FINANCIAL DIGITALIZATION AND BANKING PERFORMANCE- A COMPARATIVE STUDY OF PUBLIC & PRIVATE BANKS IN PAKISTAN

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Abstract

The integration of information technologies has given rise to the concept of the digital economy, characterized by the utilization of cutting-edge innovations. This digital transformation is pervasive across every economic sector, with the banking sector being a prominent player. In contemporary times, banking stands as one of the most crucial sectors actively incorporating and leveraging the latest advancements in information and communication technologies. Despite the growing significance of digitalization, there is a notable lack of comprehensive understanding regarding the factors influencing the performance of digital banks. The study aims to address this gap by exploring the determinants of financial digitalization and the performance of banks, shedding light on the intricacies of their operational success in the digital era.

The study endeavors to assess the impact of financial digitization on the performance of the Pakistani banking sector. Utilizing a ten-year dataset spanning from 2013 to 2022, encompassing ten banks, the study employs panel data regression with a cross-section effects model. The analysis tool employed is E-views. The findings of this study reveal a positive correlation between the application of banking digitalization, in the form of adopting digital technology within banks, and the overall performance of banks. The measured performance indicators include Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). These results underscore the positive influence of digital technology on enhancing the financial performance of Pakistani banks. Serving as factual information, this study provides a foundational basis for decision-making regarding the implementation of digital technology in both the Private and Public sectors of banks.

Key Words: *Digital Banking, Technological Infrastructure, Bank Performance, Innovation, ATM, Internet Banking, Point of sales, mobile applications, and Globalization.*

Chapter# 01

Introduction

1.1 Banking Digitalization

Digitalization in banks, also referred to by way of E-banking, online banking, or Internet banking, is a system that facilitates banking transactions, such as payments, deposits, and cash withdrawals, through the Internet rather than requiring physical visits to bank branches. The terms “digital banking” and “e-banking” are often used interchangeably, emphasizing the reduced reliance on paper currency and the transition to electronic forms of money. This shift signifies a move from traditional banking practices to more technologically advanced and convenient methods of managing financial transactions. Digitalization has certainly reformed the way banks operate and how customers interact with financial institutions. One of the most significant advantages of digitalization in banking is the decrease in human error. Traditional banking processes often relied heavily on manual data entry, which unavoidably led to errors due to human imperfection. However, with the arrival of digital banking systems, many of these processes have been automated, significantly minimizing the possibility of mistakes.

Digitalization within the banking sector revolutionizes the method customers access and use banking services, primarily through virtual channels manageable via personal computers and web browsers. This transformation empowers users to conveniently connect to their bank's website and avail themselves of various banking functions. At the core of this digital framework lies a centralized, web-enabled database, where a range of authorized Internet services is presented to users in a menu format. From checking account balances to conducting transactions, users can seamlessly navigate through these services, with each interaction tailored to meet specific service requirements. This shift towards digitalization is gradually reshaping the traditional branch banking model, with alternative delivery channels such as ATM networks gaining prominence. As bank branches become increasingly interconnected through terrestrial or satellite links, the physical presence of branches diminishes, paving the way for a borderless banking environment. This borderless landscape empowers customers to engage in banking activities anytime, anywhere, and through various means, including online transactions, mobile applications, point-of-sale terminals, and a multitude of card facilities. Central to this interconnectedness is the intranet, a network infrastructure facilitating connectivity among various bank locations and the central

office. Unlike the internet, which spans across the globe, intranets are confined to specific organizations, serving as internal communication platforms tailored to organizational needs. A prominent example of an intranet application is the Society for Worldwide Interbank Financial Telecommunications (SWIFT), which facilitates secure communication among financial institutions worldwide, ensuring efficient and reliable exchange of financial messages.

Banks are integral institutions driving the economic growth and development of nations, playing multifaceted roles across various sectors. Their contributions span trade facilitation, industrial and agricultural growth, capital creation, credit formation, production support, funds transfer, money speculation, reserves mobilization, and financial advisory services. These functions collectively underpin the economic prosperity of a country. One crucial aspect of banks' role is the establishment and maintenance of robust payment systems, which are essential for the smooth functioning of financial markets. Recognizing the importance of efficient payment mechanisms, banks continually strive to introduce innovative payment solutions to enhance security and efficiency. A notable example of such innovation is the introduction of plastic money. Plastic money represents a modern and convenient payment method that has transformed the way transactions are conducted. This shift towards digital payment systems offers numerous advantages. Firstly, it significantly enhances transaction speed and reduces processing costs compared to traditional cash-based transactions. Additionally, digital payments entail lower risks of theft or fraud, contributing to overall transaction security. Moreover, plastic money serves as a form of readily accessible funds, mitigating the risks associated with managing large sums of cash. Various forms of plastic money include debit cards, credit cards, automated teller machine (ATM) cards, and smart cards, each offering unique benefits and functionalities tailored to diverse consumer needs. Debit cards provide immediate access to funds held in a linked bank account, enabling convenient point-of-sale transactions and cash withdrawals from ATMs. Credit cards offer users the flexibility to make purchases on credit, with repayments made at a later date, along with potential rewards or benefits. ATM cards facilitate cash withdrawals and basic banking transactions through automated teller machines, enhancing accessibility and convenience for customers. Smart cards, equipped with embedded microchips, enable secure and multifunctional transactions, such as contactless payments and digital identification. These advanced features further streamline payment processes and enhance transaction security. Overall, the adoption of plastic money represents a significant step towards a more digitized and efficient payment

ecosystem. By embracing these innovative payment solutions, banks contribute to the advancement of financial inclusion, economic efficiency, and consumer convenience, ultimately fostering sustainable economic growth and development.

Here's how digitalization diminishes human error in banking:

- **Computerized Transactions:** Digital banking platforms allow customers to conduct transactions online without the need for human involvement. Whether it's transferring funds between accounts, paying bills, or setting up periodic payments, these processes are automated and executed with accuracy, reducing the risk of errors caused by manual input by bankers.
- **Account Management:** Through online banking portals or mobile apps, customers can manage their accounts in real time. They can track their balances, monitor transactions, and set up alerts for specific activities. This level of visibility and control helps in identifying any discrepancies or unauthorized transactions promptly, minimizing errors that may go unobserved in traditional paper-based systems.
- **Efficient Processes:** Digitalization has modernized various banking processes, such as loan applications, account openings, and account maintenance. Computerized workflows ensure that information is processed accurately and efficiently, reducing the chance of errors caused by manual handling of paperwork by both aspects of customer and bank staff.
- **Improved Security Measures:** Digital banking platforms employ healthy security measures, such as encryption, multi-factor authentication, and fraud detection procedures, to safeguard customer data and transactions. By reducing the risk of unauthorized access and fraudulent activities, these security measures contribute to the overall consistency and integrity of digital banking systems.
- Furthermore, the convenience and accessibility offered by online banking have a direct impact on customer loyalty.
- **Round-the-clock Access:** Unlike traditional banking hours, online banking provides customers with 24/7 access to their accounts and financial services. Whether it's checking balances, transferring funds, or paying bills, customers can perform transactions at their convenience, without being constrained by branch operating hours.
- **Improved Customer Experience:** Digital banking platforms are intended to be user-friendly and intuitive, offering features such as customizable dashboards, personalized

recommendations, and responsive customer support. By enhancing the overall banking experience, these platforms contribute to customer satisfaction and loyalty.

- **Convenient Cash Management:** Digital banking has made managing large amounts of cash easier through features like remote check deposits, mobile wallets, and peer-to-peer payment services. Customers no longer need to visit a physical bank branch to deposit or withdraw cash, saving time and effort.
- **Cashless Transactions**: Digital payment methods, such as credit/debit cards, mobile wallets, and online payment gateways, have gained widespread acceptance due to their convenience and security. By encouraging cashless transactions, digitalization reduces the reliance on physical currency and enhances the efficiency of financial transactions for both customers and businesses.

1.2 Background of the study

The first forms of digital banking can be traced back to the 1960s when banks began using mainframe computers to automate various banking functions such as check processing and customer account management. In the 1980s, banks started offering dial-up services that allowed customers to access their accounts through their home computers.

In the 1960s, Bank of America introduced the first ATM, which allowed customers to withdraw cash from their accounts without needing a bank teller. Also, In the 1980s, Citibank introduced the first online banking system, which allowed customers to access account information and perform basic transactions through a dial-up connection.

The banking sector assumes a central role as a fundamental financial intermediary within any given economic framework, facilitating an extensive array of monetary transactions, managing cash flows, and overseeing associated operational activities. Its core functions encompass catering to the financial requirements of investors through the provision of diverse services, encompassing deposit facilities, certificate of deposit issuance, and loan facilitation (Amadeo, 2019).

Currently, the banking landscape is witnessed substantial evolution in technology, resulting in the introduction of various repertoire of facilities to attract customers and enhance customer interactions. Technological advancements, including the implementation of direct deposit systems, online transaction platforms, debit and credit card functionalities, computerized banking processes, electronic statement services, and online ticket booking capabilities, have become

pervasive and widely embraced by clientele. These innovations have facilitated cost-reduction measures within banking operations and engendered heightened levels of customer engagement, operational efficiency, and overall organizational efficacy. Consequently, banks have successfully expanded their customer base, thereby fortifying their operational prowess and competitive standing within the industry (Anguelov et al., 2004).

The financial services sector is undergoing a significant transformation characterized by heightened regulatory measures, technological disruptions, and shifts in demographics. These structural forces have effectively reduced barriers to entry, leading to heightened competition both within and beyond the industry. The continuous evolution of this sector has been marked by unprecedented changes in both speed and scope over the past decade. New entrants into the financial services arena vary widely, ranging from entrepreneurial FinTech start-ups to substantial non-financial technology-based entities known as TechFins and BigTech. While some of these entrants aim to supplant existing incumbents, others are driven by a motivation to form strategic partnerships with them. This intensified competition is compelling financial incumbents to enhance their product offerings and elevate the quality of customer service. (Michael R. King, 2020).

The landscape of financial technologies is undergoing a transformative shift, fundamentally altering the dynamics of how we spend, transfer, and oversee our finances in unprecedented ways. This wave of innovation is posing substantial challenges to traditional retail banks, as they find themselves in fierce competition with emerging players. The aftermath of the worldwide economic disaster from (2007 to 2009) caused of substantial losses, and the collapse of several established banks profoundly eroded the trust of financial customers on a global scale. “The Digital Banking Revolution” has changed the traditional ways of financial transaction and shows how financial technology has made significant changes, introducing newfound flexibility to the banking industry. The study delves into the implications of these transformations, providing insightful perspectives on the evolving financial landscape and its impact on traditional banking institutions (Luigi Wewege, 2019).

The conventional concept of the banking ecosystem revolves around the intermediation role between savers and borrowers. However, with the advent of the Internet, there has been a paradigm shift towards a peer-to-peer model, wherein savers and borrowers can directly connect. The classical theory of the banking firm, as proposed by Klein in 1971, does not account for these

mirrored dynamics. Therefore, there is a need to extend Klein's theory to encompass the digital innovations that influence both borrowers and savers within a peer-to-peer environment.

The evolution of the technological landscape has engendered a significant emphasis on technological transformation across diverse economic entities (Kitsios, Giatsidis, & Kamariotou, 2021). Within the contemporary era of digitalization, businesses perceive digital technologies as pivotal for streamlining customer interactions, thereby enhancing satisfaction and operational efficiency (Frizzo-Barker, 2020).

The reception of digitalization yields explicit results inside financial foundations like banks, epitomizing the advancement of online reports, internet trading, electronic marks for exchanges, and electronic bank explanations of electronic bank statements (Kitsios, Giatsidis, & Kamariotou, 2021).

In the banking sector, digital transformation is an ongoing process that reshapes the environments of both external and internal through the restructuring of internal procedures and existing methodologies. Various factors drive this transformation, including the need to serve remote areas lacking physical branches, creating a difference from market players, and cost reduction initiatives. However, there remains skepticism regarding the adoption of digital technologies. Hence, this dissertation investigates the acceptance rate of digital transformation within the banking sector in Pakistan. The results shed light on bank employees' perceptions of new technologies. Additionally, the study offers practical insights for executives of banking institutions, suggesting targeted educational programs to facilitate their employees' evolution into the digitalization phase. Executives are eager to understand if their employees are prepared to embrace and integrate digitalization into their daily workflows (Fotis Kitsios, 2021).

In a study conducted by Mawutor (2014), the impact of E-banking on profitability in Ghana was explored with a focus on 150 respondents associated with the Agricultural Development Bank. The findings of the study revealed a significant influence of electronic banking on both the performance and customer relationships of the Agricultural Development Bank. However, the researcher identified network failures as a major challenge, leading to disruptions in ATMs and other online payment systems for customers using electronic banking products in the Agricultural Development Bank. The study further highlighted that customers preferred E-banking products, particularly ATMs, over internet banking. This preference was attributed to factors such as time-saving, easy access to cash, and overall convenience in product usage. Additionally, customers

expressed a belief that ATMs were considered safer and more secure compared to Internet banking. (Nagaraju, 2020)

As per research led by Kenya, with taking on advancement, recent fads, and programmed risk the board, the new age of computerized business examination in the financial area lately has documented extremely superior execution. In this examination, there is a negative connection between portable, Web, and ATM channels and the expense for money proportion, a proportion of business execution (Moffat, 2017).

One more examination shows a positive connection between specialized improvement in the USA banking framework and banks' business execution, especially in decreasing costs and expanding income due to applying novel specialized improvement (Berger, 2023)

Digitalization change affects business processes, altering how banks carry on with work. Computerized change is going about as an element that assists with reshaping the customary cooperation among clients and banks (Heini Maarit Taiminen, 2015)

As per research about testing the productivity of exchanges of business bank appropriation directs in the period from 2012 to 2015, the number of clients who had counter exchanges at banking branches in the UK diminished by 30%. Thought about somewhere in the range of 1992 and 2013, the number of exchanges made by bank tellers in the US diminished by 45% (S Jatic, 2017)

The advanced change in business banks is the combination of computerized innovation in all financial regions, essentially having an impact on how business banks work and offer some benefit to clients, for example, creating monetary and banking programming, computerized banking, portable financial arrangements, fintech, and so on, have the option to fulfill the need of client about the loan cost progression, huge information, versatile money, risk the executives, web money and client relationship the board (S Ortaköy, 2019)

Emphasize deliberate convergence of advanced innovations to accomplish unrivaled execution, changing numerous business aspects all the while. These business upgrades might incorporate improving client experience, smoothing out tasks, making new plans of action, and the production of creative administrations (Abdurrahman Abdurrahman, 2024)

As per the previously mentioned idea, associations need to supervise a scope of capacities to upgrade assets and lift by and large corporate execution to accomplish fruitful computerized change. Development is a vital part of digital transformation that empowers associations to

conform to the changing mechanical climate, answer dynamic market requests, brace their serious position, and further develop in general business execution (S. Nambisan, 2019)

The innate client-driven approach of computerized change, worked with by continuous commitment and info, steers upgrade in items and the origin of new contributions (Mark, 2019)

Essential for associations to try different things with new advancements, encourage development, and keep up with seriousness in computerized change by utilizing different assets like human resources, monetary speculations, and mechanical resources (D. Ellström, 2022)

Assuming a crucial part in computerized change by furnishing a reasonable structure lined up with fundamental components, for example, improving in help contributions, embracing arising advancements, and encouraging an enterprising outlook to investigate new plans of action (D.R.A. Schallmo, 2018)

1.3 Research Gap

In the domain of past examinations connected with the monetary presentation of banks, a significant collection of work exists, even though with a striking perception that most of these investigations have investigated different factors. The best specialist information, due to the shortage of research exhaustively consolidates the idea of digital transformation, particularly about contrasting the exhibition of private and public banks in light of technological developments.

One prominent concentrate by Youthful (2001) investigated the effect of digitalization on banks' presentation. While such examinations are important, the factors analyzed in these investigations must change as per the specialists' concentration. In the Indian setting, a review evaluating the benefits and execution of business banks under technological headways was led by Roy, and Thangaraj, (2020). This study recognized the areas where innovation advancement prompted expanded deals income, decreased working costs, and improved representative efficiency.

Notwithstanding, the current review plans to contribute fundamentally to this current collection of examinations by clearly looking at the outcomes of government sector and private sector banks working at the national level. The previous researchers tried to find out how banks are utilizing their resources to upgrade banking services by technological advancement. Also, researchers conducted surveys on how this advancement affects the productivity and profitability of banks. Fundamentally, the dissertation plans cover the gap of outstanding holes by giving bits of knowledge into the digital methodologies of both sectors of banks in Pakistan and this digital

transformation effect on monetary performance. Through examining the ventures come through digital evolutions and assessing the profit from these speculations, our aim to plan reveals insight into particular commitments of technical advancement to the productivity of monetary institutions in Pakistan.

1.4 Problem Statement

The importance of computerized banking is very clear in the financial era; however, it expects time to set up a good foundation for itself in the steadily developing technological period. The diligent improvement of innovative headways flags an extraordinary shift, demonstrating that conventional and manual business processes are near the very edge of outdated nature. The persistent development of innovation is expected to reshape the customary installment frameworks and modify the scene of deals that were generally directed over the counter. In the contemporary setting, these exchanges are consistently worked with through versatile and web banking, offering the accommodation of whenever anyplace access. Inside the Pakistani setting, computerized banking arises as an essential asset with the possibility to upgrade proficiency and lessen costs by supplanting customary desk work with online techniques. This change, thus, is expected to add to higher productivity. Notwithstanding these likely advantages, there exists a scarcity of writing that thoroughly investigates the effect of computerized changes on the monetary execution of banks in Pakistan.

The examination hole is especially prominent while analyzing the connection between innovation reception and the monetary exhibition of Pakistani business banks. The restricted proof is accessible to clarify how computerized changes explicitly add to or impact the monetary results of these banks. Hence, this exploration attempts to address this hole by digging into the nuanced connection between innovation reception, especially as advanced banking, and the monetary exhibition of business banks in Pakistan. Thus, it means to give significant bits of knowledge that can illuminate procedures for exploring the computerized scene in the financial area of Pakistan.

