANKS	1	0.154618	0.139804	0.08082	0.083249	-0.04945
DEP	0.154618	1	0.017239	0.541873	0.919925	-0.0457
GDP	0.139804	0.017239	1	-0.41596	-0.1822	0.05352
INC	0.08082	0.541873	-0.41596	1	0.508814	-0.06991
LOAN	0.083249	0.919925	-0.1822	0.508814	1	-0.06778
POP	0.04945	-0.0457	0.05352	-0.06991	-0.06778	1

Table 4.2 is a correlation, Matrix. The Loan=Loan& Advances, Dep=Deposits, GDP=Gross Domestic Products, POP=Population, INC=Premium income (insurance).

Table 4.2 highlights the relationship between the variables. The Pearson correlation test is used to show the strength & direction between the variables. If the value is 1 it shows a perfect relationship with all variables and the sign shows the direction of the relationship between the variables. The positive signifies that the increase in one variable will increase the other variable while the negative sign shows that they will move in the opposite direction. In the table, Banks have a positive correlation with all the variables. The Deposit has a positive correlation with all the variables except the population. GDP has a positive relationship with all the variables expect insurance and loan. It means that the GDP moves in the same direction.



Results of the Hausman Test

The panel data analysis is used because of both characteristics of the cross-section and as well as time series data. The Hausman test is applied for the selection between the fixed effect and the random effect model, and the Redundancy likelihood effect test is applied for the selection between the fixed effect and the common effect model. The p-value of cross-section F and chi-square is (0.0000) which is less than 0.05 so the fixed effect model is appropriate. The P-value of the cross-section random is (0.0087) which is also significant. In the case of the banking industry in other industries, the p-value of the cross-section random is (0.0005). It indicates that a fixed effect model will be applied.

Likelihood Ratio

Table 4.3: Likelihood Ratio

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.485398	(25,353)	0.0000
Cross-section Chi-square	62.746465	25	0.0000

Hausman Test

Table 4.4: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.524875	8	0.0087

Table 4.4 illustrates the p-value (0.0087) which is less than 0.05. Therefore, for suitable model selection in panel data analysis, primarily the study has applied the Redundant Fixed Effect- effect estimator is suitable for the model.

Estimation of The impact of Financial Inclusion on digital literacy By Using The Fixed Effect Model

Table: 4.5: Fixed Effect Model of Financial Inclusion

Dependent Variable: BANKS
Method: Panel EGLS (Cross-section SUR
Date: 12/07/24 Time: 20:15
Sample: 2005 2023
Periods included: 19
Cross-sections included: 12
Total panel (balanced) observations:228

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	24.62866	12.30398	2.001682	0.0466
DEP	2.87E-06	1.29E-06	2.227597	0.027
INC	2.86E-05	8.77E-06	3.259606	0.0013
LOAN	-7.86E-06	4.49E-06	-1.75018	0.0815
POP	-8.40E-09	1.95E-09	-4.29852	0.0000
GDP	4.83E-07	1.62E-07	2.979233	0.0032
Effects Specification				
Weighted Statistics				
R-squared		0.748976	Mean dependent var	8.326105
Adjusted R-squared		0.729941	S.D. dependent var	34.90459
S.E. of regression		32.02001	Sum squared resid	227612.4
F-statistic		9.548349	Durbin-Watson stat	0.916568
Prob(F-statistic)		0.0000		

Table 4.5 is a fixed effect model.The Loan=Loan& Advances,Dep=Deposits,GDP=Gross Domestic Products,POP=Population,INC=Premium income (insurance).

Table 4.4 explains the relationship between Banks, GDP, population(POP), Deposit(Dep), and Insurance(INC). The F-statistics shows the significance of the total model and R-square point to the goodness of fit of the model (Barney 2021; Froest 2022). And if the F-statistic value is not greater than 0.05 the model is well-thought-out a good fit. The GDP has a coefficient Value (4.83E-07) and a P-value is (0.0032) which is significant and is less at a level (P>0.05). It means that as the banking industry grows there is a growth in the GDP. The banking industry affects the GDP and the banking stock return influences economic growth. A significant and positive relationship has been found between the future GDP and Banking stock return (Rebel A. Cole; et al, 2007).