1.5 Research Questions

1. Financial Digitalization Impact on the Performance of Public Sector Banks in Pakistan:

i. Does Number of Mob application transactions affect the Public sector banking performance?

ii. Does Internet banking affect the Performance of Public sector banks?
iii. Does Number of ATM transactions affect the Financial Performance of Public sector banks?
iv. Does Credit / Debit card customer volume affect the Performance of Public sector banks?
v. Does Point of sale volume of transactions affect the Performance of Public sector banks?

2. Financial Digitalization Impact on the Performance of Private Sector Banks in Pakistan:

i. Does Number of Mob Applications transactions affect the Private sector banking performance?
ii. Does Internet banking affect the Performance of Private sector banks?
iii. Does Number of ATM transactions affect the Financial Performance of Private sector banks?
iv. Does Credit / Debit card customer volume affect the Performance of Private sector banks?
v. Does Point of sale volume of transactions effect the Performance of Private sector banks?

1.6 Research Objectives

1. Financial Digitalization Impact on the Performance of Public Sector Banks in Pakistan:

i. To analyze the Impact of Mob Applications transactions on the Financial Performance of Public sector banks.
ii. To explore the Impact of Internet banking on the Financial Performance of Public sector banks.
iii. To study the Impact of ATM transactions on the Financial Performance of Public sector banks.
iv. To determine the Impact of Credit/ Debit Card customer volume on the Financial Performance of Public sector banks.
v. To examine the Impact of Point of Sale Transactions on the Performance of Public sector banks.

2. Financial Digitalization Impact on the Performance of Private Sector Banks in Pakistan:

i. To analyze the Impact of Mob Applications transactions on the Financial Performance of Private sector banks.

ii. To explore the Impact of Internet banking on the Financial Performance of Private sector banks.
iii. To study the Impact of ATM transactions on the Financial Performance of Private sector banks.
iv. To determine the Impact of Credit/ Debit Card customer volume on the Financial Performance of Private sector banks.
v. To examine the Impact of Point of Sale Transactions on the Performance of Private sector banks.

1.7 Research Significance

The dissertation grips significant importance for both public and private banks associations, offering an essential road for upgrading administrations and drawing in a more extensive client base. By digging into the effect of financial digitalization, the review means to give significant bits of knowledge that can catalyze upgrades in the financial area, bringing about an additional client-driven and technologically progressed scene.

The significance of the study engaged financial associations to decisively improve their operational activities. By understanding the effect of different digitalization parts, banks can tailor their contributions to line up with client requirements, inclinations, and technological assumptions. The study fills in as an impetus for giving more prominent advantages to clients and clients of banking operations. Through the decrease of manual and counter exchanges, the reception of web and portable financial channels can smooth out processes, bringing about improved accommodation, effectiveness, and openness for clients. The exploration expects to add to the change of conditional cycles from manual and counter-based strategies to proficient, secure, and easy to use web and portable financial other options. This shift speeds up exchange times as well as limits desk work, prompting functional efficiencies and time investment funds. Policymakers and associations stand to acquire important experiences from this review. By understanding the effect of digitalization on monetary execution, policymakers can make informed approaches to cultivate technological advancement inside the banks. Associations, thusly, can use these experiences to improve their plans of action for greatest advantages. The decrease in administrative work and the shift towards advanced exchanges not just save time for the two clients and banking staff yet additionally add to functional productivity. This is especially pivotal in a quickly

developing digital scene where smoothed out processes are fundamental for keeping up with seriousness. For future researchers, this study would act as an essential asset. The writing produced from this examination will be added to the comprehension of computerized banking and its effect on monetary execution. The review gave a powerful structure to future scholarly investigation and examination tries in the domain of monetary innovation.

In conclusion, this examination has extensive consequences, extending out its impact to banking associations, clients, policymakers, and the scholarly local area. It fills in as a foundation for driving positive change inside the financial area and adding to the continuous development of monetary administrations in the fintech age.

1.8 Scope of Study

The research encompasses a comprehensive scope, delving into various facets of banking performance, customer satisfaction, and the efficiency of financial transactions. The contemporary surge in financial technology has posed unprecedented challenges to established banks, prompting an exploration of its consequences on their competitiveness. The study aims to scrutinize the factors that can foster digital progress within banking institutions. Analysis of the data indicates a diminishing traditional leadership role of banks in advancing financial technology in recent years. Ongoing efforts by banks to bridge the gap with the digital frontier may lead to a more consolidated banking industry. Smaller and less technologically adept banks might encounter challenges in sustaining their operations. Cross-country evidence suggests that banks in high-income economies have emerged as digital leaders, benefiting from robust digital infrastructure, a favorable legal and business environment, and dynamic competitive dynamics.

The shift towards digital banking is anticipated to address numerous challenges associated with traditional banking. By reducing the necessity for customers to physically visit bank branches during specific working hours, accessibility will be enhanced, especially for those facing time constraints or difficulties reaching the bank. Digital transactions and processes offer a more efficient alternative to the time-consuming nature of physical visits, eliminating the need for customers to wait in line for services. This transition is expected to minimize paperwork linked to various transactions, reducing delays and the risk of errors. Digital banking is poised to address issues of financial exclusion in remote or rural areas, where traditional bank branches are scarce. The convenience of online banking is anticipated to mitigate geographical barriers, contributing to

greater financial inclusion. The reduction of paperwork not only saves time but also decreases the likelihood of errors and inefficiencies. Moreover, digital banking is anticipated to prove cost-effective for financial institutions by eliminating the need for maintaining physical branches and staffing for manual processes. Lower operational costs could lead to more favorable service charges for customers. In terms of security, digital banking systems are expected to offer enhanced measures compared to paper-based records and transactions. The adoption of advanced security protocols is anticipated to reduce the risk of loss, damage, or unauthorized access. Digital banking is projected to provide a broader range of transaction options compared to traditional methods. Online transfers, mobile payments, and other electronic transactions are expected to offer customers greater convenience and versatility, aligning with the evolving preferences of the modern banking landscape.

1.9 Scheme of Study

The dissertation is organized as follows: In Chapter 1, the introduction to the thesis is presented. Chapter 2 delves into the related literature, exploring relevant theories that support the theoretical framework of the study. The methodology, along with a comprehensive description and definitions of the study variables, is discussed in Chapter 3. Chapter 4 presents and discusses the results and findings obtained through the study. Finally, in Chapter 5, the thesis is concluded by summarizing the key findings and drawing conclusions from the research.

CHAPTER# 02

LITERATURE REVIEW

2.1 Review of Literature

The literature review plays a crucial role in this research, acting as a foundation for readers to grasp key concepts. This chapter begins with fundamental insights, covering various definitions of digitalization, and exploring basic categories and subcategories in both digitalization and banking performance. Starting with foundational definitions, the chapter navigates through different dimensions of digitalization, providing clarity on its diverse forms and subtypes. Simultaneously, it delves into the complexities of banking performance, establishing a comprehensive understanding of its multifaceted nature. Continuing, the literature review succinctly outlines the definitions of financial inclusion, drawing connections to different aspects of digitalization. Special emphasis is placed on the impact of digital tools on customers, including key elements such as ATMs, debit and credit cards, point of sale systems, online banking, and mobile applications. An in-depth exploration follows, examining the effects of these digital tools on banking performance. This involves an investigation into whether the use of digital tools contributes to an improvement in banking performance and enhances overall transactional efficiency. The literature review then shifts its focus to the specific context of Pakistan, analyzing the landscape of financial digitalization. Within this framework, an analysis is conducted to clarify the positive impacts of digitalization on banking performance in the Pakistani context. In essence, this comprehensive literature review not only establishes a foundational understanding of digitalization and banking performance but also critically evaluates the impact of digital tools on transactions and the broader realm of financial performance, particularly within the context of Pakistan.

Technological advancement is widely acknowledged as a key driver for creating new opportunities within the banking sector. Innovations in technology are highly prized for gaining competitive advantage, and in today's landscape, they have revolutionized the outlook and approach of the banking sector in contrast to traditional banking services. (Malik Shahzad Shabbir, 2016)

A study evaluated the impact of e-banking on the financial performance of commercial banks in Kenya. It found that the number of ATM cards has a positive and significant effect on the

profitability of banks. Additionally, expenditures related to electronic banking also exhibit a positive and significant impact on profitability. Over time, these expenditures decrease as revenue increases, leading to enhanced profitability. (J Aduda, 2012)

A study investigated the impact of electronic banking on the profitability of commercial banks in Iran. The findings indicate that factors such as the number of terminal branches, ATMs, POS terminals, market concentration, and bank size have a positive influence on a bank's profitability. The proliferation of e-banking channels expands the range of services offered to customers, resulting in increased deposits and ultimately boosting the profitability of banks. (Karimzadeh, 2014)

(S Rauf, 2014) investigated that Mobile banking positively and significantly impacts the profitability of the Pakistani banking industry, as evidenced by both measures of performance, namely Return on Equity and Return on Assets.

Furthermore, there has been a notable expansion in the demand for digital banking services, with increasing numbers of users worldwide. Records indicate that 46% of the global population now has internet access, driving the demand for digital products like mobile banking, internet banking, and social platforms for conducting banking transactions. Consequently, the usage of traditional bank branches has declined in tandem. By 2016, the percentage of customers utilizing these digital services had risen to 33%, 59.4%, and 11%, respectively, while physical branch usage decreased to 13% globally, as reported by the World Bank Open Data in the Financial Sector.

In countries like Pakistan, the adoption of E-banking has only recently commenced. Online banking systems offer customers a range of information-related benefits that encourage the uptake of E-banking. These include the convenience for customers to manage their bank accounts anytime and anywhere, as well as access to information to aid in making investment and financing decisions. (B Howcroft, 2002)

Technologies play a crucial role in enhancing organizational performance and gaining a competitive edge for businesses. In particular, the adoption of digital technologies is seen as a means to improve operations, enhance productivity, and elevate the quality-of-service delivery within the banking industry. (O Oluwatolani, 2011)

ln many traditional economies, both businesses and customers often prefer physical interactions when conducting transactions, citing concerns about high risks and inadequate security associated

with digital banking. Consequently, there is limited engagement with digital banking services, which can adversely impact the operational performance of businesses. (A Riyanto, 2019)

Despite the undeniable importance of financial innovations in elucidating banking performance, their impact on financial performance remains poorly understood for two primary reasons: firstly, there is a lack of comprehension regarding the factors driving bank innovation adoption, and secondly, the effects of bank innovations on financial performance are still insufficiently tested. (A Mabrouk, 2010)

The landscape of banking and financial services is undergoing significant transformation, shifting away from conventional "brick and mortar" branches and placing emphasis on innovative delivery channels to enhance customer service and provide round-the-clock access to information and transactions. This evolution prompts a consideration of both the threats and opportunities presented by electronic banking. It raises questions about the formulation of new pricing strategies by banks, the security measures required for electronic financial transactions, and the broader effects of online banking on the financial sector.

What risks and rewards does electronic banking entail? What pricing models should banks adopt to align with this digital shift? How can the security of electronic financial transactions be ensured? What impact will online banking have on the financial landscape? How should the new electronic services be effectively marketed? Explore authoritative insights from bankers, trendwatchers, and financial consultants to gain expert perspectives on these critical questions. Delve into white papers and reports to understand the emerging banking solutions in the digital era. (B.V., 2001)

The impact of electronic payments on the financial performance of Deposit Money Banks (DMBs) in Nigeria was investigated. Electronic banking channels including Automatic Teller Machines (ATMs), internet banking, and point-of-sale (POS) systems were utilized as measures of electronic banking, while the profitability of DMBs served as an indicator of financial performance. Multiple regression analysis was employed for the study. Results indicated that ATMs do not significantly contribute to bank profitability. However, POS systems demonstrated a positive impact on bank profitability and were statistically significant in this regard. Similarly, internet banking also exhibited a positive influence on bank profitability and showed statistical significance. (UJ THANKGOD, 2019)

Banks are recognized for their significant contribution to the GDP of an economy and for their pivotal role in ensuring the efficient functioning of an economy through financial-based outputs.

However, the banking industry has undergone continual transformation over the years, driven by several influential factors. These include regulatory changes aimed at fostering an integrated global banking market, structural changes enabling banks to broaden their service offerings to compete with non-banking financial markets, and technological advancements necessitating the redesign of the banking model. (CH Patrick, 2023)

Digital banking represents a contemporary banking model that digitizes all traditional bank operations and services, encompassing areas such as Human Resource Management, Business Operations, Organizational Structure, and Administration. It offers digital financial services to customers, transforming the way banking services are delivered. (Nguyen, 2018)

The rapid evolution of technology, facilitated by a plethora of new mobile applications ("apps"), is transforming the landscape of consumer shopping. In the present day, these mobile apps offer valuable services aimed at enriching the overall shopping experience. They empower smartphone users to compare products and retailers in real-time, discover optimal deals, and make purchases by simply waving their phones at the checkout counter. With millions of installations on various devices, these apps leverage mobile technology to reshape the way consumers engage in shopping. While mobile payments present a convenient avenue for consumers to settle transactions, they also give rise to concerns regarding consumer protection. This book delves into the mobile payments industry, scrutinizing its impact on consumers and shedding light on areas that demand increased attention. Key aspects such as dispute resolution, data security, and privacy are explored, emphasizing the need for a comprehensive understanding of the implications of mobile payments on consumers. (Nolan, 2014)

"Cash and Dash: How ATMs and Computers Changed Banking" delves into the origins and progression of digital banking, utilizing the invention and evolution of the automated teller machine (ATM) as a focal point. Spanning from the 1960s to the present day, the book takes a comprehensive approach to unraveling the intricate journey of innovation in retail banking, particularly within the payment system.

This work addresses the fundamental drivers of enduring innovation in the banking sector, shedding light on the broader discussion surrounding technological advancements and labor-saving devices. By adopting a unique perspective on the industrial organization of financial markets, "Cash and Dash" contributes valuable insights into the dynamics of innovation. The book explores various facets, including attitudes toward the patent system, the establishment of

standards, organizational politics, the interplay between regulation and strategy, considerations of trust and domestication, the dichotomy of maintenance versus disruption, and the monumental efforts required for the development of online real-time banking services for customers. (Bátiz-Lazo, 2018)

The credit card industry has evolved into a multi-trillion-dollar enterprise with a global footprint, employing hundreds of thousands and influencing billions of people on a daily basis. Surprisingly, despite the substantial demand from industry stakeholders, there is currently no all-encompassing book or reference material available that provides fact-based insights into the development and management of a successful card business. "Developing and Managing a Successful Payment Cards Business" fills this gap by offering information, analysis, observations, perspectives, and advice on the intricacies of establishing and overseeing a thriving card business. The coverage is extensive, encompassing areas such as card business strategy, product development, customer acquisition and retention strategies, as well as effective product marketing techniques. (Jeff H. Slawsky, 2005)

This brief examines the economic implications of digital lending for micro and small-sized enterprises (MSEs) in China amid the COVID-19 pandemic. A preliminary examination of a substantial cohort of MSEs served by a digital bank reveal that these institutions successfully conducted remote evaluations of borrowers, ensuring the continuity of lending throughout the pandemic. This, in turn, played a pivotal role in supporting the operational resilience, sales expansion, and financial inclusion of MSEs. On a global scale, implementing a policy framework that capitalizes on the strengths of digital banks, empowers their capabilities, and simultaneously mitigates potential financial stability risks, would contribute significantly to supporting small businesses during and beyond the challenges posed by the COVID-19 pandemic. (Sun, 2021)

The escalating capabilities of transformation and digitalization, coupled with the accessibility of vast amounts of data (commonly referred to as "big data"), are significantly influencing global financial systems. This impact is particularly pronounced with the rapid advancement of deep-learning algorithms and the adoption of distributed ledger technologies. These transformative forces are changing the shape and effectiveness of financial markets, redefining the value scheme of economic services, and restructuring remittance systems (Ebikeme, 2020).

This study aims to explore and share perspectives on the influence of electronic banking on the operational performance of banks in Nigeria. The banking landscape has undergone significant

evolution, transitioning from traditional ledger cards and manual filing systems to contemporary electronic systems. Presently, most banks utilize electronic platforms to efficiently manage the retrieval, storage, and processing of vast amounts of information on a daily basis.

Three to four decades ago, banking was a straightforward process where customers entrusted their savings to banks and availed themselves of financial services from these institutions. Opening an account involved the issuance of a passbook for account operation, and in the case of a current account, customers were provided with cheque books to facilitate transactions. The advent of electronic banking has marked a transformative shift in these conventional practices, and this study seeks to delve into the consequential impact on the overall performance of banks in Nigeria. (Ebikeme, 2020)

This adaptation, to market requirements, to customer requirements is the promoterof financial innovation. Innovation requires adaptation and the creation of new financial products; in a wider sense, new methods are being incorporated to mobilize or place money, or the development and evolution of new financial bodies. Consequently, financial innovation is manifested at the level of the entire financial market, so also at the level of the market for banking products and services (examples of such financial innovations are interest rate swap, use of credit derivatives, securitization of credits, prepaid debit cards, use intensive Internet banking and its particular forms). (Stoica, O., 2006). As Mr. Isărescu said after the 2008 financial crisis, the innovations should never cease, because they are the ones that increase the efficiency with which the needs of the clients are satisfied. (IsărescuM., 2009)

The productivity of banks has developed because of the presentation of e-banking, and work costs have diminished. As a result of electronic means, fewer representatives are expected to convey administrations; the precision of exchanges and support has likewise been enhanced as PCs have replaced people, lessening human mistakes; systems, processes, and administrations are presently quick and dependable, saving time, exertion, and cash; and the systems, processes, and administrations are presently quick and dependable, saving time, exertion, and cash. (Manzoor, 2011)

Digitalization is considered to provide great efficiency when habits and work processes are changed to accommodate the possible efficiency improvements (Kuusisto, 2017). On the other hand, digitalization policies were surely cause changes in the normal work patterns and procedures. This process involves workers to adapt to the technology and this had various effects on

employees; some may see them as advantages and some were need time to adapt to this technology, attempting to understand and handle these changes (Saputra et al., 2020).

In the Malaysian financial landscape, commercial banks occupy a pivotal position, constituting the predominant segment of the financial institutions. The banking industry in Malaysia has undergone significant transformation driven by technological advancements, liberalization, and deregulation. This evolution has led to increased integration within the sector, resulting in a more competitive and intricate market environment.

The current scenario in the banking industry reflects a high degree of product homogeneity among various banks. Simultaneously, there is a rising demand from customers for enhanced services, prompting banks to embark on more effective transformations within the industry. In response to these challenges, banks are compelled to undertake strategic initiatives to adapt to the dynamic landscape, ensuring their relevance and competitiveness in the evolving financial market. (Khattab Ibrahim Hadid, 2020)

In the modern banking industry, technologies such as ATM networks and transactional Internet websites allow banks to interact more efficiently with their customers regardless of geographic proximity; furthermore, recent innovations in financial technologies provide the capacity to provide these services using long-distance interfaces with customers. According to Berger and Deyoung, “Greater use of quantitative methods in applied finance, such as credit scoring, may allow banks to extend credit without geographic proximity to the borrower by ‘hardening’ their credit information” (p. 1483). Kindermann (2021) has highlighted a positive correlation between social media adoption and financial performance, drawing on various research studies. However, Paulet and Mavoori (2019) and Schniederjans, Cao, and Schniederjans (2013) have primarily focused their investigations on Facebook, Twitter, or both, neglecting other platforms such as YouTube, Instagram, or Pinterest.

In contrast, H. Du and W. Jiang (2015) underscore the importance of engagement within a single channel, suggesting that merely expanding the breadth of resources may not suffice to enhance financial well-being. Instead, the speed of digitization plays a crucial role, allowing firms to effectively target new customer segments. Building upon this foundation, the present study explores the level of digitalization reflected in a financial institution's social media communication strategies. It emphasizes the need to assess not only the quantity of social media platforms utilized

by a company but also the effectiveness of their implementation, as highlighted by Malmström and Wincenty (2018).

By considering both the breadth and depth of social media utilization, this study aims to provide insights into the nuanced dynamics between digitalization efforts and financial outcomes within the banking sector. Through a comprehensive analysis, it seeks to inform strategic decision-making processes and optimize the impact of social media engagement on overall financial performance.

Gul, Irshad, and Zaman (2011) conducted an analysis of the factors influencing the profitability of Pakistani banks from 2005 to 2009. Employing the pooled ordinary least squares method, they examined the impact of inflation, market capitalization, assets, equity, and loans on banks' profit-making capabilities. Their study concluded that both external and internal factors significantly affect the profitability of banks.

Harper (2002) investigated the effects of privatization on the financial and operating performance of enterprises in the Czech Republic during 1992-1994. By comparing the performance of privatized companies with government-owned firms, Harper found that the initial wave of privatization yielded unsatisfactory results, marked by a notable decline in efficiency, employment, and real sales. However, subsequent to this initial phase, profitability exhibited a substantial increase, which persisted over time.

Dorra and Sonia (2011) explored the impact of privatization on the risk level of banks over the period of 1990-2010. Their study revealed that liquidity risk heightened as a consequence of the withdrawal of government capital from privatized banks. However, they also found that privatization tended to manage credit risk more effectively compared to solvency and liquidity risks. Das (2002) analyzed the changes in risk and productivity of public sector banks. Utilizing data spanning from 1995-96 to 2000-2001, Das found that a reduction in state ownership correlated with improved output and performance of banks.

These studies collectively provide valuable insights into the dynamics of banking sector performance, particularly in the context of privatization and its implications for profitability, risk management, and productivity. Such findings are essential for policymakers, investors, and stakeholders seeking to understand the impacts of structural reforms on banking sector outcomes.

According to Henry (2000), financial liberalization leads to a reduction in the cost of capital and an increase in liquidity, which benefits from the sharing of risks between domestic and foreign agents. Vining and Boardman (1992) investigated the impact of ownership structure on the efficiency of publicly owned firms using a sample of 500 non-financial firms in Canada, including 93 mixed-owned, 12 government-owned, and the remainder privately owned. Their findings, after controlling for factors such as size and market share, indicate that privately owned companies outperform publicly owned and mixed-owned firms in terms of profitability and operational efficiency. Obeid and Bhatti (2011) conducted a study on the effect of privatization on stock performance using a comparative approach. Their results suggest that privatized firms exhibit better performance compared to the control group, highlighting the positive impact of privatization on firm performance metrics. These findings collectively contribute to our understanding of the relationship between ownership structure, financial liberalization, and firm performance. Such insights are valuable for policymakers, investors, and stakeholders seeking to optimize the performance and efficiency of firms within a liberalized financial environment.

Camanho and Dyson (1999) conducted a seminal study utilizing data envelopment analysis (DEA) to assess the performance of Portuguese bank branches. Their research highlighted DEA as a valuable tool for complementing traditional profitability measures within the banking sector. By employing an efficiency-profitability matrix, they were able to characterize the performance profiles of bank branches, focusing particularly on the relationship between branch size and performance.The findings of the study underscored the positive impact of branch efficiency on the profitability of banking firms. However, it was noted that while higher profitability scores were generally associated with greater efficiency, this correlation was not always direct. The study further explored two alternative objective-setting policies: one policy centered on selecting best practice units, disregarding pure technical inefficiencies, while the other aimed to optimize unit scale by minimizing scale inefficiencies with minimal alteration to unit size.

The inputs considered in the analysis included the number of external ATMs, floor space of each bank branch, number of employees in each branch, and operational costs (encompassing supplies and other services). Outputs for the analysis comprised the number of transactions in external ATMs, savings amounts, and the total number of accounts. Camanho and Dyson's (1999) study contributed significantly to the understanding of performance evaluation methodologies within the

banking industry. By providing insights into the dynamics between efficiency, profitability, and operational characteristics of bank branches, their research offered valuable implications for strategic decision-making and resource allocation in the banking sector.

Burki and Niazi (2006) conducted a comprehensive study using data from 40 commercial banks spanning the period from 1991 to 2000. Their objective was to assess the impact of financial reforms on the efficiency of state-owned, privately owned, and foreign-owned banks in Pakistan. The study employed data envelopment analysis (DEA) to compute various efficiencies—namely, cost, allocative, technical, pure technical, and scale—relative to both pooled and separate frontiers for each bank type. Given that interest costs represent a significant portion of total costs within Pakistan's banking sector, the study focused on variables selected under the intermediation approach. Instead of constructing a single multi-year efficiency frontier, the researchers opted to construct efficiency frontiers for each year's cross-sectional data, thereby allowing inefficiency to vary over time. The study period was divided into three distinct groups: the pre-reform period (1991 to 1992), the first reform period (1993 to 1996), and the second reform period (1997 to 2000). This division facilitated a nuanced analysis of the temporal effects of financial reforms on bank efficiency. Burki and Niazi's (2006) study represents a significant contribution to the literature by offering insights into the evolving efficiency landscape of Pakistan's banking sector amidst financial reforms. By examining the efficiency dynamics across different ownership structures and reform periods, the research provides valuable implications for policymakers and stakeholders seeking to enhance the performance and effectiveness of the banking industry in Pakistan.

Ahmed, Farooq, and Jalil (2009) observed various challenges plaguing the Pakistani banking sector, including higher intermediary costs, low productivity levels, substantial expenditures on establishment, excessive staff hiring, and an overabundance of loss-making branches. These issues culminated in a crisis of low profitability and productivity within the sector, prompting regulatory authorities to initiate financial reforms in the early 1990s. With assistance from the Japanese government and the World Bank under the Banking Sector Adjustment Loan Program (BSAL), Pakistan's regulatory authorities embarked on a reform agenda aimed at enhancing the overall Total Factor Productivity (TFP) of the financial system. The reforms also focused on improving management practices, strengthening accountability mechanisms, and promoting ownership

separation within the banking sector. To evaluate the impact of these reforms, the study utilized sample data from 20 domestic commercial banks in Pakistan spanning the period from 1990 to 2005. Employing data envelopment analysis (DEA) and the Malmquist Index of total factor productivity (TFP), the research aimed to assess the efficiency and productivity trends within the Pakistani banking sector following the implementation of financial reforms.

Ahmed, Farooq, and Jalil's (2009) study contributes to the understanding of the effects of financial reforms on the banking sector in Pakistan. By examining efficiency and productivity metrics over a significant time frame, the research provides insights into the effectiveness of regulatory interventions in addressing the sector's challenges and fostering sustainable growth and development.

Fasial (2016) underscores the pivotal role of banks within the global economic system, emphasizing their significance in facilitating financial transactions and driving economic growth. In the context of Pakistan, the banking sector comprises both public and private entities, with a history marked by instances of privatization and nationalization in response to performance challenges. The Pakistani banking sector has navigated through various stages of crisis over time, reflecting the dynamic nature of the financial landscape. Presently, healthy competition is observed among banks across both public and private sectors, indicative of a vibrant and evolving industry. Stakeholders ranging from managers and owners to prospective investors, creditors, labor unions, governmental agencies, and the public demonstrate a keen interest in the financial data disclosed by firms. While profitability and financial strength remain primary concerns, other factors such as size, growth trajectory, and social responsibility initiatives also garner attention.

Fasial's (2016) book provides valuable insights into the evolution of banking information practices and offers guidance on leveraging financial data for analysis. Particularly beneficial for finance students, the book equips readers with essential tools and methodologies for conducting rigorous financial analysis, thereby fostering a deeper understanding of banking dynamics and performance evaluation.

The onset of the COVID-19 pandemic has precipitated a rapid acceleration of digitalization across various spheres, bringing about significant transformations in economic and social dynamics. This shift has not only altered traditional modes of employment but also exacerbated existing

inequalities, delineating a stark contrast between those equipped with digital technologies and those left marginalized by their absence.

While the pervasive adoption of digital tools has yielded numerous benefits, it has also introduced new risks and challenges. In response, "The New Digital Era" comprises two volumes aimed at systematically examining the advantages and pitfalls associated with this accelerated digitalization, particularly amidst the backdrop of the pandemic. By synthesizing insights from various chapter authors, the volumes strive to elucidate the multifaceted impacts of digitalization on social and economic landscapes.

Emphasizing the imperative of crafting novel social and economic policies, the chapters underscore the necessity of mitigating potential conflicts and inequalities arising from digitalization. This endeavor seeks to foster a balanced approach that promotes inclusive growth and societal well-being. "Contemporary Studies in Economic and Financial Analysis" serves as a platform for disseminating pertinent research within the realms of economics and finance, with a focus on both disciplinary and interdisciplinary perspectives. By curating themed volumes that address contemporary issues, the series endeavors to contribute to the ongoing discourse surrounding the transformative effects of digitalization on economic and social systems.

The rapid evolution of financial technology (fintech) presents unprecedented challenges to traditional banking institutions. This paper undertakes a comprehensive analysis of the implications of these challenges on bank competitiveness while delving into the key factors conducive to digital advancement within the banking sector. The examination reveals a diminishing prominence of banks in driving fintech innovation, signaling a shift in their traditional role. Moreover, the analysis suggests that efforts to bridge the digital divide may exacerbate industry concentration, as smaller and less technologically adept banks struggle to keep pace with their larger counterparts. Cross-country evidence highlights disparities in digital leadership, with banks in high-income economies emerging as frontrunners. This leadership position is likely attributed to factors such as robust digital infrastructure, favorable legal and business environments, and healthy competitive landscapes. However, the study also identifies potential pitfalls for digital leaders, including entrenched consumer preferences for legacy technologies, limited involvement of fintech and big tech entities, and vulnerabilities in bank balance sheets.

Consequently, some leading banks may face challenges in adopting emerging technologies in the foreseeable future.

These financial innovations may also provide senior banking managers with the ability monitor the decisions made by loan officers and managers at distant affiliate banks more easily, and to evaluate and manage the contributions of individual affiliate banks to the organization's overall returns and risk more efficiently as well (Berger and Deyoung, 2006)

Mitra and Chaya (1996) found that IT investments reduce average production costs, and increase average overhead costs in firms. Alpar and Kim (1990) reported that investments in information technology decrease total costs in the banking industry. Harris and Katz (1991) found that higher information technology spending is associated with lower growth in the operating cost of insurance `companies. Morison and Brandt (1990), found, from government data, that technology provides only marginal returns and concluded that there was over-investment in IT.

Technological advancement facilitates payments and creates convenient alternatives to cash and cheque for making transactions. Such new practices have led to the development of a truly global, seamless, and internet-enabled 24-hour business of banking. Technological advancement in payments is important because it will be feasible to outsource quite a number of the banks' roles in the payment system. Also, bank regulation can be more technologically dependent and better focused rather than focusing on conceptual guidelines. The ICT revolution both in terms of innovation rate, speedy operation, and cost per unit (portraying reduction in average total and marginal costs) has made a good number of banks embrace the use of ICT infrastructure in their operations (Akinuli,1999).

Digital transformation is an ongoing process that acknowledges the perpetual evolution of the digital landscape and the corresponding shifts in consumer expectations. This evolution aims to consistently improve outcomes, ultimately leading to heightened customer satisfaction. The advent of digital technologies has substantially altered consumer behaviors, with mobile devices, apps, machine learning, automation, and more providing customers with near-instant access to what they seek. At its core, digital transformation entails the comprehensive integration of digital technology throughout all facets of a business, fundamentally transforming its operations and enhancing the value it delivers to customers. The introduction of these novel digital technologies has effectively reshaped customer expectations, giving rise to a contemporary breed of shoppers. In today's

interconnected world, consumers are constantly engaged, equipped with various applications, and possess a profound understanding of the capabilities offered by technology. (B Kaur, 2021)

Financial innovations play a crucial role in diminishing the cost of capital, mitigating financial risks, enhancing financial intermediation, and ultimately contributing to the improvement of overall welfare. The primary purpose of the financial system is to facilitate the allocation and deployment of economic resources, especially in situations of uncertainty. (Malik, 2014)

Another review showed that balance requests/bank articulations are the most broadly involved help of portable banking in Jordan. They viewed bill installment as the second most generally utilized help of portable banking. Store move was viewed as the third most well-known utilization of the help. The rest utilize the help for paying portions of credits and home loans. They found that 65% have never applied for these administrations through Portable banking. (YK Dwivedi, 2015)

Embracing adaptable banking can fundamentally influence the advancement of non-western nations where numerous buyers need admittance to customary financial administrations or find the expense of such administrations restrictive. (Heba E. Hassan a, 2020)

Numerous studies have explored the expansion of the Technology Acceptance Model (TAM) and its extended versions by examining the importance of various constructs and factors. For instance, perceived financial cost, system quality, and social influence have been included alongside the original TAM constructs. These additions were found to have a positive correlation with consumer intentions to adopt mobile banking services. (Mirella Kleijnen, 2004)

The terms "mobile banking" and "mobile payments" refer to separate yet sometimes overlapping categories of products. Certain mobile banking platforms offer services, such as money transfers, which are classified as types of mobile payments. Conversely, some mobile payment products are closely associated with bank accounts as the primary source of funds, effectively assuming the functions of mobile banking. (CJ Jacob, 2007)

Many fintech companies integrate financial services with supplementary activities associated with sharing economy businesses, e-commerce, and big data analytics, thereby offering modern added value. Advanced technologies such as artificial intelligence, machine learning, distributed ledger technologies, and cognitive computing complement both traditional incumbents and new entrants in the fintech sector (IOSCO, 2017). Fintech plays a role in assisting farmers by facilitating connections with banks and investors. (K Mukhtar, 2020)

Digital banking services boast efficient, user-friendly, and contemporary systems, unlike traditional banking methods. Representing a novel and innovative information system, they have revolutionized conventional banking services by integrating modern technologies such as the Internet and the World Wide Web (SI Zaman, 2023).

The viability and productivity of a bank are many times checked utilizing different monetary proportions, giving speedy and open measures to store cash banks to assess their monetary presentation. Among the most regularly used proportions are return on assets, return on equity, and net revenue proportions. In the ongoing period of globalization, technological developments have not just prompted an expansion in that frame of mind of banking establishments working overall yet have additionally raised the degree of refinement in monetary items presented by banks to meet the advancing necessities and requests of clients. Subsequently, this time has cultivated extreme rivalry among banking establishments, especially as improvements in installment frameworks have advanced, acquainting options with customary hard cash and consequently affecting key parts of banking activities (Safdar Husain Tahir, 2018).

The usage of advanced monetary administrations has altogether worked on different parts of monetary administrations, including straightforwardness, security, speed, and productivity. By utilizing advanced stages, monetary organizations can give more noteworthy straightforwardness in their tasks, permitting customers to get to continuous data about their exchanges and record exercises. Also, computerized monetary administrations utilize progressed encryption innovations and verification measures, improving security and diminishing the gamble of extortion or unapproved admittance to delicate monetary data (C Pazarbasioglu, 2020).

Utilizing online technologies as intermediaries for economic activity, such as digital banking and online banking, has reshaped the paradigms of consumer-bank engagement, opening up new possibilities for both parties involved. Digital banking is recognized for its numerous advantages, including high information transferability and reduced costs. Banks leverage digital banking services to enhance customer relationships and capitalize on these benefits. (PM, 2019)

Digital banking offers customers round-the-clock access, enabling transactions to be conducted at any time and on any day of the week. Furthermore, it has empowered customers to expand their businesses globally, facilitating dealings with suppliers and partners through online transactions and overcoming geographical barriers. Digital banking has played a crucial role in mitigating unexpected events by enabling smooth recovery processes. (M Wang, 2020)

The economic explanation for financial deregulation typically hinges on the anticipated benefits it may bring to rivalry, which is expected to translate into enhanced productivity within the sector. However, there is a predominant apprehension that heightened rivalry could possibly discourage banks from efficiently monitoring and screening loan provisions, thereby strengthening the vulnerability of the banking system. While extensive research exists on the relationship between competition and bank operations, comparatively less is understood about how competition influences economic steadiness (B Casu, 2010).