The Deposits(DEP) have a coefficient of(2.87E-06) which means that it has a positive relationship and the probability of (0.0000) which is significant it means that if there is a growth in the banking industry the deposit will also grow. As there is an increase in deposits it leads to more banking as well and more resources are committed to the penetration of banking services

(Saleh et al.,2023). The insurance has a coefficient value of (2.86E-05) and a p-value(0.0013) which is significant it means that if there is a 1 per cent variation in the banking industry the insurance will change by (2.86E-05) per cent but in the same direction. As the banking industry grows so does insurance and the development of insurance fosters the demand for banking services and a linkage has been found between insurance and banking (Adams et al., 2005). The loan has a coefficient value of (-7.86E-06) and a p-value of (0.0815) which is insignificant it means that if the banking industry stock grows their loans will grow by (-7.86E-06) percent insignificant but on the opposite direction. A significant relationship has been found between the loans and the banking industry as the banks allocate their complete saving to the firms and as the loan growth leads to an increase in the bank profitability but most of the time the nonperforming loans lead to an increase in credit risk in the long run Vithessonthi, et al., (2023).

The population has a coefficient value of (-8.40E-09) and a probability of (0.000), which is significant it means that if there is a growth in the banking industry there will be growth in the population. Population has a positive relationship with the banking industry. A country like Pakistan where there is potential for growth in the banking industry but as the outreach of the banking services increases there is a decrease in the unbanked population (World Bank.,2015) and these results are in line with the theory because the deep penetration of financial services can result in bringing the more financial inclusion and digital literacy. The R square value shows that the (0.748976) per cent variation that has occurred in the banking industry (Dependent Variable) is explained by the independent variable. The adjusted R square value of (0.729) Percent is satisfactory for the model. The results are in line with previous research as the impact of banks in development as well as its impact on digital literacy was studied by Gautham & Rahul et al., (2022); and Gautham & Rastogi et al., (2022) in developing countries like indie and banks are seen as in promoting financial inclusion and digital literacy. Banks are crucial components of the financial activities.

Conclusion & Recommendations

The main objective of the study is the impact digital literacy has in promoting financial inclusion in Pakistan. As Pakistan is a developing country and an emerging economy with a variety of opportunities so there is an increasing trend in the people's interest, as well as the investor, who is more concerned about the Pakistan stock market. The study results reveal that financial inclusion plays a significant role in promoting digital literacy.

There is a very limited study on the relationship of digital literacy to financial inclusion and a lot is to be done in this area. This study has contributed to both digital literacy and financial inclusion. The study measures financial inclusion as well as the banking industry's impact from the digital literacy aspect. The financial inclusion was measured by the common coefficient mode. The perfect and strong relationship was found among all variables.

Banks have a positive relationship with all the variables. The Deposit has a positive relation with all the variables. GDP has a positive relationship with all variables. It means that the GDP moves in the same direction. The loan has a positive relationship with all the variables except insurance. It means that the loan moves in the same direction with all the variables except insurance. The population has a positive correlation and good relationship with all the variables that expect insurance and moves in the same direction with all variables that expect insurance.

The result of the fixed-effect model shows that as the banking industry grows the GDP insurance and loans grow with it and deposits have a significant negative relationship with banking stock return. The study also recommends that all the participants in the market should keep an eye on any information arising in the different industries in the market. The industries in the market show the return and volatility spillover which means that the return and volatility spillover in one industry is influencing other industries. There is industrial interdependence between the industries It is helpful for the investors when making investment decisions in the Pakistan stock exchange. So to sum up we can say that through the lens of financial inclusion can pave the way for digital literacy through penetration of financial services as well as it can lessen the gap and divide between the different income groups in Pakistan.

The study makes a recommendation for the promotion of financial inclusion and digital literacy because it is the cheapest and easiest way of changing people's lives. The countries should align their economic policies by keeping in view financial inclusion and digital literacy. They should launch programs and initiatives for promoting digital literacy. This program includes the launch and promotion of digital payment system because it can help the spread of the financial services like a wildfire such as this impact can be seen in China where the digital payment has transformed the people lives . Apart from saving and usage financial inclusion helps in to have easy access to the credit and that credit can be invested in their small scales business or their income-generating activities which bring economic development. It is the responsibility of the government to remove the hurdles in the way to achieve the financial inclusion objective and promote digital literacy. The investment should be made in reliable and affordable digital infrastructure because the digital infrastructure plays a critical role in promoting financial inclusion and digital literacy. The progressive policies should be implemented to encourage people to adopt digital payments, and those regulations should be removed that hinders the access to the financial services by the low incoe groups. Social and cultures barriers that limits the women from accessing the financial services should be removed. If Pakistan wants increased financial inclusion it should show the rule of peace and harmony in every walk of life.

As it is a new and promising research area, and a very few literatures are available in this context so there is a research gap and it needs to be filled. This study has contributed very little in the context of financial inclusion and digital literacy , but a lot is to be studied such as how it influences the economic growth, poverty alleviation or the other indicators of financial inclusion and how it plays a role in controlling corruption or the inflows of the black money to the economy. The data used in this research is the time series which outdated quickly.so the further study can be done in this context. This study can be done in the multi country setting also.

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