The conventional banking business model has been disrupted by the Information and communication technologies (ICT) revolution, enabling banks to venture beyond their traditional boundaries and restructure their value chains. This has facilitated the separation of customer service delivery across distinct business entities. As a result, certain banks, particularly those operating primarily online, now offer a diverse range of financial products such as insurance and securities, alongside traditional banking services. It's noteworthy that not all of these distributed products originate from within the bank's group, indicating a departure from the traditional model towards a more diversified and interconnected financial landscape (J Delgado, 2004).

Digitalization in banking encompasses the creation of user-friendly website designs. A poorly designed website may fail to meet customer prospects. Moreover, the proliferation of digital banking goals to boost up consumer experiences by streamlining banking activities, reducing time, and minimizing inconvenience. Particularly in small communities, electronic banking can bridge the gap by providing access to banking services that would otherwise be unapproachable (Keeton, 2001).

Observed from the consumers' perspective, the automation of banking services through the introduction of E-banking channels offers round-the-clock accessibility, leading to reduced costs associated with accessing and utilizing banking products and services. It facilitates efficient cash management, minimizes time demands, enhances comfort levels, and ensures swift and uninterrupted access to pertinent information (Aladwani, 2001).

Electronic banking, often referred to as e-banking, essentially represents the integration of e-business practices within the banking sector. It is synonymous with digital banking. In the contemporary business landscape, computer applications play a pivotal role for banks, with the Internet emerging as the primary platform for conducting financial, banking, and commercial transactions (Magembe, 2002).

The utilization of electronic payment methods offers significant advantages to both businesses and individuals. These benefits include decreased transaction costs, heightened accessibility, and the assurance of secure and consistent payment and settlement mechanisms for an extensive array of goods and services accessible globally through online or other digital platforms. The major advantage is that online payments empower bank clients to manage their day-to-day monetary activities without the necessity of physically visiting their domestic branches (DB Humphrey, 2001).

The productivity and success of a bank are evaluated through various financial indicators, providing quick and accessible insights into its financial performance. Among these indicators, return on assets, return on equity, and profit margin ratios are commonly utilized. In the current era of international and technological improvement, the banking landscape has witnessed a proliferation of institutions globally, accompanied by a surge in the sophistication of financial products offered to meet diverse customer expectations. Consequently, intense competition has emerged among banks, fueled by advancements in payment systems that have introduced alternatives to traditional currency, thereby significantly impacting banking performance and operations (OI Victor, 2015).

Financial inventions in payment procedures and systems, including automated teller machines, mobile banking, and online banking, have bolstered the banking sector in developing countries. This development in digital aspects has spurred competition among banks, leading to a proliferation of institutions in the sector. Frequent research studies have recognized a positive correlation between the acceptance of innovative financial services/ products and improvements in bank effectiveness, as well as increased customer satisfaction and expectations (I Nkem, 2017). The digital and its expected advancements have become a standard for gaining competitive advantage in today's businesses. A study delved into client perceptions regarding online and web banking, a technologically advanced service. This study elucidates various aspects that contribute to customers' expectations, including accessibility, consistency, time efficiency, run time accessibility to information, faster transaction processing, easy of utilizing the services, customers expecting minimum transaction charges, avoiding physical visits to banks so need branchless banks. The significance of these factors lies in their ability to empower firms to enhance their capacity to adapt to, respond to, and initiate technological advancements on an ongoing basis. This

capability is crucial for the service industry, where innovation plays a pivotal role in engaging with customers effectively (BA Lundvall, 1988).

A research endeavor was undertaken to assess the impact of financial innovations on the financial efficacy of commercial banks in Kenya by (KM Cherotich, 2015). Utilizing secondary data, this study opted for a census approach, encompassing all 44 banks within the study's purview, thereby obviating the need for sampling given the relatively small population size. The findings of the study unveiled a robust correlation between financial inventions and the profitability of banks, indicating a significant relationship between the two variables. Conclusively, the study inferred that financial innovations exert a positive influence on the financial performance of commercial banks. In light of these findings, the study recommends that pertinent information concerning financial innovations be readily accessible, particularly to regulatory and advisory bodies, to provide guidance and direction to commercial banks regarding their imperative.

The writer Sultan presented the digitalization effects on the banking sector in Pakistan. According to the author, digitization has been ongoing in the corporate world for decades, prompting questions about its potential to enhance performance in banking and other financial institutes, especially in Pakistan. The study goal is to determine the relationship between digitization and financial performance of banking and financial entities by investigating three aspects of digitization: adoption pace, adoption scope, and overall digital orientation across banks listed on the Pakistan Stock Exchange (PSX). Financial performance metrics such as Return on Assets (ROA) and Return on Equity (ROE) are used to gauge the impact of digitization. In addition to traditional financial metrics, the study also considers the role of social media platforms in modern communication, networking, and information sharing. Many banks utilize these platforms to identify marketing opportunities and engage with customers. By focusing on Pakistani banks listed on the stock exchange, the study uncovers unexpected trends in digitization that may pose challenges for banks in Pakistan, depending on their chosen digital strategies. These findings have significant implications for experts in the banking industry, as well as potential avenues for future research. Furthermore, the study identifies alternative digitization strategies tailored to the unique needs of the financial sector, offering insights into potential pathways for improvement and innovation (Jahanzaib Sultan, 2023).

A comprehensive study was undertaken to explore the impact of electronic-based banking services on the profitability performance of banks. This investigation delved into the effects of Return on

Assets (ROA) and Return on Equity (ROE) performance indicators across 23 developed and developing countries, spanning the period from 2005 to 2013. Employing dynamic panel data methods, the study sought to elucidate the innovative nature of Internet banking services and its consequential influence on bank performance. Notably, this study stands out from its counterparts in the literature due to its analytical approach and the inclusion of banking data from both developed and developing nations. The findings of the study revealed compelling insights. Firstly, it was observed that the bank profitability of both developed and developing countries was significantly impacted by the ratio of the number of branches to the number of ATMs, underscoring the importance of Internet banking services in driving financial performance. Additionally, the study highlighted those certain variables exhibited unexpected positive relationships, contrary to conventional expectations. This divergence in outcomes was attributed to variations in the developmental stage of the countries, the socio-cultural milieu, and the existing electronic banking infrastructure. The study sheds light on the intricate dynamics between electronic banking services and bank profitability, offering valuable insights into the multifaceted nature of banking operations across diverse geographical and socio-economic circumstances (I Akhisar, 2015).

The author Taylor & Francis significantly contributes to the existing body of knowledge by presenting a comprehensive examination of the impact of emerging digital technologies on the financial performance of banks in Pakistan. The study meticulously explores both the macro and micro-level implications of Information and Communication Technology (ICT) on monetary entities, offering a broad spectrum of evidence. A focal point of the study is the elucidation of how Information and Communication Technology (ICT) influences critical components of financial systems, such as trading and information systems, which are indispensable for their efficient functioning. Through empirical analysis, the author adeptly illustrates the transformative potential of digital technologies in revolutionizing traditional banking practices and modernizing stock exchange trading systems. Moreover, the study delves into the myriad ways in which individuals stand to benefit from the widespread adoption of digital technologies in their everyday financial endeavors, particularly in banking services. Furthermore, the study ventures into the realm of financial inclusion, shedding light on Information and Communication Technology (ICT)-driven microfinance services and addressing pertinent gender-related issues within the financial domain. By exploring the intricate associations between technology and various aspects of firms' operations, the study offers valuable insights into the evolving landscape of financial services and

the role of technological progress therein. This comprehensive analysis makes the study a valuable resource for researchers, policymakers, and practitioners alike, particularly those engaged in addressing the intersection of new technologies with financial markets, FinTech, financial innovations, and stock markets. Moreover, graduate and postgraduate students in fields such as economic and social development, information technology, global studies, social policy, or comparative economics will find this study to be an indispensable source of knowledge, providing a nuanced understanding of the evolving socio-economic landscape in the digital age (Francis, 2021).

Using digital tools effectively is very important for getting all the benefits from being online. Companies need to listen to what customers say on different websites and use that feedback to improve how they serve customers. This helps make their digital strategy work better and keeps customers happy. Many people believe that if a company's digital strategy is successful, it will make more money. This belief comes from how well a company plans its digital strategy, including setting clear goals and having people who are responsible for making sure the company uses digital tools well. Companies that fully embrace digital technology have smooth ways of working online, make their supply chains work well, and can make more money by connecting with more people online. They also have better access to information because they use digital tools, which helps them make good decisions and respond quickly to changes in the market (Sultan, 2023).

Research conducted in the United States revealed that a substantial number of individuals have adopted the use of debit and credit cards for making purchases and expenditures. This shift towards these modern forms of currency has not only increased individuals' access to funds but has also boosted their purchasing power, fostering a culture of heightened consumption. Consequently, these evolving consumption patterns have had a profound impact, leading to the consolidation and growth of various industries and the overall economy (V Stango, 2009).

Supermarkets commonly feature point-of-sale systems, with the checkout counter serving as a focal point. These systems typically include a barcode scanner and a cash register. When an item is scanned, the system automatically calculates its cost. Once all selected items have been scanned, the system tallies up the total cost of the customer's purchase (GO Nworie, 2022).

A POS device resembles a mobile phone, offering portability and efficient payment processing capabilities for customers using credit or debit cards at retail or service establishments. It facilitates various services such as retail payments, cashless transactions, cashback, balance inquiries, airtime

vending, and loyalty program redemptions. Essentially, a point-of-sale (POS) is a computer terminal commonly found in retail stores, allowing for swift fund transfers from a customer's bank account by debiting the card used for the purchase. Also referred to as the point of service, this is where products or services are provided to customers and payments are processed. While the intricacies of POS systems may vary, their ultimate goal remains consistent across different scenarios (PA Muyo, 2017).

A research investigation assessed the profitability efficiency of Saudi banks by examining a combination of traditional and e-banking elements. Findings affirmed that the presence of ATMs, branch networks, and phone banking services contributed positively to banks' efficiency levels. However, it was observed that the adoption of point-of-sale (POS) systems and mobile banking services did not have a significant impact on efficiency. The automation of banking services, including Internet banking, ATM banking, telephone banking, and mobile banking, allows customers to conveniently access their accounts and obtain information about various bank products and services using personal computers, mobile phones, or other smart devices (S Uchida, 2011).

2.2 Theoretical Framework

The Theory of Financial Inclusion was presented by (Ozili, 2020). This theory includes multiple principles of financial institution improvement by digitalization.

The global scenario reveals that approximately 1.7 billion people lack access to financial services, highlighting a significant gap in financial inclusion. A compelling example is Bangladesh, where half of the working population remains unconnected to banking services, with a noteworthy 50% of these individuals being women.

2.2.1 Theory of Financial Inclusion

According to (Ozili, 2020) the Theory of Financial Inclusion summarizes the four features which are the following.

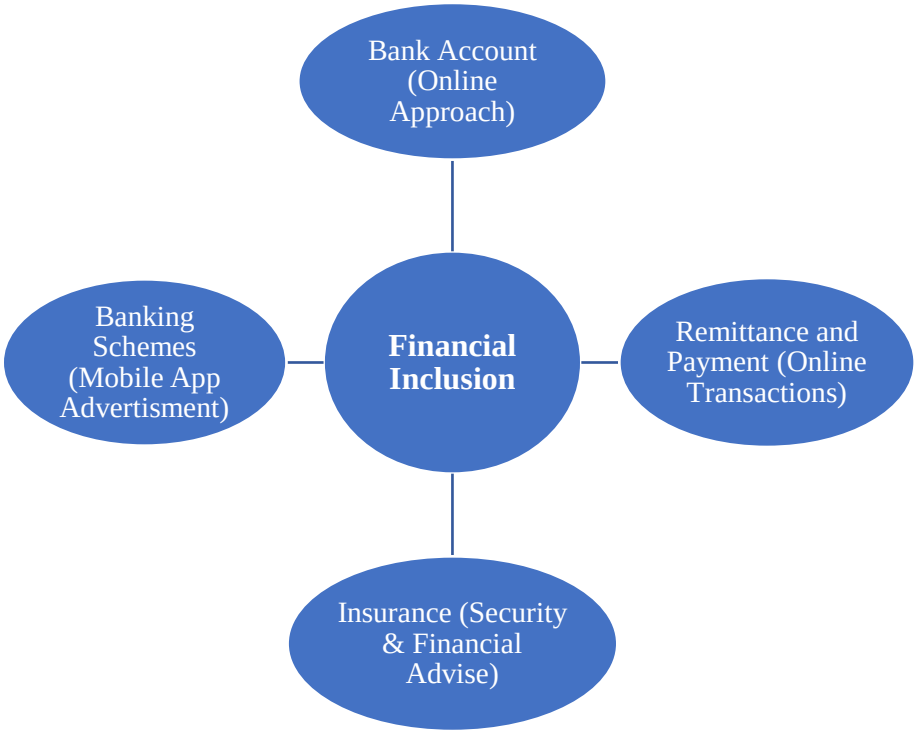
The author contends that fostering financial inclusion is pivotal, as it promotes the adoption of concepts such as payments, transactions, savings, insurance, and accessible credit, ensuring precision and availability for the population. The thesis delves into the core features of the financial inclusion theory, with a specific focus on banking accounts. Establishing banking accounts is

posited as a catalyst, providing an easy and cost-effective means for the population to access financial services through mobile apps and Internet banking. This approach is deemed essential for bridging the existing gaps in financial access.

Moreover, the author highlights the importance of utilizing digital tools for remittances and payments, stressing that such tools not only simplify processes but also lower costs for both financial institutions and customers. The thesis emphasizes the transformative potential of digital tools in redefining conventional banking methods, rendering them more streamlined and cost-effective. The digital tools, such as mobile banking apps and online payment platforms, in facilitating remittances and payments. By leveraging these digital solutions, financial transactions become quicker, more convenient, and less expensive for both banks and their customers. Furthermore, the thesis underscores how the adoption of digital tools has the potential to revolutionize traditional banking practices, leading to increased efficiency and cost savings. Overall, the emphasis is on the benefits of digitalization in enhancing the functionality and affordability of banking services.

Additionally, the thesis explores banking schemes and insurance, suggesting that financial institutions can enhance their profitability by offering discounts on loans and facilitating heavy transactions. The incorporation of insurance services not only secures the capital but also ensures the life security of individuals, marking a significant stride in the current capital-centric era.

The dissertation provides a comprehensive exploration of the theory of financial inclusion, shedding light on its various facets, from promoting banking accounts through digital means to optimizing remittances, payments, and insurance services. The overarching goal is to enhance accessibility, affordability, and efficiency in financial services, particularly for those currently underserved or excluded from mainstream banking.



Source: *Author's own description*

2.2.2 Variables of Theoretical Framework

Variables of a theoretical framework to financial inclusion, such as ATM users, Debit/Credit cards transactions, Online Banking transactions, Point of Sale transactions, and mobile app transactions.

- Financial Inclusion Aspect: ATM usage can enhance financial inclusion by providing individuals with convenient access to cash without relying on traditional bank branches. Banks can increase in ATM users correlates with improved financial access and inclusion, especially in areas with limited physical banking infrastructure.
- Financial Inclusion Aspect: Card transactions, both debit and credit, offer a cashless mode of payment, reducing the reliance on physical currency and fostering inclusion in the digital economy. Banks need to investigate the correlation between increased card transactions and the level of financial inclusion, assessing how widespread card usage influences economic participation.

- Financial Inclusion Aspect: Online banking allows individuals to manage their finances remotely, promoting inclusivity by overcoming geographical constraints. Banks need to focus on the growth of online banking transactions aligns with improved financial access, especially in regions where physical banking infrastructure is limited.
- Financial Inclusion Aspect: Point of Sale (POS) transactions enable electronic payments at various merchant locations, reducing reliance on cash and enhancing financial accessibility. Banks need to examine the relationship between increased POS transactions and financial inclusion, particularly in urban and rural areas where digital payment acceptance is expanding. In Pakistan, the use of POS machines is restricted, predominantly seen in well-known supermarkets, petrol stations, and restaurants. This is in contrast to other countries where card transactions are prevalent for daily essential purchases. Drawing from my personal experience in the UAE, card transactions are ubiquitous as POS machines are employed across various establishments for all types of transactions.
- Financial Inclusion Aspect: Mobile apps provide a convenient and accessible platform for financial transactions, especially for those without access to traditional banking services. Banks aim to educate individuals on the utilization of mobile apps for financial transactions, fostering enhanced financial inclusion, especially among populations with limited access to physical banks. This initiative not only empowers people to manage their finances digitally but also serves as a time-saving measure.

In the application of these variables, consider conducting surveys, analyzing transaction data, and evaluating the impact of technological advancements on financial inclusion metrics. Additionally, assess how changes in these variables influence the overall financial behavior and inclusion levels within specific demographics or geographic regions. The goal is to understand the role each variable plays in fostering financial inclusion and how they collectively contribute to a more inclusive financial landscape.

Digital formulation within banking involves new digital financial tools and novel approaches to streamline operations. Banks implemented innovation across their operations, assets, and systems to bolster profitability. The banks implement the latest methodologies to manage day-to-day activities more efficiently and cost-effectively. For instance, introducing new web-based and electronic tools such as automated teller machines, and cards leads to plastic money, mobile

applications to perform transactions, and online banking exemplifies development in banking products/ services (Dongol, 2021).

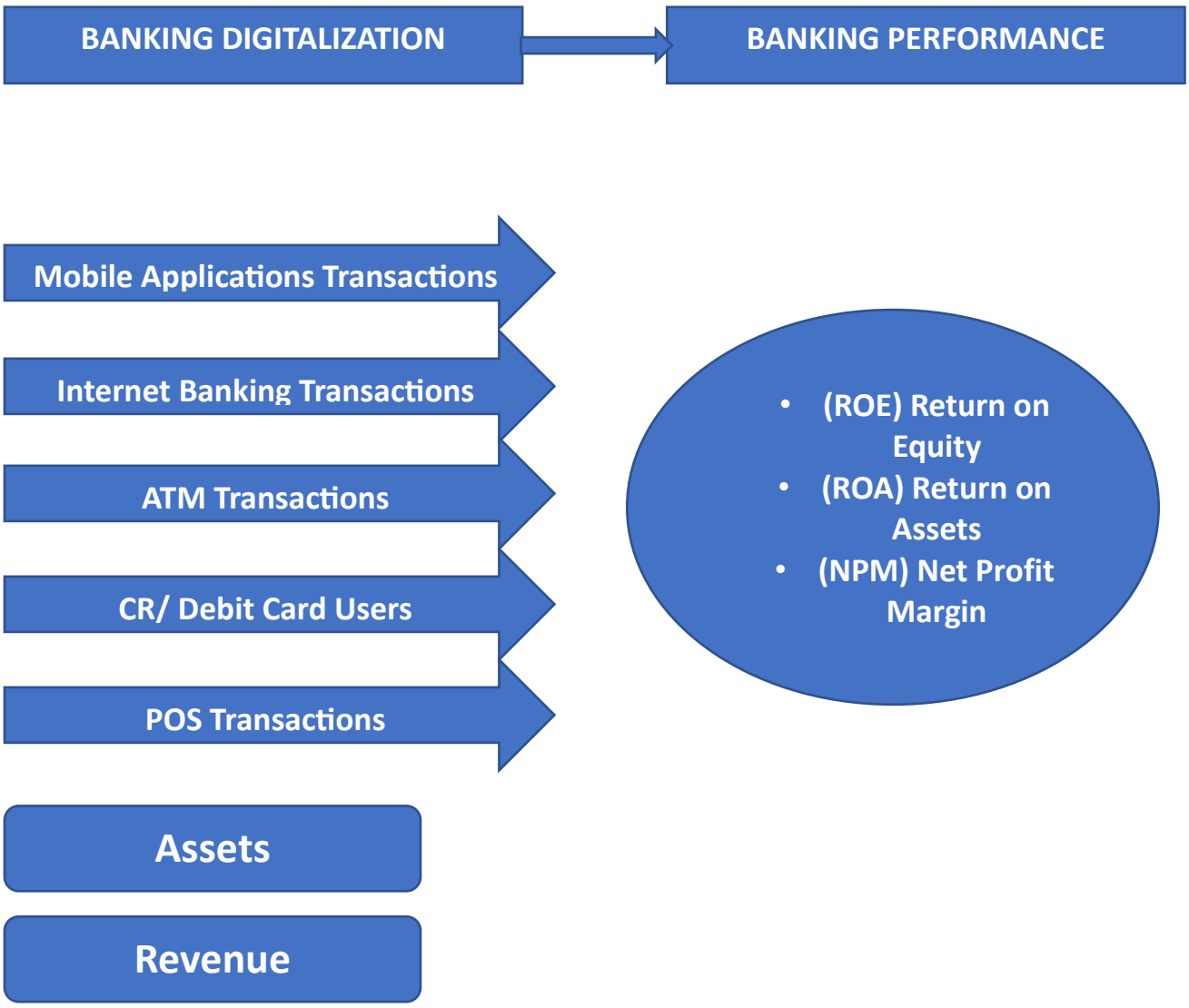
Current research has investigated the impact of modern technologies on banking profitability and assessed the operational proficiency of banks across developed and developing nations alike. Notably, in emerging economies, the acceptance of advanced practices within banking operations and remittance systems, including Internet banking, point of sale transactions, and online banking through web and mobile and ATM services, has led to notable advancements and raised the performance (I Nkem, 2017).

In the current trend of businesses, rapid changes have occurred to compete the competitors, and innovation in products and services stands out as a crucial driver of sustainable competitive advantage. By fostering enhancements in both products and processes, innovation in terms of digital and technical enables organizations to continually progress, ensuring their viability and resilience amidst evolving landscapes. This propensity for advancement not only facilitates the survival of banks but also accelerates their growth route, improves the bank's operational efficiency, and ultimately leads toward profitability as compared to other banks or organizations, setting them apart from their non-innovative entities (M Atalay, 2013).

2.3 Digitalization and Banking Performance

In the thesis, two primary variables have been employed to assess banking performance in Pakistan, focusing on Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). These are the three basic components of profitability of the banking sector so the research is conducted to evaluate the impact of technological innovations on Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). The study applies the lens of Financial Digitalization to analyze and understand the impact of digital transformation on these key performance indicators within the context of the Pakistani banking sector.

Independent Variable **Dependent Variable**



2.4 Innovation of Digitalization

Financial innovation in the banking sector is widely recognized as a pivotal factor influencing the performance of banks, exerting significant effects on consumers and the overall banking industry. The development and implementation of financial innovation embrace the potential to enhance the efficiency and profitability of banks. In today's competitive market environment, where technological advancements and evolving consumer preferences drive change, financial innovation serves as a catalyst for transformation within the banking industry. By introducing novel products, services, and processes, banks can better meet the evolving needs and expectations of consumers. Moreover, financial innovation enables banks to streamline their operations, optimize resource allocation, and capitalize on emerging opportunities in the market. This heightened efficiency not only improves the bottom line for banks but also enhances the overall stability and resilience of the banking sector. Furthermore, financial innovation plays a crucial role in driving competition within the banking industry. As banks innovate to differentiate themselves and attract customers, consumers benefit from a wider range of options and improved quality of services. In essence, financial innovation is instrumental in driving progress and competitiveness within the banking sector, ultimately leading to improved performance and outcomes for both banks and consumers alike.

Following are the independent variables to investigate the impact on banking performance and profitability in terms of return on equity, return on assets and net profit margin.

- **Mobile Banking**

  Mobile banking offers a diverse range of services that enable users to seamlessly send or receive cash with just a single click, providing unparalleled convenience and accessibility. The adoption of mobile banking is particularly advantageous for both banks and end-users alike. Notably, it is considered one of the most cost-effective means of accessing financial services, characterized by minimal transaction costs. Moreover, mobile banking streamlines service delivery, saving users valuable time, and represents an attractive alternative for individuals who may face challenges visiting traditional bank branches.

  Mobile banking has expanded access to banking services, particularly in rural and underserved areas where physical bank branches are limited. This has allowed banks to

reach a wider customer base and extend their services to previously unbanked populations. Mobile banking offers cost savings for both banks and customers. Banks can reduce operational costs associated with maintaining physical branches, while customers can conduct transactions conveniently without the need to visit a bank branch in person. This increased efficiency can contribute to improved overall banking performance. Mobile banking provides a platform for banks to engage with customers more effectively. Through mobile apps and digital channels, banks can offer personalized services, send notifications, and provide real-time updates, leading to greater customer satisfaction and loyalty. Banks that invest in mobile banking technology can differentiate themselves in the market and gain a competitive edge. By offering innovative features and functionalities through their mobile banking apps, banks can attract new customers and retain existing ones, ultimately driving improved performance. Mobile banking generates vast amounts of data that banks can analyze to gain insights into customer behavior, preferences, and trends. By leveraging this data effectively, banks can make informed decisions, optimize their operations, and tailor their services to better meet customer needs, thereby enhancing overall performance.

- **Internet Banking**

  Internet banking revolutionizes the way customers interact with their banks, offering real-time quality services accessible from the comfort of their homes or workplace, wherever internet connectivity is available. This innovative service merges internet and telecommunication technologies, providing a diverse range of valuable products and services tailored for user convenience. In countries like Pakistan, the adoption of e-banking is still in its nascent stages but is steadily gaining momentum. Online banking platforms offer customers a plethora of information-related benefits that incentivize the adoption of e-banking. These benefits include empowering customers to manage their bank accounts anytime and anywhere, enabling them to access essential information for making informed investment and financing decisions. In the competitive landscape of Pakistan's banking sector, institutions are continuously striving to offer services that are not only efficient and swift but also contribute to the overall enhancement of the banking system. Consequently, the primary objective of Internet banking initiatives is to establish a seamless working

environment wherein customers can effortlessly access the information they need to conduct financial transactions (Gulzar Ahmad, 2018).

- **Automated Teller Machine (ATM)**

  The cash dispensing machine, commonly known as an Automated Teller Machine (ATM), enables customers to withdraw cash from their accounts conveniently and swiftly, irrespective of location or time. Upon withdrawal, the amount is instantly debited from the customer's account. These ATMs are typically installed within bank premises or at designated locations designated by banks. This service not only saves customers' time in accessing banking services but also allows them to utilize the time saved in other productive activities. Additionally, the authors highlighted the cost efficiency of ATMs, which contributes to higher productivity. As a result, ATMs are strategically placed in various locations such as restaurants, hotels, shopping malls, retail stores, fuel stations, and other high-traffic areas to maximize accessibility and convenience for customers.

  The adoption of Automated Teller Machines (ATMs) in Pakistan commenced in 1987, but their growth was initially slow, with a modest increase in installed ATMs and users until the 1990s. However, a significant shift occurred in 2002 when the State Bank of Pakistan (SBP) mandated all banks to issue cards to their customers and facilitated the connection of ATMs to either of two networks, namely 1-Link and MNET, through a circular order. This directive laid the foundation for a more interconnected banking infrastructure. Subsequently, in 2006, the SBP issued further directives to interconnect the two networks, enabling customers of any scheduled bank to access cash from any ATM across Pakistan. This interoperability marked a significant milestone in enhancing the accessibility and convenience of ATM services for customers nationwide. The SBP has demonstrated a consistent commitment to improving the quality of e-banking services by regularly drafting new regulations. Additionally, it has emphasized the importance of ensuring uninterrupted service for cardholders. As a result, the e-banking landscape in Pakistan has witnessed continuous improvement and evolution. For the purpose of analysis, data from 2007 onwards was utilized, reflecting the period when ATM services were fully operational and widely utilized across the country (Gulzar Ahmad, 2018).

- **Debit/ Credit Card**

  Debit and credit cards have become integral components of banking transactions in Pakistan, significantly impacting banking performance. These cards offer convenience and flexibility to consumers, allowing them to conduct transactions seamlessly both domestically and internationally. By facilitating cashless transactions, debit and credit cards contribute to the efficiency of banking operations and enhance the overall banking experience for customers. The adoption of debit and credit cards has also spurred financial inclusion by providing access to banking services to a wider population. Individuals who may not have had access to traditional banking services can now participate in the formal financial system through card-based transactions. This expanded customer base has contributed to the growth and profitability of banks in Pakistan. Moreover, the use of debit and credit cards promotes transparency and accountability in financial transactions. Electronic records of card transactions enable banks to track and monitor customer spending patterns, detect fraudulent activities, and mitigate risks effectively. This, in turn, improves the security of banking operations and enhances customer trust and confidence in the banking system. The widespread use of debit and credit cards in Pakistan has led to significant advancements in banking performance, including increased efficiency, expanded financial inclusion, and improved security and transparency in financial transactions.

- **Point of Sale Terminals**

  Point of Sale (POS) terminals have emerged as pivotal tools in shaping banking performance in Pakistan, revolutionizing the way transactions are conducted and enhancing the overall efficiency of banking operations. These terminals, commonly known as card readers or swipe machines, facilitate electronic payments directly at the point of sale, allowing customers to make purchases using debit or credit cards. One significant impact of POS terminals on banking performance in Pakistan is the promotion of cashless transactions. By enabling customers to pay for goods and services electronically, POS terminals reduce reliance on cash, which can enhance security, transparency, and accountability in financial transactions. This shift towards cashless payments contributes to the efficiency of banking operations by streamlining the process of handling and

processing cash. Furthermore, POS terminals play a crucial role in expanding financial inclusion in Pakistan. These devices enable merchants, including small businesses and retailers, to accept card payments, thereby providing access to formal financial services for individuals who may not have access to traditional banking channels. This broader adoption of electronic payments fosters greater participation in the formal economy and contributes to the overall growth of the banking sector. In addition to promoting cashless transactions and financial inclusion, POS terminals also enhance customer convenience and satisfaction. By offering multiple payment options, including debit and credit cards, merchants can cater to diverse customer preferences, leading to a more seamless and enjoyable shopping experience. This positive customer experience can translate into increased loyalty and retention, ultimately contributing to the overall performance of banks in Pakistan. Moreover, the widespread adoption of POS terminals facilitates better tracking and management of transactions for both merchants and banks. Electronic records of transactions provide valuable data insights that banks can use to analyze customer spending patterns, identify market trends, and tailor their products and services accordingly. This data-driven approach to banking can lead to more informed decision-making, improved risk management, and enhanced profitability for banks operating in Pakistan. POS terminals play a crucial role in driving banking performance in Pakistan by promoting cashless transactions, expanding financial inclusion, enhancing customer satisfaction, and enabling data-driven decision-making. As technology continues to evolve and consumer preferences shift towards digital payments, the importance of POS terminals in shaping the future of banking in Pakistan is expected to grow exponentially.

2.5 Hypothesis

H1 (+) The number of mobile application transactions significantly affects the profitability of the banking sector of Pakistan.

H2 (+) Internet banking transactions significantly affect profitability of the banking sector of Pakistan.

H3 (+) ATM transactions significantly affect the profitability of the banking sector of Pakistan.

H4 (+) The number of Credit/ Debit card operators significantly affects the profitability of the banking sector of Pakistan.

H5 (+) The Point of sale transactions significantly affect the profitability of the banking sector of Pakistan.

CHAPTER# 03

METHODOLOGY OF THE RESEARCH

Research methodology comprises the systematic process of planning, implementing, and measuring research endeavors aimed at addressing exact investigations or testing hypotheses. It involves carefully selecting appropriate methods, tools, and methodologies to systematically gather, analyze, and interpret data. Functioning as a guiding framework, research methodology provides direction to researchers throughout the research process, ensuring adherence to principles of reliability, validity, and ethical conduct in their research.

3.1 Nature of Data

The current study adopts a predominantly quantitative approach to assess the effect of digitalization on banking performance. This involves utilizing various statistical methods, such as descriptive statistics, correlation analysis, and Panel Data Analysis (PDA). A descriptive study serves pivotal role in elucidating and condensing the dataset, on the other hand, co-relation analysis facilitates the exploration of associations among INDEPENDENT and DEPENDENT variables. Moreover, regression analysis is employed to differentiate causal relationships among DEPENDENT and INDEPENDENT variables. Descriptive statistics not only put up the understanding of the nature of data but also facilitate its comprehensive depiction. Additionally, PDA is utilized to scrutinize bank-level data, integrating the research bank-wise.

3.2 Research Approach

The study emphasizes investigating "THE IMPACT OF DIGITALIZATION ON THE FINANCIAL PERFORMANCE OF PAKISTANI PUBLIC AND PRIVATE BANKS" To address this theme, an existing and test hypothesis research approach was adopted for the collection of data. Through this research approach, the researcher conducted a comprehensive review of existing scholarly literature and relevant theories, as advocated by (J Woiceshyn, 2018). This process involved analyzing previous research to identify and formulate appropriate hypotheses. Subsequently, this approach guided the orderly testing of these veriables, leading to the source of optimum results to effectively address the research objectives. By employing this approach, the

study ensured an organized examination of the effects of transformation on both sectors of banks in Pakistan.

3.3 Data Sample

To collect the sample to investigate the study of impact of digital enhancement on banking profitability, a purposive sample which is used for a specific group was nominated, encompassing several commercial banks. This research contained the data of the last ten years, data was utilized from 2013 to 2022, to ensure a comprehensive and descriptive analysis in terms of digital development in the banking sector.

This sample selection process employed convenience sampling, primarily based on the availability of bank-level data within the specified time frame. Banks with accessible annual reports spanning from 2013 to 2022 were included in the sample, encompassing both the private and public sectors. Table 3.1 presents the classification of private and public sector banks utilized in the study. The complete list of private and public banks operating in Pakistan is provided in Appendix 1.1.

Table 3.1 List of Banks

Sr. No	Bank
1	National Bank Limited
2	Sindh Bank Limited
3	Bank Of Khyber
4	Bank Of Punjab
5	Askari Bank Limited
6	Habib Bank Limited
7	Muslim Commercial Bank Limited
8	Meezan Bank Limited
9	Soneri Bank Limited
10	Bank Alfalah Limited

3.4 Sources of Data

The research dissertation relies on secondary data collection methods, utilizing annual reports from various Pakistani Public and Private commercial banks as the primary source. A thorough analysis

of these reports has been conducted to evaluate the run time situation of digitalization within the Pakistani Public and Private commercial banking sector. Through a diligent investigation of the yearly financial reports, the researcher's goals were to differentiate the scope and features of digital enhancement steps commenced by selected banks. Additionally, the study seeks to originate prudent endorsements designed to improve the monetary outcomes of banks through the effective application of digital technology procedures. The researcher independently employed internal resources to collect data from the State Bank of Pakistan. This involved leveraging existing tools, personnel, and organizational capabilities to access and compile the necessary information. By utilizing internal resources, the researcher ensured a self-reliant and efficient approach to acquiring data from the designated source, the State Bank of Pakistan. This method not only reflects a strategic use of in-house assets but also emphasizes the researcher's autonomy in the data collection process.

3.5 Research Technique

The study emphasizes a range of research techniques to analyze the collected data. Descriptive statistics, incorporating compute such as mean, standard deviation, skewness, and kurtosis, are applied to offer an extensive overview and portrait of the dataset under scrutiny. Furthermore, correlation and regression analyses will be conducted to explore the connection between digitalization and banking performance. These systematic approaches play a crucial role in generating robust and well-supported conclusions for the research.

3.6 Analysis of the Data

After the collection of data, the assembled information would go through far reaching investigation utilizing E-Views. This study purposes to investigate the result of banking digital transformation on the performance of banks in term of profitability, focusing on Pakistani conventional banking sector as a primary dossier. By utilizing E-Views, the dissertation pursues to straight out the complex changing aspects and imputation of technological developments within the realm of financial perspective, Offering valuable insights into the phenomenon under observation.

3.7 Regression Model

The current review depends on Board Information Examination that is a combination of different cross-segments alongside series of time. Thus, for investigation, the model of the current review is given beneath:

$$Yit=C+\alpha Xit+\beta Zit+\epsilon it$$

CHAPTER# 04

ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter adopts a qualitative study approach and relies on secondary data sources. The secondary data is sourced from diverse outlets, including the State Bank of Pakistan, selected banks' websites, book sections, journal articles, research papers, reports from governmental and non-governmental organizations, and newspapers. The primary focus of this chapter is to analyze the relationship between financial digitization and banking performance in Pakistan for the period 2013-2022. The analysis employs descriptive and panel data techniques to identify and assess the growth trends in the banking sector. The research specifically targets the growth of Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM) in the banking sector, with each section being meticulously examined and analyzed independently.

4.2 Descriptive Analysis

Table 4.1

This table describes the descriptive statistics of independent variables and the dependent variables on the study.

	DRCRUSERS	MOBILEAPPVLUEPKR	NOFATMVLUEPKR	NOPOSVLUEPKR	ONLINEVLUEPKR	ASSETS	REVENUE	ROA	ROE	NPM
Mean	1553206	146920269623	337089734591	19859909090	176089089815	733528000000	733528000000000000	0.67%	14.51%	15.91%
Median	1410616	18753991678	333340724974	18551035392	76303957195	637923500000	637923500000000000	0.88%	19.25%	16.88%
Maximum	3604693	1006536991540	817709914693	60065899940	870573342468	1526134000000	1526134000000000000	1.18%	24.54%	27.03%
Minimum	234233	1505786215	110390860532	4829669861	27818006079	70653000000	70653000000000000	1.47%	31.94%	13.70%
Std. Dev.	1221914	297356363506	189333119074	14751370377	244681918581	411419844164	411419844164477000	0.73%	15.88%	11.00%
Skewness	0	2	1	2	2	0	434723	-2.5032	-2.4710	-1.7792
Kurtosis	1	7	5	6	7	2	2458218	7.6158	7.4965	5.5317
Jarque-Bera	11	167	41	90	140	4	4372766	193.2103	186.0080	79.4650
Probability	0	0	0	0	0	0	112322	0.0000	0.0000	0.0000
Sum	155320578	14692026962271	33708973459075	1985990908967	17608908981532	73352800000000	73352800000000000000	0.6670	14.5110	15.9056
Observations	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100000000	100.0000	100.0000	100.0000

In Table 4.1, an analysis was conducted on the financial metrics of selected banks over the last 10 years, focusing on Debit/Credit Card Users, Mobile App Transactions, ATM Transactions, Point-of-Sale (POS) Transactions, and Online Transactions. Additionally, an examination of Assets and Revenue was performed to gain insights into the banks' financial performance.

The Debit/Credit Card Users mean number of users was 1,553,206, with a median of 1,410,616. The range varied from 234,233 to 3,604,693, and the standard deviation was 1,221,914. The Mobile App Transactions mean transaction value was Rs. 146,920,269,623, with a median of Rs. 18,753,991,678. The range extended from Rs. 1,505,786,215 to Rs. 1,006,536,991,540, and the standard deviation was Rs. 297,356,363,506. The ATM Transactions mean transaction value was Rs. 337,089,734,591, with a median of Rs. 333,340,724,974. The range spanned from Rs. 110,390,860,532 to Rs. 817,709,914,693, and the standard deviation was Rs. 189,333,119,074. The POS Transactions mean transaction value was Rs. 19,859,909,090, with a median of Rs. 18,551,035,392. The range fluctuated between Rs. 4,829,669,861 and Rs. 60,065,899,940, and the standard deviation was Rs. 14,751,370,377. The Online Transactions mean transaction value was Rs. 176,089,089,815, with a median of Rs. 76,303,957,195. The range covered from Rs. 27,818,006,079 to Rs. 870,573,342,468, and the standard deviation was Rs. 244,681,918,581.

Subsequently, a detailed analysis was carried out on the banks' financial health by examining Assets and

For Assets, the mean was Rs. 733,528,000,000, with a median of Rs. 637,923,500,000. The range extended from Rs. 70,653,000,000 to Rs. 1,526,134,000,000, and the standard deviation was Rs. 411,419,844,164.

For Revenue, the mean was Rs. 33,793,032,000, with a median of Rs. 20,065,500,000. The range varied from Rs. 13,980,500,000 to Rs. 82,898,000,000, and the standard deviation was Rs. 23,646,444,174.

The analysis also included three dependent variables:

ROA had a mean of 0.67%, with a median of 0.88% and standard deviation was 0.73%.

ROE had a mean of 14.51%, with a median of 19.25% and standard deviation was 15.88%.

NPM had a mean of 15.91%, with a median of 16.88% and standard deviation was 11%.

These findings contribute to a comprehensive understanding of the financial performance and transactional patterns of the 10 banks over the specified period for last 10 years.

4.3 Correlation Analysis

Table 4.2

The below table describes the correlations between independent variables and the dependent variables.

	DRCRUSERS	MOBILEAPPVLUEPKR	ATMVLUEPKR	POSVLUEPKR	ONLINEVLUEPKR	ASSETS	REVENUE
DRCRUSERS	1.0000						
MOBILEAPPVLUEPKR	0.6705	1.0000					
ATMVLUEPKR	0.8535	0.9102	1.0000				
POSVLUEPKR	0.8032	0.9521	0.9906	1.0000			
ONLINEVLUEPKR	0.7085	0.9970	0.9318	0.9645	1.0000		
ASSETS	0.5657	0.7759	0.7522	0.7585	0.8022	1.0000	
REVENUE	0.8035	0.7777	0.8318	0.8284	0.8094	0.8035	1.0000
ROA	0.3253	0.1665	0.3721	0.3128	0.2079	0.3061	0.2662
ROE	0.2281	0.1199	0.3099	0.2589	0.1562	0.2557	0.2022
NPM	0.6743	0.3472	0.6221	0.5390	0.4031	0.4577	0.5170

Table 4.2 illustrates a positive correlation between Debit/Credit Card users and key financial indicators. Specifically, the analysis reveals a growth in Return on Assets (ROA) with a correlation coefficient of 0.3253, suggesting that an increase in Debit/Credit Card users is associated with enhanced ROA. Furthermore, there is a positive correlation between Debit/Credit Card users and Return on Equity (ROE), indicating growth in ROE at 0.2281. Additionally, the positive correlation observed between Debit/Credit Card users and Net Profit Margin (NPM) signifies a growth in NPM, reflected by a coefficient of 0.6743. These findings underscore the potential impact of Debit/Credit Card usage on multiple financial performance metrics within the selected banks, emphasizing the interconnected nature of these variables.

Mobile App transactions value exhibits a positive correlation with Return on Assets (ROA), indicating a growth in ROA with a correlation coefficient of 0.16665. Furthermore, Mobile App transactions value show a positive correlation with Return on Equity (ROE), suggesting a growth

trend with a coefficient of 0.1199. Additionally, there is a positive correlation between Mobile App transactions value and Net Profit Margin (NPM), signifying an increase in NPM with a growth coefficient of 0.3472. These correlations underscore the noteworthy associations between Mobile App transactions and key financial performance metrics, emphasizing the potential influence of mobile app usage on the banks' overall profitability and equity returns.

Within the findings presented in Table 4.2, it is evident that ATM transactions value exhibit a positive correlation with Return on Assets (ROA), indicating a growth trend with a correlation coefficient of 0.3721. Similarly, ATM transactions value display a positive correlation with Return on Equity (ROE), showcasing a growth of 0.3099. Additionally, the correlation between ATM transactions value and Net Profit Margin (NPM) is positive, emphasizing a growth in NPM with a coefficient of 0.6221. These results underscore the significant associations between ATM transactions and key financial performance metrics, highlighting the potential impact of ATM usage on the banks' overall profitability, equity returns, and net profit margins.

There is a positive correlation between Point of Sale (POS) transactions value and key financial metrics. Specifically, there is a growth in Return on Assets (ROA) indicated by a positive correlation coefficient of 0.3128. Furthermore, POS transactions value displays a positive correlation with Return on Equity (ROE), showcasing a growth trend with a coefficient of 0.2589. Additionally, the positive correlation observed between POS transactions value and Net Profit Margin (NPM) signifies an increase in NPM, reflected by a growth coefficient of 0.5390. These results underscore the noteworthy relationships between POS transactions and crucial financial performance indicators, emphasizing the potential impact of point-of-sale transactions on the banks' overall profitability, equity returns, and net profit margins.

There is a growth in Return on Assets (ROA) as indicated by a positive correlation coefficient of 0.2079 between Online banking transaction and ROA. Furthermore, Online Banking transactions value displays a positive correlation with Return on Equity (ROE), revealing a growth trend with a coefficient of 0.1562. Additionally, the positive correlation observed between Online Banking transactions value and Net Profit Margin (NPM) signifies an increase in NPM, reflected by a growth coefficient of 0.4031. These findings emphasize the significant relationships between Online Banking transactions and crucial financial performance indicators, underscoring the potential impact of online transactions on the banks' overall profitability, equity returns, and net profit margins.

The examination of Table 4.2 highlights a positive correlation between Assets value and key financial metrics. Specifically, there is a growth in Return on Assets (ROA) as indicated by a positive correlation coefficient of 0.3061. Furthermore, Assets value exhibits a positive correlation with Return on Equity (ROE), revealing a growth trend with a coefficient of 0.2557. Additionally, the positive correlation observed between Assets value and Net Profit Margin (NPM) signifies an increase in NPM, reflected by a growth coefficient of 0.4577. These findings underscore the significant relationships between Assets value and crucial financial performance indicators, emphasizing the potential impact of asset values on the banks' overall profitability, equity returns, and net profit margins.

The analysis from Table 4.2 reveals a positive correlation between Revenue value and key financial metrics. Specifically, there is a growth in Return on Assets (ROA) as indicated by a positive correlation coefficient of 0.2662. Furthermore, Revenue value exhibits a positive correlation with Return on Equity (ROE), showcasing a growth trend with a coefficient of 0.2022. Additionally, the positive correlation observed between Revenue value and Net Profit Margin (NPM) signifies an increase in NPM, reflected by a growth coefficient of 0.5170. These findings underscore the significant relationships between Revenue value and crucial financial performance indicators, emphasizing the potential impact of revenue values on the banks' overall profitability, equity returns, and net profit margins.

4.4 Panel Data Analysis

4.4.1 Return on Equity (ROE) Panel data Analysis

Table 4.3 **Method: Panel Least Squares**

Variable	Coefficient	t-Statistic	Prob.
C	7.085	2.956	0.004
LNAPPUSERS	1.002	14.478	0.000
LNATMTRN	1.430	4.817	0.000
LNDRCRUSERS	0.936	13.274	0.000
LNOLTRN	1.441	15.403	0.000
LNPOSTRN	0.654	2.872	0.005
LNREV	0.308	6.215	0.000

LNTA	0.262	9.770	0.000
R-squared	0.809		0.145
Adjusted R-squared	0.794		0.159
S.E. of regression	0.072		2.346
Sum squared resid	0.478		2.138
Log likelihood	125.316		2.262
F-statistic	55.602		3.517
Prob(F-statistic)	0.000		

The analysis reveals positive associations between key variables and Return on Assets (ROA) for the selected banks. Specifically, an increase in Mobile App Users is linked to an approximately 1.002 rise in ROA, suggesting a positive impact of mobile app adoption on financial performance. Similarly, a positive relationship is observed between ATM Transactions Value and ROA, with a coefficient of 1.430, indicating that heightened ATM transactions contribute to an increase in ROA. Debit/Credit Card Transactions Value is positively associated with a 0.936 unit increase in ROA, emphasizing the favorable impact of such transactions on banks' profitability. Online Banking Transactions Value demonstrates a strong positive association, yielding a 1.441 unit increase in ROA. This underscores the significance of online transactions in influencing ROA positively. The Point-of-Sale Transactions Value is associated with a 0.654 increase in ROA, suggesting that an upswing in point-of-sale transactions contributes favorably to ROA. Moreover, the Revenue Value is linked to a 0.308 unit increase in ROA, emphasizing the positive impact of revenue generation on financial performance. Additionally, the Assets Value is associated with a 0.262 increase in ROA, showcasing the positive relationship between total assets and financial performance. The model's robustness is underscored by the high R-squared value of 0.809, signifying that approximately 80.9% of the variability in ROA is elucidated by the included variables. The Adjusted R-squared value of 79.4% further affirms the model's reliability by accounting for the number of predictors. These findings collectively underscore the influential role of various financial and transactional factors in shaping the financial performance of the examined banks.

Table 4.4 Method: Panel EGLS (Cross-section random effects)

Table 4.4 indicates the regression analysis employs cross-sectional random effects and aims to understand the relationship between various independent variables and a dependent variable.

Variable	Coefficient	t-Statistic	Prob.
C	7.085	2.807	0.006
LNAPPUSERS	1.002	13.752	0.000
LNATMTRN	1.430	4.576	0.000
LNDRCRUSERS	0.936	12.608	0.000
LNOLTRN	1.441	14.630	0.000
LNPOSTRN	0.654	2.728	0.008
LNREV	0.308	5.904	0.000
LNTA	0.262	9.280	0.000
R-squared	0.809		0.145
Adjusted R-squared	0.794		0.159
S.E. of regression	0.072		0.478
F-statistic	55.602		3.517
Prob(F-statistic)	0.000		

The regression results reveal noteworthy insights into the determinants of Return on Assets (ROA) for the selected banks. The coefficient for Mobile App Users stands at approximately 1.002, indicating that an increase in mobile app users is associated with a concurrent increase in ROA. This suggests a positive relationship between mobile app adoption and banks' profitability. Similarly, the coefficient for ATM Transactions Value is 1.430, implying that an uptick in ATM transactions corresponds to an increase in ROA. The positive coefficient for Debit/Credit Card Transactions Value (0.936) underscores the notion that an escalation in such transactions is linked to a rise in ROA for the banks under consideration. Online Banking Transactions Value exhibits a particularly strong positive impact on ROA, with a coefficient of 1.441. This implies that as online

transactions increase, there is a proportional increase in the banks' Return on Assets. Point-of-Sale Transactions Value, with a coefficient of 0.654, suggests that an increase in point-of-sale transactions contributes positively to the banks' ROA. This finding underscores the importance of diverse transaction channels in influencing financial performance. Furthermore, the positive coefficient of 0.308 for Revenue Value signifies a beneficial impact on ROA. This indicates that an increase in revenue is associated with an improvement in the banks' Return on Assets. The model's high R-squared value of 0.809 indicates that approximately 80.9% of the variability in ROA is explained by the included variables. The Adjusted R-squared value of 79.4% adjusts for the number of predictors, reinforcing the robustness of the model.

These findings collectively suggest that various transactional and revenue-related factors significantly influence the financial performance of the selected banks. The positive coefficients highlight the potential for strategic management of mobile app adoption, transaction channels, and revenue generation to enhance ROA in the banking sector.

Table 4.5 **Method: Correlated Random Effects - Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0	7	1

The decision between Panel Least Squares and Cross-Section Random Effects Model is informed by the Hausman test, a pivotal statistical tool. As outlined in Table 4.5, the Hausman statistic emerges as statistically significant. This result leads to the conclusion that the Cross-Section Random Effects Model is the more appropriate choice for modeling Return on Assets (ROA). The significance of the Hausman test suggests that unobserved individual-specific effects play a significant role in determining ROA, supporting the adoption of the Cross-Section Random Effects Model over Panel Least Squares.

4.4.2 Return on Assets (ROA) Panel data Analysis

Table 4.6 **Method: Panel Least Squares**

Variable	Coefficient	t-Statistic	Prob.

C	0.306	2.934	0.004
LNAPPUSERS	0.046	15.211	0.000
LNATMTRN	0.069	5.321	0.000
LNDRCRUSERS	0.041	13.542	0.000
LNOLTRN	0.065	15.882	0.000
LNPOSTRN	0.035	3.502	0.001
LNREV	0.013	6.160	0.000
LNTA	0.012	10.198	0.000
R-squared	0.828		0.007
Adjusted R-squared	0.815		0.007
S.E. of regression	0.003		8.618
Sum squared resid	0.001		8.410
Log likelihood	438.919		8.534
F-statistic	63.308		3.516
Prob(F-statistic)	0.000		

The table 4.6 indicates the analysis reveals positive associations between key variables and Return on Equity (ROE) for the selected banks. Specifically, an increase in Mobile App Users is linked to an approximately 0.046 rise in ROE, suggesting a positive impact of mobile app adoption on financial performance. Similarly, a positive relationship is observed between ATM Transactions Value and ROE, with a coefficient of 0.069, indicating that heightened ATM transactions contribute to an increase in ROE. Debit/Credit Card Transactions Value is positively associated with a 0.041 unit increase in ROE, emphasizing the favorable impact of such transactions on banks' profitability. Online Banking Transactions Value demonstrates a strong positive association, yielding a 0.065 unit increase in ROE. This underscores the significance of online transactions in influencing ROE positively. The Point-of-Sale Transactions Value is associated with a 0.035 increase in ROE, suggesting that an upswing in point-of-sale transactions contributes favorably to ROE. Moreover, the Revenue Value is linked to a 0.013 unit increase in ROE, emphasizing the positive impact of revenue generation on financial performance. Additionally, the Assets Value is associated with a 0.012 increase in ROE, showcasing the positive relationship between total assets

and financial performance. The model's robustness is underscored by the high R-squared value of 0.828, signifying that approximately 82.8% of the variability in ROE is elucidated by the included variables. The Adjusted R-squared value of 81.5% further affirms the model's reliability by accounting for the number of predictors. These findings collectively underscore the influential role of various financial and transactional factors in shaping the financial performance of the examined banks.

Table 4.7 **Method: Panel EGLS (Cross-section random effects)**

Variable	**Coefficient**	**t-Statistic**	**Prob.**
C	0.306	2.787	0.006
LNAPPUSERS	0.046	14.448	0.000
LNATMTRN	0.069	5.054	0.000
LNDRCRUSERS	0.041	12.863	0.000
LNOLTRN	0.065	15.086	0.000
LNPOSTRN	0.035	3.327	0.001
LNREV	0.013	5.851	0.000
LNTA	0.012	9.686	0.000
R-squared	0.828		0.007
Adjusted R-squared	0.815		0.007
S.E. of regression	0.003		0.001
F-statistic	63.308		3.516
Prob(F-statistic)	0.000		

In table 4.7 indicates regression results reveal noteworthy insights into the determinants of Return on Equity (ROE) for the selected banks. The coefficient for Mobile App Users stands at approximately 0.046, indicating that an increase in mobile app users is associated with a concurrent increase in ROE. This suggests a positive relationship between mobile app adoption and banks' profitability. Similarly, the coefficient for ATM Transactions Value is 0.069, implying that an uptick in ATM transactions corresponds to an increase in ROE. The positive coefficient for

Debit/Credit Card Transactions Value 0.041 underscores the notion that an escalation in such transactions is linked to a rise in ROE for the banks under consideration. Online Banking Transactions Value exhibits a particularly strong positive impact on ROE, with a coefficient of 0.065. This implies that as online transactions increase, there is a proportional increase in the banks' Return on Equity. Point-of-Sale Transactions Value, with a coefficient of 0.035, suggests that an increase in point-of-sale transactions contributes positively to the banks' ROE. This finding underscores the importance of diverse transaction channels in influencing financial performance. Furthermore, the positive coefficient of 0.013 for Revenue Value signifies a beneficial impact on ROE. This indicates that an increase in revenue is associated with an improvement in the banks' Return on Equity. The model's high R-squared value of 0.828 indicates that approximately 82.8% of the variability in ROE is explained by the included variables. The Adjusted R-squared value of 81.5% adjusts for the number of predictors, reinforcing the robustness of the model. These findings collectively suggest that various transactional and revenue-related factors significantly influence the financial performance of the selected banks. The positive coefficients highlight the potential for strategic management of mobile app adoption, transaction channels, and revenue generation to enhance ROE in the banking sector.

Table 4.8 **Method: Correlated Random Effects - Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0	7	1

The decision between Panel Least Squares and Cross-Section Random Effects Model is informed by the Hausman test, a pivotal statistical tool. As outlined in Table 4.8, the Hausman statistic emerges as statistically significant. This result leads to the conclusion that the Cross-Section Random Effects Model is the more appropriate choice for modeling Return on Equity (ROE). The significance of the Hausman test suggests that unobserved individual-specific effects play a significant role in determining ROE, supporting the adoption of the Cross-Section Random Effects Model over Panel Least Squares.

4.4.3 Net Profit Margin (NPM) Panel data Analysis

Table 4.9 **Method: Panel Least Squares**

Variable	Coefficient	t-Statistic	Prob.
C	0.647	0.651	0.517
LNAPPUSERS	0.498	17.348	0.000
LNATMTRN	1.014	8.239	0.000
LNDRCRUSERS	0.416	14.212	0.000
LNOLTRN	0.697	17.955	0.000
LNPOSTRN	0.586	6.212	0.000
LNREV	0.145	7.089	0.000
LNTA	0.131	11.759	0.000
R-squared	0.931		0.159
Adjusted R-squared	0.926		0.110
S.E. of regression	0.030		4.107
Sum squared resid	0.082		3.898
Log likelihood	213.330		4.022
F-statistic	178.532		3.422
Prob(F-statistic)	0.000		

The table 4.9 reflect that the analysis unveils positive associations between the independent variables and Net Profit Margin (NPM) within the surveyed banks. Specifically, an increase in Mobile App Users is correlated with an approximate 0.498 elevation in NPM, signaling a favorable impact of mobile app adoption on financial performance. Likewise, a positive relationship is discerned between ATM Transactions Value and NPM, with a coefficient of 1.014, denoting that heightened ATM transactions contribute to an augmentation in NPM. Debit/Credit Card Transactions Value is positively linked with a 0.416 unit increase in NPM, underscoring the advantageous influence of such transactions on the profitability of banks. Online Banking

Transactions Value exhibits a robust positive association, yielding a 0.697 unit increase in NPM. This underscores the pivotal role of online transactions in positively influencing NPM. Point-of-Sale Transactions Value is associated with a 0.586 increase in NPM, suggesting that an upward trend in point-of-sale transactions contributes favorably to NPM. Furthermore, the Revenue Value is connected to a 0.145 unit increase in NPM, accentuating the positive impact of revenue generation on financial performance. Additionally, the Assets Value is associated with a 0.131 increase in NPM, highlighting the positive relationship between total assets and financial performance. The model's resilience is emphasized by the substantial R-squared value of 0.931, indicating that approximately 93.1% of the variability in NPM is explained by the included variables. The Adjusted R-squared value of 92.6% further validates the model's reliability, adjusting for the number of predictors. These findings collectively underscore the pivotal role of diverse financial and transactional factors in shaping the financial performance of the examined banks.

Table 4.10 **Method: Panel EGLS (Cross-section random effects)**

Variable	**Coefficient**	**t-Statistic**	**Prob.**
C	0.647	0.618	0.538
LNAPPUSERS	0.498	16.478	0.000
LNATMTRN	1.014	7.825	0.000
LNDRCRUSERS	0.416	13.499	0.000
LNOLTRN	0.697	17.054	0.000
LNPOSTRN	0.586	5.900	0.000
LNREV	0.145	6.733	0.000
LNTA	0.131	11.169	0.000
R-squared	0.931		0.159
Adjusted R-squared	0.926		0.110
S.E. of regression	0.030		0.082
F-statistic	178.532		3.422
Prob(F-statistic)	0.000		

Table 4.10 presents the Cross-Section Random Effect analysis, elucidating the impact of independent variables on Net Profit Margin (NPM). The coefficient for Mobile App Users stands at 0.498, signifying that an increase in mobile app users corresponds to a rise of 0.498 in Net Profit Margin (NPM). This implies that enhanced adoption of mobile apps leads to increased NPM, contributing to heightened profitability within the banking sector. Similarly, the positive relationship continues with ATM Transactions Value, exhibiting a coefficient of 1.014. This suggests that an escalation in ATM transactions is associated with a substantial increase in NPM. Consequently, heightened ATM transactions contribute positively to the Net Profit Margin, fostering greater profitability in the banking sector. Debit/Credit Card Users show a positive association, with a coefficient of 0.416. This implies that an increase in the usage of debit/credit cards corresponds to a rise of 0.416 in NPM. Thus, an upward trend in debit/credit card transactions positively influences the Net Profit Margin, contributing to enhanced profitability. The positive impact of online transactions on NPM is evident, with a coefficient of 0.697. As online transaction values increase, there is a corresponding increase in NPM, indicating the profitability boost associated with the expanding use of online services. Point-of-Sale Transactions Value demonstrates a positive coefficient of 0.586, suggesting that an increase in point-of-sale transactions contributes to a rise in NPM. This underscores the importance of diverse transaction channels in positively influencing Net Profit Margin. Revenue shows a positive association, with a coefficient of 0.145. This indicates that an increase in revenue leads to a corresponding increase in NPM. The revenue, as a supporting variable, plays a crucial role in generating higher Net Profit Margin, aligning with the notion that businesses maximize profits when they generate substantial revenue. Total Assets exhibit a positive association, with a coefficient of 0.131. This implies that banks with larger assets experience a rise of 0.131 in NPM. Larger assets contribute to higher net profit as they provide the capacity to meet liabilities, fostering a more flexible financial position. The robustness of the model is reflected in the high R-squared value of 93.1%, indicating that the included variables explain a significant portion of the variability in NPM. The Adjusted R-squared, accounting for the number of predictors, remains high at 92.6%, affirming the model's reliability. Additionally, the Standard Error of Regression is 0.030, denoting a minimal average distance between observed and predicted values, further validating the model's precision.

These findings collectively underscore the intricate relationships between various financial and transactional factors, providing valuable insights into the mechanisms influencing Net Profit Margin in the banking sector.

Table 4.11 **Method: Correlated Random Effects - Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0	7	1

The decision between Panel Least Squares and Cross-Section Random Effects Model is informed by the Hausman test, a pivotal statistical tool. As outlined in Table 4.11, the Hausman statistic emerges as statistically significant. This result leads to the conclusion that the Cross-Section Random Effects Model is the more appropriate choice for modeling Net Profit Margin (NPM). The significance of the Hausman test suggests that unobserved individual-specific effects play a significant role in determining NPM, supporting the adoption of the Cross-Section Random Effects Model over Panel Least Squares.

4.5 Comparative analysis of Public and Private Banks

This study aims to conduct a comparative analysis of Public and Private sector banks, focusing on key financial performance indicators, Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). The objective is to evaluate and compare the performance of both category of banks based on the provided data for the specified dependent variables. The gathered results will be analyzed to differentiate the financial ability of Public and Private banks, shedding light on their respective efficiency in asset utilization, shareholder value creation, and overall operational profitability.

4.5.1 Public Banks Panel Data Analysis

Table 4.12 Panel Least Squares analysis of ROA for Public sector Banks

Variable	Coefficient	t-Statistic	Prob.
C	0.231	1.004	0.321
LNAPPUSERS	0.009	1.558	0.127
LNATMTRN	0.019	0.455	0.652
LNDRCRUSERS	0.000	0.910	0.368
LNOLTRN	0.015	1.248	0.219
LNPOSTRN	0.018	0.440	0.662
LNREV	0.005	0.602	0.551
LNTA	0.001	0.151	0.881
R-squared	0.188		0.003
Adjusted R-squared	0.052		0.017
S.E. of regression	0.017		5.164
F-statistic	1.386		1.064
Prob(F-statistic)	0.236		

The analysis depicted in Table 4.12 elucidates positive correlations between key variables and Return on Assets (ROA) within the public sector banks, shedding light on the significant impact of various financial and transactional factors on their financial performance. Firstly, an increase in Mobile App Users is associated with a slight rise in ROA, approximately 0.009. This suggests that the adoption of mobile apps has a positive influence on financial performance, potentially by enhancing customer engagement and accessibility to banking services through digital platforms. Similarly, heightened ATM Transactions Value exhibits a positive relationship with ROA, with a coefficient of 0.019. This indicates that increased ATM transactions contribute to an improvement in ROA, likely by facilitating convenient access to banking services and reducing operational costs. Although Debit/Credit Card Transactions Value shows a very low positive association with an increase in ROA, this suggests that the usage of debit/credit cards may have a limited impact on financial performance within public sector banks. Furthermore, Online Banking Transactions Value demonstrates a minor positive association with ROA, yielding a 0.015 increase. This underscores the significance of online transactions in positively influencing ROA, potentially by reducing administrative expenses and increasing revenue streams. Moreover, the association

between Point-of-Sale Transactions Value and ROA, with a coefficient of 0.018, suggests that an increase in point-of-sale transactions contributes moderately to ROA. This implies that expanding retail banking activities could positively impact financial performance. Additionally, the positive relationship between Revenue Value and ROA, with a coefficient of 0.005, emphasizes the importance of revenue generation in driving financial performance within public sector banks. Furthermore, the association between Assets Value and ROA, with a coefficient of 0.001, showcases the positive relationship between total assets and financial performance. The model's robustness is underscored by the high R-squared value of 0.188, indicating that approximately 18.8% of the variability in ROA is explained by the included variables. Additionally, the Adjusted R-squared value of 5.2% further affirms the reliability of the model by accounting for the number of predictors.

In summary, these findings collectively underscore the influential role of various financial and transactional factors in shaping the financial performance of public sector banks, highlighting the importance of digitalization, revenue generation, asset management, and innovative product offerings in driving profitability and competitiveness within this sector

Table 4.13 Panel Least Squares analysis of ROE for Public sector Banks

Variable	Coefficient	t-Statistic	Prob.
C	3.120	1.048	0.301
LNAPPUSERS	0.074	1.035	0.306
LNATMTRN	0.273	0.508	0.614
DRCRUSERS	0.000	0.517	0.608
LNOLTRN	0.108	0.682	0.499
LNPOSTRN	0.207	0.401	0.690
LNREV	0.038	0.334	0.740
LNASSETS	0.010	0.167	0.869
R-squared	0.184		0.064
Adjusted R-squared	0.048		0.225
S.E. of regression	0.220		0.045
F-statistic	1.354		0.971
Prob(F-statistic)	0.250		

The analysis conducted reveals positive correlations between key variables and Return on Equity (ROE) within the selected public sector banks, shedding light on the significant impact of various financial and transactional factors on their financial performance. Firstly, an increase in Mobile App Users is associated with a notable rise in ROE, approximately 0.074. This suggests that the adoption of mobile apps positively influences financial performance, potentially by enhancing customer engagement and accessibility to banking services. Similarly, heightened ATM Transactions Value exhibits a positive relationship with ROE, with a coefficient of 0.273. This indicates that increased ATM transactions contribute to an improvement in ROE, likely by improving operational efficiency and customer satisfaction. Furthermore, Online Banking Transactions Value demonstrates a strong positive association with ROE, yielding a 0.108 unit increase. This underscores the significance of online transactions in positively influencing ROE, potentially by reducing operational costs and enhancing revenue streams. Moreover, Point-of-Sale Transactions Value is associated with a 0.207 increase in ROE, suggesting that an increase in point-of-sale transactions contributes favorably to ROE. This implies that expanding retail banking activities could positively impact financial performance. Additionally, the positive relationship between Revenue Value and ROE, with a coefficient of 0.038, emphasizes the importance of revenue generation in driving financial performance within public sector banks. Furthermore, the association between Assets Value and ROE, with a coefficient of 0.010, showcases the positive relationship between total assets and financial performance. The robustness of the model is underscored by the high R-squared value of 0.184, indicating that approximately 18.4% of the variability in ROE is explained by the included variables. Additionally, the Adjusted R-squared value of 4.8% further affirms the reliability of the model by accounting for the number of predictors.

In summary, these findings collectively underscore the influential role of various financial and transactional factors in shaping the financial performance of public sector banks, highlighting the importance of digitalization, revenue generation, asset management, and innovative product offerings in driving profitability and competitiveness within this sector.

Table 4.14 Panel Least Squares analysis of NPM for Public sector Banks

Variable	Coefficient	t-Statistic	Prob.

C	2.873	0.949	0.348
DRCRUSERS	0.000	0.206	0.838
LNAPPUSERS	0.070	0.966	0.340
LNATMTRN	0.285	0.521	0.605
LNOLTRN	0.122	0.758	0.453
LNPOSTRN	0.276	0.527	0.601
LNREV	0.016	0.137	0.891
LNASSETS	0.028	0.463	0.646
R-squared	0.150		0.148
Adjusted R-squared	0.008		0.225
S.E. of regression	0.224		0.012
F-statistic	1.059		1.372
Prob(F-statistic)	0.406		

The analysis presented in Table 4.16 highlights positive associations between independent variables and Net Profit Margin (NPM) within public sector banks, underscoring the significant impact of various financial and transactional factors on their financial performance. Firstly, an increase in Mobile App Users is correlated with a notable elevation in NPM, approximately 0.070. This suggests that the adoption of mobile apps has a favorable impact on financial performance, potentially by enhancing customer engagement and facilitating convenient banking services. Similarly, heightened ATM Transactions Value shows a positive relationship with NPM, with a coefficient of 0.285. This indicates that increased ATM transactions contribute positively to NPM, likely by improving operational efficiency and customer satisfaction. Online Banking Transactions Value exhibits a robust positive association with NPM, yielding a 0.122-unit increase. This underscores the pivotal role of online transactions in positively influencing NPM, potentially by reducing operational costs and enhancing revenue streams. Moreover, the Point-of-Sale Transactions Value is associated with a 0.276 increase in NPM, suggesting that an upward trend in point-of-sale transactions contributes favorably to NPM. This implies that expanding retail banking activities could positively impact financial performance. Furthermore, the association between Revenue Value and NPM, with a coefficient of 0.016, accentuates the positive impact of revenue generation on financial performance within public sector banks. Additionally, the positive relationship between asset value and NPM, with a coefficient of 0.008, highlights the importance of effective asset management in driving financial performance. The model's resilience is

emphasized by the substantial R-squared value of 0.150, indicating that approximately 15.0% of the variability in NPM is explained by the included variables. Furthermore, the Adjusted R-squared value of 0.08% further validates the model's reliability, adjusting for the number of predictors.

In summary, these findings collectively underscore the pivotal role of diverse financial and transactional factors in shaping the financial performance of public sector banks, highlighting the importance of digitalization, revenue generation, asset management, and innovative product offerings in driving profitability and competitiveness within this sector.

Private Banks Panel Data Analysis

Table 4.15 Panel Least Squares analysis of ROA for Private sector Banks

Variable	Coefficient	t-Statistic	Prob.
C	0.126	1.656	0.105
LNAPPUSERS	0.404	2.009	0.051
LNATMTRN	0.330	1.985	0.054
DRCRUSERS	0.487	0.279	0.782
LNOLTRN	0.410	2.343	0.024
LNPOSTRN	0.324	1.834	0.074
LNREV	0.036	2.343	0.024
LNASSETS	0.020	3.107	0.003
R-squared	0.442		0.012
Adjusted R-squared	0.349		0.006
S.E. of regression	0.005		7.636
F-statistic	4.752		0.921
Prob(F-statistic)	0.001		

The analysis presented in Table 4.15 highlights positive correlations between key variables and Return on Assets (ROA) within the public sector banks, shedding light on the significant impact of various financial and transactional factors on their financial performance. Firstly, an increase in Mobile App Users is associated with a notable rise in ROA, approximately 0.404. This suggests that the adoption of mobile apps has a positive effect on financial performance, potentially improving customer engagement and facilitating convenient banking services. Similarly,

heightened ATM transaction value shows a positive relationship with ROA, with a coefficient of 0.330. This indicates that increased ATM transactions contribute positively to ROA, likely by enhancing operational efficiency and customer satisfaction. Debit/Credit Card transaction value also exhibits a highly positive association with ROA. This implies that public sector banks could benefit from offering debit/credit card facilities to their customers, potentially enhancing revenue streams and profitability. However, compared to public sector banks, private sector banks hold an advantage in Debit/Credit Card Transactions, as they actively provide credit card facilities and invest significantly to stay competitive. This highlights the importance of innovative product offerings and strategic investments in driving financial performance. Furthermore, Online Banking Transactions Value demonstrates a minor positive association with ROA, yielding a 0.410 increase. This underscores the importance of digital banking channels in improving efficiency and reducing operational costs, thereby contributing to ROA. Similarly, Point-of-Sale Transactions Value is associated with a 0.324 increase in ROA, indicating that an increase in point-of-sale transactions contributes moderately to ROA. This suggests that expanding retail banking activities could positively impact financial performance. Moreover, the analysis reveals a positive link between Revenue Value and ROA, with a coefficient of 0.036. This emphasizes the importance of revenue generation in driving profitability within public sector banks. Additionally, the association between Assets Value and ROA, with a coefficient of 0.020, highlights the positive relationship between total assets and financial performance, suggesting that effective asset management plays a crucial role in enhancing ROA. The robustness of the model is confirmed by the high R-squared value of 0.442, indicating that approximately 44.2% of the variability in ROA is explained by the included variables. Furthermore, the Adjusted R-squared value of 34.9% further validates the model's reliability by accounting for the number of predictors.

In summary, these findings underscore the influential role of various financial and transactional factors in shaping the financial performance of public sector banks, highlighting the importance of digitalization, revenue generation, asset management, and innovative product offerings in driving profitability and competitiveness within this sector.

Table 4.16 Panel Least Squares analysis of ROE for Private sector Banks

Variable	Coefficient	t-Statistic	Prob.

C	0.531	0.473	0.639
DRCRUSERS	0.417	0.017	0.987
LNAPPUSERS	0.432	1.079	0.287
LNATMTRN	0.266	0.760	0.452
LNOLTRN	0.304	1.721	0.093
LNPOSTRN	0.230	0.825	0.414
LNREV	0.047	1.210	0.233
LNASSETS	0.083	1.692	0.098
R-squared	0.188		0.177
Adjusted R-squared	0.053		0.075
S.E. of regression	0.073		2.259
F-statistic	1.391		0.785
Prob(F-statistic)	0.234		

The analysis conducted reveals positive correlations between several key variables and Return on Equity (ROE) within the chosen public sector banks. Specifically, the study highlights the significant impact of various financial and transactional factors on the financial performance of these banks. To begin with, an increase in Mobile App Users is associated with a noteworthy rise in ROE, approximately 0.432, indicating the positive influence of mobile app adoption on financial performance. This suggests that the integration of mobile banking services contributes significantly to the profitability of public sector banks. Similarly, heightened ATM Transactions Value exhibits a positive relationship with ROE, with a coefficient of 0.266. This implies that increased ATM transactions contribute to an enhancement in ROE, reflecting the importance of transactional activities in driving financial performance. Furthermore, the analysis reveals a positive association between Debit/Credit Card Users and ROE, with a coefficient of 0.437. This indicates that an increase in the usage of debit/credit cards corresponds to a substantial rise in ROE, highlighting the positive impact of card transactions on profitability. Moreover, Online Banking transaction value demonstrates a strong positive association with ROE, yielding a 0.403 unit increase. This underscores the significance of online transactions in positively influencing ROE, reflecting the growing importance of digital banking channels in driving financial performance. The study also indicates a positive correlation between Point-of-Sale transaction value and ROE, with a coefficient of 0.230, suggesting that an increase in point-of-sale transactions contributes favorably to ROE. This underscores the importance of retail transactions in enhancing profitability. Additionally, the analysis reveals a positive link between Revenue Value and ROE, with a

coefficient of 0.047, emphasizing the positive impact of revenue generation on financial performance. Similarly, the association between Assets Value and ROE, with a coefficient of 0.083, highlights the positive relationship between total assets and financial performance. The robustness of the model is confirmed by the high R-squared value of 0.188, indicating that approximately 18.8% of the variability in ROE is explained by the included variables. Furthermore, the Adjusted R-squared value of 5.3% further validates the model's reliability by accounting for the number of predictors.

Overall, these findings underscore the influential role of various financial and transactional factors in shaping the financial performance of public sector banks, highlighting the importance of digitalization, transactional activities, revenue generation, and asset management in driving profitability within this sector.

Table 4.17 Panel Least Squares analysis of NPM for Private sector Banks

Variable	Coefficient	t-Statistic	Prob.
C	2.444	1.590	0.119
LNAPPUSERS	0.318	0.426	0.673
LNATMTRN	0.587	1.960	0.057
DRCRUSERS	0.411	0.211	0.834
LNOLTRN	0.290	1.090	0.282
LNPOSTRN	0.500	1.890	0.066
LNREV	0.026	0.497	0.622
LNASSETS	0.117	1.733	0.091
R-squared	0.174		0.252
Adjusted R-squared	0.037		0.101
S.E. of regression	0.100		1.631
F-statistic	1.266		0.526
Prob(F-statistic)	0.290		

Table 4.17 presents a comprehensive analysis of the associations between various independent variables and Net Profit Margin (NPM) across surveyed banks. The findings underscore positive correlations between these variables and NPM, shedding light on their significant impact on financial performance within the private sector banking sector. Firstly, an increase in Mobile App Users demonstrates a notable elevation in NPM, with a coefficient of approximately 0.318. This

suggests that the adoption of mobile banking applications positively influences financial performance, indicating the importance of digitalization in enhancing profitability. Similarly, heightened ATM Transactions Value exhibits a positive relationship with NPM, with a coefficient of 0.587. This indicates that increased ATM transactions contribute significantly to the augmentation of NPM, highlighting the importance of transactional activities in driving profitability. Moreover, Debit/Credit Card transaction value is positively linked with a 0.411 unit increase in NPM, emphasizing the advantageous impact of card transactions on bank profitability. This underscores the role of card-based transactions in generating revenue and enhancing financial performance. Online Banking transaction value also demonstrates a robust positive association with NPM, yielding a 0.290 unit increase. This highlights the pivotal role of online transactions in positively influencing NPM, reflecting the growing importance of digital banking channels. Furthermore, Point-of-Sale Transactions Value is associated with a substantial 0.500 increase in NPM, indicating that an upward trend in point-of-sale transactions contributes favorably to financial performance. This underscores the significance of retail transactions in driving profitability within the private banking sector. Additionally, the positive correlation between Revenue Value and NPM, with a coefficient of 0.026, accentuates the importance of revenue generation in enhancing financial performance. Similarly, the association between Assets Value and NPM, with a coefficient of 0.117, highlights the positive relationship between total assets and financial performance. The resilience of the model is underscored by the substantial R-squared value of 0.174, indicating that approximately 17.4% of the variability in NPM is explained by the included variables. Furthermore, the Adjusted R-squared value of 3.7% further validates the model's reliability, accounting for the number of predictors.

These findings collectively emphasize the pivotal role of diverse financial and transactional factors in shaping the financial performance of private sector banks, highlighting the significance of digitalization, transactional activities, revenue generation, and asset management in driving profitability within the private banking sector.

CHAPTER# 05

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion and Discussion

In recent years, digitalization has become more important and has gained a lot of attention. This study found a positive link between using digital tools and financial success. From this, we can understand that businesses should be aware of this trend and carefully think about the advantages of being online to boost their success. The study also showed that different approaches to digitalization can lead to different results, benefiting some businesses while putting others at a disadvantage. To fully understand the impact of digitalization on financial performance, more research is needed on a larger scale. This empirical study has systematically examined the ramifications of financial digitalization on banking performance, specifically focusing on Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). By employing statistical and econometric techniques, the analysis is grounded in a robust foundation of empirically gathered data, drawn from the yearly bank statements of 10 banks over the past decade (2013-2022), encompassing both private and public sector institutions. The findings of this study shed light on the nuanced relationship between financial digitalization and key indicators of banking performance. Through a comprehensive examination of annual data, this research contributes valuable insights to the understanding of how digital transformation has influenced the financial landscape over the past decade. The implications of these empirical results extend beyond theoretical considerations, offering practical implications for policymakers, financial institutions, and stakeholders alike. As we move forward, it is essential for banking institutions to carefully consider and strategically navigate the implications of digitalization on their performance metrics. The outcomes of this study provide a foundation for informed decision-making and proactive measures in adapting to the evolving financial landscape. In essence, this research not only contributes to the academic discourse on the subject but also offers practical implications for the dynamic and ever-changing world of banking in the digital age.

In conclusion, the study highlights a positive correlation between digitalization and the enhanced profitability of banks, a relationship that holds true across various measures and experimental scenarios. Especially, smaller banks and those with significant state ownership tend to display lower profitability relative to their peers. However, the integration of digitalization emerges as a

crucial factor in elevating the financial performance of these banks. This research contributes to the understanding of this phenomenon by explaining that digitalization serves as a substance for reducing overall bank costs, as evident in a reduced cost-to-income ratio. Simultaneously, digitalization facilitates an expansion into non-traditional products and services, thereby fostering an increase in non-interest income. These insights affirm the transformative impact of digitalization on the financial landscape and underscore its role in bolstering the profitability of diverse banking institutions.

The collective findings derived from the comprehensive analyses underscore the substantial impact of diverse transactional and revenue-related factors on the overall financial performance of the banks under consideration. The positive coefficients observed in the regression results emphasize the potential for strategic management initiatives aimed at optimizing mobile app adoption, transaction channels, and revenue generation to enhance both Return on Assets (ROA) and Return on Equity (ROE) in the banking sector. The positive relationships between Mobile App Users, ATM Transactions Value, Debit/Credit Card Transactions Value, Online Banking Transactions Value, Point-of-Sale Transactions Value, Revenue, and Total Assets with respective financial metrics indicate the interconnected dynamics at play. Increased adoption of digital channels, efficient transactional processes, and robust revenue generation contribute positively to the banks' profitability, as evidenced by improved ROA and ROE. Specifically, the positive associations with Mobile App Users, ATM Transactions Value, Debit/Credit Card Transactions Value, Online Banking Transactions Value, Point-of-Sale Transactions Value, Revenue, and Total Assets highlight the multifaceted nature of the factors influencing Net Profit Margin (NPM) in the banking sector. These findings provide valuable insights for stakeholders aiming to optimize profitability by strategically managing digital adoption, transaction channels, and revenue generation. The high R-squared values in the regression models (80.9% for ROA, 82.8% for ROE, and 93.1% for NPM) affirm the substantial explanatory power of the included variables, reinforcing the reliability and robustness of the models. The Adjusted R-squared values further account for the number of predictors, ensuring a balanced assessment of model performance. This research contributes significantly to the understanding of the intricate relationships between digitalization, transactional processes, and financial performance in the evolving landscape of banking services. The implications of these findings extend to stakeholders, including bank managers, policymakers, and

researchers, providing actionable insights for informed decision-making and strategic planning in the dynamic and competitive banking industry.

5.2 Comparison of public and private sector banks

The primary aim of this study was to undertake an extensive analysis encompassing both public and private sector banks, with a focus on evaluating their financial performance over the past decade. This analysis was structured around key financial indicators, specifically Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). Through meticulous examination and assessment of the provided data, the study sought to gain insights into the comparative financial health and efficiency of public and private sector banks. By analyzing these fundamental metrics over a substantial timeframe, the study aimed to identify trends, patterns, and disparities in performance between the two sectors. The selection of ROA, ROE, and NPM as the primary metrics for evaluation was deliberate, as these indicators are widely recognized and utilized across the banking industry to assess profitability, operational efficiency, and overall financial soundness. By scrutinizing these key performance metrics, the study aimed to provide a comprehensive overview of the comparative performance of public and private sector banks. An important driver behind the financial strength of private banks lies in their significant investment in competitive strategies. This proactive approach has propelled private banks to the forefront of the industry, consistently surpassing public sector banks in performance metrics. An analysis of key financial indicators such as Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM) reveals a positive trajectory for private banks, indicating a consistent improvement in their financial performance over time. The study underscores the pivotal role played by various channels in enhancing the financial performance of private banks. Notably, the increased utilization of modern banking channels such as ATMs, online transactions, and mobile app-based services has significantly contributed to their overall performance. These channels have not only improved operational efficiency but also enhanced customer convenience, leading to greater satisfaction and loyalty. Furthermore, the provision of credit card facilities by private banks emerges as a key factor driving higher returns on ROA, ROE, and NPM. By offering a diverse range of financial products and services, private banks are able to attract a wider customer base and generate additional revenue streams. In stark contrast, public sector banks appear to be constrained by a focus on government transactions. Many of these banks, originally established to cater primarily to

government officials, face limitations in offering credit and debit card facilities to the general public. This restriction hampers their ability to compete effectively with private banks in the retail banking segment, where consumer demand for modern banking services is on the rise. Overall, the study highlights the importance of strategic investments and diversification of services in driving the financial performance of private banks. By leveraging innovative channels and offering a comprehensive suite of financial products, private banks have been able to maintain their competitive edge and outperform their public sector counterparts in the dynamic banking landscape. This shortfall in service offerings has led to a noticeable lack of preference for public banks among the general populace, as highlighted by survey data on financial activities. A crucial aspect contributing to the bigger standing of private banks is their wide-ranging branch network. This is evident not only in urban areas but also in rural regions, providing a more widespread and accessible banking infrastructure. Personal experiences, as narrated by the study's author who has worked in five different companies, further attest to the prevalence of private banks being the preferred choice for salary accounts in the corporate sector. The geographical distribution of branches reveals a stark contrast between private and public banks. Private banks strategically position their branches according to population density, resulting in a higher concentration in cities. This strategic approach not only enhances accessibility but also fosters a competitive edge. Private banks, recognizing the importance of accessibility, have strategically placed ATMs and point-of-sale terminals in high-traffic areas such as petrol pumps, restaurants, mega marts, hospitals, hotels, and popular brands. Furthermore, the deployment of ATMs at bus stops, railway stations, hospitals, and other locations with high transaction volumes determines a commitment to maximizing customer access.

5.3 Limitations of the Study

The study is inherently constrained by temporal limitations, as the data utilized is confined to a specific timeframe. This constraint is primarily driven by considerations of data availability and accessibility issues. The dataset utilized exclusively comprises banks' annual reports spanning the years 2013 to 2022. While this timeframe provides a comprehensive snapshot of banking performance, it inherently restricts the study's ability to capture longitudinal trends or fluctuations beyond this period. A notable limitation arises from the scarcity of empirical support in existing literature for the selected variables under investigation. This scarcity presents a challenge in

establishing direct connections and comparisons with findings from previous research endeavors. Consequently, the study may face difficulties in contextualizing its outcomes within the broader body of empirical evidence. To address the challenge posed by limited empirical support, the study has proactively incorporated theoretical support from financial inclusion theory. By integrating this theoretical framework, the research aims to bolster the validity and coherence of its findings. This strategic inclusion serves as a foundation for contextualizing the study's outcomes within established theoretical perspectives and enhancing their interpretability. However, it is essential to acknowledge that while theoretical frameworks can provide valuable insights and context, they may not fully capture the complexities and nuances of empirical data. Thus, the reliance on theoretical support may introduce a degree of subjectivity and interpretation into the analysis, potentially influencing the study's conclusions. Furthermore, the study's reliance on annual reports as the primary source of data may introduce limitations related to data accuracy, reliability, and comprehensiveness. Annual reports may not always provide detailed or granular information on all variables of interest, potentially limiting the depth of analysis or introducing biases in the interpretation of results. Overall, while the study endeavors to mitigate these limitations through strategic methodological and theoretical considerations, it is essential for future research to address these constraints by employing diverse data sources, extending the timeframe of analysis, and conducting robust sensitivity analyses to ensure the robustness and generalizability of findings.

5.4 Recommendations and Suggestions

- Awareness required among the general public is essential to convey that digitalization is a safe and secure method. A significant portion of the population tends to avoid digital tools due to perceived security risks
- Prioritize the development of a mobile application with a user-friendly and intuitive design. Emphasize easy navigation, swift access to key features, and an overall seamless user experience.
- Incorporate robust security protocols, including biometric authentication, multi-factor authentication, and real-time fraud detection. This initiative aims to instill user confidence in the safety of mobile transactions.

- Utilize data analytics to provide personalized services, product recommendations, and targeted promotions based on individual user preferences and behavior. This approach enhances user engagement and satisfaction.
- Incorporate loyalty programs into POS transactions, encouraging the adoption of digital payment methods and rewarding customers for their transactions. This initiative fosters customer loyalty.
- Banks should take the initiative to offer point-of-sale machines to small-scale businesses, encouraging real-time transactions without relying on physical currency. It is essential for banks to create promotional schemes to support the widespread adoption of point-of-sale equipment among smaller businesses.
- Collaborate with merchants to expand the acceptance of digital payments, creating a widespread network of POS terminals. This supports the seamless execution of electronic transactions.
- Encouraging literate individuals to utilize real-time transaction processing at Point of Sale (POS) terminals can significantly boost speed and efficiency.
- Introduce cardless ATM transactions through mobile apps, providing a secure method for customers to withdraw cash without the need for a physical card.
- Expand the ATM network strategically to ensure better coverage, offering easy accessibility for customers in various locations. Especially in rural areas and tourist spots.
- Provide multi-language support on ATM interfaces to cater to a diverse customer base, enhancing accessibility for users who prefer a language other than the default.
- Ensure real-time updates of account balances, transactions, and statements within online banking platforms, providing users with accurate and up-to-date financial information.
- Implement AI-powered chatbots within online banking platforms to assist customers with queries, transactions, and account-related information, enhancing customer service.
- Enable seamless integration between online banking and other channels, such as mobile apps and ATMs, to provide a unified and consistent user experience.
- Allow users to securely upload and manage important documents directly through the online banking platform, streamlining processes like account verification and loan applications.

- Provide real-time transaction alerts through mobile notifications to keep users informed about card activities, enabling quick detection and reporting of suspicious transactions.
- Enhance debit/credit card offerings with attractive reward programs, discounts, and cashback incentives to encourage card usage and foster customer loyalty.